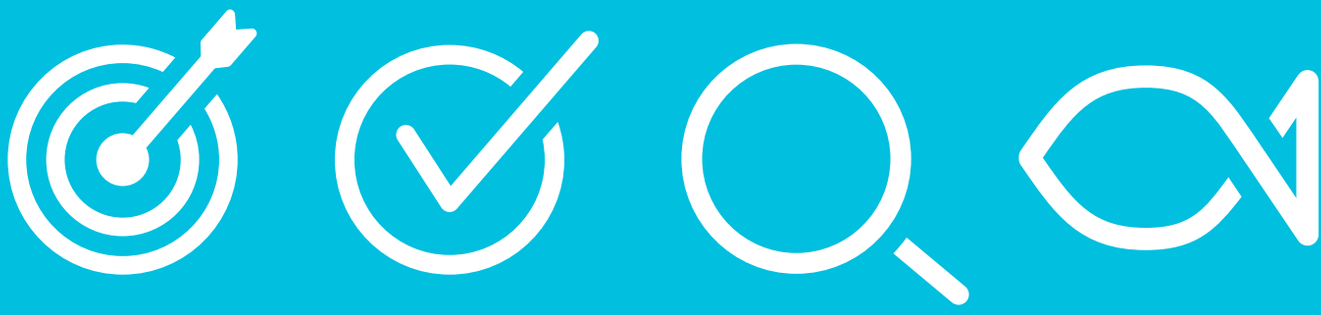
Working towards MSC certification:

A practical guide for fisheries improving to sustainability



For use alongside the MSC Fisheries Standard version 2.0

Contents

Acronyms

Term	Meaning
B_{lim}	Biomass limit reference point
B_{MSY}	Biomass consistent with MSY
B_{pa}	Biomass precautionary reference point
$B_{trigger}$	Biomass level that triggers management action
CAB	Conformity Assessment Body
CFP	EU Common Fisheries Policy
CITES	Convention of International Trade in Endangered Species
CoP	Code of Practice
CPUE	Catch per Unit Effort
CSA	Consequence Spatial Analysis
CV	Coefficient of Variation
ETP	Endangered, Threatened or Protected
EEZ	Exclusive Economic Zone
EU	European Union
F_{pa}	Fishing mortality precautionary reference point
F_{MSY}	Fishing mortality consistent with MSY
F_{lim}	Fishing mortality limit reference point
FAO	United Nations Food and Agricultural Organisation
FCR	MSC Fisheries Certification Requirements
FMP	Fishery Management Plan
FNA	fins naturally attached
GIS	Geographic Information System
HCR	Harvest Control Rule
IATTC	Inter-American Tropical Tuna Commission
ICES	International Council for Exploration of the Sea
IUCN	International Union for Conservation of Nature
IUU	Illegal, Unregulated, Unreported

Acronyms – *continued*

Term	Meaning
LTL	Low Trophic Level
MCS	Monitoring, Control and Surveillance
MoU	Memorandum of Understanding
MPA	Marine Protected Area
MSC	Marine Stewardship Council
MSE	Management Strategy Evaluation
MSY	Maximum Sustainable Yield
MT	Metric Tonnes
NGO	Non-Governmental Organization
PI	Performance Indicator
PRI	Point of Recruitment Impairment
PSA	Productivity Susceptibility Analysis
RBF	MSC Risk-Based Framework
RFMO	Regional Fishery Management Organisations
SG	Scoring Guidepost
SICA	Scale Intensity Consequence Analysis
SMP	Square Mesh Panels
SSB	Spawning Stock Biomass
TAC	Total Allowable Catch
TED	Turtle Excluder Device
UNFSA	United Nations Fish Stocks Agreement
UoA	Unit of Assessment
UoC	Unit of Certification
US	United States of America
VME	Vulnerable Marine Ecosystem
VMS	Vessel Monitoring System
WCPFC	Western and Central Pacific Fisheries Commission

Section 1

Introduction

Introduction to this guide

The Marine Stewardship Council (MSC) is an international non-profit organisation established to contribute to efforts to address the problem of unsustainable fishing and safeguard seafood supplies for the future. The MSC runs a certification and ecolabelling program for wild-capture fisheries that meets international best practice for sustainability standards. Fisheries that meet the MSC Fisheries Standard can make a claim that they are MSC certified and products from such fisheries are eligible to carry the MSC's blue ecolabel once they have obtained MSC Chain of Custody certification.

In 2015, 10% of the world's wild-caught seafood came from fisheries certified against the MSC Standard. While there has been considerable growth in the number of certified fisheries in developed countries, a significant proportion of the world's fish supply originates in developing world and small-scale fisheries which currently have growing but still limited participation in the MSC program. A number of factors may account for this. For example, fisheries may have a limited awareness and understanding of the requirements for MSC certification and the means by which they might demonstrate that they meet the standard. Another reason may be that some fisheries need to make improvements to their practices in order to become more sustainable and meet the requirements of the Standard. This guide aims to support efforts to bring developing world and small-scale fisheries closer to sustainability, and achieving MSC certification.

Overview

This guide is a resource for stakeholders working directly with fisheries moving towards achieving MSC certification. It contains practical examples and guidance to help fisheries understand how they can meet the MSC requirements.

With over 250 MSC certified sustainable fisheries, it is now possible to showcase many examples of best practice and describe the actions being made by small and large scale fisheries in developed and developing countries to improve the sustainability of their practices. The guide builds on experience within the MSC program certifying best practice, on-going work with small-scale and developing world fisheries and MSC policy work to adapt its standard to allow more informal, traditional and data limited fisheries to enter assessment for certification.

The guide accompanies the capacity building training program developed to support improvement of fisheries to MSC certification. While the primary goal of the guide is to build the capacity of practitioners involved in Fishery Improvement Projects (FIPs), it may also be used as a tool for building the capacity of other stakeholders associated with fisheries that are interested in MSC certification, including fishery managers, NGOs, development agencies and certifiers.

The MSC Standard

The MSC Fisheries Standard was developed based on the United Nations Food and Agriculture Organization (FAO) Code of Conduct for Responsible Fisheries. It was developed in consultation with a range of stakeholders across the globe including government academics, researchers, fishing industry, NGOs, private sector and the fishing community.

The Fisheries Standard is made up of three principles:

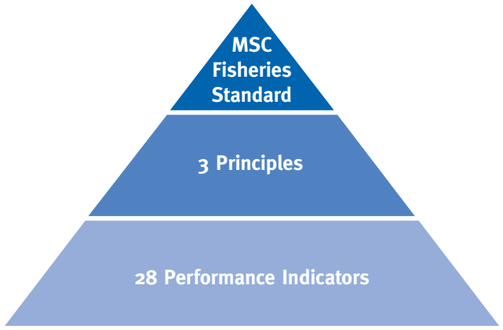
Principle 1 – Sustainable fish stocks

Principle 2 – Minimising environmental impacts

Principle 3 – Effective management

Each principle is further broken down into a set of Performance Indicators (PIs). Fisheries are assessed and scored against each of these PIs to determine how the fishery performs overall against the MSC Standard.

To guide certifiers in scoring fisheries, each PI is further broken down into one or more scoring issues. The performance required to reach a score of 60 (minimum acceptable level), 80 (global best practice) or 100 (near perfect performance) is defined in a set of scoring guideposts. Certifiers determine the performance of a fishery against the MSC Fisheries Standard on the basis of whether or not they meet each of the numeric PI scoring guideposts, with clear rationales being provided at each point.



In order to be certified, fisheries must score at least 60 for each of the 28 PIs, as well as an average of 80 across all PIs under each of the 3 principles. Further detail on how a fishery is scored against the MSC Fisheries Standard is provided in MSC's scheme document – MSC Fisheries Certification Requirements (FCR)

Structure of the guide

This guide is designed as a tool to accompany the capacity building training program. It is divided into four sections:

Section 1
An introduction to the guide and an explanation of how the guide should be used.

Section 2
Key MSC Concepts

Section 3
A detailed overview of each of the 28 PIs of the MSC Fisheries Standard.

Section 4
A set of annexes to the main document.

Section 3 breakdown:

Section 3 is broken down into three chapters, one for each 'principle' of the Standard. Each principle is further divided into sub-chapters based on the PIs and scoring issues within it. Each scoring issue contains examples of good practice, what certifiers check, key questions and examples of scoring rationales. The guide shares real fisheries examples, key challenges and example solutions to meet specific requirements.

Principle 1 | **Principle 2** | **Principle 3**

Each PI subchapter includes:

- An overview of the PI
- Scoring issues
- Challenges and solutions
- Example actions to improve performance

Each scoring issue subsection includes:

- Good practice
- What certifiers check
- Key questions to determine if further action is needed
- Examples of scoring rationales

How to use this guide

Section 3 provides content on MSC's requirements at the PI and scoring issue level with which to train practitioners involved in pre-MSC fisheries. However, users should note that it does not cover all the situations that may be encountered in a fishery when assessing any particular PI. The definitive reference for the MSC Fisheries Standard as it applies to different fishery types is the MSC Fisheries Certification Requirements (FCR). Below the various subsections in Section 3 are introduced.

Good practice

The 'good practice' subsections of the guide provide examples of key attributes which, when present, may increase the likelihood of a fishery meeting the MSC Standard. Users should note that these attributes are not exhaustive. There may be other ways in which a fishery may demonstrate consistency with a scoring issue requirement.

What certifiers check

This subsection is intended to give users an idea of the types of documents and information sources that can be used to demonstrate how a fishery meets the MSC requirements. This subsection must be viewed simply as a guide because the precise information that a certifier uses in a full assessment may vary with individual fisheries.

Key questions to determine where further action is needed

This subsection lists typical questions that certifiers may ask when trying to determine if a fishery meets the requirements for a particular scoring issue and/or whether improvements may be required in order for a fishery to meet the MSC Standard.

Examples of scoring rationales

This subsection provides examples of the supporting rationale that certifiers use to demonstrate how a fishery meets the requirements of each scoring issue. The examples have either been taken directly from previous assessments, modified from previous assessments or created as examples to suggest how evidence that a fishery meets specific requirements might be presented. The latter approach was necessary to demonstrate examples of scoring rationales relating to new requirements created in FCR v2.0 that have not previously been scored against. The examples used here have in some cases been shortened or modified from their original and are not a definitive statement of the current state of the specific fishery cited. All references to the status of such fisheries should refer to the official reports published on www.msc.org

Examples of scoring rationales – *continued*

Users may find it useful to compare the rationale provided in the examples with the level of performance in their own fisheries or use the examples to identify how they might make improvements in their fisheries. Users should however be aware that the dynamic nature of fisheries, and differences in their location, size and type, mean that while useful lessons can be learnt from the example rationale provided, the way that sustainability is demonstrated will differ from one fishery to another.

Users should also note that certifiers are required to back up the rationale provided in their assessments with appropriate source references and other information. These are a requirement for preparing the Public Certification Reports but have been left out of this guide for the sake of simplicity.

Challenges and solutions to meeting PIs

This section describes some of the challenges and solutions associated with achieving the requirements of each PI in developing country and small-scale fisheries.

Example actions to improve performance for PIs

This section outlines possible actions to address gaps in the fishery's performance. The examples are based on some of the actions implemented by fisheries in order to meet the requirements of the MSC Standard or to maintain their certification. These examples are useful in seeding discussion on the development of an action plan for a Fisheries Improvement Project. They are however not intended as a blanket set of actions to meet the MSC Fisheries Standard and must be referenced with caution given the unique and dynamic nature of fisheries around the world.

Disclaimer

The MSC Fisheries Certification Requirements (FCR) is the definitive source of the MSC Fisheries Standard. All formal assessments of fisheries against the MSC Fisheries Standard must refer to this scheme document. It is important to note that this document 'Working towards MSC Certification: a practical guide for fisheries improving towards sustainability' is a supporting document only, and it is not the MSC Fisheries Standard nor an official MSC scheme document.

The text of the English MSC Fisheries Certification Requirements and other MSC scheme documents will prevail in all instances where doubt exists on requirements or interpretation. Visit the MSC website to access all scheme documents.

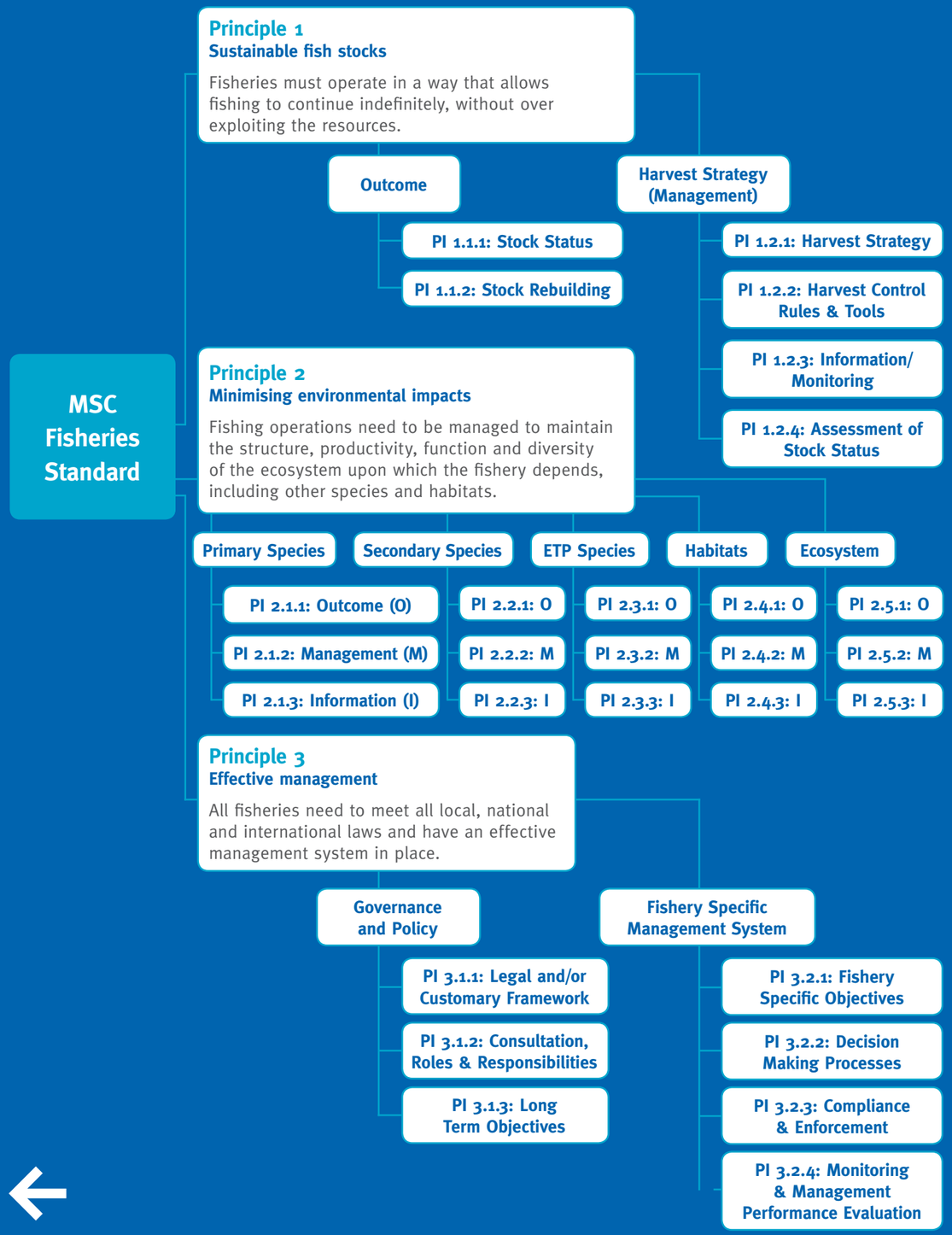
Feedback and review

The MSC welcomes feedback on the usability, content and structure of this guide. Please share your feedback by sending an email to: developingworld@msc.org

Section 2

Key MSC Concepts

The Default Assessment Tree



What is assessed?

The scope of what is assessed varies slightly under each Principle. Principle 1 applies to the whole of the fish stock(s) exploited by the fishery being assessed, and this may include fleets fishing on that stock which are outside the Unit of Assessment.

Under Principle 2, the fishery is normally only held to account for its own interactions with the non-target catch, habitat and ecosystem. While other fisheries and human uses may impact the marine ecosystem and may ultimately cause impacts that prevent MSC certification of all related fisheries, interpretation of the MSC standard is focussed on the fishery being assessed.

In some circumstances the actions of other certified fisheries need to be considered, to avoid the problem of MSC fisheries generating cumulative impacts on P2. This incentivises adoption of best practice by certified fisheries without requiring that they influence the entire fishery.

Principle 3 applies to the management jurisdictions that apply to the fishery being assessed.

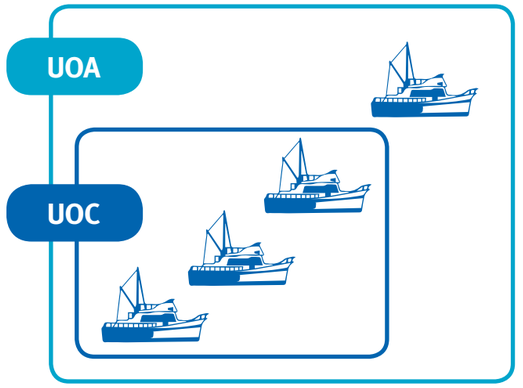
Unit of Assessment (UoA) and Unit of Certification (UoC)

At the very beginning of the assessment process, the Unit of Assessment (UoA) needs to be decided upon. It defines the full scope of what is being assessed (in a pre-assessment or full assessment) and includes:

- The target stock(s);
- The fishing method or gear;
- The fleets, vessels, individual fishing operators and other eligible fishers pursuing that stock.

The Unit of Assessment could cover anything from a handful of local boats to a full national fleet. Once it has been defined, only seafood from that particular unit will later be able to carry the MSC ecolabel in the marketplace.

Defining the Unit of Assessment



UOA = Unit of Assessment

UOC = Unit of Certification

Unit of Assessment (UoA) and Unit of Certification (UoC) – *continued*

The term Unit of Certification (UoC) refers to those elements of the UoA that are covered by an MSC certificate. As such, the UoC defines the unit that will be entitled to receive an MSC certificate and includes:

- The target stock(s);
- The fishing method or gear;
- The fishing fleets or groups of vessels, or individual vessels of other fishing operators pursuing that stock, that intend to be covered by the certificate.

The reason there is a UoA and a UoC is because the MSC allows parts of fishing fleets to be certified, even if the rest of the fleet is not certified. There may be fishers (i.e. vessels) that are not part of the certification program but their impacts will have been assessed nonetheless. These fishers are called 'other eligible fishers', and they have the option to join the certificate at a later date through a 'certificate sharing' process.

Outline of the MSC Fisheries Standard

*Grey cells indicate that there is no scoring guidepost for that scoring issue.

Performance Indicator	Scoring issue	SG 60	SG 80	SG 100
1.1.1 Stock status	(a) Stock status relative to recruitment impairment			
	(b) Stock status in relation to achievement of Maximum Sustainable Yield (MSY)			
1.1.2 Stock rebuilding	(a) Rebuilding timeframes			
	(b) Rebuilding evaluation			
1.2.1 Harvest strategy	(a) Harvest strategy design			
	(b) Harvest strategy evaluation			
	(c) Harvest strategy monitoring			
	(d) Harvest strategy review			
	e) Shark finning			
	(f) Review of alternative measures			
1.2.2 Harvest control rules and tools	(a) HCRs design and application			
	(b) HCRs robustness to uncertainty			
	(c) HCRs evaluation			
1.2.3 Information and monitoring	(a) Range of information			
	(b) Monitoring			
	(c) Comprehensiveness of information			
1.2.4 Assessment of stock status	a) Appropriateness of assessment to stock under consideration			
	(b) Assessment approach			
	(c) Uncertainty in the assessment			
	(d) Evaluation of assessment			
	(e) Peer review of assessment			
2.1.1 Primary species outcome	(a) Main primary species stock status			
	(b) Minor primary species stock status			

Outline of the MSC Fisheries Standard – *continued*

Performance Indicator	Scoring issue	SG 60	SG 80	SG 100
2.1.2 Primary species management strategy	(a) Management strategy in place			
	(b) Management strategy evaluation			
	(c) Management strategy implementation			
	(d) Shark finning			
	(e) Review of alternative measures			
2.1.3 Primary species information	(a) Information adequacy for assessment of impact on main primary species			
	(b) Information adequacy for assessment of impact on minor primary species			
	(c) Information adequacy for management strategy			
2.2.1 Secondary species outcome	(a) Main secondary species stock status			
	(b) Minor secondary species stock status			
2.2.2 Secondary species management strategy	(a) Management strategy in place			
	(b) Management strategy evaluation			
	(c) Management strategy implementation			
	(d) Shark finning			
	(e) Review of alternative measures			
2.2.3 Secondary species information	(a) Information adequacy for assessment of impact on main secondary species			
	(b) Information adequacy for assessment of impact on minor secondary species			
	(c) Information adequacy for management strategy			
2.3.1 ETP species outcome	(a) Effects of the UoA on population/stocks within national or international limits, where applicable			
	(b) Direct effects			
	(c) Indirect effects			

Outline of the MSC Fisheries Standard – *continued*

Performance Indicator	Scoring issue	SG 60	SG 80	SG 100
2.3.2 ETP species management strategy	(a) Management strategy in place (national and international requirements)			
	(b) Management strategy in place (alternative)			
	(c) Management strategy evaluation			
	(d) Management strategy implementation			
	(e) Review of alternative measures to minimise mortality of ETP species			
2.3.3 ETP species information	(a) Information adequacy for assessment of impacts			
	(b) Information adequacy for management strategy			
2.4.1 Habitats outcome	(a) Commonly encountered habitat status			
	(b) VME habitat status			
	(c) Minor habitat status			
2.4.2 Habitats management strategy	(a) Management strategy in place			
	(b) Management strategy evaluation			
	(c) Management strategy implementation			
	(d) Compliance with management requirements and other MSC UoA's/non MSC fisheries' measures to protect VMEs			
2.4.3 Habitats information	(a) Information quality			
	(b) Information adequacy for assessment of impacts			
	(c) Monitoring			
2.5.1 Ecosystem outcome	(a) Ecosystem status			
2.5.2 Ecosystem management strategy	(a) Management strategy in place			
	(b) Management strategy evaluation			
	(c) Management strategy implementation			
2.5.3 Ecosystem information	(a) Information quality			
	(b) Investigation of UoA impacts			

Outline of the MSC Fisheries Standard – *continued*

Performance Indicator	Scoring issue	SG 60	SG 80	SG 100
2.5.3 Ecosystem information	(c) Understanding of component functions			
	(d) Information relevance			
	(e) Monitoring			
3.1.1 Legal and/ or customary framework	(a) Compatibility of laws or standards with effective management			
	(b) Resolution of disputes			
	(c) Respect for rights			
3.1.2 Consultation, roles and responsibilities	(a) Roles and responsibilities			
	(b) Consultation processes			
	(c) Participation			
3.1.3 Long term objectives	(a) Objectives			
3.2.1 Fishery-specific objectives	(a) Objectives			
3.2.2 Decision-making processes	(a) Decision-making processes			
	(b) Responsiveness of decision-making processes			
	(c) Use of precautionary approach			
	(d) Accountability and transparency of management system and decision-making process			
	(e) Approach to disputes			
3.2.3 Compliance and enforcement	(a) MCS implementation			
	(b) Sanctions			
	(c) Compliance			
	(d) Systematic non-compliance			
3.2.4 Monitoring and management performance evaluation	(a) Evaluation coverage			
	(b) Internal and/or external review			

Section 3
Performance Indicators

Principle 1 - Sustainable fish stocks

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

Overview of Principle 1 Performance Indicators

Principle 1 states that 'a fishery must be conducted in a manner that does not lead to over-fishing or depletion of the exploited populations and for those populations that are depleted, the fishery must be conducted in a manner that demonstrably leads to their recovery'.

There are two components in Principle 1: an outcome component with two PIs and a management component with four PIs. The stock status PI (1.1.1) is scored to reflect:

- increased probability that exploited biomass fluctuates around the B_{MSY} target, or a higher target if this is warranted from a consideration of the trophic inter-dependencies of the target species; and
- decreased probability that exploited biomass will drop significantly towards the point where recruitment becomes impaired, either through recruitment overfishing or through genetic effects or imbalances in sex ratio.

A rebuilding PI (1.1.2) is triggered in cases where stock status (PI 1.1.1) is not at or fluctuating around a level consistent with MSY, to ensure that stock rebuilding is expected. Stocks whose status is currently below the point at which recruitment is impaired (termed the PRI) would not achieve the necessary pass level in the stock status PI (PI 1.1.1) even if there are recovery plans or programmes in place which are effectively increasing the status of the stock, until such time as the stock status again meets the pass level.

The management component (harvest strategy) has four PIs. These PIs assess a fishery's ability to manage the impact on target stocks to achieve the outcomes sought by the MSC Principle 1. The overall harvest strategy and the specific management components in PIs 1.2.2-1.2.4 should in combination be capable of achieving the management objectives expressed in the target and limit reference points.

1.1.1 Stock status

Performance Indicator overview

Performance Indicator (PI) 1.1.1 examines the impact of the fishery on the target stock/species and whether or not the species/stock status is at a sustainable level. This applies to the entire stock that is under assessment and the combined impact of all fisheries. In simple terms it looks to verify firstly that the stock status is likely to be above the Point of Recruitment Impairment (PRI) and secondly that the stock is fluctuating around a target level consistent with Maximum Sustainable Yield (MSY). This combination of scoring issues ensures that the stock meets the combined goals established in the UN Fish Stocks Agreement for high production from a fishery taken at a sustainable level (with a low risk of recruitment overfishing).

The scoring issues in PI 1.1.1 are phrased in terms of likelihood or probability. The phrasing is intended to allow for either qualitative or quantitative evaluation of the stock in a probabilistic way. Higher scores require not only a higher stock status but also a greater degree of certainty of that status.

The scoring of PI 1.1.1 implies that there is some empirical understanding of stock status (i.e. some form of stock assessment) in which stock status is determined relative to defined reference points. However, this does not call for an examination of either the quality of that assessment or the information used in the assessment, which are assessed later in Principle 1. Where a stock assessment is lacking, or reference points are lacking for that assessment, the MSC allows for an assessment to be made using the MSC Risk Based Framework (RBF) to determine the score for this PI. This is described fully in Annex 1 and requires that a scoring exercise is carried out, informed by stakeholder input. It involves determining a consequence score and also examining the productivity of the species relative to its susceptibility to capture.

The scoring of PI 1.1.1 is intended to reflect the status of the target stock biomass or abundance. However, the MSC guidance also allows other proxies to be used in place of direct biomass indicators, such as indications of fishing effort or fishing mortality. Other proxies that can be used may include Catch per Unit Effort (CPUE). In these cases, certifiers are required to demonstrate how the proxies are consistent with the PRI and MSY levels. Examples of data-limited approaches to demonstrate consistency with MSY are outlined in Annex 2.

Two scoring issues are considered under this PI:

(a) Stock status relative to recruitment impairment

(b) Stock status in relation to achievement of Maximum Sustainable Yield (MSY)

Scoring issue (a) – Stock status relative to recruitment impairment

The first scoring issue assesses the degree of confidence that the stock is above the point where recruitment would be impaired (PRI).

Scoring issue	SG60	SG80	SG100
(a) Stock status relative to recruitment impairment	It is **likely** that the stock is above the point where recruitment would be impaired (PRI).	It is **highly likely** that the stock is above the PRI.	There is a **high degree of certainty** that the stock is above the PRI.

Good practice

Scoring issue (a) requires a high level of confidence that the stock is above the PRI. Where probabilistic information is used in scoring this issue:

- 'Likely' above the PRI, as required at SG60, means greater than or equal to the 70th percentile.
- 'Highly likely' above the PRI, as required at SG80, means greater than or equal to the 80th percentile.
- 'High degree of certainty' that the stock is above the PRI, as required at SG100, means greater than or equal to the 95th percentile.

If no evidence exists that the stock is likely above the PRI, then the fishery does not achieve the minimum 60 level and would fail its assessment.

Fisheries are easiest to score and potentially perform well against this scoring issue where they have some stock status indicators that can be used to show the position of the stock relative to a reference point that is regarded as equivalent to the PRI. The MSC provides common default proxies for such levels in MSC Fisheries Certification Requirements (FCR) guidance clause GSA2.2.3.1.

MSC also provides guidance for fisheries which use proxy information as indicators of stock status and reference points. These may include Catch Per Unit Effort (CPUE) or mean fish sizes. In general, a higher score may be assigned here where the proxy information gives a higher level of confidence. For example, an 80 score may be appropriate where there are at least two proxies of biomass, both of which show no decline over a number of years equal to one generation time of the species. Where proxies are used there must be robust justification the proxies are appropriate for the context in which they are used.

Generally, stocks that are in a healthy state and which have shown no signs of decline over a number of years will perform well against this scoring issue. Where limited data are available, and the RBF is used, stocks with low overlap with fishing effort and low intensity have a higher likelihood of performing well against PI 1.1.1

What certifiers check

Certifiers will primarily refer to the results of the most recent stock assessment carried out for the fishery. In order to place this in context they may also refer to previous stock assessments and any reviews or benchmark assessments carried out for the fishery. In doing so, certifiers will be giving consideration to the nature of the assessment methods used and the extent to which any reference points used may be taken as indicative of the PRI levels. Note that the more detailed aspects of the information used in assessing the stock and the robustness of the stock assessment are not directly scored under PI 1.1.1, but rather in PI 1.2.3 and PI 1.2.4.

Scoring issue (a) – Stock status relative to recruitment impairment

What certifiers check – *continued*

If a fishery has a number of good proxy indicators that are independent of each other, certifiers will examine the proxies to see if they show a decline or have been stable. Where such proxies are associated with some specific reference points that are regarded as consistent with either the PRI or MSY levels, the normal scoring process may be followed. Where a stock assessment, referring to reference points is not available, certifiers will score the fishery using the RBF, informed by stakeholder input, as described in Annex 1.

Key questions to determine where further action is needed

Q Is there an up-to-date empirical stock assessment available for the stock being targeted by the fishery?

Q Does the stock assessment provide an indication of stock status relative to the PRI (in some cases this is used as the limit reference point, as scored in PI 1.2.2)?

Q Does the stock assessment indicate an empirical probability/likelihood that the stock is above this point?

Q Are proxy indicators available for the stock targeted by the fishery?

Q Do proxy indicators indicate the stock is in decline, stable or on an upward trend?

Examples of scoring rationales

Scoring issue (a)	Fishery Example
SG60	*Hake longline fishery:* The latest stock assessment indicates that there is a 75% probability that the female spawning stock biomass (SSB) is above the reference level 20% B_0, at which the stock would be reduced to 20% of the unexploited level. This reference point level has not been estimated explicitly as the PRI for this stock, but it is consistent with the level given as a default proxy for the PRI in the MSC FCR (clause GSA2.2.3.1), and accepted by the team as a reasonable default for this type of stock (not low trophic level etc.). The estimated 75% probability meets the 70% level required for SG60, but not the 80% level required for SG80.

Scoring issue (a) – Stock status relative to recruitment impairment

Examples of scoring rationales – *continued*

Scoring issue (a)	Fishery Example
SG60	*Sole gill net fishery:* The fishery is small scale and data-limited, and does not have an explicit stock assessment that provides an estimate of biomass in relation to the PRI level. The standardized CPUE level for the gill net fleet is however used as a proxy of biomass. This has fluctuated around a level of 1.5t/vessel/day in the last 10 years, after recovering from a historical low level of 1.0t/vessel/day in 2003, following a reduction in the fleet size. Ten years is more than one generation time of the species. Since a recovery was quickly achieved at that time, the 1.0t/vessel/day level is regarded as likely above any actual PRI, and the current catch rate of 1.5t/vessel/day is regarded as confirming that the stock is likely above the PRI.
SG80	Mexico Baja California red rock lobster (Certified 2011): The latest stock assessment using a Biomass Dynamic Model indicated that current biomass is 1.5 times larger than the biomass at MSY and it has fluctuated around that level in the last five years. In the last assessment of the fishery the level of recruitment was not evaluated. Based on the current values of biomass for the last five years and taking into consideration the results of former assessments and the nature of the models, it is highly likely that the stock is above the PRI. A higher degree of certainty, that the stock is above the PRI, can be attained if a model that reflects the level of recruitment is used. *Croaker handline fishery:* Information is available for CPUE of the two types of fleets in this fishery. The handline fleet shows a catch rate that has fluctuated without clear trend at 2.0t/hour fishing over the last 8 years. The other fleet is a gill net fleet. The CPUE in the gill net fleet has fluctuated around a level of 1.3t/vessel/day in the last 10 years after recovering from a low level of 1.0t/vessel/day after a fleet size reduction. No information is available for the handline fleet in the earlier days of the fishery development, but catch rates in this fleet are currently stable and the combined proxy information for both the handline and gill net fleets and the stability of recent catch rates indicate that it is 'highly likely' that the stock is above the PRI.
SG100	Fiji albacore tuna longline (Certified 2012): Overfishing is not occurring (F2007-2009/F_{MSY}= 0.26). Albacore is not overfished (SB2009/ SB_{MSY}= 2.25 and B2007-2009/B_{MSY}=1.26). There is no indication in the most recent assessment that current levels of catch are causing recruitment overfishing given the age selectivity of the fisheries.

Scoring issue (b) – Stock status in relation to achievement of MSY

The second scoring issue assesses whether the stock is being maintained at high productivity levels, at or above the point of Maximum Sustainable Yield (MSY).

Scoring issue	SG60	SG80	SG100
(b) Stock status in relation to achievement of Maximum Sustainable Yield (MSY)		The stock is at or fluctuating around a level consistent with MSY.	There is a **high degree of certainty** that the stock has been fluctuating around a level consistent with MSY or has been above this level over recent years.

Good practice

Good practice requires that the stock is fluctuating around a level consistent with MSY. Stock status assessments or proxies must show the stock to be at highly productive levels, well above the PRI.

Generally, stocks that are in a healthy state and which have shown no signs of decline over a number of years will perform well against this scoring issue.

What certifiers check

Certifiers will primarily refer to the results of the most recent stock assessment carried out for the fishery. Certifiers will also refer to any long-term or strategic stock assessments, reviews or benchmark assessments carried out for the fishery, to determine the extent to which any reference points used in the fishery may be taken as indicative of the MSY levels. In doing so, certifiers will give consideration to the quantity and quality of information available for stock assessment, the suitability of the assessment methods and reference points. Although these aspects are not directly scored under 1.1.1, they may inform the consideration of probability/certainty.

Where a stock assessment, referring to reference points is not available, certifiers will carry out a RBF scoring exercise, informed by stakeholder input (this process is described in Annex 1).

Scoring issue (b) – Stock status in relation to achievement of MSY

Key questions to determine where further action is needed

Q Is there an up to date stock assessment available for the stock being targeted by the fishery?

Q Does the stock assessment provide an indication of stock status relative to MSY (in some cases this is taken to be the target reference point)?

Q Does the stock assessment indicate that the stock is at, or fluctuating around the MSY?

Q Does the stock assessment indicate an empirical probability/likelihood that the stock is above this point?

Q Does the recent history of stock abundance have a trend that is consistent with an expectation that future biomass will continue to fluctuate around MSY levels? (i.e. not steadily downwards over the time series, and currently below MSY)

Q Are there proxies that provide an indication of whether the stock has been in decline or stable?

Examples of scoring rationales

Scoring issue (b)	Fishery Example
SG60	No scoring guidepost at the 60 level.
SG80	Suriname Atlantic seabob shrimp (Certified 2011): The target reference point has been set at a level which is slightly less than the 120% of B_{MSY} recommended by the scientists who completed the assessment, but which is still measurably above B_{MSY}. The range of possible values of current biomass, relative to B_{MSY} (i.e. B/B_{MSY}) estimated by the assessment gave a median value of 1.22 (i.e. 122% of B_{MSY}), which is therefore higher than the agreed target reference point (or higher than B_{MSY}). In addition, if catch rate (i.e. CPUE) is a reasonable index of abundance and hence a proxy for biomass, as assumed for the assessment, recent CPUE levels have been higher or close to the target level in all years examined. However, these results are generated by a single assessment and are closely linked to validity of the model assumptions, data quality, and parameter estimates used, which are best additionally informed by fishery independent studies and strengthened fishery activity monitoring. For this reason, it is considered premature to conclude that there is a high degree of certainty that the stock has been fluctuating around its target reference point, or has been higher than the target point for recent years. At present, therefore, the assessment result is accepted to reflect that the stock is at or fluctuating around its target reference point. *Anchovy pole and line fishery:* The fishery is managed on the basis of a stock assessment that estimates the fishing mortality rate (F), relative to MSY levels, i.e. F_{MSY}. The recent time series suggests that F has been 'low enough for long enough' to ensure that biomass is now likely to be at or fluctuating around MSY levels. Fishing mortality has been below the estimated F_{MSY} for at least two generation times.

Scoring issue (b) – Stock status in relation to achievement of MSY

Examples of scoring rationales – *continued*

Scoring issue (b)	Fishery Example
SG100	*Horse mackerel trawl fishery:* The fishery is managed on the basis of a stock assessment that estimates both absolute biomass and the fishing mortality rate. The most recent assessment indicates there is a zero probability that B/B_{MSY} is as low as 1.0 and has been the case for the past 10 years. The most recent value is around 1.6. The assessment also indicates that F has been 'low enough for long enough' (over 2 generation times) to ensure that biomass is now likely to be at or fluctuating around MSY levels. Taken in combination, these 2 indicators provide a high degree of certainty.

Challenges and solutions to meeting PI 1.1.1

The biggest challenges to meeting the required level in this PI is where the stock is below the level at which it can be regarded as fluctuating around a biomass consistent with MSY (in which case at least a condition would be triggered), or worse, below the level where recruitment is impaired (in which case the fishery does not meet even the 60 level and would fail). In heavily exploited fisheries the stock may be below the PRI, in which case there is no alternative to allowing time for the stock to rebuild (typically also involving some form of management intervention) before seeking MSC certification. If however the stock is between the PRI and MSY, it may be possible to achieve MSC certification, depending on scoring elsewhere in Principle 1, including in relation to rebuilding.

The other major challenge is the availability of a recent stock assessment, with appropriate reference points, to allow this PI to be scored. If this is absent, there is the potential to still score this PI using the RBF (described in Annex 1), although the scoring is more precautionary (as would be expected given the paucity of data). For this reason, MSC scores, and management certainty will normally be enhanced by the completion of an appropriate stock assessment.

In order to carry out an appropriate stock assessment there needs to be sufficient resources and capacity available to the fishery. This can be a constraint to developing country fisheries, however, there are a wide range of stock assessment approaches which may be appropriate and which are less data-intensive and therefore less expensive (see Annex 2). MSC generally recognises that management must be consistent with the 'scale and intensity' of the fishery, but also expects that where data-limited approaches are used, higher levels of precaution will be applied to compensate for the lower information availability.

Example actions to improve performance for PI 1.1.1

Process Chronology				Management Actions	
1	2	3	4	Example action	Scoring issue
●				Determine the cause of poor performance in this PI. This could be caused by either: (i) actual stock status; (ii) lack of certainty about stock status; or (iii) lack of empirical assessment and the RBF has been used to score the fishery which has resulted in a score of less than 80.	(a), (b)
	●			If the low score relates to a depleted stock status, undertake a program of remedial measures (a rebuilding plan) designed to bring about the recovery of the stock in the shortest practicable timeframe. This is likely to involve a (possibly temporary) reduction in both landings and effort, but may also require additional steps, such as increased landing controls, technical measures (such as gear modification or changes to minimum landing sizes) or spatial or temporal closures.	(a), (b), 1.1.2
	●			If the low score relates to a lack of probabilistic certainty in relation to benchmarks, then it may simply be a case of adding this probabilistic element into the next stock assessment, however this may also be an indication of the need for some stock rebuilding.	(a), (b)
	●			If the low score is a result of a high risk score using the RBF (which may or may not be an indication of actual depletion), review all available empirical datasets, select an appropriate stock assessment methodology, and undertake on-going data collection tailored to the needs of the assessment.	(a), (b)
		●		Conduct a stock assessment which enables biological reference points to be estimated. Review stock status relative to these reference points.	(a), (b)
			●	Review stock status relative to reference points annually (or on a timeframe appropriate to the life history characteristics of the target species). Where the stock has been depleted, this should provide an indication of recovery if the rebuilding plan is successful.	(a), (b)

Notes

Notes

1.1.2 Stock rebuilding

Performance Indicator overview

This PI looks at the rebuilding and recovery of a stock that is depleted below the levels required to achieve an 80 score on PI 1.1.1. The PI is only scored where the score for 1.1.1 (stock status) is less than 80, indicating that the stock is either not regarded as 'fluctuating around' MSY or is less than highly likely (i.e. 80th percentile) to be above the PRI. This PI seeks to verify that where the stock is reduced, there is evidence of stock rebuilding within a specified timeframe.

As with other scoring in Principle 1 the focus of this PI is on the rebuilding of the entire stock – not just the catches or management efforts of the particular fishery.

A stock that is depleted below the PRI (often used as the limit reference point) will score less than 60 for PI 1.1.1, so would not at that time be eligible for MSC certification. In this instance although a recovery plan is likely required, no matter how convincing or effective this plan is, the fishery would not be eligible for certification until the stock had at least recovered to be considered 'likely' above the PRI (enabling PI 1.1.1 to achieve at least the 60 level).

It would normally be assumed that a well-constructed harvest strategy would include consideration of the situation where a stock becomes depleted, for example by progressively reducing fishing mortality when the stock status falls below its target. However, when the stock is depleted, in order to ensure re-building is achieved in as short a timeframe as possible, additional measures may be required, such as seeking to address issues of unobserved mortality, or introducing further restrictions or technical conservation measures to facilitate rapid rebuilding. Such a plan should seek to achieve its goal of rebuilding the stock to its target level consistent with MSY or a similar highly productive level within a specified time frame, or within a certain generation time (the average age of a reproductive individual in a given fish stock).

This PI looks not only at the management (i.e. the design of the plan) but also the outcome (i.e. the extent to which the plan is achieving its aims).

Two scoring issues are considered under this PI:

(a) Rebuilding timeframes

(b) Rebuilding evaluation

Scoring issue (a) – Rebuilding timeframes

This first scoring issue of PI 1.1.2 seeks to ensure that a rebuilding plan is in place with a specified timeframe for the recovery of the stock.

Scoring issue	SG60	SG80	SG100
(a) Rebuilding timeframes	A rebuilding timeframe is specified for the stock that is the **shorter of 20 years or 2 times its generation time**. For cases where 2 generations is less than 5 years, the rebuilding timeframe is up to 5 years.		The shortest practicable rebuilding timeframe is specified which does not exceed **one generation time** for the stock.

Good practice

Expected performance for this scoring issue is for the recovery plan to specify a shorter timeframe – with the best being as short as practicably possible. This means there should be measures in place to ensure the level of catch is reduced so that the stock is likely to recover within one generation time (the average age of a reproductive individual, in a given fish stock).

What certifiers check

Certifiers will refer to the results of the most recent stock assessment carried out for the fishery to provide the context for rebuilding. They will then look at the rebuilding steps applied by management. This could include any measures within the harvest strategy for actions that will be taken when the stock levels fall below the target (or MSY) levels. It may also include a specific recovery or rebuilding plan, which details any additional steps to be taken to achieve the rapid recovery of the stock. In particular, certifiers will look to see that there is a specified timeframe for recovery, perhaps based on forward projections or an underlying management framework.

It should be noted that fisheries are not required to have a 'formal recovery plan'. Instead they are expected to have some sort of recovery strategy, which may or may not be binding in a statutory context.

Scoring issue (a) – Rebuilding timeframes

Key questions to determine where further action is needed

Q Is there a recovery plan (or equivalent), specifically outlining the approach to bringing about recovery of the stock to MSY level (or above)?

Q Is there a stated estimate of anticipated recovery time, based on an analytical assessment and stock projection?

Q Is the stated recovery time not longer than two generation times of the stock?

Examples of scoring rationales

Scoring issue (a)	Fishery Example
SG60	SPSG West of Scotland herring Pelagic Trawl (Certified 2012): The multiannual plan has the objective of maintaining the stock size above 75000 tones (i.e. B_{pa} = 1.5*B_{lim}) by exploiting the stock at F_{MSY}. A B_{pa} = 75MT is used as $B_{trigger}$. If the stock is assessed to be below this level the fishing mortality rate applied to the stock is reduced linearly with SSB. The MSY management framework was implemented in 2010 with the timeline of exploiting fish stocks at F_{MSY} by 2015. The generation time for the species is approximately 4.5 years. Detailed projections of stock biomass have not been made, but achievement of an F_{MSY} level within 5 years (by 2015) should allow the stock biomass to return to a B_{MSY} level within not more than four more years, i.e. within two generation times of the stock as required for SG60.
SG80	No scoring guidepost at the 80 level.
SG100	DFPO Denmark North Sea plaice (Certified 2011): The management plan has shown evidence that rebuilding will be complete within the shortest practicable timeframe. The plaice fishery is implementing an explicit long term management plan with two defined stages in which the first stage aims to rebuild the stock above precautionary level (B_{pa}). The second stage aims to reduce the exploitation rate to a target level that will allow the stock to be harvested at MSY. The expected recovery timescale is currently within the required one generation timescale, assisted by the strong recruitment of recent year classes.

Scoring issue (b) – Rebuilding evaluation

The second scoring issue looks at the evidence of rebuilding. This may be either actual evidence of rebuilding or, if the stock is in the early stages of depletion and so it is not yet possible to demonstrate recovery, evidence of the likelihood of recovery based on simulation modelling, supported by appropriate monitoring. While the SG60 level only requires that some form of monitoring is in place (to accompany the rebuilding plan covered in scoring issue (a)), the SG80 level requires that evidence is also in place.

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

Good practice

Good practice requires good evidence and confidence that the rebuilding strategies are either already working to rebuild stocks, i.e. that the stock biomass has been improving towards an MSY-consistent level, or that they are expected to work based on simulation modelling or other evidence.

What certifiers check

Certifiers will refer to the results of the most recent stock assessment carried out for the fishery to provide the context for rebuilding. This may provide an indication of the response of the stock since the rebuilding plan or strategy was implemented. In addition certifiers may look at:

- Any evaluations of the recovery plan or strategy which provides evidence of the likely efficacy of rebuilding, based on simulation modelling or other evidence such as low current exploitation rates, incoming recruitment patterns, and previous dynamics of the stock.
- Information on the management decision made in response to scientific advice on rebuilding.

Scoring issue (b) – Rebuilding evaluation

Key questions to determine where further action is needed

Q Can it be demonstrated that the stock is rebuilding as planned? Is the plan working?

Q Does the stock assessment already show a stock recovery since the recovery plan or strategy was implemented?

Q Has some form of evaluation been carried out either on previous recoveries of the fishery, or on the likely future recovery performance?

Q Has simulation modeling been carried out on the recovery strategy or plan which provides an indication of the likelihood of success (in rebuilding the stock to MSY-consistent levels) within the timeframe specified within the plan?

Q Does this simulation modeling provide confidence limits that may increase the evidence to a 'highly likely' level?

Examples of scoring rationales

Scoring issue (b)	Fishery Example
SG60	Cooperative Fishery Organisation (CVO) North Sea sole (Certified 2012): The stock is considered to be depleted since SSB is well below estimated biomass levels at MSY and shows no immediate signs of recovery. Although fishing mortality has declined in recent years, it has not yet reached a level consistent with MSY (F_{MSY}=0.22). Under the EU long-term management plan, a rebuilding strategy is in place which aims at an annual 10% reduction in fishing mortality until an F of 0.2 is reached, with a maximum change in TAC of 15%. This has been evaluated and concluded there was low risk of B<B_{lim} within the next 10 years and that the management plan could be provisionally accepted as precautionary. However, given the SSB and fishing mortality levels outlined above, simulation modelling suggests that the North Sea sole stock is unlikely to rebuild under current levels of fishing exploitation by the specified timeframe (within the management plan).
SG80	SPSG West of Scotland herring Pelagic Trawl (Certified 2012): There is evidence that the management plan is rebuilding stocks. SSB was estimated to increase in years 2012 and 2013 as a result of the application of the multi annual management plan. ICES has evaluated the plan and concludes that it is in accordance with the precautionary approach. The evaluation estimated F_{MSY} at 0.25 as a value of fishing mortality that will allow the stock size to achieve biomass levels consistent with B_{MSY} within not more than two generation times.

Scoring issue (b) – Rebuilding evaluation

Examples of scoring rationales – *continued*

Scoring issue (b)	Fishery Example
SG100	DFPO Denmark North Sea plaice (Certified 2011): The management plan has shown evidence that rebuilding will be complete within the shortest practicable timeframe. The plaice fishery is implementing an explicit long term management plan with two defined stages, in which the first stage aims to rebuild the stock above precautionary level (B_{pa}). The second stage aims to reduce the exploitation rate to a target level that will allow the stock to be harvested at MSY. After a continuous increase in SSB in successive years, the first stage of the management plan has been completed successfully. The increase in the SSB experienced from 2007 has occurred under average recruitment conditions and is not caused by a higher productivity of the stock. Instead, increasing SSB levels are mainly due to the reduction of fishing mortality under the present management plan. The management plan has now entered the second stage which sets targets for the fishing mortality (F = 0.3 y^{-1}) based on the principle of MSY. The target fishing mortality has been already achieved and temporal trends in SSB shows that the stock biomass is increasing toward target long term yields within the shortest practicable timeframe.

Challenges and solutions to meeting PI 1.1.2

In order to put in place a rebuilding plan, it must first be demonstrated that the stock is in a depleted state (below levels that could be regarded as 'fluctuating around MSY'). Therefore, in data-rich fisheries, it is only once the results of some form of analytical stock assessment are available that there will even be an understanding of whether a rebuilding strategy is required. Ongoing monitoring and some form of on-going stock assessment will also be required to demonstrate that the recovery measures, once adopted, are working. In situations where there is low availability of data the methods outlined in Annex 2 will give an indication of how the stock is performing with respect to MSY.

The fact that a stock is depleted and requires rebuilding is a likely indication that past management has not adequately managed the impacts on the fishery. The rebuilding phase is therefore likely to require additional management measures and restrictions on the fleet. Getting agreement for these measures and then passing the necessary legislation to adopt and enforce these measures can be a challenge. This may be politically unpopular where there are perceived short term socio-economic impacts and may require additional management input, in particular where the proposed management measures result in additional enforcement challenges. Such problems emphasise the benefits of incorporating such recovery strategies into the normal HCRs for the fishery and seeking agreement with fishers and stakeholders in advance of any stock declines.

Stock recovery can also be a slow process, particularly for fish with longer generation times. It therefore requires long term commitment on the part of management to achieve rebuilding. This long term commitment is more likely to be ongoing where there is a reasonable level of administrative stability.

Example actions to improve performance for PI 1.1.2

Process Chronology				Management Actions	
1	2	3	4	Example action	Scoring issue
●				Where a stock is shown to be depleted (i.e. not meeting SG80 for PI 1.1.1) a review should be undertaken of the measures, regulations and plans that are in place to rebuild the stock.	(a)
●				Where a stock is shown to be depleted (i.e. not meeting SG80 for PI 1.1.1) an evaluation should be done of the effectiveness of the rebuilding measures in place (described above) and the degree to which these will ensure rebuilding within a specified timeframe (relative to species generation times).	(b)
	●			Where the reviews/evaluations described above (in step 1) indicate gaps, uncertainties or lack of confidence in the measures for rebuilding, development should begin on a revised/new rebuilding plan. This plan should stipulate how rebuilding will be achieved, including any special management measures/restrictions. It should stipulate the rebuilding timeframe relative to the species generation times. It should also stipulate how rebuilding will be monitored and enforced to ensure a high level of confidence that the strategies will work. The rebuilding plan should tie in with the wider management plan for the fishery.	(a), (b)
	●			In spite of the obvious requirement for rapid implementation, it is important that the proposals for the rebuilding plan should be widely communicated and consulted upon so that any practical issues of implementation may be foreseen and where possible addressed.	3.1.2
		●		The rebuilding plan should be formally implemented/enacted and all necessary management steps put in place.	(a), (b)
			●	On-going monitoring of key data should be maintained to ensure that rebuilding is effective. This may also require a more wide ranging periodic evaluation of the effectiveness of the rebuilding plan (perhaps including external review).	(b), 1.2.3
			●	Amendments to the rebuilding plan should be made based upon the outcome of monitoring/evaluations where required to ensure rebuilding will be achieved within the specified timeframe.	(a), 1.2.3

Notes

1.2.1 Harvest strategy

Performance Indicator overview

This PI seeks to verify that there is a robust and precautionary harvest strategy in place. A harvest strategy is the combination of monitoring, stock assessment, harvest control rules (HCRs) and management actions that are required to bring about the sustainable management of the fishery.

The harvest strategy sets out the management actions necessary to attain defined ecological and sometimes economic objectives in a particular fishery, including achieving the management objectives expressed in the target and limit reference points. It should specify a process for conducting assessments and monitoring the biological and economic attributes of the fishery as well as specific rules (i.e. HCRs) that control the fishing effort.

The scoring issues for PI 1.2.1 focus on the design of the harvest strategy and the expectation of success in maintaining the stock at MSY (i.e. a score of 80 for PI 1.1.1). In addition there is a focus on the requisite monitoring, review and evaluation of the strategy to ensure that it remains appropriate to the changing dynamics of the fishery.

In general, harvest strategies should be pragmatic (or appropriate to the fishery given the economic and data limitations), cost effective, transparent, easy to understand to all stakeholders, and adaptive (able to change as more information becomes available).

Five scoring issues are considered under this PI:

(a) Harvest strategy design

(b) Harvest strategy evaluation

(c) Harvest strategy monitoring

(d) Harvest strategy review

(e) Shark finning

(f) Review of alternative measures

Scoring issue (a) – Harvest strategy design

The first scoring issue looks at the design of the harvest strategy and the degree of responsiveness to fluctuations in the stock.

Scoring issue	SG60	SG80	SG100
(a) Harvest strategy design	The harvest strategy is **expected** to achieve stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy **work together** towards achieving stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and is **designed** to achieve stock management objectives reflected in PI 1.1.1 SG80.

Good practice

It is only at SG80 and SG100 that there is a requirement for the harvest strategy to be responsive to the state of the stock. The performance level described in SG100 also requires that the strategy has been designed. This implies a clear, fishery-specific strategy tailored to the particular needs of the fishery. There should be evidence that the harvest strategy is updated, as appropriate, to meet management objectives.

What certifiers check

Certifiers begin by seeking to understand all of the component parts of the harvest strategy, in order to determine how these function together and the degree to which they have been designed to suit the needs of the particular fishery. This is likely to include consideration of:

- The stock assessment report for the fishery.
- The fishery management plan and the HCR.
- The fishery technical regulations (landings and effort restrictions, technical conservation measures, fleet licencing and capacity).
- The process of review and evaluation (although this is more subject of later scoring issues within this PI).
- The findings of any past reviews or evaluations of fishery or management performance.

Scoring issue (a) – Harvest strategy design

Key questions to determine where further action is needed

Q Does the stock assessment provide advice on overall management controls, and is management responsive to the advice given?

Q Is there a management plan which sets out objectives for the fishery and an overall strategy detailing how this will be achieved through stock assessment, harvest rules (and reference points), fishery controls and technical measures, appropriate enforcement and monitoring of performance?

Q Has it been demonstrated that the components of the management harvest strategy have been designed to work together to achieve the aims expressed by management objectives (including, but not limited to target reference points).

Examples of scoring rationales

Scoring issue (a)	Fishery Example
SG60	*Skipjack tuna longline fishery:* There are a number of elements that make up the current harvest strategy and the state of the stock provides some evidence that the harvest strategy has been effective to date. However, there is a need for further development of the harvest strategy to ensure that it is responsive to the state of the stock and that agreed monitoring, analysis, assessment and HCRs work together to achieve management objectives with increased integration of management actions across the entire stock.
SG80	Sian Ka'an and Banco Chinchorro Biosphere Reserves spiny lobster (Certified 2012): The harvest strategy includes access controls, seasonal and area closures, effort controls, gear restrictions, and size limits supported by good monitoring and control at the local scale through the fishing cooperatives (although federal monitoring and enforcement is considered to be less effective). All the elements of the harvest strategy have been examined and updated over time to meet the main management objective: maintain the reproductive stock and recruitment at levels close to maximum productivity. All the information available, including stock assessments, trends in relative abundance, and catch levels suggest that the harvest strategy works to achieve stock management objectives.
SG100	Suriname Atlantic seabob shrimp (Certified 2011): The trawl fishery has a restricted number of licenses and restricted geographic range with no access in the coastal waters inside of a 10 fathom line, which avoids overlap and conflict with artisanal fishing activities and helps reduce the quantity of juveniles occurring in both the target catch and the bycatch. More recently the harvest strategy has been further developed and codified with the following additional management control elements: (a) a revised upper annual limit for the number of seabob trawl fishing licenses; (b) an agreed upper annual limit for the total days at sea by the trawl fleet; (c) agreed target, trigger and limit catch rate thresholds that reflect the state of the stock relative to the agreed target and limit reference points and which incorporate a degree of precaution and are consistent with those adopted management objectives for the seabob. The additional elements listed at (a), (b) and (c) have been specifically designed for the fishery and contribute directly to making the harvest strategy responsive to the state of the stock.

Scoring issue (b) – Harvest strategy evaluation

The intent of the second scoring issue for PI 1.2.1 is to ensure that the harvest strategy has received appropriate evaluation showing that it is working or likely to work.

Scoring issue	SG60	SG80	SG100
(b) Harvest strategy evaluation	The harvest strategy is **likely** to work based on prior experience or plausible argument.	The harvest strategy may not have been fully **tested** but evidence exists that it is achieving its objectives.	The performance of the harvest strategy has been **fully evaluated** and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.

Good practice

For both SG80 and SG100 there must be evidence that the harvest strategy is working. This implies that the strategy has been in place for sufficient time to show results or that previous experience shows that it is likely to work. For SG100 there is a requirement for full evaluation of the harvest strategy.

What certifiers check

Certifiers will seek to understand how long the harvest strategy has been in place, in order to score a fishery's current performance in context. They are likely to refer to:

- Stock assessment reports – in particular since the implementation of the harvest strategy.
- A documented evaluation of the harvest strategy.

Scoring issue (b) – Harvest strategy evaluation

Key questions to determine where further action is needed

Q Does the stock assessment (and profile of the stock status) indicate that the harvest strategy is working?

Q Has there been an evaluation carried out of the performance of the management system (harvest strategy)?

Q If there has not been a full evaluation, are structured logical arguments and analysis presented to support the choice of strategy?

Q If the harvest strategy (or significant components of the harvest strategy) is new, has it been demonstrated that it is expected to work?

Examples of scoring rationales

Scoring issue (b)	Fishery Example
SG60	*Lobster trap fishery:* The harvest strategy is newly designed and implemented, therefore there is no direct evidence the strategy is working and it therefore cannot meet the SG80. However, based on the results seen in fisheries of similar size and scale managed by the same management body and on generic analyses of fisheries of this type reported by other researchers it is regarded as likely that the strategy will work, thus SG60 is met.
SG80	*Albacore tuna pole and line fishery:* The stock assessment provides an independent assessment of the effectiveness of management in controlling SSB and limiting the exploitation rate. The robust state of the albacore stock provides evidence that the strategy is achieving its objectives. However, this has not been fully tested. For example, no management strategy evaluations have been conducted, and although uncertainty has been reported as part of the stock assessment, it is not clear how this is being incorporated into the decision-making process. Management measures are being put in place to curb expansion of the fishery; however, the effectiveness of the latest management plan will need to be monitored and, in time, fully evaluated.
SG100	Australia Northern prawn (Certified 2012): The harvest strategy has been tested using the Northern Prawn Fishery Management Strategy evaluation. The Harvest Strategy is regularly reviewed and updated as appropriate by the Northern Prawn Fishery Resource Assessment Group. The performance of the harvest strategy has been fully evaluated and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels. The evaluation showed that the harvest strategy performed well in terms of meeting the Harvest Strategy objectives under a number of different scenarios that included different sources of uncertainty.

Scoring issue (c) – Harvest strategy monitoring

The intent of the third scoring issue for PI 1.2.1 is to ensure that all fisheries have in place appropriate monitoring which will provide information to determine whether the harvest strategy is working.

Scoring issue	SG60	SG80	SG100
(c) Harvest strategy monitoring	Monitoring is in place that is expected to determine whether the harvest strategy is working.		

Good practice

Fisheries should have monitoring in place to enable determination of whether the harvest strategy is working or not.

What certifiers check

Certifiers will seek to understand the monitoring that occurs in the fishery. This is likely to be informed by stakeholder meetings with fishery managers and stock assessment scientists. It may also be informed by reference to the following documents:

- Stock assessment and advice.
- Fishery regulations.
- The management plan.
- Operating Procedures of the various fishery agencies.
- Logbooks.

Scoring issue (c) – Harvest strategy monitoring

Key questions to determine where further action is needed

Q Is monitoring undertaken, which would allow determination of whether the harvest strategy is working?

Q Is all of the relevant data for undertaking routine stock assessment monitored at the required level?

Q Does monitoring provide information on other aspects of the harvest strategy, such as fleet operational characteristics and performance?

Examples of scoring rationales

Scoring issue (c)	Fishery Example
SG60	Sian Ka'an and Banco Chinchorro Biosphere Reserves spiny lobster (Certified 2012): The following monitoring is in place in the fishery: monitoring the distribution of catch and fishing effort by area and gear; tagging studies to assess growth, mortality and migration patterns; monitoring recruitment of post-larvae (as a good index of recruitment); monitoring environmental variables; surveys of spawning and nursery areas; evaluation of artificial refugia in comparison with other fishing methods; and stock assessment studies. While this research/ monitoring is conducted by different institutions at variable times and locations, monitoring information is produced regularly and is used to inform the harvest strategy. The information provided above indicates that the harvest strategy has adapted to the changes and needs of the fishery.
SG80	No scoring guidepost at the 80 level.
SG100	No scoring guidepost at the 100 level.

Scoring issue (d) – Harvest strategy review

The intent of the 4th scoring issue for PI 1.2.1 is to determine whether the overall harvest strategy is subject to periodic review and improvement.

Scoring issue	SG60	SG80	SG100
(d) Harvest strategy review			The harvest strategy is periodically reviewed and improved as necessary.

Good practice

Credit for this scoring issue only occurs at the SG100 level. For this, the harvest strategy should be subject to periodic review, in order to allow improvements.

What certifiers check

Certifiers will discuss with key stakeholders in the fishery, notably fishery managers and stock assessment scientists, the improvements that have occurred in the harvest strategy in recent years, what process highlighted the need for any such changes and in particular, whether a review process of the overall strategy led to the changes. Where available they are also likely to review:

- Past harvest strategy evaluations to determine the degree to which past recommendations have been implemented by management.
- Any regulatory requirements of specifications in the management plan detailing the process for harvest strategy review.

Scoring issue (d) – Harvest strategy review

Key questions to determine where further action is needed

Q Is there a process of periodic review of the overall harvest strategy, that is intended to lead to on-going refinement and improvement in the design of the harvest strategy?

Q Are there examples of where elements of the harvest strategy have been changed as a result of monitoring indicating that change is required?

Q Does the process of stock assessment and advice also review monitoring of information and act as a review of the wider harvest strategy?

Q Are there meetings between fishers, scientists, and other stakeholders, as well as periodic analysis of fishery dependent information, to review and shape the adaptive management of the fishery?

Examples of scoring rationales

Scoring issue (d)	Fishery Example
SG60	No scoring guidepost at the 60 level.
SG80	No scoring guidepost at the 80 level.
SG100	Mexico Baja California pole and line skipjack tuna (Certified 2012): The harvest strategy is under a constant process of review by Inter-American Tropical Tuna Commission (IATTC) and it may be expected that the harvest strategy will be changed in response to identified issues. An example is the movement from an analytical assessment with known considerable uncertainties to the indicator approach used in recent years, following the recommendations of a review. This is considered to give more scientifically robust indications of stock status.

Scoring issue (e) – Shark finning

Scoring Issue (e) only applies in event that the target species in the fishery (i.e. the species being scored in Principle 1) is a shark species. Where this is the case, the fishery must show that shark finning is not occurring.

Scoring issue	SG60	SG80	SG100
(e) Shark finning	It is **likely** that shark finning is not taking place.	It is **highly likely** that shark finning is not taking place.	There is a **high degree of certainty** that shark finning is not taking place.

Good practice

Good practice simply requires a higher degree of certainty and a stronger empirical basis for confidence that shark finning is not occurring. Sharks should be landed with fins naturally attached and there should be validation that sharks are not being finned. The MSC recognises that in some fisheries this may be practically difficult to achieve when sharks are destined for processing and utilisation, and therefore also recognises that landing fins and other shark parts separately, including as meal, may be allowed if adequately regulated and observed. Where sharks are processed on board, there must be rules in place on management of sharks and documentation of destination of shark body parts.

What certifiers check

Certifiers will refer to the following key documents:

- Regulations governing the management of shark species.
- Regulations governing the on-board processing of shark species.
- Records of inspections/observations providing validations of shark finning policies.
- Documentation of shark body parts.

Scoring issue (e) – Shark finning

Key questions to determine where further action is needed

Q Do management measures within the fishery prohibit shark finning?

Q Is there a regulatory requirement that all shark fins and carcasses shall be landed together in compliance with a ratio specifically relevant for the species, fishing fleet and initial post-catch processing (e.g. fresh/frozen/dried).

Q Is there reliable external validation of the vessels' activities to confirm that it is likely that shark finning is not taking place?

Examples of scoring rationales

Scoring issue (e)	Fishery Example
SG60	*Mako shark longline fishery*: There are regulations that prohibit shark finning. Fins are removed onboard during processing and landed separately to the body of the shark in accordance with 3.5 fin to greenweight ratio (as mandated in government regulations). The ratios for each species have been set based on statistical analysis of at-sea sampling data. There is 5% onboard observer coverage and all landing are subject to dockside inspection.
SG80	*Blue shark longline fishery*: Although the target species is shark, regulations state that shark finning is not permitted and all sharks must be landed with fins naturally attached. Although there is a potential market for shark fin the inspection regime places considerable focus on ensuring that the shark finning regulation is complied with. Vessels are required to have VMS and only land at designated ports where dockside inspection of the catch is carried out to ensure that all shark are landed with fins naturally attached.
SG100	*Dogfish hook and line fishery*: Regulations for dogfish fishery state that any fins landed must be naturally attached to the remainder of the shark. This means that there must be some portion of uncut skin connecting the fins to the body. Fins are partially cut to allow them to be folded flat against the fish, and to allow for bleeding, but they remain naturally attached to the trunk of the shark when landed. There is 20% onboard observer coverage and dockside inspection.

Scoring issue (f) – Review of alternative measures

This scoring issue applies when the fishery has unwanted catches of the target species (e.g. of a certain size or at certain times of the year, either for biological, economic or regulatory reasons). This scoring issue requires that fisheries review whether the use of alternative measures could reduce the mortality arising from unwanted catches from the target stocks.

Scoring issue	SG60	SG80	SG100
(f) Review of alternative measures	There has been a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock and they are implemented as appropriate.	There is a **biennial** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock, and they are implemented, as appropriate.

Good practice

Good practice simply requires regular review. At the SG80 and SG100 there is also a requirement to implement alternative measures where it is appropriate to do so.

What certifiers check

Certifiers will refer to the following key documents:

- Any reviews that have been undertaken of the fishing gear under assessment in relation to catches of the target species.
- Any reviews of the practical and economic implications of introducing alternative gears in order to seek to minimise unwanted catch.
- Any reviews of additional management measures (such as spatial or temporal restrictions) designed to limit catches of unwanted catches of the target species.
- Evidence of implementation of any review recommendations (observer reports or evidence from inspections).

Scoring issue (f) – Review of alternative measures

Key questions to determine where further action is needed

Q If the fishery sometimes has an unwanted catch of the target stock, has a review been undertaken to determine how this may be minimised?

Q Is any review of possible alternative measures revisited and revised, perhaps as new technologies become available or more cost effective?

Q Are recommendations from reviews of alternative measures implemented as suggested and is there evidence of this?

Examples of scoring rationales

Scoring issue (f)	Fishery Example
SG60	*Tropical sole gillnet fishery:* The fishery is managed by means of quota and with minimum landing sizes. Unwanted catches are therefore those of the target species below the minimum landing size or on-going catch of the target species after the annual quota has been exhausted. Over the years the mesh size in the fishery has gradually increased to reduce catches below minimum landing size, although there has been some resistance to further increases in mesh size due to the perceived loss of some valuable bycatch species. In the last few seasons the quota has not been exceeded therefore there has been limited unwanted catch, however management have given consideration to whether quota should be allocated individually to enable fishers to better manage their fishing entitlements and avoid the risk of the target species becoming an unwanted end of season catch. Given that there has been some consideration (and practical trial) of different mesh sizes and the fact that management has previously reviewed how quota management might influence the amount of unwanted target species, it can be considered that the intent of SG60 is met. However, this falls short of the regular review or implementation described by SG80.
SG80	*Atlantic octopus pot fishery:* Fishers use pots to catch octopus and any under the legal landing size are discarded. In recent years this has amounted to 10-15% of the total catch. Estimates on survival of any discarded octopus are based on an assessment of condition that they are released in and are expected to be at least 50%. A review of measures to reduce discarded species (the octopus plus a lobster species for which the fishers do not have quota) was undertaken in 2014 by the local management agency. These measures included replacing pots currently used with some fitted with escape hatches, avoiding areas with high density of lobsters and providing crew with training on safe handling practices to improve post-release survivability. The agency concluded the measures to replace the pots with those containing escape hatches would be more effective at minimising catches of undersized lobster but that the costs of replacing all of the gear would make the fishery financially unviable. However, the lobster pots are currently replaced every 3-5 years, so they have recommended that fishers purchase the pots with escape hatches when it is time to replace their gear. The density of lobsters was found to be fairly even over the fishing grounds, so there was no potential for additional minimisation of capture of this species through avoiding certain areas. The agency did determine that training for crews to more effectively handle octopus so that they had greater survivability could further reduce mortality of these discards, so this was implemented in December 2014. The minutes of the meeting of the management agency showed that another management review of alternative measures (including any pots purchased that have escape hatches) is scheduled for 2017. As a review had

Scoring issue (f) – Review of alternative measures

Examples of scoring rationales – *continued*

Scoring issue (f)	Fishery Example
SG80 - *continued*	been undertaken and measures either implemented or justification as to why they have not been (cost prohibitive), and another review is scheduled within the next 5 years, the SG80 is met. The SG100 is not met as the review is not biennial.
SG100	*Tropical snapper pole & line fishery:* This fishery is managed by a local management authority. This authority sets minimum landing sizes for snapper, and any undersized snapper are returned to the water. In 2012, about 5% of the catch was generally undersized. No specific studies had been done to show the mortality rate. However, the authority implemented a biennial review of measures used to manage this species, including ensuring that undersized species are not caught or that they are given the best chance of survival if released. A consultant was hired to undertake the first review in 2012 and he found that prohibiting fishing in certain areas was likely to prevent capture of juveniles in the first place. These areas were closed from the start of the 2013 season to protect the juvenile stock. Another review of measures was undertaken in 2014 but no additional measures were identified that would be more effective than those currently in place and no additional areas were identified for potential closures. Since the measure was introduced the number of undersize snapper caught has decreased to be about 2% of the overall catch and the total catch rates have not decreased. The next review is scheduled to take place in 2016. The SG100 is met.

Challenges and solutions to meeting PI 1.2.1

A good harvest strategy requires holistic management oversight at the level of the stock. This implies that there is good understanding of the stock boundaries and joined up management where a stock crosses management jurisdictions. Once these foundations are in place, a good harvest strategy requires all of the component parts - monitoring, stock assessment, HCRs and management actions – to work together to bring about management objectives, typically reflected in the target and limit reference points, but also inclusive of wider management objectives related to ecosystem (P2) or fleet, governance and socio-economics (P3).

In many developing countries many of the component parts of a harvest strategy are present to some degree, however demonstrating that these are working together at an appropriate scale can be a challenge. Harvest strategies can be highly diverse in nature and data needs, so there is not always a one size fits all solution. Ensuring that the elements of the harvest strategy combine effectively is likely to involve good cooperation between agencies, agreements or combined management plans across jurisdictional boundaries. In addition, the effectiveness of a harvest strategy is greatly enhanced by a culture of monitoring and review to enable adaptive management, which is not only responsive to the state of the stock, but also able to address wider management issues as they arrive.

Sometimes there can be a lot of attention placed on getting the component parts of the harvest strategy in place (e.g. ensuring that there is a good stock assessment or an effective deterrent against illegal fishing) and less attention is paid to the strategic oversight which ensures the management system is fit for purpose. Assuming the component parts of the management system are in place, the development of strategic oversight need not be expensive, but it does require recognition of the need for such oversight.

Example actions to improve performance for PI 1.2.1

Process Chronology				Management Actions	
1	2	3	4	Example action	Scoring issue
●				Set out the component parts of the existing harvest strategy for the target fishery, using the description for what a harvest strategy could and should contain, (control rules and tools, information base, stock status monitoring, responsiveness of management to stock status) outline how the monitoring, regulations, control rules, and stock assessment all fit together. Determine where there are gaps within the overall design of the strategy.	(a), 1.2.2
●				Detail how the performance of the harvest strategy is currently monitored, reviewed and where necessary amended in response to the state of the stock.	(b), (c), (d)
	●			Where the harvest strategy is missing, or gaps are evident from the reviews undertaken in step 1, then a harvest strategy should be developed. This is likely to be a process which requires the input from a wide range of stakeholders and expertise and should be closely linked to the drafting of a management plan for the fishery.	(a)
	●			Undertake simulation testing to demonstrate that the proposed harvest strategy is likely to work.	(b)
	●			Where there is a harvest strategy in place, but there is a lack of monitoring or evaluation to indicate the degree to which the harvest strategy is achieving its objectives, appropriate monitoring and a program for evaluation should be implemented.	(c), (d)
	●			Where the target fishery is a shark species the harvest strategy should include specific focus on shark finning and should detail regulations and monitoring required to counter this practice.	(e)
	●			The harvest strategy should outline a process to consider and review on a timely basis alternative measures that will ensure unwanted catches of the target species will be minimised. This should be informed by empirical data on catch profiles.	(f)
		●		An appropriate degree of consultation should be carried out on the proposals for the harvest strategy to ensure potential technical or practical challenges to implementation are appropriately addressed.	3.1.2
		●		Ensure that all parts of the harvest strategy are enacted and implemented and, where necessary appropriately staffed and resourced.	(a)
			●	Undertake an evaluation of the performance of the harvest strategy as per the timetable set out in the fishery management plan.	(b)
			●	Implement changes to management where indicated as necessary in the harvest strategy evaluation.	(a), (b)

Notes

1.2.2 Harvest control rules and tools

Performance Indicator overview

PI 1.2.2 assesses whether a fishery has well defined and effective harvest control rules (HCRs) in place. An HCR is a set of pre-agreed rules or actions used for determining a management action in response to changes in indicators of stock status with respect to defined 'trigger' reference points. HCRs are sometimes described as a set of 'if' and 'then' rules, defining the circumstances that will lead to what management responses (i.e. *if the stock falls to x, then the management will respond by y*).

HCRs should be designed to achieve a medium or long-term target reference point while also safely avoiding a limit reference point. The HCRs should also define how a stock will be rebuilt to the target reference point, at times when it falls below this level. Typically the rule will be phrased in terms of changes in stock status triggering changes in exploitation rate (catches and/or fishing effort). HCRs should be based on plausible hypotheses about resource dynamics and be reasonable and practicable, in the context of the scale of the fishery, to ensure they are likely to achieve the management goals. In general, HCRs should be economically sound, compliant with national regulations and/or international fishery agreements, based on relevant international experiences, supportive of ecosystem-based fisheries management, and compatible with the biology of target stocks.

HCRs are a critical component of precautionary management frameworks aiming at replacing ad hoc advice and decision-making with a more rigorous and consistent management structure. An HCR carries several advantages. By agreeing a set of rules by the fishery, the management system becomes both more transparent and more predictable, particularly where there has been effective stakeholder participation and consultation in the development of the rules. It is often easier and less controversial to agree on management actions, in the event of certain situations, before the need actually arises. If and when the stock level indicators highlight a need for a reduction in exploitation rate, there may be less socio-economic or political pressure to make short term management decisions which may be at odds with the long term objectives for the stock. This should result in a more timely return to target levels.

The establishment of HCRs also enables the performance of a clear set of rules to be modelled, tested or evaluated. Typically HCRs will be agreed for a certain time period, and will be subject to periodic testing and review. Rather than management over-riding or ignoring the HCR, it is good practice to periodically test and amend the rule, re-engaging in the participatory and consultative process to do so.

For key low trophic level (LTL) species, which are particularly important as food for other species in the ecosystem, the HCRs should maintain stocks at higher than normal levels.

Three scoring issues are considered under this PI:

(a) HCRs design and application

(b) HCRs robustness to uncertainty

(c) HCRs evaluation

Scoring issue (a) – HCRs design and application

The first scoring issue for PI 1.2.2 seeks to verify that appropriate harvest control rules (HCR) are in place, capable of both limiting exploitation rates as the PRI is approached and keeping the stock fluctuating around a level consistent with MSY.

Scoring issue	SG60	SG80	SG100
(a) HCRs design and application	**Generally understood** HCRs are in place **or available** that are **expected** to reduce the exploitation rate as the point of recruitment impairment (PRI) is approached.	**Well defined** HCRs are **in place** that **ensure** that the exploitation rate is reduced as the PRI is approached, are expected to keep the stock **fluctuating around** a target level consistent with (or above) MSY, or for key LTL species a level consistent with ecosystem needs.	The HCRs are expected to keep the stock **fluctuating at or above** a target level consistent with MSY, or another more appropriate level taking into account the ecological role of the stock, **most** of the time.

Good practice

Good practice requires that there are HCRs in place. For SG80, the rules should be both 'well defined' and 'in place'. For SG100 the rule should also aim to keep the stock 'at or above' a target level consistent with MSY, whilst demonstrating that consideration is also given to the ecological role of the stock.

What certifiers check

Certifiers will wish to speak to fishery managers to determine exactly what the HCR is that governs their decisions on the exploitation rate in the fishery. Equally important is the status of the rule, in terms of implementation. Details may be available in the following documents:

- Legislation, regulations or licencing arrangements relating to the HCRs.
- Management plans, defining how the HCRs will be applied.
- Reviews of evaluations that have contributed to the design and selection of the HCR.
- Where well defined HCRs may be missing, it may be important to consider the management authorities understanding of HCRs and application in other fisheries within their jurisdiction.

Scoring issue (a) – HCRs design and application

Key questions to determine where further action is needed

Q Is there a binding HCR that has been agreed and implemented for the fishery under assessment that is 'well-defined' and exists in some written form?

Q If there is not yet a binding HCR in place, are there 'generally understood' HCRs, that have been applied in some way in the past to maintain the stock at healthy levels (allowed at the SG60 level).

Q If there is not yet a binding HCR in place, but there is an argument that the stock is consistently above MSY, do other fisheries within the jurisdiction have HCRs in place, to provide an indication that a similar approach is 'available'.

Q Does the target stock referred to in the HCR give consideration to the ecological role of the target stock – in particular for key LTL species?

Q Are adequate monitoring and management tools in place to ensure that the exploitation rate could and would be reduced in the event of a decline in stock status, approaching the PRI?

Examples of scoring rationales

Scoring issue (a)	Fishery Example
SG60	*Lobster trap fishery:* Well defined HCRs relative to target and limit reference levels have not been formally agreed. However, fishing cooperatives have historically had control mechanisms to regulate the amount of effort exerted on the resource, particularly during times of crisis. The fishing cooperatives have a self-imposed co-management system in place, which may also compensate for the market-driven actions. They take the initiative to propose and implement management tools (such as changes in size limits, closed areas and closed seasons) that promote conservation of the resource in response to signs of stock decline (lower catches). Accurate and up to date records are kept of catch and effort, supported by annual stock assessment which enables an on-going review of stock status, which informs the need for management intervention. *Skipjack tuna pole and line fishery:* HCRs are in place to manage bigeye and yellowfin tuna exploitation, but these have not yet been applied explicitly to skipjack, since skipjack stocks are currently above the levels at which effort reductions or other controls would be needed (B>B_{MSY} and not expected to fall). Evidence shows that the HCRs used for bigeye and yellowfin are effective in controlling exploitation as all indicators have been within their desired ranges in recent years, well above the PRI. It is expected that the same HCRs would be applied to skipjack as and when needed to achieve the stated target levels, and appropriate HCRs are thus regarded as 'available' to the fishery.

Scoring issue (a) – HCRs design and application

Examples of scoring rationales – *continued*

Scoring issue (a)	Fishery Example
SG80	Suriname Atlantic seabob shrimp (Certified 2011): The HCR that is in place is well-defined and is consistent with the agreed harvest strategy that aims to maintain the seabob stock at or above the MSY level. The agreed trigger point has been set at B_{MSY}, and this is intended to propel management to implement corrective action (through limiting days at sea) so as to maintain the fishery safely above the limit reference point and move it again towards the target point that is slightly above B_{MSY}.
SG100	*Snapper longline fishery:* Clear documented HCRs are agreed by management, following widespread consultation and are enshrined in binding legislation. This is used to determine the TAC based on annual stock assessment advice. A modeling projection of the TAC levels in the HCR, based on the current stock assessment, indicates that if this catch is applied over 35 years, there will be a 10% chance or less of the spawning stock falling below 20% of the pre-exploitation level and the median spawning biomass will remain at or above 50% of its pre-exploitation level. Allowances are made for the ecological role of the stock as a minor forage species (at juvenile sizes) by keeping the stock at a higher level than would be required for a single species MSY level (estimated at 35% of pre-exploitation level).

Scoring issue (b) – HCRs robustness to uncertainty

The second scoring issue focuses on the degree to which uncertainties are recognised and accounted for in the HCRs. Uncertainties could include incorrect assumptions in the stock assessment, uncertainty over the effects of environmental changes, uncertainty about life history attributes of the target species, data and reporting errors, uncertainties over stock boundaries, unaccounted fisheries mortality, such as from IUU etc.

Scoring issue	SG60	SG80	SG100
(b) HCRs robustness to uncertainty		The HCRs are likely to be robust to the main uncertainties.	The HCRs take account of a **wide** range of uncertainties including the ecological role of the stock, and there is **evidence** that the HCRs are robust to the main uncertainties.

Good practice

This scoring issue requires that the main uncertainties are taken into account in the HCR. SG100 requires that a wider range of uncertainties (including ecological uncertainties) are not only considered but that there is evidence that the HCRs are robust to these uncertainties (e.g. through simulation testing).

What certifiers check

The key stakeholders for this scoring issue are the fishery scientists involved in designing and testing the HCR. Certifiers will be keen to discuss the uncertainties that have been considered in the design of the rule and the degree to which these have been tested.

- A document detailing the development and testing of the HCR.
- An evaluation of the HCR.

Scoring issue (b) – HCRs robustness to uncertainty

Key questions to determine where further action is needed

Q Did the development of the HCR specifically acknowledge that there were uncertainties that would affect the robustness of the rule and were the effects of possible errors accounted for in the design of the rule?

Q Was simulation testing carried out on the rule to test its robustness to these uncertainties; or is there evidence from similar fisheries that supports the use of the HCRs?

Q Is explicit consideration given to the uncertainty over the ecological role of the target stock (such as in relation to predator – prey interactions) in the design of the HCR?

Examples of scoring rationales

Scoring issue (b)	Fishery Example
SG60	No scoring guidepost at the 60 level.
SG80	Hastings fleet Dover sole (Recertified 2012): The main uncertainties which affect the HCRs are some uncertainty in the overall catch levels through underreporting and misreporting into and out of other areas. These uncertainties have reduced in recent years but they are taken into account in the stock assessment process which underpins the setting of the annual TAC. There is no evidence that a wide range of uncertainties has been explored in relation to the HCRs in particular the technical measures.
SG100	Suriname Atlantic seabob shrimp (Certified 2011): The assessment model, which informs the design of the current rule, provides information on the degree of uncertainty in estimating current levels of biomass and fishing mortality relative to the agreed management reference points. Those target and limit reference points currently incorporated into the HCR, have been established slightly above recommended levels (as per the FCR), to account for the lack of specific measure of spawning biomass and also considering the low trophic level of seabob. The trigger point, set at the MSY level, will help to maintain the stock well above the limit reference point. The robustness of the HCR to uncertainties in key assumptions about stock and fishery conditions has been demonstrated with simulation modeling.

Scoring issue (c) – HCRs evaluation

The final scoring issue of PI 1.2.2 examines the extent to which it has been demonstrated that the tools used to limit exploitation, as per the requirement of the HCR, are or would be effective. For example, were the HCR to trigger a reduction in effort, is there evidence that this would have the intended effect on limiting the overall exploitation rate?

Scoring issue	SG60	SG80	SG100
(c) HCRs evaluation	There is **some evidence** that tools used **or available** to implement HCRs are appropriate and effective in controlling exploitation.	**Available evidence indicates** that the tools in use are appropriate and effective in achieving the exploitation levels required under the HCRs.	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the HCRs.

Good practice

Good practice requires firstly that the tools are already in place, for example there is already a reactive system of effort or catch control, and secondly that it can be demonstrated that the tools are effective at controlling the exploitation rate as required by the HCR.

What certifiers check

Certifiers will first consider whether the tools used by the HCR to limit exploitation (for example TAC or effort controls) are in place already. For this it will be necessary to consult fishery managers and refer to relevant regulation. Secondly certifiers will check whether the appropriateness and effectiveness of these tools for limiting the exploitation rate has been evaluated. Key documents are likely to be:

- A document detailing the development and testing of the HCRs.
- Regulatory evidence of quota, effort restriction, area or seasonal closures or any other measures applied in an adaptive manner as part of the HCR.
- An evaluation of the current levels of exploitation rates in the fishery, and their position relative to F_{MSY}.
- If HCRs are regarded as being 'available' at SG60 score, assessments showing that such HCRs are currently being effectively used by the same management agency on at least one other species of similar importance (i.e. of a similar average catch levels and value).

Scoring issue (c) – HCRs evaluation

Key questions to determine where further action is needed

Q Are the tools which would limit exploitation rate, when required by the HCR, already in use?

Q Does past experience in the fishery provide evidence that the tools are effective in limiting exploitation rate and resulting in the stock fluctuating around a target (approximately) consistent with MSY?

Q Where fishing mortality rate is estimated, is F currently less than F_{MSY} (see guidance to FCR clause SA2.5.6)?

Q Has any simulation testing of the HCR occurred demonstrating that the selection of tools used by management to limit exploitation, as required, are expected to be effective?

Examples of scoring rationales

Scoring issue (c)	Fishery Example
SG60	*Tuna pole and line fishery:* Although there are no well-defined HCRs in place, tools to control the rate of exploitation are in place. These include quota restriction as well as supporting measures such as licencing and logbooks. Licencing and quota restriction have been highly effective in controlling exploitation in other fisheries, and depending on the design of the HCR when it is formally adopted, these measures should be appropriate for the application of the rule. The existing status of the stock provides the evidence that the approach used have been appropriate and effective in controlling the stock.
SG80	Suriname Atlantic seabob shrimp (Certified 2011): Taken in combination, the limited entry system and a restriction on days at sea are appropriate and effective in ensuring implementation of the HCR. The satellite VMS has been operational for some time and is an appropriate and effective tool in monitoring vessel activity, including total days-at-sea, time spent fishing at each location identified and compliance with the closed area regulation. The VMS data, together with seabob trawl fishery activity data summaries provided by the processing plants, are housed in databases maintained by the national fisheries authority and are the main data required by the present assessment model to determine seabob exploitation levels, as required under the HCR.
SG100	*Cockle hand rake fishery:* Ongoing target stock status, oystercatcher population status (as a key dependent predator) and cockle landings are routinely monitored. The evidence shows that required exploitation rates are being maintained, notably TACs have not been exceeded and target stock levels are maintained. This demonstrates that the mechanisms for maintaining exploitation at levels required in the HCR are achieving the objective and thus are effective.

Challenges and solutions to meeting PI 1.2.2

An HCR implies the need for quantitative stock assessment and reference points, so these need to be put in place initially. Ideally an HCR would also include empirical modelling to assess the effectiveness under different scenarios. This approach will be challenging for certain developing countries that lack the information, tools or technical capacity to develop either the assessments or the resulting rules. However, HCRs can also be based on simple rules, supported by plausible argument and monitored by means of appropriate indicators. Thus, HCRs are not necessarily a constraint for developing countries, although testing and monitoring may require economic and technical resources sometimes not available.

An effective HCR also requires a good degree of participatory development, involving consultation or engagement between managers and fishers. This is vital if the rule is to prove effective and practical in the long run. Where such participatory approaches are not common within the administrations, this can be a challenge. An effective HCR also requires some means of limiting the exploitation where the stock assessment indicates that this is required. A relatively open access fishery which only has technical measures but does not have either quota or effort control may find it difficult to limit the exploitation rate effectively when required to do so. Furthermore, where the HCR (responding to stock status) requires a reduction in exploitation rate, and where this proves unpopular or damages the economically viability of the fleet, it is likely that the controls may prove insufficiently robust, without increased investment in control and enforcement.

Example actions to improve performance for PI 1.2.2

Process Chronology				Management Actions	
1	2	3	4	Example action	Scoring issue
●				Undertake an initial review of the rules which are used to determine the level of exploitation in the fishery, examining how clearly defined they are, the objectives they seek to meet, and the degree to which uncertainties are taken into account.	(a), (b)
●				Undertake an initial review of the tools which are used to set the exploitation rate in the fishery, as determined by the HCRs.	(c)
	●			Develop or refine HCRs which clearly state the key trigger reference points for the stock and defines how the exploitation rate will be adjusted relative to these.	(a)
	●			Add or amend the tools in use to control the exploitation rate (such as quota, effort restriction, technical measures or spatial or seasonal controls), as defined by the HCR. It should be demonstrated that where the application of the HCR requires a reduction in exploitation rate (for example as the PRI is approached), the selected tools will effectively achieve this.	(c)
	●			Ensure that the data collection and monitoring regime, and annual stock assessment cycle is tailored to the needs of both the HCR and the tools which are used to control the exploitation rate. This may require different indicators to be monitored, or for enforcement to focus on new areas of risk.	1.2.3, 1.2.4
		●		There should be a full consultation/stakeholder engagement on the new proposal for the HCR, including any trigger reference points proposed, and how they will maintain the stock above the PRI and achieve a target consistent with MSY or other productive level. The tools that will be used to govern the exploitation rate should also be explained. Industry support can be an important factor in the success of the HCR and its application.	3.1.2
		●		The HCR and the tools used to apply the HCR should be implemented. This may require the drafting of amendments to legislation, or the inclusion within a Fishery Management Plan. It may also require personnel or budgetary changes to ensure that all practical steps required to apply the HCR are in place.	(a), (c)
			●	Continue to set the exploitation rate in the fishery according to the HCR. Where these are deemed out of date or inappropriate they should be subject to full consultative review prior to amendment.	(a), (c)
			●	Undertake periodic evaluation of the HCR performance and seek to address any remaining uncertainties.	(b)

Notes

1.2.3 Information and monitoring

Performance Indicator overview

PI 1.2.3 requires that relevant information is collected to support the harvest strategy. Sound and precautionary fisheries management requires the timely use of reliable information to enable analysis and ultimately management feedback response. The information and monitoring required for the management of stocks should include everything that is needed to inform the harvest strategy, HCRs and control tools. For Principle 1, the information that is essential is focused on the requirements for management of the target stock and more specifically, the information required to:

- Undertake a stock assessment;
- Inform the design of the harvest strategy and effective HCRs;
- Operate the HCRs.

Well-designed fisheries monitoring provides operational intellect to inform management decisions and demonstrate to stakeholders that the objectives (in particular the long-term sustainability of the resource) are being met and that the management measures and regulations are effective. Over time, monitoring also enables the detection of trends and provides a baseline from which to inform discussions of future fisheries performance.

The information needs of a given fishery will vary according to the scale and operational characteristics of the fishery, but it is crucial that the information (and the monitoring that provides this) is tailored to the needs of the particular management system. This PI considers not just the breadth and depth of information available but the suitability of that information to support management decision-making processes, as well as its veracity. Typically the following information categories will be required to inform management of the target stock, and will therefore be the focus of this PI:

- Stock structure (geographical range of stock, age, size, sex, genetic structure).
- Stock productivity (maturity, growth, natural mortality, stock recruit relationship, fecundity).
- Fleet composition (effort by gear type or method of capture, fleet characteristics).
- Stock abundance (absolute or relative abundance indices, surrogate indicators).
- Fishery removals (level, size, age, sex, genetic structure of all forms of catch including landing, IUU, discards, recreational, etc.).
- Other data (other information that may influence fish populations such as temperature or weather).

Three scoring issues are considered under this PI:

(a) Range of information

(b) Monitoring

(c) Comprehensiveness of information

Scoring issue (a) – Range of information

The first scoring issue of PI 1.2.3 assesses the range of information that is available and the relevancy of that information, to support management decision-making in relation to the target stock.

Scoring issue	SG60	SG80	SG100
(a) Range of information	**Some** relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.	**Sufficient** relevant information related to stock structure, stock productivity, fleet composition and other data are available to support the harvest strategy.	A **comprehensive range** of information (on stock structure, stock productivity, fleet composition, stock abundance, UoA removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.

Good practice

Good practice requires a more comprehensive range of relevant information. The explicit requirement for information on 'stock abundance, fishery removals and other information such as environmental information or information not directly relevant to the harvest strategy' is only required at the SG100 level. The additional information could, for example, enable managers to consider a wider range of hypotheses or scenarios, enabling the management to be more robust to future changes in the fishery.

What certifiers check

The information requirements for this scoring issue should fit the management system, therefore certifiers will consider the information in the context of the harvest strategy, control rules and tools which control the exploitation level. Certifiers also consider the veracity of the information, so this is likely to be informed by a range of stakeholder input. Key sources for the consideration of this are likely to be.

- The stock assessment – and any background documents, such as benchmark assessments.
- The management plan – particularly where it details monitoring and data collection requirements.
- Any legislation which details approach to data collection or monitoring requirements.
- Evaluations of the HCR or harvest strategy.
- The published outputs of any other monitoring – i.e. fleet composition.
- Research plan.
- Scientific papers.

Scoring issue (a) – Range of information

Key questions to determine where further action is needed

Q Does the fishery have information on stock structure, stock productivity and fleet composition?

Q Is the information that is available adequate to support the harvest strategy?

Q Is monitoring designed to provide the information required for stock management decision-making?

Q Have any information gaps (which may have been highlighted in past evaluations or stock assessments) been addressed?

Q Are there other monitoring programs which, though not directly relevant to the target stock, are referred to by fishery managers to inform their understanding of stock management (i.e. environmental monitoring?)

Examples of scoring rationales

Scoring issue (a)	Fishery Example
SG60	*Sole gill net fishery:* Basic information on the stock structure (geographical range, size composition) is available. Additionally a few studies on size at maturation, growth and fecundity have been conducted [to inform the stock assessment]. The fleet composition for the target fishery is well-known including effort, however comprehensive information on other fleet that target the stock is at a minimum.
SG80	Maldives pole & line skipjack tuna (Certified 2012): Information on stock structure (age, size and sex), stock productivity, growth curves and fleet composition is available to monitor the fishery and assess stock status. Tagging data, catch data and size frequency data are available on a continuing basis for inclusion in stock assessments. However, certifiers concluded that there are some limitations to the data available, e.g. on the effect of environmental variability on the stock, to the extent that the information cannot be regarded as comprehensive.

Scoring issue (a) – Range of information

Examples of scoring rationales – *continued*

Scoring issue (a)	Fishery Example
SG100	Newfoundland & Labrador snow crab (Certified 2013): Detailed information is available from trawl and trap surveys and the at-sea observer program on the distribution and geographical range of the stock, and the age, size and sex structure of the stock. Genetics studies show that there is a single Atlantic wide stock of snow crab and although movement of snow crabs within the wider stock is minimal, stock assessments are carried out at the National Atlantic Fisheries Organisation Division level, as these tie in with management areas. Good information is available on stock productivity in the form of growth and natural mortality rates, including size at terminal moult, and reproductive capacity in the form of maturity and fecundity. Fleet composition is described comprehensively through the licensing system, and daily fishing activity is recorded for the largest vessels through the VMS program. Stock abundance is estimated through indices of exploitable and prerecruit biomass from multi-species trawl surveys and post-season trap surveys, and fishery removals are very closely monitored through the Dockside Monitoring Program, fisher log books and at-sea observer program. Increasingly critical to management of the snow crab fishery is the recognition that snow crab biomass is influenced by environmental and biological factors even in the absence of fishing, and the most recent stock assessments show that CPUE in each of the four UoCs is inversely correlated with bottom water temperature 6-8 years previously, and that the warm oceanographic regime in recent years suggests future declines in recruitment. A comprehensive range of climate indices is also collected for the region and presented at the Regional Advisory Process meetings to inform analysis of future snow crab stock trajectories.

Scoring issue (b) – Monitoring

The focus of the 2nd scoring issue of PI 1.2.3 is on the actual monitoring program. This again considers the relevancy to the harvest strategy, the frequency of monitoring as well as the accuracy and robustness of the monitoring results.

Scoring issue	SG60	SG80	SG100
(b) Monitoring	Stock abundance and UoA removals are monitored and **at least one indicator** is available and monitored with sufficient frequency to support the harvest control rule.	Stock abundance and UoA removals are **regularly monitored at a level of accuracy and coverage consistent with the harvest control rule**, and **one or more indicators** are available and monitored with sufficient frequency to support the harvest control rule.	**All information** required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of the inherent **uncertainties** in the information [data] and the robustness of assessment and management to this uncertainty.

Good practice

Good practice requires management to have a wide range of monitoring, with a high degree of frequency, and a high level of accuracy (including full recognition of inherent uncertainties).

What certifiers check

Certifiers will need to see what information is routinely monitored and by who. To inform this, certifiers may wish to discuss monitoring processes with stock scientists and fishery managers and other relevant stakeholders – such as on-board observers, or those engaged in environmental monitoring programs. Key sources for the consideration of this are likely to be:

- The stock assessment – and any background documents which detail the available datasets.
- The management plan – particularly where it details monitoring and data collection requirements.
- Any legislation which details approach to data collection or monitoring requirements.
- Evaluations of the HCR or harvest strategy.
- Research plan.

Scoring issue (b) – Monitoring

Key questions to determine where further action is needed

Q Are stock abundance and fishery removals monitored?

Q Are all monitoring programs that may be required to enable managers to make informed management decisions in place?

Q Do all relevant monitoring programs happen on time and without interference or complication?

Q Is consideration given to the possible sources of error or uncertainty in the monitoring programs?

Examples of scoring rationales

Scoring issue (b)	Fishery Example
SG60	Faroe Islands queen scallop (Certified 2013): Authorities require skippers to maintain log books, detailing date, fishing location and catch. The authorities do not actively 'monitor' the CPUE series in the main fishing area, although the data is available to do so and they have monitored CPUE in the experimental northern areas. However, CPUE is to some extent monitored by fishermen who apply an informal 'move on' rule (based on kg/hour) when a local scallop bed shows signs of depletion. VMS data is sent to inspection services every two hours and is available to monitor/verify areas fished, including closed areas.
SG80	Suriname Atlantic seabob shrimp (Certified 2011): Catch rate is being used as the measure/index of stock abundance and is recorded as tonnes per day-at sea, consistent with the measure agreed to monitor and enforce the HCR. Vessel captains and the seabob processing plants maintain regular records for each fishing trip and the processing plant data forms are currently made available to inform the assessment process. The established satellite VMS also facilitates independent monitoring of actual fishing effort, recorded as days-at sea and can contribute information on fishing locations, changes in which are important to interpret the catch rate index.
SG100	Gulf of St. Lawrence northern shrimp (Recertified 2014): All information required by the HCR is monitored with high frequency and a high degree of certainty and there is a good understanding of inherent uncertainties in the information [data] and the robustness of assessment. Main stock indicators are essential for assessing status relative to precautionary reference points. These indicators rely on data from the fishery and the annual research survey. Data from the summer fishery are collected systematically and are considered representative of the commercial catch and effort. The survey, in place for many years, follows strict sampling protocols to produce statistically valid results (i.e. biomass/abundance by sex with confidence limits). The simulation model was used in the selection of decision rules and provided a test of the robustness of assessment and management to uncertainty. The model describes and assesses a wide range of uncertainties underlying its performance.

Scoring issue (c) – Comprehensiveness of information

The final scoring issue of PI 1.2.3 requires that there is good information on all other fishery removals from the stock. This is likely to include captures of the target stock by other fleets, discards of the target stock and any IUU related fishing mortality.

Scoring issue	SG60	SG80	SG100
(c) Comprehen-siveness of information		There is good information on all other fishery removals from the stock.	

Good practice

If there is good information on other removals, SG80 is met. The fishery should either be the only one fishing on the stock or information is available on any other fishery or fisheries (including recreational fisheries) that may be targeting the stock.

What certifiers check

Following stakeholder consultation, certifiers will have an understanding of the possible sources of other fishing related mortality, certifiers will then review documents to ascertain the extent to which information of these other possible sources of fishing mortality are recorded. These may include:

- Stock assessment and advice – does this highlight any additional sources of fishing related mortality?
- Evaluations of the performance of the monitoring control and surveillance system, which may provide estimates of IUU catches.
- Breakdown of total catches of the P1 stock by all nations and all gears.
- Studies on bycatch (of the target species, either in the targeted fishery, or other overlapping fisheries).

Scoring issue (c) – Comprehensiveness of information

Key questions to determine where further action is needed

Q Are there other fisheries catching the target stock, whether directed or incidental?

Q Is data (either from routine or periodic monitoring) available to quantify catches of the target stock by other fleets (either landed or discarded), discards in the targeted fishery (either due to high grading, size limits or quota restrictions), illegal fishing, or spoiled catch?

Q Does the stock assessment consider, or seek to quantify these possible other sources of mortality?

Examples of scoring rationales

Scoring issue (c)	Fishery Example
SG60	No scoring guidepost at the 60 level.
SG80	Sian Ka'an and Banco Chinchorro Biosphere Reserves spiny lobster (Certified 2012): The Concessions from the government to the cooperatives (the UoC) preclude harvest of lobster by fishermen other than cooperatives members. Therefore, there are no other official fishery removals. A small amount of poaching occurs from non cooperative members, but the quantity is determined as *di minimus* by enforcement agencies.
SG100	No scoring guidepost at the 100 level.

Challenges and solutions to meeting PI 1.2.3

Despite the importance of monitoring, fishery managers and stakeholders have sometimes struggled to implement effective monitoring programs in fisheries where access to economic and human resources maybe limited. Monitoring programs that have been in place for many years may not be adapted to the requirements of a newer, more adaptive fishery management strategy. Monitoring may historically have focused on priority areas, in particular if resources are limited, such as target fishery removal or fleet statistics. These may also be the most straightforward to monitor and be the ones with the longest time series and clearest departmental oversight. However, some of the more challenging areas to monitor are also important in order to have proper oversight of stock dynamics. Stock productivity, fishery removals, environmental parameters, measures of gear efficiency, bycatch rates and post capture mortality are all likely to be increasingly used to inform the management process. For example, it is likely that some fishery monitoring may have already been in place before the need to undertake an empirical stock assessment was identified. With this requirement for an increased level of analysis, comes an increased data demand, so the monitoring plans, responsibilities, capacity and budgets must be adjusted accordingly.

As a result, even when some monitoring is in place, it is part of the function of management to ensure that monitoring is reviewed and adapted in order to remain relevant to the needs of management.

In order to be efficient and achievable, monitoring programs need to consider costs of data collection, processing and analysis and determine both financial and departmental responsibility. The strategy for monitoring must also be tailored, for example, in some situations sampling at sea may be more relevant than at port monitoring, which in turn will necessitate a certain level of equipment, training and infrastructure.

It is important also that data collection is, where possible, standardised in consistent electronic formats, which should make entry, analysis and reporting more efficient and mean data is readily available for future use. For this, standardised computer use is important within departments. Where fishers themselves are to undertake monitoring, for example by providing information on catch rates, or fishing areas, submission of data in electronic form may be challenging where there are low levels of computer literacy or problems with rural connectivity.

Example actions to improve performance for PI 1.2.3

Process Chronology				Management Actions	
1	2	3	4	Example action	Scoring issue
●				Review all of the information and data monitoring that is currently available to inform the fishery management process. This should include consideration of the adequacy of this data and any uncertainties. Information may be available from a range of sources including research organisations, universities, fishers, NGO's, management agencies, processors, etc. It may also be useful to indicate where responsibility lies for monitoring, the frequency of monitoring and the process by which this informs fishery management decisions.	(a), (b), (c)
	●			Undertake a review of the types of information that will be required for the evolving harvest strategy (as described in 1.2.1), harvest control rule (as described in 1.2.2) and for future stock assessment (as described in 1.2.4). Identify where there are gaps in the existing data (described in step 1), with regard to the needs of future management.	(a), (b), (c)
		●		Plan for the monitoring of any new indicators or the refinement of any existing monitoring programs. This should clearly identify where responsibility for monitoring lies and ensure that all resource and capacity issues relating to future monitoring are addressed. Information may be generated through management agencies, NGO's, fishers, research institutes, etc.	(a), (b), (c)
		●		Ensure fishery stakeholders are engaged in the process of the design of the new monitoring regime, so that there is a good understanding of the needs for effective monitoring and an understanding of how the collected data will be used. This may be an opportunity to address any stakeholder concerns in relation to the new monitoring program (i.e. confidentially of information) or seek additional fishery-dependent input into the data collection program.	3.1.2
		●		Ensure that new monitoring regime is enshrined in the fishery management plan and/or relevant legislation or regulation.	(a), (b), (c)
		●		Begin the new monitoring program and continue with the collection of any previously collected time series of data which may be of value to fishery management.	(a), (b), (c)
			●	Ensure that the outputs of the monitoring program are made available to fishery managers with sufficient frequency and timeliness to enable effective adaptive management. This should clearly highlight to management any underlying assumptions or uncertainties.	1.2.1

Notes

1.2.4 Assessment of stock status

Performance Indicator overview

The final Principle 1 PI requires that there is an adequate assessment of the stock status. There are many different approaches to stock assessment and a key consideration for this PI is the appropriateness of the assessment method to the scale of the fishery. There are also requirements for reference points, whether the stock assessment identifies major sources of uncertainty and whether the assessment method has been evaluated and internally or externally peer-reviewed.

The complexity of assessment methods used for a given stock generally reflects the availability of data and the value or importance of the fishery. Most large scale, industrial fisheries generate enough revenue to justify wide ranging data collection and sophisticated stock assessments.

For small scale and lower value fisheries, conducting surveys and collecting fishery-independent data is often difficult or the costs cannot be justified. However, effective management still requires a reliable understanding of stock status and trends in order to inform adaptive stock management. To be classified as an assessment, an analysis must at least produce some measure of stock or fishery status relative to a reference point or benchmark such as a fishing target or an overfishing limit. When possible, assessments should consider biological characteristics of the species (e.g. natural mortality, growth rates) as well as account for main uncertainties.

There are a wide range of stock assessment methods, requiring different levels of input data. Not all are necessarily model based, or reliant on fishery-independent survey data. However, it is important that whatever method is used, it seeks to identify stock status relative to either analytical (model-based) or empirical (e.g. catch rates, CPUE, etc.) reference points.

When information is scarce and data-limited stock assessments are used, it can be informative to consider a variety of different assessment methods. Variations in outcomes between different approaches can help to refine the process of assessment, help to identify uncertainty and enable more informed decisions. Annex 2 provides an overview of a number of assessment methods that can be used in data limited situations.

Peer review is another important element of the stock assessment process, to ensure the results are subject to external scrutiny. Peer review is typically conducted by independent fisheries scientists from inside and outside management agencies, carried out at reasonable intervals. The focus of peer review is likely to include (i) the survey sampling methods used in the collection of fishery-dependent and fishery-independent data; (ii) the stock assessment methods themselves, and (iii) uncertainty estimates and risk management strategies.

When the MSC Risk Based Framework is used to assess stock status for PI 1.1.1, this PI is not scored. In this case a default score of 80 is given for this PI.

Five scoring issues are considered under this PI:

(a) Appropriateness of assessment to stock under consideration

(b) Assessment approach

(c) Uncertainty in the assessment

(d) Evaluation of assessment

(e) Peer review of assessment

Scoring issue (a) – Appropriateness of assessment to stock

The first scoring issue seeks to ensure that the assessment is appropriate to enable the harvest control rule (HCR) rule to be applied and that it is relevant to the biological characteristics of the target stock.

Scoring issue	SG60	SG80	SG100
(a) Appropri-ateness of assessment to stock under consideration		The assessment is appropriate for the stock and for the harvest control rule.	The assessment takes into account the major features relevant to the biology of the species and the nature of the UoA.

Good practice

Good practice requires that the assessment is appropriate and takes into account the biological characteristics of the fishery.

What certifiers check

The key source of information is likely to be stakeholder meetings with stock assessment scientists, covered with review of the following documents:

- The stock assessment report.
- Background documents, such as benchmark assessment, which may provide a review of the choice of the stock assessment.
- Science working group papers.
- Any internal or external peer reviews of the stock assessment.
- Published literature demonstrating appropriateness of the assessment.

Scoring issue (a) – Appropriateness of assessment to stock

Key questions to determine where further action is needed

Q Is there a stock assessment carried out for the fishery?

Q Given the scale, intensity and operational practices of the fishery, is the assessment appropriate to provide managers with reliable understanding of the effectiveness of the harvest strategy?

Q Are the assessment and the underlying assumptions, appropriate for the target stock?

Q Is the assessment a one-off, or will it continue to be carried out at appropriate intervals?

Examples of scoring rationales

Scoring issue (a)	Fishery Example
SG60	No scoring guidepost at the 60 level.
SG80	Fiji albacore tuna longline (Certified 2012): The assessment methodology has been developed using the software MULTIFAN-CL (MFCL), which is software that implements a size-based, age-and spatially-structured population model. This is a robust and internationally acknowledged approach. This assessment methodology was specifically developed to take advantage of the tuna fishery data available from the region. The assessment method estimates stock status in relation to a number of indicators and management advice is presented in terms of MSY-based reference points and HCRs. Difference in growth rates between male and female albacore are apparent but are not modeled directly in the assessment. The assessment uses an assumed level of steepness to model stock-recruitment and estimated MSY-based reference points are sensitive to this parameter.
SG100	Gulf of St. Lawrence northern shrimp (Certified 2014): The assessment of the status of shrimp stocks in the Gulf of St. Lawrence relies on information from both fisheries dependent and independent sources to estimate stock health indicators relative to precautionary reference points (PI 1.1.2) which were developed in accordance with the Department of Fisheries and Oceans (Canada) decision-making framework. The main stock indicators include both male and female abundance. Because shrimp are protandrous (i.e. change sex), it is important to protect both the male (recruitment to the female component) and the female stock components (spawning stock). The assessment also considers the role of predators as a source of natural mortality.

Scoring issue (b) – Assessment approach

The second scoring issue seeks to ensure the assessment provided for the fishery describes stock status relative to reference points, as used in the HCR.

Scoring issue	SG60	SG80	SG100
(b) Assessment approach	The assessment estimates stock status relative to generic reference points appropriate to the species category.	The assessment estimates stock status relative to reference points that are appropriate to the stock and can be estimated.	

Good practice

To meet requirements the assessment must not only be relative to reference points, but the reference point used must be possible to estimate from the assessment and be appropriate to the stock.

What certifiers check

The key source of information is likely to be stakeholder meetings with stock assessment scientists, combined with review of the following documents:

- The stock assessment report.
- Background documents, such as benchmark assessment which may provide a review of the choice of the stock assessment.
- Any internal or external peer reviews of the stock assessment.

Scoring issue (b) – Assessment approach

Key questions to determine where further action is needed

Q Does the assessment describe stock status relative to reference points?

Q Are the reference points used estimated from the assessment?

Q Are the reference points appropriate for the species?

Examples of scoring rationales

Scoring issue (b)	Fishery Example
SG60	Gulf of California, Mexico – sardine (Certified 2011): Spawning stock biomass and recruitment are assessed systematically using a stochastic age structured model with density-dependent recruitment. This is appropriate for the stock, taking into consideration its biology and the possible SSB-R relationship. However, a published review stated about this model: The model appeared to be able to match the observed catch trends fairly well. Allowance for the fact that environmental factors impact recruitment is included in the model, which also considers the possible uncertainties of the system. However, potential trends in life history characteristics and natural mortality rates are not included.
SG80	Suriname Atlantic seabob shrimp (Certified 2011): A logistic surplus yield model was used to assess the stock status in 2009, made possible by the availability of catch and effort data for a 10-year period (1998-2008) and a time series of total catch for the period 1989-2008. This type of model does not allow examination of size-specific or seasonal dynamics, but is suitable for assessment of species that cannot be aged such as seabob. There is an assumption that the surplus yield model used is an appropriate model for representing the population dynamics of the stock. The surplus yield model provides information on stock health (current biomass/biomass at MSY level) and the status of fishing performance (current fishing mortality/fishing mortality at MSY level) that includes estimation of corresponding levels of catch rate and fishing effort. In view of this, the choice of assessment model is suitable for directly informing the agreed HCR that uses catch rate (tonnes per day-at-sea) and fishing effort (days-at-sea) to measure the achievement of fishery performance relative to agreed management reference points.
SG100	No scoring guidepost at the 100 level.

Scoring issue (c) – Uncertainty in the assessment

The third scoring issue addresses the issue of uncertainty in assessments requiring that any uncertainties are identified and given proper consideration.

Scoring issue	SG60	SG80	SG100
(c) Uncertainty in the assessment	The assessment **identifies major sources** of uncertainty.	The assessment **takes uncertainty into account**.	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a **probabilistic** way.

Good practice

Good practice requires that the assessment method must take uncertainty into account. To achieve higher scores, in addition to taking uncertainty into account, stock status must also be evaluated relative to reference points in a probabilistic way.

What certifiers check

The key source of information is likely to be stakeholder meetings with stock assessment scientists, covered with review of the following documents:

- The stock assessment.
- Background documents, such as benchmark assessment which may provide a review of the choice of the stock assessment.
- Any internal or external peer reviews of the stock assessment.

Scoring issue (c) – Uncertainty in the assessment

Key questions to determine where further action is needed

Q Are the possible sources of uncertainty clearly identified in the stock assessment?

Q Does the assessment take account of the uncertainties in drawing conclusions?

Q Is stock status assessed in a probabilistic way, fully recognizing the possible inherent errors or uncertainty?

Q Is the assessment seeking to address sources of uncertainty for future assessment?

Examples of scoring rationales

Scoring issue (c)	Fishery Example
SG60	*Snapper long line fishery*: The main source of uncertainty for this species is the recruitment variability. Although the assessment clearly acknowledges this uncertainty, the model on which the assessment is based does not yet take this into account.
SG80	Argentine anchovy (Certified 2011): The main uncertainty for this species is the recruitment variability which is taken into account in the future projection, when uncertainty around last year numbers-at-age is also taken into account. However, the assessment stops short of evaluating stock status relative to reference points in a probabilistic way.
SG100	Suriname Atlantic seabob shrimp (Certified 2011): The model is applied using a Bayesian framework that provides outputs in the form of probability densities that illustrate clearly the levels of uncertainty associated with each of the estimates generated (current biomass relative to the MSY level and current fishing mortality relative to the MSY level). The probability ranges are illustrated graphically and the 90% confidence intervals for estimates are provided in tabular format. Establishment of the present HCR has taken into account the probabilities provided by the assessment, as well as the 10% risk of overshooting the agreed target reference point requested by the industry.

Scoring issue (d) – Evaluation of assessment

The fourth scoring issue of PI1.2.4 rewards those fisheries where the stock assessment has been shown to be robust by rigorous testing.

Scoring issue	SG60	SG80	SG100
(d) Evaluation of assessment			The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.

Good practice

A maximum score can only be achieved where the assessment has undergone thorough and rigorous assessment of alternative hypotheses.

What certifiers check

The key source of information is likely to be stakeholder meetings with stock assessment scientists, covered with review of the following documents:

- The stock assessment.
- Background documents, such as benchmark assessment which may provide a review of the choice of the stock assessment.
- Any internal or external peer reviews of the stock assessment.

Scoring issue (d) – Evaluation of assessment

Key questions to determine where further action is needed

Q Does the assessment explore alternative hypotheses?

Q Is rigorous testing carried out of the alternative hypotheses?

Q Has the testing of hypotheses demonstrated that the assessment is robust?

Examples of scoring rationales

Scoring issue (d)	Fishery Example
SG60	No scoring guidepost at the 60 level.
SG80	No scoring guidepost at the 80 level.
SG100	Maldives pole & line skipjack tuna (Certified 2012): The assessment has been tested using a systematic exploration of the interactions among different sets of assumptions. The final stock status estimate represents a synthesis from a grid of 180 models. This confirms that alternative hypothesis and assessment approaches have been rigorously explored.

Scoring issue (e) – Peer review of assessment

The intent of the final scoring issue for PI 1.2.4 is to ensure that the stock assessment is subject to an appropriate level of peer review to ensure rigour.

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

Good practice

Good practice requires that there is both internal and external review. This will usually involve stock assessment reports being presented for review to external independent entities such as regional scientific bodies or other independent external reviewers. The review should normally result in improvements to future assessment process as appropriate.

What certifiers check

The key source of information is likely to be stakeholder meetings with stock assessment scientists, covered with review of the following documents:

- Any internal or external peer reviews of the stock assessment.
- Any policy or regulatory documents detailing the process of peer review.
- The fishery management plan, should this detail the process of stock assessment peer review.

Scoring issue (e) – Peer review of assessment

Key questions to determine where further action is needed

Q Does the stock assessment get submitted to a peer review process before being used for management purposes?

Q Does the peer review process seek to get outside, independent expert review, as well as any internal review mechanisms?

Q Does the peer review process result in changes to the stock assessment, or amendments to future assessment methodologies?

Q Where external reviewers are engaged, are they fully independent of the fishery?

Examples of scoring rationales

Scoring issue (e)	Fishery Example
SG60	No scoring guidepost at the 60 level.
SG80	Suriname Atlantic seabob shrimp (Certified 2011): The 2009 assessment of the Suriname seabob stock was completed and reviewed during the Caribbean Regional Fisheries Mechanism (CRFM) Scientific Meeting. The CRFM Scientific Meeting is usually held annually and provides a level of peer review, specifically among a small number of visiting assessment experts serving as meeting consultants and counterpart fisheries officers from other Caribbean territories whose assessment skills are still developing. This peer review process therefore needs to be strengthened, particularly in the area of assessment methodology.
SG100	Mexico Baja California pole and line yellowfin and skipjack tuna (Certified 2012): All Inter-American Tropical Tuna Commission (IATTC) stock assessments are peer reviewed – both internally and externally. All stock assessment reports are reviewed internally by the Head of the stock assessment program and the Chief Scientist/Technical Coordinator. They are then reviewed by the IATTC Director. In the case of the skipjack assessment, since the assessment author is the head of the stock assessment program, the main technical review is conducted by the Chief Scientist/Technical Coordinator. In addition, other members of staff in the stock assessment program review the stock assessment report. The stock assessment is then presented to the Scientific Advisory Committee where scientists from member countries and other interested parties who have reviewed the draft, comment on the assessment. Therefore, the assessment is internally reviewed by IATTC staff and reviewed by scientists external to the IATTC staff. The indicator method used for skipjack was presented to the Scientific Advisory Committee when used for the first time.

Challenges and solutions to meeting PI 1.2.4

Developing appropriate stock assessments has been a challenge in many developing county fisheries. In some cases outside funding, or technical expertise have enabled periodic quantitative stock assessments, informed by research surveys to be undertaken, but these have often been one off exercises, which are not suited to providing managers with timely feedback information on the effectiveness of the harvest strategy.

For simpler, more affordable empirical stock assessment methodologies, which may be fishery dependent and less reliant on expensive survey work, there is a requirement for access to relevant data sets to support the development of appropriate indicators of stock status. The available data is most useful where it is in electronic format to enable rapid analysis. There may also be limitations in the technical capacity to develop or run such methods, but also in the scientific and technical knowledge to peer-review the stock assessment at the national level. In addition, external peer-review can also be expensive (although this may be possible within the RFMO structure).

There are growing efforts globally to develop data-limited methods that are more cost effective and more appropriate to the type of data available to many developing country fisheries. Some of the more established methods are described in Annex 2.

Example actions to improve performance for PI 1.2.4

Process Chronology				Management Actions	
1	2	3	4	Example action	Scoring issue
●				Review the existing method of estimating stock status for the fishery, assessing its robustness, timeliness and appropriateness. This may be combined with a review of the information that is currently available.	(a), 1.2.3
●				Conclude whether the existing stock assessment method is appropriate for the target stock and where it is not, whether additional information should be collected to ensure that the assessment of the stock can be updated appropriately.	(a)
	●			Identify most appropriate method for stock assessment given the characteristics of the species, the stock and the fishery. This should allow for the assessment of stock status (whether it is analytical stock assessment or proxy indicators) to be reported on, relative to limit and target reference points.	(a), (b)
	●			Detail how the assessment properly evaluates major sources of uncertainty and takes them into account and provide justification of robustness of the assessment method as well as detail why alternative hypothesis and assessment approaches were not chosen/ undertaken.	(c), (d)
	●			Identify additional data needs and develop and implement research and data collection programs.	1.2.3
	●			Contact qualified scientists to perform a peer-review of the stock assessment, particularly in terms of the appropriateness of the assumptions, the validity of the data used and the considerations on main uncertainties.	(e)
	●			Conduct a stock assessment to obtain a measure of the status of the stock, robust reference points. Make sure the approach considers main uncertainties in the biology of the species, and the data available.	(a), (b), (c), (d), (e)
	●			Ensure that the results of the stock assessment are fed into the management decision-making process in a timely fashion.	1.2.1
		●		Periodically undertake baseline assessments, which draw upon the conclusions of both external and internal peer review, which evaluate the performance of past assessments, and consider alternative approaches.	(a), (b), (c), (d), (e)

Notes

Notes

Principle 2 - Minimising environmental impacts

Fishing operations should be managed to maintain the structure, productivity, function and diversity of the ecosystem on which the fishery depends, including other species and habitats.

Overview of Principle 2 Performance Indicators

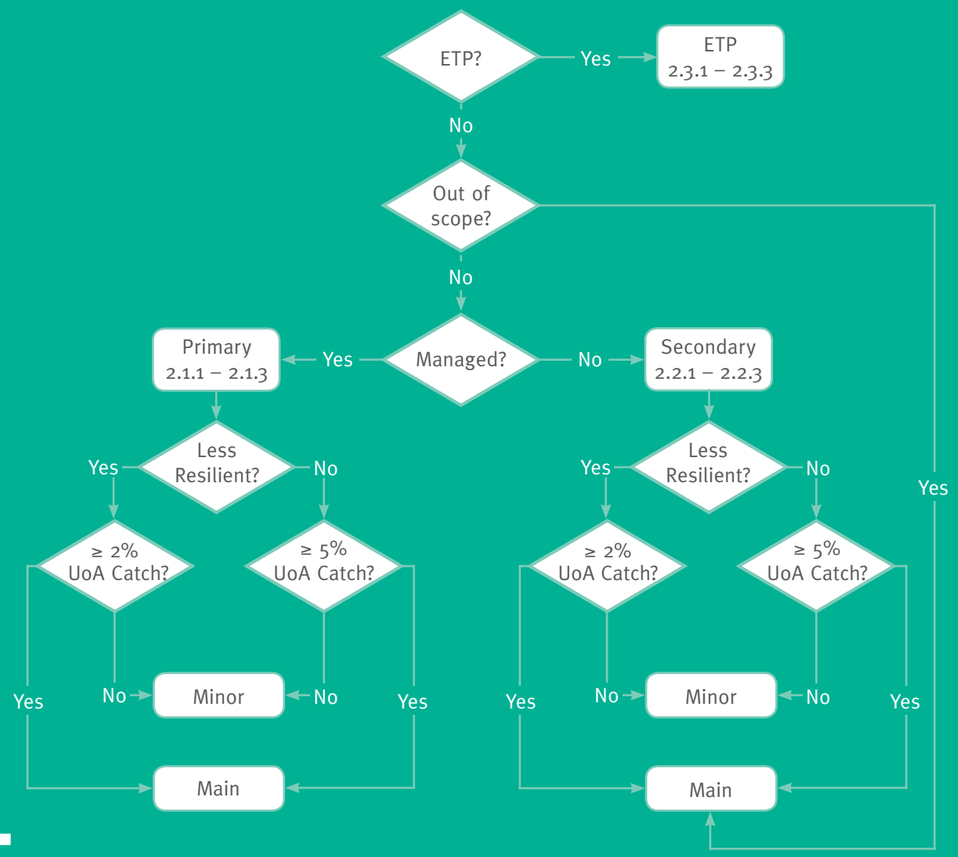
Principle 2 states that 'fishing operations should allow for the maintenance of the structure, productivity, function and diversity of the ecosystem (including habitat and associated dependent and ecologically related species) on which the fishery depends'.

There are five components in Principle 2, which are considered to cover the range of potential ecosystem elements that may be impacted by a fishery. These are: primary species, secondary species, ETP species, habitats and ecosystems.

Each Principle 2 component has three PIs: outcome, management and information. The outcome PIs assess the current status of each component and whether the fishery is posing a risk of serious or irreversible harm to the component or hindering its recovery. The management PIs assess the arrangements in place to manage the impact that the UoA has on the Principle 2 components to ensure that it does not pose a risk of serious or irreversible harm to them (or, in the case of ETP, that the UoA complies with any national or international requirements for protection of the species). The information PIs assess the adequacy of information to support the management strategy.

Designation of P2 species

The decision tree provides an overview of the intent of the separation between primary, secondary and ETP species. It can be used as a guide on the designation of P2 species, further definitions of 'primary', 'secondary', 'ETP' and 'less resilient' can be found in the Fisheries Certification Requirements.



2.1.1 Primary species outcome

Performance Indicator overview

Performance Indicators (PIs) 2.1.1 to 2.1.3 make an assessment of the other species caught in the fishery which are considered primary. The first of these (2.1.1) assesses the status of those species classed as primary on the basis that:

- They are not covered by P1 or included in the fishery, therefore would not be eligible to carry the MSC logo themselves.
- Management tools and measures are in place, expected to achieve stock management objectives reflected in either limit or target reference points, which apply to the whole stock complex, including across any multi-jurisdictional boundaries.
- They are species within the scope of the MSC program (meaning they are not amphibians, birds, reptiles or mammals).

The objective of this PI is to ensure that these other species caught by the fishery are either not depleted, or that there is an assurance that the fishery under assessment is not hindering the ability of those stocks to recover. The benchmark applied for PI 2.1.1 is lower than what is applied under Principle 1. The certainty thresholds are as follows:

Likely = › 70th percentile

Highly likely = › 80th percentile

High degree of certainty = › 90th percentile

The focus of scoring is on the main primary species – i.e. those that the fishery catches most of (more than 5% of catches), or that certifiers conclude to be less resilient, perhaps on the basis of low productivity or where there is existing knowledge of depletion or vulnerability to anthropogenic or natural changes. In order to achieve high scores, certifiers must also consider species that account for a small proportion of the catch (i.e. minor species).

Although this PI focuses on outcome, rather than information, scores are inevitably influenced by the level and the quality of available information, on the composition and status of the catch of the primary species. The definition of 'primary' implies that some form of quantitative assessment will have already been carried out.

It should be noted that the species covered by this PI are those that are caught, regardless of whether they are subsequently landed. Where species are caught and discarded (where permitted by the management system), perhaps because of restrictions on landing, size restrictions or lack of market opportunities, their status should still receive full consideration as primary species.

It should also be noted that if there is a very high bycatch, compared to the target catch (P1), provided it can be demonstrated that those other species are not depleted, then the gear efficiency is not necessarily a hindrance to achieving reasonable MSC scores on this PI. In short, it is not necessarily the selectivity of the gear that is being assessed here, although this can of course help to achieve higher scores, particularly if it enables smaller catches of depleted or vulnerable species.

Two scoring issues are considered under this PI:

(a) Main primary species stock status

(b) Minor primary species stock status

Scoring issue (a) – Main primary species stock status

The first scoring issue examines the status of those stocks which are classified as both primary and main. It considers if there is evidence that the stocks are above a Point of Recruitment Impairment (PRI), or if there is management in place by MSC fisheries to ensure recovery is not hindered.

Scoring issue	SG60	SG80	SG100
(a) Main primary species stock status	Main primary species are **likely** to be above the PRI. OR If the species is below the PRI, the UoA has measures in place that are **expected** to ensure that the UoA does not hinder recovery and rebuilding.	Main primary species are **highly likely** to be above the PRI. OR If the species is below the PRI, there is either **evidence of recovery** or a demonstrably effective strategy in place **between all MSC UoAs which categorise this species as main**, to ensure that they collectively do not hinder recovery and rebuilding.	There is a **high degree of certainty** that main primary species are above the PRI **and are** fluctuating around a level consistent with MSY.

Good practice

To perform well on this scoring issue, stocks are required to be above the PRI (with a high degree of confidence) and around the MSY point to meet SG100. Fisheries with little or no interaction with other species perform well on this scoring issue therefore the use of highly selective gear designed to reduce bycatch can contribute to improved performance. Good practice also includes having effective strategies designed to manage stocks of primary species or to reduce bycatch of non-target species.

What certifiers check

Certifiers require clear empirical evidence to support scoring of this scoring issue and will refer to the following data – ideally in published form:

- Empirical catch composition data (perhaps with seasonal and spatial patterns).
- All available stock assessments for stocks which comprise more than 5% of the catch.
- Stock assessments for any stocks which may be vulnerable or depleted, which comprise 2-5% of the catch.
- Management measures for any main stocks shown to be depleted.
- Management plans for species classified as main.
- In some cases it may also be necessary to derive data for total catches on the stock (including from other fisheries) to determine the fishery's contribution to overall mortality.

Scoring issue (a) – Main primary species stock status

Key questions to determine if further action is needed

Q Is there a quantitative breakdown of catches in the fishery under assessment? Is this independent and reflective of conditions across the fishery?

Q For those stocks that are considered main, have stock assessments been carried out, and do these stock assessments refer to stock status relative to reference points? Are proxies or other indicators of stock status available?

Q Are the main primary species likely to be above the PRI?

Q If the fishery catches a stock which may be depleted to the PRI, can it be demonstrated that the fishery under assessment has measures in place to ensure it is not the cause for this depletion, or hindering any recovery?

Q Are there other MSC fisheries that also capture the species categorised as main primary in the fishery under assessment? Do the other MSC fisheries catch a significant proportion of any species which are at a level below the PRI? Do they collectively have measures in place to ensure they do not hinder recovery of the species?

Q Where management of main primary species is based on reference points, does the empirical assessment which supports this, allow the confidence limits to be demonstrated? Is confidence high?

Examples of scoring rationales

Scoring issue (a)	Fishery Example
SG60	*Groundfish demersal trawl fishery:* The main primary species in this assessment is wolffish, with annual catches of 5.4% by weight of total the catches. The stock was below its PRI, which is B_{lim} five years ago, but due to increased management efforts, including a formal adoption of a HCR, the stock is now showing signs of recovery. The latest stock assessment shows that Spawning Stock Biomass (SSB) has now increased to just above B_{lim}. However, there is still uncertainty surrounding this estimate caused mainly by on-going problems with misreporting of bycatch. Given this uncertainty, it cannot be concluded that the stock is 'highly likely' to be above the PRI and therefore wolffish does not meet SG80.

Scoring issue (a) – Main primary species stock status

Examples of scoring rationales – *continued*

Scoring issue (a)	Fishery Example
SG60	*Hake demersal trawl fishery:* There is only one main primary species in this fishery, the sleeper shark *(Somniosus microcephalus)*. This species is classified as 'less resilient' according to FCR clause SA3.4.2.2 and the total catch of the species is 2.1% of the total catch (averaged over the last 3 years). The stock is currently below B_{lim} and there is rebuilding in place set to limit the fishing mortality. However, not all states have ratified the plan and there remains reports of serious underreporting of catches and suspected illegal fishing. This has undermined the effectiveness of the plan. The species is not landed for commercial purposes by the fishery and is only incidentally caught in the gear during regular operations. The crew take several measures to avoid catching the sharks, but nevertheless some interactions do occur and there is a very low survival rate. It is estimated that about 10 sharks per year are incidentally caught by the fishery, compared to the 1500 reported annual catches, although this number is likely underestimated as outlined above. The preventative measures taken by the fishery in reducing the mortality, including the overall low contribution to the total catches on this stock, satisfies SG60. There are no other MSC fisheries in this area, however, the preventative measures in place by the fishery do not satisfy the MSC definition of a demonstrably effective 'strategy' as required at SG80 for species below the PRI.
SG80	*Haddock longline fishery:* Atlantic cod was the only main retained species (avg. 5.3% of the total catch over the last 5 years). The SSB of cod has more than doubled in size since 2001 and is now estimated to be 419,000 tonnes, compared to B_{lim} at 125.000 tonnes. A precautionary management plan and HCR are in place for this stock, which has resulted in fishing mortality declining significantly in the last decade and is presently at a historical low and below F_{pa} and F_{lim}. Therefore the stock is highly likely above the PRI and SG80 is met. However, target B_{MSY} or F_{MSY} reference points have not yet been established, therefore SG100 is not met. *Sablefish demersal trawl fishery:* There were three identified primary main species in this assessment (hake, whiting and yellowtail flounder). Two of these species (hake and whiting) were found to be well above their respective PRI (1.4 B/B_{MSY} for Hake and 1.1 B/B_{MSY} for whiting). Further, a TAC based on scientific advice is in place for both stocks and has not been exceeded over the last 5 years. Consequently, it is highly likely that these stocks are above the PRI, satisfying SG80 for these two scoring elements. The yellowtail flounder stock is below the PRI but there is a rebuilding strategy in place with effort controls. This has resulted in a fishing mortality well below F_{MSY} (0.3 F/F_{MSY}). Although the stock has not yet shown any signs of recovery, the current fishing mortality rate is expected to rebuild the stock to surpass the PRI in 2017 with a very high confidence level (CL 95%). There are two other MSC fisheries which have yellowtail flounder as a main primary species and both are signatory to the rebuilding plan. The current low fishing mortality (satisfying FCR clause SA3.4.6 c) as well as the high degree of confidence yielded by simulation studies of the rebuilding plan, serves to satisfy SG80 for this scoring element as there is a demonstrably effective strategy in place to ensure that recovery and rebuilding is not hindered by all MSC fisheries.

Scoring issue (a) – Main primary species stock status

Examples of scoring rationales – *continued*

Scoring issue (a)	Fishery Example
SG100	*Cod longline fishery:* The biomass of the two main primary species, saithe and haddock (5.6% and 6.9% of total catch respectively) are both above the PRI with a high degree of certainty. There is robust stock monitoring and assessment in place which indicates that haddock biomass has been increasing and has been fluctuating around B_{MSY} for the last 5 years. For saithe, the stock has declined slightly since 2005, but is still twice the level of B_{pa}, which the management authority has deemed to be well above a level consistent with MSY.

Scoring issue (b) – Minor primary species stock status

The second scoring issue of PI 2.1.1 assesses the status of minor primary species, which are more rarely caught by the target fishery. This scoring issue considers evidence that stocks are above PRI or where minor species are below PRI there is management in place by the fishery to ensure recovery is not hindered.

Scoring issue	SG60	SG80	SG100
(b) Minor primary species stock status			Minor primary species are highly likely to be above the PRI. OR If below the PRI, there is evidence that the UoA does not hinder the recovery and rebuilding of minor primary species.

Good practice

To perform well on this scoring issue, stocks are required to be above the PRI or in case where stocks are below PRI the fishery should seek to ensure that they do not hinder the recovery of any minor primary species. Generally fisheries with low interaction with other non-target species perform well on this scoring issue.

What certifiers check

Certifiers require clear empirical evidence to support scoring for this PI and will refer to the following data – ideally in published form:

- Empirical catch composition data (perhaps with seasonal and spatial patterns).
- All available stock assessments for stocks identified as primary minor.
- Evidence that the fishery is not hindering the recovery of any minor species below the PRI, such as evidence indicating a lack of gear interaction, or evidence pointing to an unrelated cause (or fishery) limiting recovery.

Scoring issue (b) – Minor primary species stock status

Key questions to determine if further action is needed

Q Are there minor primary species in the fishery?

Q Are stock assessments available for these minor primary species? Are proxies or other indicators available?

Q Are the minor primary species highly likely to be above the PRI? Or do stock assessments indicate that the species is depleted below the PRI?

Q Where stocks are below PRI has the cause of the stock depletion been identified?

Q Is there evidence to demonstrate that the fishery under assessment is not hindering the recovery of stocks below PRI?

Examples of scoring rationales

Scoring issue (b)	Fishery Example
SG60	No scoring guidepost at the 60 level.
SG80	No scoring guidepost at the 80 level.
SG100	*Plaice trawl fishery:* The regularly landed species composition, as an average over the last 5 years, contains 10 Primary species. Of these, only cod and redfish are landed in significant quantities to count as 'main' species. The remaining species are therefore classified as minor. With the exception of sculpin, which accounts for about 1% of the catches, the others are caught in very small quantities (usually ~ 0.1% of the total catch). None of the minor species can be considered to be below the PRI, and therefore this scoring issue is met for all minor species.

Challenges and solutions to meeting PI 2.1.1

This PI relies on the availability of an empirical catch profile of the fishery under assessment, representative of spatial and temporal patterns. Ideally this would be independently provided. In many fisheries this information is not reliably available and is an important step in preparing for full assessment. In many developing countries there may be some indication from landing statistics of catch profile, but this may not necessarily match catches unless all catches are retained. Furthermore, for landings statistics there may be poor verification procedures and inconsistent data recording protocols, undermined by lack of capacity on the ground for accurate recording – to species level.

For those stocks which are caught by the fishery, which do have management relative to reference points, supported by stock assessment, there is a requirement for the stock assessment to offer some confidence in the status of the stock being assessed. Those stocks which do not have a stock assessment and which are subject to fewer management controls are assessed in PIs 2.2.1 to 2.2.3.

Finally, where there is evidence of a stock depletion, there is a requirement to demonstrate that the fishery under assessment is not the cause of this depletion, or that it is not hindering the potential of the depleted stock to recover. Unless the proportions of the catch from the assessed fishery are insignificant compared to another targeted fishery, this may be difficult to demonstrate. This may require a certain amount of scientific research, examining the catch rates of the gear under assessment or other studies such as post capture survival. Where wider scientific study is required this may be constrained by available resources and expertise. It may also be required to consider other MSC fisheries which have catches of any primary species considered as main to determine the collective impact.

Example actions to improve performance for PI 2.1.1

Process 1	Process 2	Chronology 3	Chronology 4	Example action	Scoring issue
●				Undertake a catch profiling trial for the fishery. This should be independent, scientifically robust, and spatially and seasonally representative.	(a), (b), 2.2.1
●				Determine catch proportions of each species (including P1 target species). Allocate those non P1 species that are greater than 5% as main. For these determine whether management tools and measures are in place, expected to achieve stock management objectives reflected in either limit or target reference points. If so, score these under 2.1.1. If not refer to 2.2.1. Repeat exercise for those species comprising between 2-5% of the catch (minor).	(a), (b), 2.2.1
	●			Refer to available stock assessments to determine whether main and minor primary species are above the PRI and the degree of confidence in this.	(a), (b)
	●			Where stock assessments are available for main primary species, but these assessments do not provide the level of robustness to be able to draw conclusions with high degree of confidence, refine the assessment methodology to address uncertainties.	(a)
		●		Put in place appropriate management measures to ensure that the fishery (and other MSC fisheries where applicable) do not hinder the recovery of any species below the PRI (whether main or minor). This could include: reduced exploitation levels (through licensing, quota or effort restrictions), gear modifications, seasonal or area closures,	(a), (b)
		●		Where depleted stocks are caught but not retained (i.e. discarded), undertake post capture mortality trials to demonstrate whether the fishery is contributing to overall mortality levels.	(a), (b)
		●		Ascertain the level of fishing mortality on any stock below the PRI attributable to the fishery under assessment, in comparison with that from other fleets.	(a), (b)
			●	Introduce a system of on-going periodic recording of catch profiling, plus any other data gathering as required.	(a), (b)

Notes

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2.1.2 Primary species management strategy

Performance Indicator overview

The second PI relates to the management of primary species. This PI seeks to ensure that there is management in place for primary species to ensure the fishery does not pose a risk of serious or irreversible harm to their stocks/populations. It also encourages the development and implementation of technologies and operational methods to minimise mortality of unwanted catch of primary species.

Primary species are those that:

- Are not covered by Principle 1 and therefore would not be eligible to carry the MSC logo themselves.
- Have management tools and measures in place that are expected to achieve stock management objective as reflected in limit or target reference points. Management tools must apply to the whole stock complex across any multi-jurisdictional boundaries.
- Are in scope of the MSC program (even though they are not the species elected to carry the ecolabel).

Although the definition of what is considered a primary species considers the management tools and measures in place for the management of that species, the scoring of PI 2.1.2 focuses more tightly on the management of the impact of the fishery.

Like the other P2 components, this PI should be scored using a 'scoring element' approach, where each species is considered separately and the overall PI score is determined by using FCR Table 4 (see FCR clause 7.10.7). This PI is designed to cater for both primary species that are targeted by the fishery and which have an obvious commercial value, but also any primary species that may be unwanted by the fishery, either due to lack of market or inability to land (perhaps due to licence or quota restrictions). As such it is not looking to minimise catches of primary species (unless they are unwanted), but rather ensure that the impact on those species is appropriately managed.

Five scoring issues are considered under this PI:

(a) Management strategy in place

(b) Management strategy evaluation

(c) Management strategy implementation

(d) Shark finning

(e) Review of alternative measures

Scoring issue (a) – Management strategy in place

The first scoring issue assesses the management that is in place for the fishery to either maintain the primary species stock above the PRI, or to ensure that the fishery does not hinder the recovery of the primary species, if the stock is below the PRI.

Scoring issue	SG60	SG80	SG100
(a) Management strategy in place	There are **measures** in place for the UoA, if necessary, that are expected to maintain or to not hinder rebuilding of the main primary species at/to levels which are likely to be above the PRI.	There is a **partial strategy** in place for the UoA, if necessary, that is expected to maintain or to not hinder rebuilding of the main primary species at/to levels which are highly likely to be above the PRI.	There is a **strategy** in place for the UoA for managing main and minor primary species.

Good practice

The FCR describe a strategy as a cohesive and strategic arrangement which may comprise one or more measures, an understanding of how 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 the light of the identification of unacceptable impacts.

To perform well under this requirement fisheries should have a combination of actions or tools that are designed to manage impact on primary species.

At both SG60 and SG80 the focus is just on main species, but at SG100 there is also a requirement for there to be a strategy in place for minor species. Both SG60 and SG80 also contain the caveat 'if necessary', meaning that these SG levels do not need to be scored when there is no impact of the fishery on primary species. However, at SG100 there is an expectation that a strategy will be in place regardless of necessity.

What certifiers check

Certifiers will look at the management that is in place at the level of the fishery for each of the primary species, but also at the wider management that is in place for the primary species (although by making the definition of primary species it has already been determined that certain management tools and measures are in place). Documentation and information required will include:

- Management plans for each of the primary species.
- Stock assessment for each of the primary species.
- A summary of management measures and regulations governing the fishery catches (may be for primary species or for other species), e.g. TAC, Minimum Landing Sizes, seasonal and spatial restrictions.
- Any gear design characteristics or modifications which may be impacting on each of primary species.

Scoring issue (a) – Management strategy in place

Key questions to determine if further action is needed

Q Is there an understanding of which species are primary and secondary species and which are main and minor?

Q Can it be demonstrated that management measures or a partial strategy are not necessary – i.e. that the fishery has negligible impact on primary species.

Q Are there management measures in place that ensure that each of the primary species is either maintained above its PRI or that the fishery does not hinder its recovery (these measures could either be specific to the species or designed for another species but also work for this species)?

Q Are these management measures, whether designed for primary species or not, measures that can be brought together into either a partial strategy or a strategy for each of the primary species?

Examples of scoring rationales

Scoring issue (a)	Fishery Example
SG60	*Saithe trawl fishery:* The only main primary species caught is nephrops. The TAC set for the saithe fishery also limits catches of nephrops. There is a TAC set for nephrops in the targeted fishery for this species, but a bycatch limit on the amount that can be discarded in other fisheries has not been set. This species is assessed to be above its limit reference point in the area where the saithe fishery operates, so it is expected that the limit on fishing effort for saithe will also ensure that the fishery impacts do not cause the nephrops stock to decline below this point. However, there is no plan to consider other measures if the nephrops stock were to become depleted, so the 'partial strategy' requirement at SG80 is not met.
SG80	*Plaice trawl fishery:* There are two primary species caught in this fishery, haddock (main) and cod (minor). Several measures are in place which contribute to maintain the haddock stock at its current healthy levels. These include effort (days at sea) restrictions to ensure that the cod (minor primary species) capture is minimised. In addition the fishery has made efforts to reduce discards of haddock through a conservation credits scheme. The haddock stock status and landings are closely monitored and these measures are expected to be amended should they cease to be effective. Thus haddock meets SG80, but as the measures are not designed specifically for haddock, it does not meet the SG100. The minor cod species automatically meets the SG80 level as it is not a main species and would be considered at SG100.

Scoring issue (a) – Management strategy in place

Examples of scoring rationales – *continued*

Scoring issue (a)	Fishery Example
SG100	*Haddock trawl fishery:* The only main primary species is cod. Cod is protected specifically through a cod recovery plan for this region which applies to all fisheries in this area. The cod recovery plan is a cohesive and strategic arrangement of measures designed specifically to ensure that fisheries in this region do not hinder rebuilding of the cod stock, which is currently assessed as being below its limit reference point (but with F<F_{MSY}). The strategy includes a monitoring program and regular meetings of an advisory committee tasked with changing the management measures should it be shown that they are not effective. The main primary cod species therefore meets SG100 for this scoring issue.

Scoring issue (b) – Management strategy evaluation

The second scoring issue assesses the expectation of whether the management described in scoring issue (a) will work and the degree of empirical or evidential basis for this expectation.

Scoring issue	SG60	SG80	SG100
(b) Management strategy evaluation	The measures are considered **likely** to work, based on plausible argument (e.g., general experience, theory or comparison with similar UoAs/species).	There is some **objective basis for confidence** that the measures/partial strategy will work, based on some information directly about the UoA and/or species involved.	**Testing** supports **high confidence** that the partial strategy/strategy will work, based on information directly about the UoA and/or species involved.

Good practice

Good practice requires that the partial strategy or strategy has been tested to provide high confidence that it will work.

What certifiers check

Certifiers will look for the following evidence in support of this scoring issue:

- Details of any management evaluations undertaken for each of the primary species caught in the fishery.
- Details of any testing that may have taken place of any measures designed to manage the fishery's impact on primary species – such as gear testing.
- Evaluations of other parts of the management system that contribute to managing the impact on primary species.
- Any stock status evidence (i.e. from stock assessments) which may provide objective basis for confidence that management measures/strategies are working.
- Any evaluation or testing of impacts on the species by similar fisheries (i.e. using same or similar gear and in similar area).

Scoring issue (b) – Management strategy evaluation

Key questions to determine if further action is needed

Q Is there a plausible argument to support confidence that the management approach described in scoring issue (a) will work for each primary species?

Q Can this argument be supported more objectively – by pointing to empirical evidence, or better still by pointing to testing either in the fishery of from a similar fishery?

Q Does monitoring of both the impacts of the fishery and the status of each of the primary species provide objective basis for confidence that the management described in scoring issue (a) is working?

Q Have any more empirical testing, or management evaluations been carried out on any of the management described in scoring issue (a)?

Examples of scoring rationales

Scoring issue (b)	Fishery Example
SG60	*Herring midwater trawl fishery:* The main primary species is mackerel. On board sorting of the catch is not possible due to vessel design and regulation. Processors pay higher prices for clean catches of the target species. So there is an economic incentive to ensure that catches of other species are minimised. The measures to avoid mixed catches (through shoal identification) are considered likely to work based on the economic incentive, but there is no objective basis for confidence that these measures will work. Therefore mackerel meets SG60 but not SG80.
SG80	*Cod demersal trawl fishery*: The main primary species are haddock. Haddock are captured as an inevitable consequence of fishing for cod. The fishery does not have a direct entitlement to the haddock quota but national legislation has recently determined that up to 15% haddock can be captured in directed cod fisheries on a per haul basis. Haddock has a clearly defined stock and management plan which sets out closed areas to protect juvenile haddock and there is a minimum mesh size for the demersal trawl vessels. Landings of haddock are recorded and there is a high inspection level. The landings data and inspection reports provide objective basis for confidence that the levels of haddock catches are at about 10% of total catch of the cod, which is enough to ensure that they are maintained above their PRI when considering total fishing mortality of the haddock stock. In this instance, haddock meets SG80.
SG100	*Yellowfin tuna purse seine fishery:* The main primary species are swordfish and the minor primary species is skipjack tuna. A partial strategy is in place in this fishery which seeks to manage the impact of the fishery on skipjack which include general effort control and spatial closures. There is ongoing monitoring and observers are deployed on board at least 20% of the trips. The observers record the implementation of measures and also record volumes of catches (which are reported to be low for both skipjack and swordfish). The management agency reviews the observer data as well as the other fishery information and has used management strategy evaluation (MSE) to determine that the combined measures are working to limit the main species (swordfish) catches as well as the minor species (skipjack). Therefore both species meet SG100.

Scoring issue (c) – Management strategy implementation

The intent of the third scoring issue in PI 2.1.2 is to ensure that the management for primary species described in scoring issue (a) is being implemented successfully.

Scoring issue	SG60	SG80	SG100
(c) Management strategy implementation		There is **some evidence** that the measures/ partial strategy is being **implemented successfully**.	There is **clear evidence** that the partial strategy/ strategy is being **implemented successfully and is achieving its overall objective as set out in scoring issue (a)**.

Good practice

Good practice requires that the management is not only being implemented, but that it is achieving its objective.

What certifiers check

Certifiers will look for evidence of implementation and also evidence of the response to implementation. It is likely that this scoring issue may be informed by meetings with stock assessment scientists engaged in the management of each of the primary species, to determine the stock response to the relevant management measures. This will be further informed by the following evidence:

- Reviews of any management measures described in scoring issue (a).
- Results of any monitoring of compliance or observer work which provides independent verification that the management measures are in place and operational.
- Any catch profiling before and after relevant management measures to demonstrate that it has had the desired effect.
- Any stock assessment evidence that the stock is either at or above the PRI, or if below that it is recovering, or if not recovering that the fishery's impact is reducing.

Scoring issue (c) – Management strategy implementation

Key questions to determine if further action is needed

Q Are the management measures and strategies described in scoring issue (a) fully implemented for each primary species? What evidence is there to support this conclusion?

Q If the management measures/strategies are in place, are they achieving their intended objectives for each of the primary species? What evidence is there to support this conclusion?

Examples of scoring rationales

Scoring issue (c)	Fishery Example
SG60	No scoring guidepost at the 60 level.
SG80	*Tropical shrimp trawl fishery:* The main primary species is a croaker species. Captures of this species is minimised in this fishery through the use of a bycatch reduction device and effort limitation for the target species, which also limits the impact on other species. The fishery is monitored by VMS and is also subject to inspections by control officers both at sea and at port. Inspections have shown that compliance with these measures are good. Based on the use of the device in similar fisheries, post escape survival from the bycatch reduction device is expected to be good, although this has not been tested specifically in this fishery. There is therefore some evidence that the measures are being implemented successfully in this fishery, although the evidence is not 'clear' for this fishery in relation to escapement. The croaker species meets SG80.
SG100	*Nephrops demersal trawl fishery:* The main primary species is whiting. To reduce impact on whiting, the fishery is subject to effort restrictions and they have inserted Square Mesh Panels (SMP) at the top of the trawl. The whiting rise when inside the trawl and can escape through the SMP while nephrops remain near the bottom and are retained. Additionally there has been testing for the survivability of species escaping through the SMP. It has shown that although there are some mortalities, overall survivability is high (>80%). The status of the whiting stock is known to be well above the biologically based limit and increasing. Therefore there is clear evidence that the partial strategy is being implemented successfully and is achieving its overall objective. Whiting therefore meets SG100.

Scoring issue (d) – Shark finning

The intent of the fourth scoring issue in PI 2.1.2 is to provide a mechanism for scoring a fishery on the level of certainty that shark finning is not taking place. This scoring issue only applies in fisheries where a primary species is a shark. The FCR (clause SA2.4.3 - SA2.4.7) provides further detail that should be referred to if this scoring issue is considered to be relevant to the fishery.

Scoring issue	SG60	SG80	SG100
(d) Shark finning	It is **likely** that shark finning is not taking place.	It is **highly likely** that shark finning is not taking place.	There is a **high degree of certainty** that shark finning is not taking place.

Good practice

Good practice requires that evidence is provided that shark finning is not taking place. The best evidence that shark finning is not taking place is to land sharks with fins naturally attached (FNA). However, the MSC recognises that in some fisheries this may be practically difficult to achieve. The MSC therefore also recognises that landing fins and other shark parts separately, including as meal, may be allowed if adequately regulated and observed.

What certifiers check

The intent of this scoring issue is to provide a mechanism for scoring a fishery on the level of certainty that a certifier has that shark finning is not taking place. It is designed as a combination of regulations and external validation. This is informed by the following information:

- Observer reports along with a summary of the frequency of observer trips.
- Details of regulations in place governing the management of sharks.
- Documentation of the destination of all shark bodies and body parts.
- Evaluations of the vessel's activities to confirm that it is likely that shark finning is not taking place.

Scoring issue (d) – Shark finning

Key questions to determine if further action is needed

Q Are there any shark species in the catch profile of the fishery or in the landings statistics?

Q Are sharks landed with fins naturally attached?

Q Does the fishery process sharks on board or are fins cut on board?

Q Is there any national regulation on shark finning?

Q Is there any RFMO conservation measures, national or international MoU or agreements on shark finning?

Q What's the level of observer coverage?

Q Is there any other monitoring system in place (e.g. dockside monitoring, video camera, vessel monitoring systems (VMS)?

Examples of scoring rationales

Scoring issue (d)	Fishery Example
SG60	*Swordfish longline fishery:* Mako shark are landed by the fishery, it is a quota managed stock and there are regulations that prohibit shark finning. Vessels have onboard processing facilities, and fins are removed onboard during processing and landed separately to the body of the shark in accordance with 3.5 fin to greenweight ratio (as mandated in national regulation). The ratios for each species have been set based on statistical analysis of at-sea sampling data. There is 5% onboard observer coverage and all landing are subject to dockside inspection.
SG80	*Kingklip demersal trawl fishery:* Various shark species are captured. Vessels are required to have VMS and fishermen are required to land all species intact, with dockside verification of the catch as set out in national legislation banning shark finning. There is a domestic market for shark flesh and sharks are landed whole. It is thus the flesh rather than the fins that is valuable.
SG100	*Ling demersal trawl fishery:* All shark species are required to be retained on board by national legislations. The client has implemented a number of measures to ban shark finning consistent with the MSC definition. Sharks are fully landed with fins attached or released. Observer monitoring confirms this, observer coverage is 20%.

Scoring issue (e) – Review of alternative measures

The final scoring issue of PI 2.1.2 relates to efforts made to minimise the mortality of unwanted primary species to the extent practicable. It is only scored for those primary species that are identified as being 'unwanted' as defined in the FCR (see FCR clause SA3.1.6). Note that if species are discarded with high survivability, this should be considered when defining which species are 'main' here and in the other PIs (see FCR clause SA3.4.5). This contrasts with the earlier scoring issues for this PI which recognise that other primary species may be targeted therefore seeking to avoid their capture may not be seen as an appropriate management tool. However, for this scoring issue, the focus is on ensuring that the fishery continues to consider mortality of unwanted catches and reviews any other possible approaches to either minimise this catch or to utilise it so that it is no longer considered unwanted (see FCR box GSA8).

Scoring issue	SG60	SG80	SG100
(e) Review of alternative measures	There is a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of main primary species.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of main primary species and they are implemented as appropriate.	There is a **biennial** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of all primary species, and they are implemented, as appropriate.

Good practice

To perform well under this scoring issue, fisheries should be reviewing and considering implementation of other measures that could further reduce the mortality of unwanted species. Measures reviewed may include alternative gear design, catch reduction devices, spatial and temporal measures, better handling and discarding practices to improve survivability, limits on unwanted catches, etc. Both SG80 and SG100 require that measures to minimise the fishery's mortality of unwanted primary species have been implemented, as appropriate. Good practice is where there is a regular review (at least every 2 years) of alternative measures to minimise mortality of unwanted primary species.

What certifiers check

Certifiers will first need to clarify from the catch composition, which elements of the catch are unwanted – usually either due to lack of market or due to inability to land (i.e. licence or quota restrictions). The assessment of this scoring issue is likely to be informed by meeting with the regulatory authority, but also from discussions with fishermen. Important supporting evidence in scoring this scoring issue is likely to come from:

- Empirical catch profile, including discards and any indication of their likely survivability, to detail which primary species are unwanted.
- Details of gear specification and any modifications currently used to minimise mortality of each of the unwanted species.
- Details of supporting evidence, assessing the efficacy of current gear modifications or other measures (e.g. spatial or seasonal restrictions, handling practices etc.) for each of the unwanted species.

Scoring issue (e) – Review of alternative measures

What certifiers check – *continued*

- Evidence that alternative measures have been considered for each unwanted species, such as a consultant or management agency report or minutes from a meeting where alternative measures were considered.
- Evidence of either implementation of alternative measures (if they are likely to be more effective at minimising mortality than current measures and are practical etc.) or evidence of why the alternative measures were not implemented (i.e. not likely to further minimise mortality of unwanted species, not practical or cost effective, likely to negatively impact another species and/or habitat).

Key questions to determine if further action is needed

Q Are there primary species which are unwanted in the catch and have high mortality, for reasons such as discarding (with low survivability) due to lack of quota, lack of appropriate license entitlement or lack of market?

Q If there are unwanted primary species in the catch have measures been taken to reduce mortality of catches of these species, such as gear modifications, seasonal or area closures, improved handling practices or other technical measures?

Q Is there evidence to demonstrate how well the measures taken to reduce unwanted primary species mortality are working?

Q Has any review been carried out of potential alternative measures to reduce mortality of unwanted species?

Q Have the results and recommendations of any review or testing been implemented within the management system?

Q If measures have not been implemented, what were the reasons (i.e. not practical, not cost effective, would negatively impact other species and/or habitats) and is there supporting evidence for this?

Q Are reviews carried out regularly, i.e. is the next review scheduled?

Scoring issue (e) – Review of alternative measures

Examples of scoring rationales

Scoring issue (e)	Fishery Example
SG60	*Flounder longline fishery:* Cod are a main primary species in the catch in spite of a zero TAC. They are therefore classed as unwanted and this scoring issue must be scored. The fishery currently has a move on rule if >10% of a haul is cod. As part of a national bycatch reduction program, a review was undertaken of other potential measures including closed areas, closed seasons and better handling practices. However the report concluded that better handling practices would not improve survivability of the cod and that closing areas or seasons to avoid cod bycatch would severely limit the economic viability for the flounder fishery. Therefore none of the measures were implemented. The unwanted cod meets the SG60 requirements as a review has been carried out however, as no follow up (regular) review is scheduled, the SG80 is not met.
SG80	*Lobster trap fishery:* Crab is a main species, they are classed as unwanted because they are required to be landed, but there is no market for the product. In 2008 the fishery implemented a closed area to avoid capture. A review in 2012 indicated that if the fishery started 1 month later that it would further minimize bycatch of crab and would not have significant cost or practicality implications as fishers would still have ample opportunity to fulfil their lobster quota. As a result of the review (undertaken in 2012), the fishery voluntarily started their season 1 month late in 2013 and have shown a reduction in the amount of crab bycatch per trip. Another review is scheduled to be undertaken by the national bycatch reduction program for 2016. The unwanted crab meets SG80 as a review has been carried out and the measure considered likely to be more effective at minimizing crab mortality was implemented as it was considered appropriate to do so. Another review is scheduled within a five year time frame. SG100 is not met because the review is not scheduled to take place in two year intervals.
SG100	*Sardine purse seine fishery:* Sprat is an unwanted species in this fishery. The fishery is very specific and highly targeted but sprat is occasionally captured and landed but not used. The fishery implemented mesh size regulations and move on rules if a haul was identified to be sprat. In 2014, a review was undertaken on how to minimise capture of sprat further and following this review a more modern sonar system was introduced which allowed for better identification of schools and this has shown a reduction in the schools of sprat encountered. Another review is scheduled in 2016 and additionally the fishery has committed to review alternative measures every two years.

Challenges and solutions to meeting PI 2.1.2

In considering the challenges for meeting PI 2.1.2 in developing countries, it must be considered that this only applies to species which meet the primary species definition, most notably that these are species that have management tools and measures in place, expected to achieve stock management objectives reflected in either limit or target reference points, which apply to the whole stock complex, including across any multi-jurisdictional boundaries. It may be expected that in developing countries relatively few other species in the catch may meet this criteria and a larger proportion will be considered under 2.2 (secondary species). Conversely, where this criteria is met, it suggests a certain level of management capacity is already in place, which suggests in turn that further management steps, as required should not be a considerable additional constraint.

There may be challenges in implementing management steps to ensure the fishery does not impact primary species to the PRI, or to avoid hindering the potential of the depleted stock to recover. This may require a certain amount of scientific research, examining the catch rates of the gear under assessment or other studies such as post capture survival or potential for alternative management measures such as area or seasonal closures. Where wider scientific study is required this may be constrained by available resources and expertise. Further review and assessment work may also be required in relation to unwanted species.

Example actions to improve performance for PI 2.1.2

Process Chronology				Management Actions	
1	2	3	4	Example action	Scoring issue
●				Undertake a profile of the catch, to determine which species are caught (as opposed to just landed). This should be independent, scientifically robust, and spatially and seasonally representative.	(a), (b)
●				For each species identified as primary, review their stock status relative to reference points to identify those that are below the PRI.	(a), (b)
●				For each species identified as primary, identify the management measures that are in place, both at the stock level and at the level of the fishery and consider the effectiveness (and degree of confidence) of this in achieving the stock objectives.	(a), (b)
●				Determine the level of catches of primary species relative to the catches from other fleets/target fisheries. This may provide indication of relative impact of fishery.	(a)
	●			Where a primary species is a shark, the client should ensure there is evidence that shark finning is not occurring. This could be verified by providing observer coverage information. In absence of observer coverage ensure that the fishery collaborates with any MCS activities to collect that data.	(d)
	●			Undertake trials of different management measures to reduce catches of unwanted primary species – such as gear trials, area or seasonal closures etc.	(a), (b)
	●			Where there is a HCR and supporting reference points in place, but this is not achieving aims, consider need for this to be re-evaluated or additional measures applied at a stock level (i.e. recovery plan).	(a), (b)
		●		Implement any management measures either at the level of the stock or the level of the fishery (i.e. fleet) to ensure that the impact of the fishery is appropriately managed. This should include consideration of the necessary regulatory, administrative and enforcement resources.	(c)
			●	Undertake periodic review of the efficacy of management measures designed to manage the impact of the fishery on primary species. In the case of unwanted primary species, this should also include a review of alternative measures.	(e)

Notes

Notes

2.1.3 Primary species information

Performance Indicator overview

The third of the PIs assessing primary species focuses on the availability and quality of information to inform outcome and management. It seeks to ensure that information on the nature and extent of primary species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage primary species.

Information is a crucial component of an effective fisheries management system and seeking to understand stock status, the scale of fishery impacts or the effectiveness of management measures is compromised by a failure to collect adequate information in a robust, independent and timely fashion.

Determining adequacy of information will depend to some extent on the necessity of that information. For example, if the fishery operates at a very low level of intensity, the species is well above its PRI or the management approach is very precautionary, information with low precision may be adequate for both the estimation of current status and the performance of the management strategy. Conversely, where a fishery is being more heavily targeted, a species is close to or below its PRI and only limited management is in place (with little evidence of precaution), then a more comprehensive range of information would be required to assure managers (and certifiers) of stock status or impact.

As with the other P2 species PIs, this PI needs to be addressed on a scoring element basis, with a score determined for each primary species assessed.

Three scoring issues are considered under this PI:

(a) Information adequacy for assessment of impact on main primary species

(b) Information adequacy for assessment of impact on minor primary

(c) Information adequacy for management strategy

Scoring issue (a) – Information adequacy - main species

The first scoring issue for PI 2.1.3 assesses the amount and quality of information to assess the impact of the fishery on the main primary species, with respect to status. This would include information on catches (not just landings) of primary species caught by the fishery, but may also include further detail such as post capture mortality, where released. Given that the impact must be determined relative to stock status, this also means the information required to determine stock status may also be subject to scrutiny here – although the emphasis of the language is on the fishery. The scoring issue also has an option to score information if the RBF is used to score PI 2.1.1.

Scoring issue	SG60	SG80	SG100
(a) Information adequacy for assessment of impact on main primary species	Qualitative information is **adequate to estimate** the impact of the UoA on the main primary species with respect to status. OR **If RBF is used to score PI 2.1.1 for the UoA:** Qualitative information is adequate to estimate productivity and susceptibility attributes for main primary species.	Some quantitative information is available and is **adequate to assess** the impact of the UoA on the main primary species with respect to status. OR **If RBF is used to score PI 2.1.1 for the UoA:** Some quantitative information is adequate to assess productivity and susceptibility attributes for main primary species.	Quantitative information is **adequate to assess with a high degree of certainty** the impact of the UoA on main primary species with respect to status.

Good practice

Good practice requires that the information is both quantitative and affords a high degree of certainty for each main primary species. This implies that there is a degree of independence and that results are scientifically robust (with confidence intervals). The methods for collecting data should be robust.

What certifiers check

Certifiers may wish to speak to stock assessment scientists involved in the assessment of the main primary species to get an indication of the veracity of landings information as well as any compliance/control bodies that might have observers or review logbooks and fishers themselves.

Certifiers may also refer to the following documentary evidence for justification:

- Stock assessments/advice for main primary species.
- Reviews or evaluations of stock assessments, which may give more comment on adequacy of information.

Scoring issue (a) – Information adequacy - main species

What certifiers check – *continued*

- Catch profile for the fleet under assessment, for recent seasons/years. This could be fishery-dependent or fishery-independent information.
- Regulatory requirements for catch monitoring and reporting.
- Other published studies looking at impact of fishery or other relevant fisheries on each primary species.
- Photographic evidence, vessel logbooks, catch landing sheets, observer reports, compliance records, including any information on unobserved mortalities and unwanted catches.

Key questions to determine if further action is needed

Q Is there a scientifically robust and independent catch profile of the fishery?

Q Are catches (as opposed to landings) routinely reported? How are these figures verified?

Q Is a coefficient of variation (CV) or precision of an estimate given?

Q Is all the information for the stock assessment of primary species available?

Q Is there information on the indirect impact of the fishery on primary species – such as post-capture mortality (in event of escape or release)?

Q Is there information on the extent of unobserved mortalities or unwanted catches?

Q Do the methods used to collect data have a high or low level of verifiability?

Q If the primary species are close to or below their PRI, are data collection methods with higher levels of verifiability and lower levels of bias used?

Scoring issue (a) – Information adequacy - main species

Examples of scoring rationales

Scoring issue (a)	Fishery Example
SG60	*Sole gillnet fishery:* Two main primary species were identified; plaice and seabass. There are stock assessments using reference points for both of these species. However, reporting of catches (including discards) is only reported through logbooks on a voluntary basis and no standardised form is used. No logbooks had been submitted for the previous two years, but earlier records show that plaice catch is around 5% of total catch and sea bass varies between 3-8%. Interviews were undertaken separately with the control agency, stock assessment scientists and randomly selected fishers. Fishers indicated that they do not discard either of these species because there is generally a good market for them. Sales notes showing average market prices for these species confirmed that this is the case. Independent interviews with the control agency also confirmed that plaice and seabass are generally retained and sold rather than discarded. Both fishers and the control agency indicated that these two species represent between 5-10% of the catch, depending on the season. The stock assessment scientists confirmed that the stock assessment was precautionary for both species and allows for these captures (even with uncertainty around the exact amount taken). Both the plaice and seabass meet SG60 as the information available is mainly qualitative.
SG80	*Flounder trawl fishery:* Cod, plaice and witch are the main primary species. Both the cod and plaice are shown to be below their limit reference point and there is a restricted TAC on them, so almost all catches are discarded. They are expected to have high mortality from discarding, based on information in a recent scientific study looking at survivability of these species in a similar trawl fishery. Witch is fluctuating around MSY and most are retained and sold. Fishers are required to complete electronic logbooks reporting catch for each haul by weight. These logbooks are submitted to the control agency, who review them and analyse the results to submit to the scientific and management bodies. There are 3 years' worth of data collected this way that indicate that catches (before discards) of cod, plaice and witch average 3%, 5% and 8% by weight respectively. In addition, the control agency places observers on randomly selected trawl vessels throughout the season and their main duty is to take samples of the catch and discards. In the previous two years the observer coverage in the fishery was less than 2%. Observer bias is a potential concern in this fishery, although based on the limited observer coverage the difference between logbook estimates and observer estimates is roughly equivalent. Landings inspections of catch are also undertaken for all vessels returning to port and show that only flounder and witch are regularly landed. Any cod or plaice landed is counted against the quota. All three species meet SG80, but would need a higher degree of certainty with regard to potential observer bias to meet SG100.
SG100	*Swordfish longline fishery:* Bluefin tuna and white marlin are the two main primary species. There is 100% observer coverage on the vessels in this fishery in addition to electronic logbook reporting. Observers spend at least 50% of their time observing hauls and report on species caught (including weight) as well as any hook loss. The observer data and the fishery data assess the impact of the fishery with a high degree of certainty, with 95% confidence intervals. In addition, these data contribute to the biannual stock assessments for these species. Both species meet SG100.

Scoring issue (b) – Information adequacy - minor species

The second scoring issue focuses on the information of the impact on minor primary species – i.e. those that fit the description of primary, and are not classified as main either as a result of catch proportion or particular vulnerability.

Scoring issue	SG60	SG80	SG100
(b) Information adequacy for assessment of impact on minor primary species			Some quantitative information is adequate to estimate the impact of the UoA on minor primary species with respect to status.

Good practice

Good practice requires the availability of some quantitative information that enables the assessment of the impact of the fishery on minor species.

What certifiers check

Certifiers may wish to speak to stock assessment scientists involved in the assessment of primary species as well as any compliance/control bodies that might have observers or review logbooks and fishers themselves. They may also refer to the following documentary evidence for justification:

- Stock assessments/advice for minor primary species.
- Reviews or evaluations of stock assessments, which may give more comment on adequacy of information.
- Catch profile for the fleet under assessment for recent seasons/years. This could be fishery-dependent or fishery-independent information.
- Regulatory requirements for catch monitoring and reporting.
- Other published studies looking at impact of the fishery or other relevant fisheries on primary species.
- Photographic evidence, vessel logbooks, catch landing sheets, observer reports, compliance records, including any information on unobserved mortalities and unwanted catches

Scoring issue (b) – Information adequacy - minor species

Key questions to determine if further action is needed

Q Is the same level of information available for minor primary species, as for main primary species (scored in scoring issue (a))?

Q Is catch profiling information available which adequately captures the amount of mortality on minor species attributable to the fishery?

Q Is all the information for the stock assessment of minor primary species available?

Examples of scoring rationales

Scoring issue (b)	Fishery Example
SG60	No scoring guidepost at the 60 level.
SG80	No scoring guidepost at the 80 level.
SG100	*Sole demersal trawl fishery:* There are 10 primary species caught in this fishery. Only one of these species is considered main. The catch of all other species combined is between 1-5% by weight and comprises prickly puffer, royal threadfin, common guitarfish, flying gurnard, canary drum, bearded brotula, bobo croaker, bigeye grunt and crevalle jack. All of these species are minor primary species and all are landed and sold in the local market. There is electronic reporting of catches by weight required on all vessels. In addition, a project was carried out by a local research group where observers were placed on vessels on 5 different trips throughout the season. They collected data on the catches and discards, including species, size, age, length and sex. Their data were scaled up using logbook information on effort and catch to get the average annual catch rates for the main and minor species. Sales notes from local markets also have similar figures for sales of these species throughout the year. All minor species meet SG100.

Scoring issue (c) – Information adequacy for management strategy

The focus of the third scoring issue of PI 2.1.3 is on the adequacy of information to support the management of primary species. This has a slightly wider scope than the previous two scoring issues, which were more focused on information relating to mortality caused by the fishery. The intent of this scoring issue is therefore to include information on aspects such as change in operational practices, information in relation to fishing patterns or information required to monitor any of the management measures or strategies referred to in PI 2.1.2.

Scoring issue	SG60	SG80	SG100
(c) Information adequacy for management strategy	Information is adequate to support **measures** to manage **main** primary species.	Information is adequate to support a **partial strategy** to manage **main** primary species.	Information is adequate to support a **strategy** to manage **all** primary species, and evaluate with a **high degree of certainty** whether the strategy is achieving its objective.

Good practice

To perform well in relation to this scoring issue fisheries should have adequate information to support management of primary species including information that allows detection of any changes in level of risk to primary species.

What certifiers check

Certifiers will consider the information required to undertake the management measures detailed in PI 2.1.2. Supporting evidence for this is likely to come from:

- Analysis of catch profiles over time, indicating responses to management measures.
- Information required for wider management measures – such as effort or spatial mapping.
- Monitoring or evaluation reports detailing changes in operational practices over time.
- Observer reports which capture information relevant to the management of primary species, or the impact of the fishery on those species.
- Regulatory requirements for monitoring and reporting.
- Any compliance issue in relation to statutory reporting requirements
- Other published studies looking at impact of the fishery on primary species over time.
- Details of any voluntary, fleet level recording of interactions with primary species.

Scoring issue (c) – Information adequacy for management strategy

Key questions to determine if further action is needed

Q Is the appropriate information collected (or monitoring programs in place) to determine whether the management measures referred to in PI2.1.2 are achieving their objectives?

Q Where the wider management of primary species requires certain information – such as effort, fishing pattern or quota uptake – do the reporting and monitoring systems effectively provide this information?

Q Are there additional sources of information (such as voluntary reporting or observer reports) which provide further information in relation to management measures?

Q Do the stock assessments or advice for primary species indicate that all the required information is in place and verifiable?

Examples of scoring rationales

Scoring issue (c)	Fishery Example
SG60	*Estuarine mullet gillnet fishery:* Several primary species are captured, but only one of these is main – the golden perch. Interviews with fishers and with the management agency indicated that catches of golden perch have been consistent over time and it is managed using proxy stock reference points, using information focused on the main management measure – mesh size. The management agency regularly reviews sales notes for golden perch and would be able to detect an increase in the catch of golden perch. The main measure to control catches of golden perch is the mesh size, which limits the catches to mature individuals. If the mesh size were to change, the increase or decrease of captures would eventually be picked up by the management agency. The mesh size of gillnets used are monitored by the local enforcement agency on a stratified sampling basis and they have indicated a high degree of compliance with this measure. There is also an economic incentive for fishers to use this mesh size to maximize catches of mullet, which is more valuable than the golden perch. There is information adequate to support measures to manage golden perch, so this species meets SG60. There is no partial strategy for golden perch or information on what the impact of changes in mesh size would be on the population in order to support it, so it does not meet SG80.

Scoring issue (c) – Information adequacy for management strategy

Examples of scoring rationales – *continued*

Scoring issue (c)	Fishery Example
SG80	*Halibut longline fishery:* The main primary species captured are haddock, white hake and mackerel. All are quota managed species and are subject to stock assessments and monitoring of landings. Size restrictions on landings (discards of undersized species form a very small percentage of catch due to hook size) and seasonal area closures are measures that form part of the partial strategy for these species. Biological and life history traits for these species are known and support the management of these species. The management body is able to monitor any changes in risk to or non-compliance of measures used for these species. All three species meet SG80.
SG100	*Inland perch longline fishery:* Fishers are required to provide data on catches (including discards) of all primary species (roach, bream and pikeperch) on a continous basis. In addition, a test-gillnet fishery is undertaken on an annual basis two times a year (coincident with the fishery) by the local university which records all captures of species. These data are analysed by the university along with the fishery-dependent data to provide regular updates to CPUE trend data for all species, time series analysis goes back 15 years and the analysis is peer reviewed. This gives a reliable estimate of stock status. The university uses these data to create a simulation model of stock status for the coming year, which they can test against potential risks. Together these data provide enough information to enable the management to determine if there is any change to the risk in species, i.e. due to changes in the management strategy such as the size of the mesh used in gillnets or the area or season that the gillnets are deployed. In addition, landings inspections and vessel inspections are regularly undertaken to ensure that the management measures are complied with. The roach, bream and pikeperch all meet SG100.

Challenges and solutions to meeting PI 2.1.3

This PI requires that several sources of fisheries data are available and adequate. Across the 3 scoring issues of the PI the scope of the information requirements are quite wide, ranging from information on catch and fishing related mortality of the fishery, to information to inform the assessment of stock status of the primary species, to information to monitor the performance of management measures (both related to the management of primary species and the management of the fishery impact on primary species). Across each of these areas of information there is an increasing requirement (at least for higher scores) for the information to be scientifically robust, independent and comprehensive.

This all implies a certain level of monitoring and reporting infrastructure, a good level of scientific capacity and increasingly the systems in place, such as databases to support the collation and analysis of the relevant information, to ensure that information is not only collected – but used.

Example actions to improve performance for PI 2.1.3

Process 1	Process 2	Process 3	Process 4	Example action	Scoring issue
●				Once the primary species have been identified and further divided into main and minor, undertake a review of the level of existing information, or routine monitoring currently in place, to determine the adequacy of this information in determining both the status of those primary species and the fishery impact of those species (and consequence to primary species status).	(a), (b), (c)
●				Review existing stock assessment reports for primary species which may also provide an indication of the quality of the information that is available and routinely collected for management purposes.	(a), (b), (c)
	●			Ensure there is a quantitative robust catch profile for the fishery, which will provide evidence of total catches of all species (including any that may not be landed). If necessary initiate improved monitoring and catch recording systems so that the catches of primary species by the fishery are reliably recorded in the future.	(a), (b), (c)
	●			Where gaps are identified in the information and monitoring reviewed in the stages described above, propose data gathering exercises and routine monitoring procedures to ensure that these information gaps are addressed.	(a), (b), (c)
		●		Commission any independent research or observer work where necessary to address any of the information gaps identified above.	(a), (b), (c)
		●		Implement any additional data gathering or routine monitoring processes required to successfully manage primary species (and the fishery impact on primary species). If required, this should highlight the needs for staff training or capacity building, identify appropriate resourcing of monitoring programs and include any regulatory and enforcement backing.	(a), (b), (c)
		●		Undertake consultation/outreach on any new proposed data gathering exercises to ensure there is good stakeholder understanding of the need for data, the process by which data will be collected and the ways in which data will be protected and used.	(a), (b), (c)
			●	Undertake periodic evaluations of the effectiveness of the data collection in relation to primary species, to ensure that programs continue to be tailored to the needs of management.	(a), (b), (c)

Notes

Notes

2.2.1 Secondary species outcome

Performance Indicator overview

PIs 2.2.1 to 2.2.3 make an assessment of the other species caught in the fishery which are considered 'secondary'. The first of these (2.2.1) assesses the status of those species classed as secondary to ensure that the fishery aims to maintain secondary species above a biological based limit and does not hinder recovery of secondary species if they are below a biological based limit. Species are classified as secondary on the basis that:

- They are not covered by Principle 1 and therefore would not be eligible to carry the MSC logo themselves.
- They are not classified as primary species or ETP species.
- They are subject to less management than primary species (though there may be some management tools and measures are in place, these are not explicitly linked to stock management objectives reflected in either limit or target reference points).
- They may be within or outside of scope (i.e. could include birds, reptiles, amphibians, mammals, where these are not classified as ETP).

Secondary species are more likely to be of lesser commercial importance and therefore less directly targeted – although there may be exceptions to this (i.e. commercially important and targeted species which are not subject to clear management connected to reference points). As such they may well include species which are rarely landed. However, the impact of overall fishing mortality, taking account of any mortality not reflected in landings statistics, must be considered.

The benchmark applied for PI 2.2.1 is lower than is applied under Principle 1. The certainty thresholds are as follows:

Likely = › 60th percentile

Highly likely = › 70th percentile

High degree of certainty = › 80th percentile

The focus of scoring is on the main secondary species – i.e. those that the fishery catches most of (more than 5% of catches), or that certifiers conclude to be less resilient, perhaps on the basis of low productivity or where there is existing knowledge of depletion or vulnerability to anthropogenic or natural changes. Any species which are out of scope (but are not treated as ETP) must be included as a main secondary species. This would include any birds, reptiles, amphibians or mammals in the catch. In order to achieve high scores, certifiers must also consider species that account for a small proportion of the catch (i.e. minor species).

Although this PI focuses on outcome, rather than information, scores are inevitably influenced by the level and the quality of available information, firstly of the composition of the catch and secondly on the status of those species.

The scoring of this first outcome PI in relation to secondary species may be scored using the MSC's Risk Based Framework (RBF). Annex 1 provide more detail about the RBF and how it can be used to score this PI. Given that the classification of secondary species includes those stocks which are not subject to management reflected in reference points it is quite possible that there may be more call for using the RBF in this instance.

Two scoring issues are considered under this PI:

(a) Main secondary species stock status

(b) Minor secondary species stock status

Scoring issue (a) – Main secondary species stock status

The first scoring issue focuses on the outcome status of the secondary species classed as main.

Scoring issue	SG60	SG80	SG100
(a) Main secondary species stock status	Main secondary species are **likely** to be above biologically based limits. OR If below biologically based limits, there are **measures** in place expected to ensure that the UoA does not hinder recovery and rebuilding.	Main secondary species are **highly likely** to be above biologically based limits. OR If below biologically based limits, there is either **evidence of recovery** or a **demonstrably effective partial strategy** in place such that the UoA does not hinder recovery and rebuilding. AND Where catches of a main secondary species outside of biological limits are **considerable**, there is either **evidence of recovery** or a, **demonstrably effective strategy in place between those MSC UoAs that also have considerable catches of the species**, to ensure that they collectively do not hinder recovery and rebuilding.	There is a **high degree of certainty** that main secondary species are above biologically based limits.

Good practice

Fisheries with little or no interaction with secondary species will perform well against this scoring issue. Where there is interaction with secondary species, fisheries will score well if the secondary species is at healthy stock levels or if there are a collection of actions that reduces the impact of the fishery on the secondary main species. Examples of such actions may include restricting catches of secondary species, spatial and temporal fishing limits, gear controls such as mesh size and net design and fisher awareness and sensitisation.

Scoring issue (a) – Main secondary species stock status

What certifiers check

Where possible certifiers require some empirical evidence to support scoring for this PI and will refer to the following data – ideally in published form:

- Empirical catch composition data (perhaps with seasonal and spatial patterns).
- Any available stock assessments for stocks which comprise more than 5% of the catch (although these won't contain reference points – or else the species would be treated as a primary species – they may still offer relative indications of stock status and fishing mortality).
- Stock assessments for any stocks which may be less resilient to fishing pressure (e.g. most-long lived species like shark) which comprise 2-5% of the catch.
- Management measures for any main stocks shown to be depleted.
- Where stock assessments are lacking, any other evidence which may provide some information (albeit with less certainty) about stock status. For example, time series of catch and effort, ecosystem descriptions.
- Life history characteristics providing indications of species productivity, vulnerability and susceptibility to capture.

Key questions to determine if further action is needed

Q Is there a quantitative breakdown of catches in the fishery under assessment? Is this independent and reflective of conditions across the fishery?

Q Can it be established which elements of the catch are considered secondary, as opposed to primary or ETP?

Q Of the secondary species can it be determined which are main?

Q Is there any information available about the stock status of any secondary species which have been classified as main?

Q Where species are below biologically based limits are there measures in place to reduce the impact of the fishery?

Q Is there any ecosystem description or catch composition time series available that may provide some empirical evidence of relative status of any such species?

Q Are there any other MSC fisheries which have catches of any depleted secondary species – if so are their catches considerable? Do the MSC fisheries have measures in place to reduce the impact of the fishery?

Scoring issue (a) – Main secondary species stock status

Examples of scoring rationales

Scoring issue (a)	Fishery Example
SG60	*Horse mackerel trawl fishery:* Silver hake is a main secondary species and its stock status is difficult to infer based only on survey indices, although relative abundance and fishing mortality can be estimated from trawl surveys and CPUE, which shows that the stock is not likely above biologically based limits. The fishery is managed with a TAC and as a measure to protect spawning silver hake, small seasonal area closures are in place which together work as a partial strategy to ensure the fishery is not hindering recovery, but it has not yet been demonstrated to be effective. This scoring element therefore meets the SG60, but will not meet SG80 until either the stock recovers to be highly likely above biologically based limits or evidence is presented to highlight the effectiveness of the partial strategy.
SG80	*Cod longline fishery:* Mackerel are often used for bait at a volume great enough for the species to be considered in the assessment. There is a precautionary management strategy available in the fisheries management plan that includes a TAC that is evaluated annually, a minimum size limit, bycatch limits from non-directed fisheries and a license limited entry. No reference points have been defined, but the stock is subject to a trends-based assessment using abundance indices from directed surveys. The current biomass estimates have been relatively stable over the past 5 years and compared to the long term average have increased in recent years. Coupled with this trend in biomass catches have been very stable over this time period. Given these developments in stock status as well as the successful restrictions on fishing mortality as outlined above, the stock can be considered highly likely above biologically based limits. *Sole trawl fishery:* Plaice is a main secondary species in this fishery and is currently managed according to a rebuilding plan, which was introduced in response to stock depletion. This includes a moratorium on the directed fishing, bycatch limits and small fish protocols. The fishery is fully compliant with the measures set out in the rebuilding strategy. Although the plaice stock is still currently below the long-term mean based on survey indices, some modest increases have been recorded more recently, which supports the notion that the current strategy is effective. There are no other MSC fisheries that catch 10% or more of this plaice stock, so a cumulative evaluation of fishery impact is not necessary. SG80 is met.
SG100	*Swordfish pole and line fishery:* Although the swordfish fishery is a very clean and selective fishery with no main secondary species, the fishery does use green herring as bait and these are categorised as secondary main species, on account of the volume used. The green herring populations consist of multiple distinct stocks, often separated by distinct near shore spawning areas. A complete green herring stock assessment combining all these distinct stocks is not available. A precautionary management plan for green herring is in place, where commercial harvest on herring stocks is not permitted in an area unless stock forecasts of annual population levels exceed a minimum threshold biomass. These effort controls tied to the biomass surveys have led significant increases in stock biomass for all distinct herring stocks and stocks are now at the highest observed levels compared to the ten year average. Since the herring stocks used for bait are at very healthy levels with precautionary management measures in place, there is a high degree of certainty (80% probability) that the stock is above biologically based limits, satisfying SG100.

Scoring issue (b) – Minor secondary species stock status

The second scoring issue for secondary species outcome is specifically to address the issues of any impacts on minor species present in the catch. This scoring issue considers evidence that stocks are above biologically based limits or where minor species are below biologically based limits, there is management in place by the fishery to ensure recovery is not hindered.

Scoring issue	SG60	SG80	SG100
(b) Minor secondary species stock status			Minor secondary species are highly likely to be above biologically based limits. OR If below biologically based limits there is evidence that the UoA does not hinder the recovery and rebuilding of minor secondary species.

Good practice

Good practice requires that minor species are above biologically based limits or in the case that stocks are below biologically based limits that there are measures or strategy in place in the fishery that ensures that it does not hinder the recovery of that minor secondary species.

What certifiers check

The body of evidence that certifiers will refer to for this scoring issue will be the same as that referred to for scoring issue (a) of PI 2.2.1.

- Empirical catch composition data (perhaps with seasonal and spatial patterns).
- Any available stock assessments for stocks which comprise more than 5% of the catch (although these wont contain reference points – or else the species would be treated as a primary species – they may still offer relative indications of stock status and fishing mortality).
- Stock assessments for any stocks which may be vulnerable or depleted, which comprise 2-5% of the catch.
- Management measures for any main stocks shown to be depleted.
- Where stock assessments are lacking, any other evidence which may provide some information (albeit with less certainty) about stock status. For example, time series of catch and effort, ecosystem descriptions.
- Life history characteristics providing indications of species productivity, vulnerability and susceptibility to capture.

Scoring issue (b) – Minor secondary species stock status

Key questions to determine if further action is needed

Q Is there a quantitative breakdown of catches in the fishery? Is this independent and reflective of conditions across the fishery?

Q Of the secondary species can it be determined which are minor?

Q Is there any information available, including proxy indicators about the stock status of any secondary species which have been classified as minor?

Q Is there any ecosystem description or catch composition time series available that may provide some empirical evidence of relative status of any such species?

Q Are minor secondary species highly likely to be above biologically based limits? Or are there indications that minor secondary species are below biologically based limit?

Examples of scoring rationales

Scoring issue (b)	Fishery Example
SG60	No scoring guidepost at the 60 level.
SG80	No scoring guidepost at the 80 level.
SG100	*Groundfish demersal trawl fishery:* There are two minor species in this fishery, calico rockfish and copper rockfish. Based on trawl survey abundance data which is collected annually, both species have shown a decline in the long term average over the last 5 years and cannot be considered highly likely above biologically based limits. Although these stocks are not showing any signs of recovery at the moment, the incidental mortality caused by the fishery, estimated at fewer than 10 individuals per year, represents a very small contribution to the total estimated fishing mortality, which is mostly from a directed fishery. Furthermore, the fishery has in place several mitigation measures to limit the interactions with these species, including avoiding known spawning areas and full recording of all catches. For these two scoring elements, the SG100 level is therefore satisfied as the fishery cannot be considered to be hindering the recovery of these species.

Challenges and solutions to meeting PI 2.2.1

Perhaps the first constraint in meeting this PI in developing countries will be to understand the MSC scoring criteria and classification system such that the meaning of the terms primary, secondary, main, minor and considerable are understood. Once these terms are understood the second challenge is likely to be in attributing different elements of the catch into these categories. Above all this requires a reliable empirical catch composition. All fisheries wishing to enter the MSC program should have this.

In developing countries, where fisheries science is less well developed, the target species which is the focus of the overall assessment (Principle 1) may be subject to the most advanced stock management, compared to other fisheries in the country. The other species which contribute to the catch composition are therefore likely to be subject to comparatively fewer management measures and less robust forms of stock assessment. It is probable therefore that a large number of the other fish caught as a bycatch in a developing country fishery will be classified as secondary rather than primary. Almost by definition, this means they are likely to be subject to less empirical stock assessment. This therefore presents a challenge to present evidence of stock status or to demonstrate that the stock is above biologically based limits.

In some cases it may be possible to demonstrate robust stock status by reference to expert evidence and plausible argument, augmented by some data sets. Where this is not possible the risk based framework should be used to determine likely risk posed to other species by the fishery. Undertaking a Productivity Susceptibility Analysis (PSA) on all catches in the fishery may be a useful exercise in preparation for a full assessment to help identify where there maybe particular issues.

Many stocks in developing countries, which do not have management reflected in reference points and which lack empirical stock assessments, but which are commercially targeted (in particular by the gear under assessment) are likely to score as high risk under the Risk Based Framework (see Annex 1). This does not mean that the fishery is necessarily depleted, but rather that there is sufficient risk of this, that a more empirical form of stock assessment would be required to to provide assurance of stock status. This may mean that in order to meet this PI some form or empirical stock assessment may ultimately be required for the most vulnerable or commercially important elements of the bycatch. This in turn implies a requirement for capacity, expertise and funding, all of which may be a constraint in a developing country situation.

Finally, where there is evidence of a stock depletion, there is a requirement to demonstrate that the fishery under assessment is not the cause of this depletion, or is not hindering the potential of the depleted stock to recover. Unless the proportions of the catch from the assessed fishery, are insignificant compared to another targeted fishery, this may be difficult to demonstrate. This may require a certain amount of scientific research, examining the catch rates of the gear under assessment or other studies such as into post capture survival. Where wider scientific study is required this may be constrained by available resources and expertise.

Example actions to improve performance for PI 2.2.1

Process Chronology				Management Actions	
1	2	3	4	Example action	Scoring issue
●				Undertake a catch profiling trial for the fishery. This should be independent, scientifically robust, and spatially and seasonally representative.	(a), (b)
●				Determine catch proportions of each species (including target species). Allocate those non P1 species into primary, secondary and ETP and main or minor.	(a), (b)
	●			Refer to available stock assessments or other forms of empirical evidence or plausible argument to determine whether main secondary species are above the point where recruitment would be impaired and the degree of confidence in this.	(a)
	●			Where there is insufficient evidence to support conclusions about stock status of secondary species, undertake an RBF (see Annex 1) scoring exercise.	(a), (b)
		●		Consider management options for any species which are main and which cannot be clearly demonstrated to be above biologically based limits to move these to minor or less. In other words consider management options to reduce bycatch of these species. These may include legislation restricting catches of bycatch species, spatial and temporal fishing limits, gear controls such as mesh size and net design and fisher awareness and sensitisation.	(a), (b)
		●		Where species are main and cannot be clearly demonstrated to be above biologically based limits but where a reduction of catch is not possible (i.e. because the species is commercially important or an inevitable bycatch) develop more quantitative stock assessment techniques to demonstrate that the stock is above biologically based limits.	(a)
		●		Ascertain the level of fishing mortality on any stock below the PRI attributable to the fishery under assessment, in comparison with that from other fleets.	(a), (b)
			●	Introduce a system of on-going periodic recording of catch profiling, plus any other data gathering as required.	(a), (b)

Notes

2.2.2 Secondary species management strategy

Performance Indicator overview

The second PI in relation to secondary species focuses on the management that is in place to manage the impact of fisheries upon those species. It is worth again reminding that species are classified as secondary on the basis that:

- They are not covered by Principle 1 and therefore would not be eligible to carry the MSC logo themselves.
- They are not classified as primary species or ETP species.
- They are subject to less management than primary species (though there may be some management tools and measures in place, these are not explicitly linked to stock management objectives reflected in either limit or target reference points).
- They may be within or outside of scope (i.e. could include birds, reptiles, amphibians, mammals, where these are not classified as ETP).

The consideration of the management in place for secondary species must be seen (and scored) in the context of the definition of secondary species which includes a comparatively lower level of management (as compared with primary or P1 species). In particular there is unlikely to be management tied to reference points and HCRs (or else these would likely be classified as primary species) and the level of empirical stock assessment feeding into an adaptive management decision-making process is also likely to be less well developed.

In spite of this likely lower level of management, the MSC Standard still requires that there is some management, sufficient to give confidence that the fishery (or fisheries) are unlikely to reduce the stock to below the point of recruitment impairment. In the context of P2 there is also considerable opportunity for the management measures to be applied to the fishery, meaning that it is the management of the impact of the fishery under assessment (rather than all fisheries) that mostly determines the score.

The types of management that may be expected and could contribute to the management of secondary species could include:

- Clear management authority/oversight at an appropriate jurisdiction
- An on-going record of key time series – landings (logbook), effort, key biological data (length weight)
- Fleet level management – licencing, gear restrictions, effort limitations
- Output controls – quota, size limits
- Monitoring Control & Surveillance (inspections, VMS)
- Spatial or seasonal restrictions
- Some form of stock assessment

The focus of scoring is on the main secondary species – i.e. those that the fishery catches most of (more than 5% of catches in most cases), or that certifiers conclude to be less resilient, perhaps on the basis of low productivity or where there is existing knowledge of depletion or vulnerability to anthropogenic or natural changes (species should generally be considered main if they constitute more than 2% of catches in these cases). Any species which are out of scope (but are not treated as ETP) must be included as a main secondary species. This would include any birds, reptiles, amphibians or mammals in the catch. To achieve top marks certifiers also look beyond these main species, to species which are less frequently caught by the fishery (minor).

Five scoring issues are considered under this PI:

(a) Management strategy in place

(b) Management strategy evaluation

(c) Management strategy implementation

(d) Shark finning

(e) Review of alternative measures to minimise mortality of unwanted catch

Scoring issue (a) – Management strategy in place

The first scoring issue looks at the presence and comprehensiveness of management in place for secondary species.

Scoring issue	SG60	SG80	SG100
(a) Management strategy in place	There are **measures** in place, if necessary, which are expected to maintain or not hinder rebuilding of main secondary species at/to levels which are highly likely to be above biologically based limits or to ensure that the UoA does not hinder their recovery.	There is a **partial strategy** in place, if necessary, for the UoA that is expected to maintain or not hinder rebuilding of main secondary species at/to levels which are highly likely to be above biologically based limits or to ensure that the UoA does not hinder their recovery.	There is a **strategy** in place for the UoA for managing main and minor secondary species.

Good practice

Good practice seeks to implement strategies to minimise catches of non-target species, as appropriate, which could include legislation, restricting catches of secondary species, spatial and temporal fishing limits, gear controls such as mesh size and net design and fisher awareness and sensitisation. The measures should aim to keep stocks above biologically based limits or at least ensure that the fishery is not hindering recovery of the species if the species is already below biologically based limits.

In both SG60 and SG80 the focus is just on main species, but at SG100 there is a requirement for there to also be a management strategy in place for minor species. Both SG60 and SG80 also contain the caveat 'if necessary', meaning that these SG levels do not need to be scored when there is no impact of the fishery on secondary species. However, at SG100 there is an expectation that a strategy will be in place, regardless of necessity.

What certifiers check

Assuming the certifiers have a comprehensive list of the catch composition, and have determined which are primary, secondary, main and minor they will then focus initially on the main secondary species to determine: (i) the stock status; (ii) the management in place for the species and (iii) the fleet level management to limit impact on any depleted secondary species. Certifiers are likely to talk to managers within the fishery department (or equivalent e.g. if the species is out of scope) to determine the level of management in place for these other species caught in the fishery. Additional data sources may include:

- Stock assessments/stock management advice for each secondary species.
- Fishery management plans/details for managing each species or all of them.
- Details of fishery regulations.
- Any fleet level initiatives.
- Any information on gear selectivity or post-capture mortality studies where fleet is seeking to avoid mortality of unwanted species.

Scoring issue (a) – Management strategy in place

Key questions to determine if further action is needed

Q Are all species classified as secondary and main in the fishery subject to management measures?

Q Can it be demonstrated that management measures or partial strategy are not necessary – i.e. that the fishery has no impact on secondary species?

Q Do the measures in place form a cohesive strategy enabling managers to have real oversight of trends in stock status and an ability to respond appropriately?

Q Are there additional measures that the fishery is undertaking to ensure they do not hinder the recovery of any depleted species?

Examples of scoring rationales

Scoring issue (a)	Fishery Example
SG60	*Lobster trap fishery:* The two main secondary species are rock crab and hermit crab. As there is no market, both species are discarded alive and are expected to have high survivability, although this has not been specifically tested in this fishery. In addition, to mitigate effects of potential ghost fishing through gear loss, the traps have biodegradable panels so that target and bycatch species can escape if a trap is not recovered. Both of these measures are expected to ensure that these species are maintained above their biologically based limits, so both species meet SG60. However, there is no quantitative assessment of the status of the two species or recording of discards so there is little evidence that these measures would be altered or changed if the crab abundance was to decline. There is not an awareness that the measures would be altered if they were shown to be ineffective, so they do not meet SG80.
SG80	*Hake trawl fishery:* The main secondary species are kingklip and kob, both of which are landed. Several measures are in place that are not specifically for these species, but which act to maintain these stocks above their biologically based limits and can collectively be considered as a partial strategy. These include effort (days at sea) restrictions to ensure that the target hake stock is maintained at healthy levels and closed areas to protect spawning grounds for multiple species. Landings from these fisheries are recorded and the management agency reviews these to determine CPUE trends for kingklip and kob. In recent years, trends have been stable. The measures are expected to be amended should the CPUE trends show that the kingklip and kob stocks are likely to be hindered by the fishery. The kingklip and kob both meet SG80, but as the measures of the partial strategy are not designed specifically for these species, they do not meet SG100. Additionally, there is a lack of management in place for some of the minor species caught in the fishery, which would be a requirement for SG100 to be met for these minor species.

Scoring issue (a) – Management strategy in place

Examples of scoring rationales – *continued*

Scoring issue (a)	Fishery Example
SG100	*Pikeperch gillnet fishery:* The only secondary species are cormorants. In spite of a relatively low catch rate, as birds are outside of the MSC scope they must be classified as main. These birds have been known to interact with the fishery in periods when gillnets are set with no ice cover. The fishery has published and implemented a strategy to minimise bird interactions following an onboard research and monitoring program which trialed various approaches. Measures limit the gillnet season to the winter months, when there is most ice cover, and to use a multi-filament mesh that is more visible to birds. These measures were designed to minimize this fisheries interaction with any piscivorous birds (although only cormorants have ever been recorded) and are likely to be amended by the management body if fisher logbooks show an increase in cormorant mortality to the point that there would be a negative consequence for the population (not expected at current high population status and low mortalities from fishery). Therefore the fishery meets SG100 in relation to impact on this species.

Scoring issue (b) – Management strategy evaluation

The second scoring issue relating to secondary species management considers the degree of confidence that the management in place will work.

Scoring issue	SG60	SG80	SG100
(b) Management strategy evaluation	The measures are considered **likely** to work, based on plausible argument (e.g. general experience, theory or comparison with similar UoAs/species).	There is **some objective basis for confidence** that the measures/partial strategy will work, based on some information directly about the UoA and/or the species involved.	**Testing** supports **high confidence** that the partial strategy/strategy will work, based on information directly about the UoA and/or species involved.

Good practice

Good practice requires an objective basis, to ensure that the management strategy/ partial strategy will work. Availability of research studies and reports demonstrating effectiveness of the strategy in the fishery or in similar fisheries will be useful to fisheries.

What certifiers check

Certifiers will be looking for evidence of the effectiveness of management of secondary species. This could include:

- Time series data of stock status, landings, effort, spatial patterns, size profiles.
- Evaluations of management (fishery management plans) for each secondary species.
- Modelling in support of the selection of management measures.
- Research on gear selectivity or post-capture mortality for any secondary species which the fishery is seeking to avoid.

Scoring issue (b) – Management strategy evaluation

Key questions to determine if further action is needed

Q Is there evidence available to demonstrate that the management of each secondary species is working?

Q Are there arguments that can be drawn from analogous fisheries to suggest that the management in place is likely to be sufficient?

Q Is there evidence that the fishery's own efforts to fish selectively are working?

Q Have any formal evaluations been undertaken of any fishery management plans for secondary species caught by the fishery?

Examples of scoring rationales

Scoring issue (b)	Fishery Example
SG60	*Herring midwater trawl fishery:* The main secondary species are boarfish. The fishery gets higher prices for clean catches of the target species only, rather than mixed trawls. Boarfish are often seen as a nuisance, so there is an economic incentive to ensure that catches are minimised. The measures to avoid mixed catches (through shoal identification and communication between vessels) are considered likely to work based on the economic incentive to avoid capture of other species, but this is more of a plausible argument than an objective assessment.
SG80	*Mahi Mahi longline fishery:* The main secondary species is white marlin. Measures to maintain white marlin at healthy levels are encouraging release and training fishers in methods that allow live release of marlin (as majority of marlin are alive at time of haul back). To better understand survivorship, streamer tags were used and the estimated survivorship was about 75%. Additionally white marlin that are landed are recorded and there is a high inspection level. The landings data and inspection reports provide objective basis for confidence that the levels of white marlin catches in this fishery are low enough to maintain the stock above biologically based limits as there was an increasing abundance observed through catch rate estimates in recent years.
SG100	*Albacore tuna handline fishery:* The main secondary species is swordfish. In addition to the measures used such as fishing closer to the surface as swordfish are found a greater depths, two area closures and seasonal closures, there is ongoing monitoring and observers are deployed on board at least 20% of the trips. The observers verify the implementation of measures and also record volumes of catches. Additionally, independent research studies were carried out testing the efficacy of the area and seasonal closures, the results indicated higher abundance of swordfish. The management agency reviews the observer data as well as the other fishery information and has used performance testing to determine that the cohesive arrangements of measures are working for swordfish.

Scoring issue (c) – Management strategy implementation

The third scoring issue seeks to ensure that the management of secondary species is being implemented as intended.

Scoring issue	SG60	SG80	SG100
(c) Management strategy implementation		There is **some evidence** that the measures/ partial strategy is being **implemented successfully**.	There is **clear evidence** that the partial strategy/ strategy is being **implemented successfully and is achieving its objective as set out in scoring issue (a)**.

Good practice

Generally fisheries will perform well against this scoring issue if it can be clearly shown that the measures prescribed are being implemented.

What certifiers check

Certifiers are likely to look at the following information for evidence of implementation:

- Reviews of any management measures described in scoring issue (a).
- Certificates of compliance with any gear requirements (escape panel, bycatch reduction devises etc.).
- Evidence from enforcement officers that any management measures applying to the fleet (quota, effort restrictions, landings sizes etc.) are in force and regularly inspected.
- Evidence that any additional voluntary measures applied at the fleet level (Code of Conduct etc.) are in place and operating as intended.
- Evidence from stock assessments/scientific advice that regulation are functioning as intended with the desired outcome.

Scoring issue (c) – Management strategy implementation

Key questions to determine if further action is needed

Q Is all the management for each secondary species actually operational and doing exactly what it is supposed to?

Q Are there inspections, or certificates, or observer reports that can be presented to the certifier to demonstrate that all the management that should be in place, is in place?

Q If the fleet takes additional measures to avoid capture of certain species, can this be independently verified?

Q Is there evidence from stock status that management is working?

Examples of scoring rationales

Scoring issue (c)	Fishery Example
SG60	No scoring guidepost at the 60 level.
SG80	*Tropical shrimp trawl fishery:* The main secondary species is yellow rockhead. Captures of this species are minimised in this fishery through the use of a bycatch reduction device and effort limitation for the target species, which also limits the impact on other species. The fishery is monitored by VMS and is also subject to inspections by control officers both at sea and at port. Inspections have shown that compliance with using this measure is good. Based on the use of the device in similar fisheries, post escape survival from the bycatch reduction device is expected to be good, although this has not been tested specifically in this fishery. There is therefore some evidence that the partial strategy is being implemented successfully in this fishery, although the evidence is not clear for this fishery in relation to escapement. Therefore yellow rockhead meets SG60.
SG100	*Snapper gillnet fishery:* The main secondary species are greater cormorants. To reduce impact of the fishery on the cormorants, they have introduced highly visible netting and acoustic pingers. Evidence of implementation included observer reports and inspection certificates. Observer report that there has been a 60% reduction in cormorant captures. In addition, the local nature agency reports that cormorant numbers have been steadily increasing. Therefore there is clear evidence that the partial strategy is being implemented successfully and is achieving its overall objective.

Scoring issue (d) – Shark finning

The intent of the 4th scoring issue in PI 2.2.2 is to provide a mechanism for scoring a fishery on the level of certainty that shark finning is not taking place. This only applies and need only be scored in fisheries where one of the secondary species is shark. The FCR (clause SA2.4.3–SA2.4.7) provides further detail that should be referred to if this scoring issue is considered to be relevant to the fishery under assessment.

Scoring issue	SG60	SG80	SG100
(d) Shark finning	It is **likely** that shark finning is not taking place.	It is **highly likely** that shark finning is not taking place.	There is a **high degree of certainty** that shark finning is not taking place.

Good practice

Good practice requires that evidence is provided that shark finning is not taking place. The best evidence that shark finning is not taking place is to land sharks with fins naturally attached (FNA). However, the MSC recognises that in some fisheries this may be practically difficult to achieve. The MSC therefore also recognises that landing fins and other shark parts separately, including as meal, may be allowed if adequately regulated and observed.

What certifiers check

The intent of this scoring issue is to provide a mechanism for scoring a fishery on the level of certainty that a certifier has, that shark finning is not taking place. It is designed as a combination of regulations and external validation. This is informed by the following information:

- Observer reports along with a summary of the frequency of observer trips.
- Details of regulations in place governing the management of sharks.
- Documentation of the destination of all shark bodies and body parts.
- Evaluations of the vessel's activities to confirm that it is likely that shark finning is not taking place.

Scoring issue (d) – Shark finning

Key questions to determine if further action is needed

Q Are there any shark species in the catch profile of the fishery or in the landings statistics?

Q Are sharks landed with fins naturally attached?

Q Does the fishery process sharks on board or are fins cut on board?

Q Is there any national regulation on shark finning?

Q Are there any RFMO conservation measures, national or international MoU or agreements on shark finning?

Q What's the level of observer coverage?

Q Is there any other monitoring system in place (e.g., dockside monitoring, video camera, vessel monitoring systems (VMS)?

Examples of scoring rationales

Scoring issue (d)	Fishery Example
SG60	*Swordfish longline fishery:* Mako shark are landed by the fishery, there are regulations that prohibit shark finning. Vessels have onboard processing facilities, and fins are removed onboard during processing and landed separately to the body of the shark in accordance with 3.5 fin to greenweight ratio (as mandated in national regulation). The ratios for each species have been set based on statistical analysis of at-sea sampling data. There is 5% onboard observer coverage and all landing are subject to dockside inspection.
SG80	*Haddock demersal trawl fishery:* Various shark species are captured. Vessels are required to have VMS and fishermen are required to land all species intact, with dockside verification of the catch as set out in national legislation banning shark finning. There is a domestic market for shark flesh and sharks are landed whole. It is thus the flesh rather than the fins that is valuable.
SG100	*Ling demersal trawl fishery:* All shark species are required to be retained on board by national legislations. The client has implemented a number of measures to ban shark finning consistent with the MSC definition. Sharks are fully landed with fins attached or released. Observer monitoring confirms this, observer coverage is 20%.

Scoring issue (e) – Review of alternative measures

The final scoring issue in relation to secondary species only applies where relevant (i.e. when there are unwanted species). It seeks to ensure that the fishery reviews alternative management measures for minimising the mortality of unwanted catch to the extent practicable, and implements these where appropriate.

Scoring issue	SG60	SG80	SG100
(e) Review of alternative measures to minimise mortality of unwanted catch	There is a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of **unwanted** catch of main secondary species.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of **unwanted** catch of main secondary species and they are implemented as appropriate.	There is a **biennial** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of **unwanted** catch of all secondary species, and they are implemented, as appropriate.

Good practice

Good practice requires that the review of alternative measures is carried out regularly, and at least every 2 years in order to meet SG100, and that the measures are implemented as appropriate, i.e. when they are likely to be more effective at minimising the mortality of the unwanted species and also practical and cost effective to implement and do not negatively impact other species and or habitats.

What certifiers check

Certifiers will look at the following evidence:

- Empirical catch profile, including discards and any indication of their likely survivability, to detail which secondary species are unwanted.
- Details of gear specification and any modifications currently used to minimise mortality of each of the unwanted species.
- Details of supporting evidence, assessing the efficacy of current gear modifications or other measures (e.g. spatial or seasonal restrictions, handling practices etc.) for each of the unwanted species.
- Evidence that alternative measures have been considered for each unwanted species, such as a consultant or management agency report or minutes from a meeting where alternative measures were considered.
- Evidence of either implementation of alternative measures (if they are likely to be more effective at minimising mortality than current measures and are practical etc.) or evidence of why the alternative measures were not implemented (i.e. not likely to further minimise mortality of unwanted species, not practical or cost effective, likely to negatively impact another species and/or habitat).
- Indication of when next review is likely to take place.

Scoring issue (e) – Review of alternative measures

Key questions to determine if further action is needed

Q Are there secondary species which are unwanted in the catch and have high mortality?

Q If there are unwanted secondary species in the catch, have measures been taken to reduce mortality of catches of these species, such as gear modifications, seasonal or area closures, improved handling practices or other technical measures?

Q Is there evidence to demonstrate how well the measures taken to reduce unwanted secondary species mortality are working?

Q Has any review been carried out of potential alternative measures to reduce mortality of unwanted species?

Q Have the results and recommendations of any review or testing been implemented within the management system?

Examples of scoring rationales

Scoring issue (e)	Fishery Example
SG60	*Lumpfish gillnet fishery:* The main secondary species are diving ducks, namely long-tailed duck, common scoter and eider duck. Although the fishery is not expected to be hindering the population of these species, they have undertaken a review of potential other measures that could be deployed to minimize interactions including spatial and temporal closures, more visible twine used for the mesh, and acoustic pingers. Two hotspots for interactions have been proposed for spatial closures but they have not yet been implemented, furthermore, no further review of alternative measures is planned so the fishery meets SG60 for all three species.
SG80	*Crab trap fishery:* The main secondary species is lobster and the juvenile lobster are thrown back with high mortality rate, so this part of the lobster catch is unwanted. A review was carried out in 2012 to consider measures to minimise catch of juvenile lobster. As a consequence the traps have been fitted with escape hatches, initial landing figures indicate that the measure is successful. Another review of this measure compared to other possible measures is scheduled for the next national bycatch management group meeting (in four years' time) so the fishery meets SG80 for this species.
SG100	*White shrimp trawl fishery:* Jellyfish are the only secondary species captured. To reduce impact on turtle (an ETP species) a review of measures in 2010 showed that using a Turtle Excluder Devices (TED) could minimise captures of both turtles (assessed under ETP) and also jellyfish. This measure was introduced in 2013, prior to assessment of this fishery. It became clear that following introduction of the TED that the number of jellyfish landed decreased by 70%, the next review is scheduled on a biennial basis (every 2 years) so it meets SG100.

Challenges and solutions to meeting PI 2.2.2

The second PI requires that there is management in place, which is expected to work, for all secondary species which comprise more than 5% of the fishery's catch (or lower if the species are less resilient or out of scope). The only exception to this is where it can be shown that such management is not necessary. The likelihood is that for most fisheries (unless they are highly selective) there will be a number of species which fall into this category, therefore there will be a requirement to demonstrate that management is in place.

For developing countries this may include a number of lower value species, which are none the less commercially exploited components of the catch, for which understanding of stock status may be limited and where the fleet is subject to few restrictions of controls. In this case, the first challenge is to demonstrate whether management is necessary (in the absence of a stock assessment, the RBF (see Annex 1) may be used to provide an indication of the level of risk based on productivity of the species and susceptibility to capture).

Unless this is shown to be low risk, then it will need to be demonstrated that the management in place is sufficient to safeguard the resource. This may be a combination of management at the level of the fishery or covering all fleet sectors targeting the resource. Effective management can be expensive and demanding of limited capacity. Key factors for developing countries are to understand the relative risk to different species, and ensure that clear management oversight (informed by appropriate time series data) is in place enabling managers to respond (using appropriate tools) to potential risks.

Example actions to improve performance for PI 2.2.2

Process Chronology				Management Actions	
1	2	3	4	Example action	Scoring issue
●				List the management measures that are in place for the species that have been identified as secondary. Consider the degree to which these are collectively considered a strategy.	(a)
●				Undertake a review of the existing measures to determine their likely effectiveness and the level of confidence that they will ensure the fishery maintains (if above biological limits) or does not hinder recovery (if below biological limits) of the secondary stocks in question.	(b)
	●			Based on the gaps identified in the reviews above, identify the additional management measures that should be taken, whether at a stock level (perhaps involving other fisheries) or at the level of the fishery – i.e. gear modifications or other technical measures. Give consideration to how these measures may work collectively and strategically to achieve the stock objectives.	(a), (c)
	●			Give particular consideration to the levels of unwanted catch and seek to prioritise ways in which this can be reduced to a minimum.	(e)
	●			If sharks are caught in the fishery, review the regulations on shark finning. If there are any gaps in the regulations or there are no regulations identify regulations that need to be in place to ensure there is no shark finning.	(d)
	●			Proposals for further management measures/strategy should also be linked to consideration of the information/monitoring needs to determine the efficacy of the new measures in meeting their objectives.	2.3.3
		●		Undertake consultation on proposed management measures/strategy to ensure that the proposals are practical and the reasons for the implementation of further measures in understood by all stakeholders.	3.1.2
		●		Implement any new measures/strategy. Where necessary these should have statutory or regulatory backing, for example through licensing requirements. Ensure that the administrative and enforcement resources are in place to ensure the new measures/ strategy is implemented as intended.	(c)
			●	Undertake an evaluation/review of the effectiveness of the newly implemented measures/strategies. Determine if the strategies in place have been effective in achieving their aim/objective.	(b)
			●	Undertake a review of potential other measures that could be deployed to minimize interactions with unwanted secondary species.	(e)

Notes

2.2.3 Secondary species information

Performance Indicator overview

The third and final PI in relation to 'secondary' species relates to the presence and quality of the information that is available to inform outcome and management. In particular there is a requirement that the information on the nature and amount of secondary species taken is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage secondary species.

Although the definition of secondary species indicates that the level of management is less than primary species (for example not having management relative to reference points), there is still a requirement that there is information, monitoring or data collection to inform managers of key time series to inform their decision-making.

Determining adequacy of information will depend to some extent on the necessity of that information. For example, if the fishery operates at a very low level of intensity, the species is well above its biologically based limit or the management approach is very precautionary, information with lower precision may be adequate for both the estimation of current status and the performance of the management strategy. Conversely, where a fishery is being more heavily targeted, a species is close to or below its biologically based limit and only limited management is in place (with little evidence of precaution), then a more comprehensive range of information would be required to assure managers (and certifiers) of stock status or impact.

In situations where the stock status of some species is not known or regularly monitored, it is likely that the MSC Risk Based Framework (RBF) would be used to assess the risk of the fishery to secondary species under PI 2.2.1. Even in this situation information is required. The RBF requires information on life history parameters, such as size, age, maturity, fecundity. This PI therefore also considers the adequacy of this information where the RBF is used.

As with the other P2 species PIs, this PI needs to be addressed on a scoring element basis, with a score determined for each primary species assessed.

Three scoring issues are considered under this PI:

(a) Information adequacy for assessment of impact on main secondary species

(b) Information adequacy for assessment of impact on minor secondary species

(c) Information adequacy for management strategy

Scoring issue (a) – Information adequacy - main species

The first scoring issue looks at the relative balance of quantitative and qualitative information on the impacts of the fishery on the main secondary species.

Scoring issue	SG60	SG80	SG100
(a) Information adequacy for assessment of impacts on main secondary species	Qualitative information is **adequate to estimate** the impact of the UoA on the main secondary species with respect to status. **OR, if RBF is used to score PI 2.2.1 for the UoA:** Qualitative information is adequate to estimate productivity and susceptibility attributes for main secondary species.	Some quantitative information is available and is **adequate to assess** the impact of the UoA on the main secondary species with respect to status. **OR, if RBF is used to score PI 2.2.1 for the UoA:** Some quantitative information is adequate to assess productivity and susceptibility attributes for main secondary species.	Quantitative information is available and is **adequate to assess with a high degree of certainty** the impact the UoA on main secondary species with respect to status.

Good practice

Good practice requires that good quality information is available for each secondary species. This could be in the form of published material, preferably peer reviewed or other credible sources.

What certifiers check

Certifiers are likely to speak with both managers and local fishery scientists, to learn about the data that is routinely monitored. They may also speak to compliance or control bodies that might have information on monitoring and compliance of measures.

- Availability of central database detailing landings, effort, licencing etc. for recent seasons/years.
- Stock assessments or other sources of information on the status of any/all main secondary species (e.g. CPUE trends, biomass indices).
- Key parameters for any species assessed using the RBF – species range, life history traits, and post-capture mortality for any/all main secondary species.
- Observer reports or other monitoring for impacts on any/all secondary species, particularly out of scope species (birds, reptiles, amphibians, mammals).
- Other published studies looking at the impact of the fishery or other relevant fisheries on any/all main secondary species.

Scoring issue (a) – Information adequacy - main species

Key questions to determine if further action is needed

Q Does the information that is routinely collected allow managers to determine for any/all secondary species the catch, effort, changes in species biology (size or sex ratio), unobserved mortality etc.?

Q If qualitative information is used to support management, is this considered robust or reliable?

Q Are there several sources of data collection?

Q Is there data available which details the impact of the fishery's fishing gear on secondary species?

Q If the RBF is used, is there data to allow all the attributes to be scored with confidence?

Q Is there qualitative or quantitative information on the impacts of any species which are out of scope, but which are not ETP, such as birds, reptiles, amphibians, mammals?

Q If the secondary species are close to or below their biologically based limit, are data collection methods with higher levels of verifiability and lower levels of bias used?

Examples of scoring rationales

Scoring issue (a)	Fishery Example
SG60	*Brown crab pot fishery:* Regular catches of velvet crab (main secondary species) are noted anecdotally but there are no accurate figures. The velvet crab are discarded with expected high survivability. The velvet crab are not allowed to be landed in this fishery. Interviews with fishers indicated that they are committed to ensuring that velvet crab are returned alive to the seafloor so that they do not have any spatial closures implemented for this fishery. Interviews with fishery managers and port inspectors has confirmed that there is no landing of velvet crab and that there is high survivability of velvet crabs that are discarded due to their biological characteristics. The fishery meets SG60 for velvet crab. SG80 is not met because there is not a stock assessment or accurate catch profile for the velvet crab.
SG80	*Sole gillnet fishery:* The main secondary species identified is gurnard. There is information on the life history of gurnard and reliable landings data which provides a basis for an assessment of recent CPUE trends for five years. The CPUE data is derived from fishermen's logbook and is not independently verified. Interviews with the fisheries management body confirmed that these data are likely to be accurate based on comparison with data from similar fisheries. This quantitative data is adequate (particularly in the context of relatively small fishery catches compared to overall catches) to estimate the impact of the fishery on main secondary species, though perhaps not with a 'high degree of certainty'. Therefore this fishery meets SG80 for gurnard.

Scoring issue (a) – Information adequacy - main-species

Examples of scoring rationales – *continued*

Scoring issue (a)	Fishery Example
SG100	*Hake longline fishery:* Two non-ETP out of scope species interact with the fishery – great shearwater and northern gannet. There is 100% independent observer coverage on board the vessels and at least 20% of the observer's time is to count bird aggregations around the vessel and record any observed interactions or mortalities. The observer is trained specifically in seabird identification and survey methods. In addition, all bird mortalities that are brought on board are required to be recorded in a standardised logbook. An ID guide is posted in the wheelhouse to help record the data to species level. The numbers of birds recorded by observers and in the logbooks are extrapolated by the nature protection agency, who report estimated annual mortalities with an 85% confidence interval. Both species meet SG100.

Scoring issue (b) – Information adequacy - minor species

The second scoring issue seeks to determine (at the state of the art level) whether there is also information collected to support the assessment of the impact of the fishery on minor secondary species captured.

Scoring issue	SG60	SG80	SG100
(b) Information adequacy for assessment of impact for minor secondary species			Some quantitative information is adequate to estimate the impact of the UoA on minor secondary species with respect to status.

Good practice

Good practice requires the availability of some quantitative information that enables the assessment of the impact of the fishery on minor species.

What certifiers check

Certifiers will check the same sources of information as the previous scoring issue, but will examine if this dataset is sufficiently inclusive to include minor species.

- Availability of central database detailing landings, effort, licencing etc. for recent years.
- Stock assessments or other information sources for any/all minor species.
- Key parameters for any species assessed using the RBF – species range, life history traits, and post-capture mortality.
- Observer reports or other assessment (including published studies) on impacts on minor secondary species.

Scoring issue (b) – Information adequacy - minor species

Key questions to determine if further action is needed

Q Is relevant information collected to determine the impact of the fishery on minor secondary species?

Q Is there data available which details the impact of the fishery on the minor secondary species in the catch?

Q Is there evidence or any supporting data that can be used to determine the stock status of secondary minor species, or relative trends in stock status?

Examples of scoring rationales

Scoring issue (b)	Fishery Example
SG60	No scoring guidepost at the 60 level.
SG80	No scoring guidepost at the 80 level.
SG100	*Toothfish longline fishery:* Minor secondary species are unicorn icefish, grey rock cod and sandpaper skate. All effort in the fishery is monitored by observers, with two observers on every vessel. Vessels and observers maintain shot by shot logbooks. The impact of the fishery is considered through an environmental risk assessment process, reviewed on an annual basis Furthermore, there is a comprehensive and statistically robust fisheries independent trawl survey conducted each year that contributes to the understanding of the status of minor secondary species. The information is of sufficient quality to assess whether bycatch rates are changing, and the status relative to the various bycatch TACs. The information covers each commercial shot, and is adequate to support the implementation of both move-on rules and TACs. Based on the information it is possible to estimate the number of individuals caught for each taxa in the fishery and monitoring is ongoing. Therefore the information is sufficient to estimate the impact of the fishery on minor secondary species with a high degree of certainty. Each minor species meets SG100.

Scoring issue (c) – Information adequacy for management strategy

The third scoring issue in relation to secondary species focuses on the information that would be required to manage secondary species.

Scoring issue	SG60	SG80	SG100
(c) Information adequacy for management strategy	Information is adequate to support **measures** to manage **main** secondary species.	Information is adequate to support a **partial strategy** to manage **main** secondary species.	Information is adequate to support a **strategy** to manage **all** secondary species, and evaluate with a **high degree of certainty** whether a strategy is **achieving its objective**.

Good practice

Good practice requires that information must not only be sufficient for a comprehensive and strategically linked range of management measures, but also be sufficient to determine whether this management is achieving its aims. This implies monitoring of stock status. Information may include good scientific data from credible surveys, peer reviewed reports, etc.

What certifiers check

Certifiers will wish to identify the information that supports the management described in 2.2.2. In particular the information that is required to manage the impact of all fisheries (i.e. total fishing mortality).

- Analysis of catch profiles over time, indicating responses to management measures.
- Information required for wider management measures – such as effort or spatial mapping.
- Monitoring or evaluation reports detailing changes in operational practices over time.
- Observer reports or other monitoring information which capture information relevant to the management of secondary species, or the impact of the fishery on those species.
- Other published studies looking at impact of fishery on primary species over time.
- Details of any voluntary, fleet level recording of interactions with secondary species.
- Information of presence of nursery or spawning areas.
- Biological sampling to support efforts to understand stock/population status.

Scoring issue (c) – Information adequacy for management strategy

Key questions to determine if further action is needed

Q Does management activity collect appropriate information to manage the main and minor secondary species caught in the fishery?

Q Is the impact of the fishery on the secondary species quantified and understood?

Q Are the key biological characteristics of the species understood, to enable management to be appropriately tailored?

Q Is the species or stock range understood, to enable management to be undertaken at the appropriate jurisdiction?

Q Does the monitoring or assessment in place allow managers to determine, with confidence, whether management efforts are working to safeguard stock status (and any other management objectives)?

Examples of scoring rationales

Scoring issue (c)	Fishery Example
SG60	*Coastal Red mullet gillnet fishery:* There are two main secondary species in this fishery – the red drum and kingfish. Interviews with fishers and with the management agency indicated that catches of these species have been consistent over time. The management agency regularly reviews sales notes for both species and would be able to detect an increase in the catch. The main measure to control catches of these species is the mesh size. If the mesh size were to change, the increase or decrease of captures would eventually be picked up by the management agency. The mesh size of gillnets used are monitored by the local enforcement agency on a stratified sampling basis, and they have indicated a high degree of compliance with this measure. There is also an economic incentive for fishers to use this mesh size to maximize catches of mullet, which is more valuable than the other species. There is therefore information adequate to support measures to manage red drum and kingfish, so the fishery meets the SG60 level for these species. There is not a partial strategy for these species or information to support this level of management, so it does not meet the SG80 level.

Scoring issue (c) – Information adequacy for management strategy

Examples of scoring rationales – *continued*

Scoring issue (c)	Fishery Example
SG80	*Halibut longline fishery:* The main secondary species are 2 skate species. Quantitative data are available on the number of skates caught through logbooks, VMS data and limited on-board observer coverage. The management body undertakes trawl and research vessel surveys which provide long-term datasets on relative abundance of main secondary species. This level of information supports at least a broad understanding on whether relative abundance of secondary species populations are changing relative to historical levels. Changes in the range of a species are also able to be detected. These surveys are usually annual and occur in different seasons to detect changes due to migration patterns. In addition, interviews with the control agency indicate that compliance with the measures of the partial strategy used to ensure the fishery does not negatively impact these species (namely, spatial and temporal closures) is good, with no non-compliances found through checks on VMS and through observer coverage. Therefore this fishery meets SG80 for the 2 main secondary skate species.
SG100	*Yellow perch gillnet fishery:* Fishers are required to provide data on catches (including discards) of all other species (in this case including the main secondary species white perch and lake whitefish) on a continuous basis. In addition, a test-gillnet fishery is undertaken on an annual basis two times a year (coincident with the fishery) by the local university which records all captures of species. These data is analysed by the university along with the fishery-dependent data to provide regular updates to CPUE estimates for all species. Together these data provide enough information to enable the management to determine if there is any change to the risk in species, i.e. due to changes in the management strategy such as the size of the mesh used in gillnets or the area or season that the gillnets are deployed. In addition, landings inspections and vessel inspections are regularly undertaken to ensure that the management measures are complied with. The white perch and lake whitefish both meet SG100.

Challenges and solutions to meeting PI 2.2.3

The challenges on the information required for the management of secondary species are likely to be much the same as those already described in relation to primary species (2.1.3). However, for secondary species, there is even more likelihood of these being less commercially important, therefore many secondary species may be seen as being a lower management priority. In addition, as main secondary species will include any out of scope species featuring in the bycatch (birds, mammals, amphibians – unless classified as ETP), this also implies the need for good information on these species which are neither protected or of any commercial interest. Targeting limited resources into lower priority species may be seen as an unaffordable luxury. In this case, it must be demonstrated that the information that is collected, is adequate, when combined with appropriate precautionary management.

As with primary species there is a need to first demonstrate the impact of the fishery. Essentially this requires quantitative catch profiling of all species, whether landed or not. This could also imply the need for some post capture mortality studies (on any vulnerable or depleted species) or some studies to inform on the effectiveness of any management measures applied at the fishery level (such as gear selectivity).

Example actions to improve performance for PI 2.2.3

Process Chronology				Management Actions	
1	2	3	4	Example action	Scoring issue
●				Review the current information that is available or that is collected in relation to management of secondary species. Consider whether this is adequate to manage that species/stock?	(c)
●				Review the current information that is available or that is collected in relation to the impact of the fishery on secondary species. Consider whether this is adequate to quantify the impact of the fishery on secondary species? At the very least a full catch profile is needed.	(a), (b)
	●			Initiate improved monitoring and catch recording systems such as scientific observer program for data collection (quantifiable), log-book reporting, landings sampling, discard sampling.	(a), (b), (c)
	●			Any fleet supported data collection will need to be supported by training/awareness raising to help ensure accuracy of catch reporting	(a), (b), (c)
		●		Ensure that any monitoring or data collection programs are fully implemented. This should include ensuring that programs are properly resourced and, where required, have appropriate regulatory or enforcement backing.	(a), (b), (c)
		●		Plan for any future research or information collection as required, so that gaps in understanding can be addressed.	(a), (b), (c)
			●	Design on-going monitoring requirements to ensure changes in secondary species over time are captured and to ensure that any mitigation measures implemented are achieving their objectives.	(a), (b), (c)

Notes

Notes

2.3.1 ETP species outcome

Performance Indicator overview

Endangered, Threatened or Protected (ETP) species are 'in scope' species that are recognised by national threatened species legislation or species that are listed in binding international agreements such as the Convention on International Trade in Endangered species (CITES). Species classified as 'out-of scope' (amphibians, reptiles, birds and mammals) that are listed in the IUCN Redlist as vulnerable (VU), endangered (EN) or critically endangered (CE) are recognised as ETP species. In scope species which are not protected by any such legislation and out of scope species which are not IUCN listed as above should be treated elsewhere in Principe 2. This would include marine mammals or cetaceans not covered by specific legislation.

Many fisheries occur in areas where endangered, threatened or protected species also occur. Possible impacts may be poorly understood, but may include entanglement, direct capture and mortality, impacts on behavioural or migratory patterns, indirect impacts due to competition for resources, loss of habitat and pollution. The objective of this PI is to ensure that the direct and indirect impacts of the fishery on ETP species are known and are either within national/international limits, or are not hindering the recovery of ETP species.

In many cases there are strategies (comprising many measures) that can be taken to mitigate possible negative impacts. Although this management is the subject of scoring in the next PI, it is the outcome of that management, or the impact or outcome to the ETP species that is the subject of this PI.

The certainty thresholds for PI 2.3.1 are as follows:

Likely = › 70th percentile

Highly likely = › 80th percentile

High degree of certainty = › 90th percentile

Where the impact of the fishery on ETP species cannot be determined analytically, the outcome PI in relation to ETP species may be scored using the MSC's Risk Based Framework (RBF) see Annex 1.

Three scoring issues are considered in this PI:

(a) Effects of the UoA on population/stocks within national or international limits, where applicable

(b) Direct effects

(c) Indirect effects

Scoring issue (a) – Effects of the UoA on stocks within limits

The first scoring issue focuses on the impact of the fishery on the status of ETP species against limits set in national or international requirements. If there is no applicable national legislation or international binding agreement that sets limits on mortality, then this scoring issue (a) is not scored.

Scoring issue	SG60	SG80	SG100
(a) Effects of the UoA on population/ stocks within national or international limits, where applicable	Where national and/ or international requirements set limits for ETP species, the **effects of the UoA** on the population/stock are known and **likely** to be within these limits.	Where national and/ or international requirements set limits for ETP species, the **combined effects of the MSC UoAs** on the population/stock are known and highly likely to be within these limits.	Where national and/ or international requirements set limits for ETP species, there is a **high degree of certainty** that the **combined effects of the MSC UoAs** are within these limits.

Good practice

Good practice seeks to ensure that where limits are set for an ETP species that the combined impacts of the fishery and other MSC fisheries within the jurisdiction are within this limit.

What certifiers check

The initial task is to determine which species are classified as ETP according to the MSC. This will require a review of the relevant national and international legislation, a review of the status of any out of scope species, combined with a review of the species which are present in the area of the fishery, to determine overlap. This will require reference to the following sources:

- ETP national and international legislation (including species annexes).
- ETP distribution maps.
- National species profiles.
- IUCN status for all out of scope species.
- Records of interaction with a fishery in logbooks, scientific reports, observer data etc.
- Independent observer reports.
- Independent expert reports (e.g. Environmental NGOs).
- Records of any testing or inspecting of any ETP mitigating management measures (e.g. gear modifications).

Scoring issue (a) – Effects of the UoA on stocks within limits

Key questions to determine if further action is needed

Q Is there a clear understanding of what species are considered ETP, present in the area of the fishery?

Q Are there any out of scope species in the area of the fishery which are classified by IUCN as vulnerable, endangered or critically endangered?

Q Are limits on catches for these species stipulated in relevant legislation?

Q Is the distribution and abundance of the ETP species in the area of the fishery known?

Q Are ETP species that interact with the fishery within specified limits?

Q Has the impact of the fishery on all relevant ETP species been independently quantified?

Q Are there other MSC fisheries operating in the same area and has the cumulative impact of all relevant MSC fisheries been considered?

Examples of scoring rationales

Scoring issue (a)	Fishery Example
SG60	*Saithe demersal trawl fishery:* Common skate and spurdog are incidentally caught in association with this saithe fishery. Several other fleets (originating from different flag states) also interact with these species. A regional regulation prohibits the landing of both these species. Landing statistics from 2009 and January – May 2010 reveal that common skate and spurdog continue to be landed by vessels from outside the fishery, throughout and outside the region. There are indications that there is a lack of awareness of these landing restrictions which contributes to the risk that the limit is exceeded. The available evidence indicates that the saithe fishery has minimal interactions (no more than 10 skate or spurdog are encountered annually) with these species, but this cannot be stated with great certainty. With the current data provided, it is therefore not possible to say that the interactions from this fishery are highly likely to be within defined limits and it does not meet SG80.

Scoring issue (a) – Effects of the UoA on stocks within limits

Examples of scoring rationales – *continued*

Scoring issue (a)	Fishery Example
SG80	*Tuna longline fishery:* The National Endangered Species Act, RFMO resolutions and recommendations, and CITES restrictions mean that sea turtles are classified as ETP. Loggerhead sea turtles and leatherback turtles are ETP species in this fishery and the fishery meets the RFMO requirements with respect to sea turtles. There is no trade in loggerheads or leatherbacks either into or out of the country due to the CITES listing. Therefore international requirements are met for both turtle species. The national fishery management agency sets a limit on the number of incidental takes for all longline vessels. This is monitored using an onboard observer program. Interactions observed in 2012 estimated that interactions are below the annual limits for both turtle species, though for loggerhead sea turtles the estimates indicate that interactions are just below the set limit. The coefficients of variation (CVs) on which these estimates are based are also below the precision target required for monitoring ETP species. There are 2 other MSC fisheries with loggerhead and leatherback turtle interactions and both of them were included in the observer program. Therefore the interactions for this fishery and the other MSC fisheries are highly likely to be within national requirements, but the confidence yielded from these studies are not sufficient to state that these interactions are within limits with a high degree of certainty as required to meet SG100. SG80 is met for both turtle species.
SG100	*Groundfish gillnet fishery:* The two ETP species that are known to interact with this fishery are harbour porpoise and leatherback turtles. By-catch of harbour porpoises in the groundfish gillnets have been addressed under a national agreement to limit mortalities caused by all commercial gillnet fisheries to no more than 110 animals per year. The collected observer data confirm that the fishery interaction with harbour porpoise are well below these limits. The National Recovery Strategy for Leatherback Turtles is the main mechanism for reducing interactions. Sighting data collected by the fleet and summarised in a peer review published scientific journal showed that there is an overlap between the fishery and the regular range of large numbers of leatherbacks. According to a report published by the fisheries management agency in charge of the recovery strategy fishers remain committed to effecting practical conservation for the leatherback at sea, particularly through their efforts to disentangle accidentally entrapped turtles. The national leatherback turtle working group reported 87 records of stranded leatherbacks (either entangled in fixed fishing gear or found floating dead) from 1995 – 2002. Recently, observer reporting requirements for turtles were upgraded to ensure that actual impacts were better assessed. In addition, licensed fishers are required to collect and subsequently report information to the fisheries management authorities for each fishing trip where leatherback turtles and harbour porpoise are caught. Fishers are required to provide details of the date, position, number and weight of species at risk caught, as well as their condition. These data are collected and then compiled by the fishery management authority. There are no other MSC fisheries impacting these species at present and since recorded interactions are well within the nationally established limits for both these species with a high degree of certainty, SG100 is met.

Scoring issue (b) – Direct effects

The second scoring issue focuses on the direct effects of the fishery on the status of ETP populations. This is from direct capture or direct contact with fishing gear.

Scoring issue	SG60	SG80	SG100
(b) **Direct effects**	Known direct effects of the UoA are likely to **not hinder recovery** of ETP species.	Direct effects of the UoA are **highly likely** to not **hinder recovery** of ETP species.	There is a **high degree of confidence t**hat there are no **significant detrimental direct effects** of the UoA on ETP species.

Good practice

Good practice requires fisheries to demonstrate there are no significant effect on ETP species or the fishery is not likely to hinder recovery of ETP species.

What certifiers check

Certifiers will be keen to identify quantitative sources of data on direct impacts. Consultations with on-board observers, local research scientists and environmental NGOs may prove helpful in identifying these sources. In addition, the following types are resources will be reviewed:

- Records of interaction with a fishery in logbooks, scientific reports, observer data etc.
- Independent observer reports.
- Independent expert reports (e.g. environmental NGOs).
- Records of any testing or inspecting of any ETP mitigating management measures (e.g. gear modifications).

Scoring issue (b) – Direct effects

Key questions to determine if further action is needed

Q Is independent quantitative data available on the level of direct impact (i.e. capture) of ETP species in the fishery?

Q Has the fishery carried independent on-board observers, which record level of ETP interactions?

Q Are there characteristics of the gear in use that mean direct interaction with ETP species is unlikely? If so, is there evidence available to support this?

Examples of scoring rationales

Scoring issue (b)	Fishery Example
SG60	*Saithe demersal trawl fishery:* The key interaction with ETP species for this fishery is with common skate. There is reported to be discarding of common skate in some areas. In addition, there are some reported landings of common skate, despite the fact that this is not allowed according to regulations. The fishery has been among the most successful at reducing discards of other species with landings restrictions, and it seems likely that this strategy would also have had an impact on reducing catches of common skate although this has not been studied in detail. The team concluded that the requirements in place for the management of common skate will, if met, ensure that the fishery is not likely to hinder their recovery. However, given the dire state of common skate populations, it is not possible to say this with greater confidence.
SG80	Mexico Baja California red rock lobster (Recertified 2011): There is the potential for direct fishing gear interactions with ETP species if gear is concentrated in high-use areas for endangered whales or seals. There has been some historic evidence of entanglement of whales in lines, although it is unclear exactly which fishery these lines originate from. There has also been occasional anecdotal reports from a lobster fisherman of leatherback sea turtle entanglement in lobster lines, but live release has been possible. Additionally, Guadalupe Island is the breeding ground of the Guadalupe fur seal. Since the government of Mexico declared Guadalupe Island a pinniped sanctuary, populations are recovering. In addition, due to the low fishing effort around the island it is expected that interactions are very rare. Given the low level of impact, the localised nature of the fishery compared with the highly migratory nature of the ETP species, and the local management measures it is highly unlikely that the fishery would hinder the recovery of any ETP species.
SG100	*Herring pelagic trawl fishery:* Reference-fleet observers gather data on ETP interactions. The pelagic fleet fisheries reference-fleet data provide evidence of fishery interactions with seabirds and mammals. This evidence supports the industry's contention that although there may be the occasional capture of birds diving to take fish during hauling (of trawl), it is neither a regular nor frequent occurrence. Furthermore, the low numbers of ETP species recorded by the reference fleet observers provide a high degree of certainty that direct interactions between the fishery and ETP species do not cause significant detrimental effects.

Scoring issue (c) – Indirect effects

The final scoring issue of 2.3.1 considers indirect effects of the fishery on ETP species. This could include competition for resources or impacts of pollution/noise.

Scoring issue	SG60	SG80	SG100
(c) Indirect effects		Indirect effects have been considered for the UoA and are thought to be **highly likely** to not create unacceptable impacts.	There is a **high degree of confidence** that there are no **significant detrimental indirect effects** of the UoA on ETP species.

Good practice

Good practice will require that fisheries are able to show with a high level of confidence that there are no unacceptable indirect impacts on ETP species.

What certifiers check

Certifiers will be keen to identify quantitative sources of data of indirect impacts. Consultations with local research scientists and environmental NGOs may prove helpful in identifying these sources. In addition, the following types of resources will be reviewed:

- Independent expert reports (e.g. environmental NGOs).
- Records of any testing or inspecting of any ETP mitigating management measures designed to limit indirect impact (e.g. spatial measures).
- Ecosystem modelling which provides analysis in relation to potential competition for resources.
- Published research papers on other indirect impacts on ETP species – such as noise, or pollution.

Scoring issue (c) – Indirect effects

Key questions to determine if further action is needed

Q Have the possible indirect impacts of the fishery on ETP species been considered?

Q Are there any management measures in place designed to mitigate against any indirect effects on ETP species?

Q Is there any published academic research (whether locally or from other analogous situations) which may provide inside and perhaps empirical data in relation to the potential for unacceptable indirect impacts?

Q Is there ecosystem modeling in place which could enable the possible consequences of removal of target species, bycatch species or habitat impacts on ETP species in the area?

Examples of scoring rationales

Scoring issue (c)	Fishery Example
SG60	No scoring guidepost at the 60 level.
SG80	Hastings Fleet Dover Sole (Recertified 2012) Management measures for this fishery are firmly embedded in the precautionary approach, which includes biomass and fishing mortality limits for each relevant non-target species. UK and EC nature conservation designation processes consider direct and indirect effects on ETP species (e.g. EC Habitats Directive and UK Marine Bill). The level of catch within the Hastings fishery is insignificant in relation to productivity and overall fishing mortality within the channel and southern North Sea. Therefore there are unlikely to be indirect effects caused by competition for resources from the fishery.
SG100	Dee Estuary Cockle (Certified 2012): Indirect effects would be removal of cockle as a food resource for overwintering waders, notably oystercatcher. The TAC is specifically set so as not to have a significant effect on oystercatcher mortality. This is also reflected in the appropriate assessment; the conclusion of which is that TACs set would not lead to detrimental indirect effects on ETP species.

Challenges and solutions to meeting PI 2.3.1

In some situations a lower priority may be placed on the protection of endangered or threatened species. This is not necessarily because of purposeful neglect but because policy makers, fishers and communities may not place the same value on these species in a non-consumptive context. Protection and management of ETP species may be seen as a lesser priority compared with ensuring livelihoods for rural coastal communities. Therefore there may be greater government focus on developing the fishing fleet, increasing training and safety or building fisheries infrastructure and market channels. Challenges to meeting this PI in the developing country context include:

- Limited expertise and capacity to undertake the research needed to identify ETP species.
- Limited funding to undertake the research needed.
- Lack of knowledge and value of ETP species to the general ecosystem.
- Lack of understanding at a fleet level as to which species are considered ETP.

Example actions to improve performance for PI 2.3.1

Process		Chronology		Management Actions	
1	2	3	4	Example action	Scoring issue
●				Review relevant national and international legislation to determine which ETP species have a potential overlap with the fishery. Review whether limits are set for the capture of any of these species.	(a)
●				Review the status of identified ETP species including recent trends. Information on distribution and temporal patterns are also likely to be helpful to determine the potential for impact.	(a), (b)
●				Determine the level of direct impact of the fishery on the identified ETP species. Determine whether the information basis is sufficient to draw confident and robust conclusions.	(b)
	●			Determine the level of indirect impact of the fishery on the identified ETP species. Determine whether the information basis is sufficient to draw confident and robust conclusions.	(c)
	●			Commission or undertake any additional monitoring or research required to more accurately quantify the degree of either direct or indirect impact.	(a), (b), (c), 2.3.3
	●			Based on the outcomes of the review and research undertaken above, consider the need for the development and implementation of more measures as part of a management strategy. These could include a range of possible solutions such as spatial or temporal restrictions, gear modifications, improved monitoring and reporting, capacity building and training etc.	(a), (b), (c), 2.3.2
		●		Undertake consultation on any proposed additional management measures or monitoring proposals, to ensure that any potential obstacles to efficient and practical implementation are addressed.	3.1.2
		●		Implement any additional measures/monitoring etc. Ensure that all necessary regulatory and personnel issues are addressed to enable implementation.	2.3.2
			●	Continue to monitor the performance of the fishery, such that the outcome status can be determined with a high degree of confidence.	2.3.3

Notes

2.3.2 ETP species management strategy

Performance Indicator overview

The second PI in relation to ETP species focuses on the management that is in place to manage the impact on ETP species that are vulnerable to being impacted by the fishery in the assessment area. Management strategies should be precautionary, should meet national and international requirements (where these are present) and should ensure that the fishery does not hinder recovery of any ETP species. In addition, these strategies and their component measures should be evaluated and reviewed to ensure their on-going efficacy and improvement.

The management strategy or strategies referred to here could comprise measures applied at different jurisdictions, or different tiers of management. For example, there may be measures in place nationally, such as protected areas for certain species, measures in place at an overall fleet level, such as regulations covering gear design, and even measures in place at the client fishery level, such as crew training, on board voluntary codes of conduct and voluntary reporting. A strategy should state its objectives, identify potential risk, apply measures and ultimately demonstrate that the component measures work together to meet the stated objectives.

There are also strong linkages between the information described in the next PI (2.3.3) and management. A management strategy should identify the information and monitoring requirements for management decision-making and should stipulate how this information will be collated and used.

Finally, an effective management strategy should have, at its core, strong regulatory basis (although there will always be place for additional voluntary measures). This in turn may require some redrafting of legislation, and some budgetary and administrative planning to ensure that the management requirements are fully met.

Five scoring issues are considered under this PI:

(a) Management strategy in place (national and international requirements)

(b) Management strategy in place (alternative)

(c) Management strategy evaluation

(d) Management strategy implementation

(e) Review of alternative measures to minimise mortality of ETP species

Scoring issue (a) – Management strategy in place (defined requirements)

The first scoring issue will only be scored where there are national and international requirements for the protection of the specific ETP species (where these are absent scoring issue (b) is scored instead). This scoring issue describes the measures that are in place and the degree to which these have been designed to cohesively work together toward an effective management strategy that will meet the national and international requirements for protection of the ETP species.

Scoring issue	SG60	SG80	SG100
(a) Management strategy in place (national and international requirements)	There are **measures** in place that minimise the UoA-related mortality of ETP species, and are expected to be **highly likely to achieve** national and international requirements for the protection of ETP species.	There is a **strategy** in place for managing the UoA's impact on ETP species, including measures to minimise mortality, which is designed to be **highly likely to achieve** national and international requirements for the protection of ETP species.	There is a **comprehensive strategy** in place for managing the UoA's impact on ETP species, including measures to minimise mortality, which is designed to **achieve above** national and international requirements for the protection of ETP species.

Good practice

The requirement for management is greater for ETP species than elsewhere in Principle 2. At the SG100 level there is a requirement for the strategy to be comprehensive and for it be designed to exceed national and international requirements. Good practice fisheries will have a robust management strategy that covers all possible impacts (including indirect impacts), is well-supported by appropriate data and monitoring, evaluates its performance to highlight changing risks and consider ways to improve. Good practice will seek to implement mitigation measures to prevent interactions between fisheries and ETP species. In some cases fisheries will be closed to certain areas, or at different seasons to prevent mortality, some may have gear modifications to prevent interaction with species and some fisheries may also have quota allocations and limits that may close a fishery if mortality or interaction with ETP species occurs.

What certifiers check

Certifiers will speak to a range of stakeholders, such as the fisheries and nature protection administrations, the fishers themselves, environmental NGOs to understand the measures and/or strategies in place. This could be supported by the following documentary evidence:

- A description of the ETP strategy, either for all ETP species or for a specific ETP species – perhaps in a standalone document, or included in the fisheries management plan, or a national sector-wide policy document.
- Any regulatory backing of measures within the strategy or the strategy itself (i.e. licence conditions or regulations on technical measures).
- Evidence of ETP data (scored in 2.3.3) being used by management to inform decision-making processes.
- Research or evaluations of the efficacy of any of the measures which comprise the strategy.

Scoring issue (a) – Management strategy in place (defined requirements)

Key questions to determine if further action is needed

Q Are there national and international requirements for protection of any/all ETP species vulnerable to being impacted in the area the fishery operates?

Q Are there measures in place to minimise the fishery's impact on any/all ETP populations?

Q Are these measures brought together in a strategic and cohesive manner, in a way which demonstrates that the measures are appropriate and tailored to the identified risks?

Q Is there evidence which can be used to demonstrate with confidence that these measures/strategy are adequate to meet or exceed national or international requirements?

Examples of scoring rationales

Scoring issue (a)	Fishery Example
SG60	*Small pelagic trawl fishery:* There is some likelihood of the fishery causing mortality to two ETP seabird species: sooty shearwater and white-chinned petrels. In this fishery, the main measure being used is to avoid any discharge of offal when the trawls are operational. This is expected to minimize mortality of the two seabird species and be highly likely to achieve national and international requirements for the protection of ETP species. However the assessment team concluded that this did not comprise a strategy as there is currently not a plan to review and revise the measures if unacceptable impacts are identified and there is a lack of supporting data. Both seabird species meet SG60, but not SG80.

Scoring issue (a) – Management strategy in place (defined requirements)

Examples of scoring rationales – *continued*

Scoring issue (a)	Fishery Example
SG80	*Crab and lobster gillnet fishery:* There are measures in place that minimise the mortality and are expected to be highly likely to achieve national and international requirements for protection of the three ETP species: finless porpoise, oliver ridley sea turtle and asian sea otter. The fishery management plan restricts the number of vessels within the fishery through the annual issue of licenses, which also minimizes the chances of interactions with the three ETP species identified. There is a range of relevant legislation pertaining to marine turtles, small cetaceans and otters (both at a national and regional level). Under these it is illegal to deliberately kill or catch a marine turtle, cetacean or otter. Furthermore live turtles may not be landed unless for the purpose of tending them or enabling their subsequent release. There is no offence however if turtles, cetaceans or otters are caught accidentally in fishing gear. A National Turtle Code was produced by an environmental NGO who have also produced an Advisory Note, which contains more detailed information and advises on the rescue of live, stranded turtles. These are endorsed by government and fishery representatives alike and disseminated to all fishers in the fishery. There is also a National Small Cetacean By-catch Response Strategy which sets out the extent of current knowledge and proposes strategy on a national basis (with a focus on higher risk fisheries). Government funded research and monitoring into cetacean bycatch caused by fishing effort is on-going. For example, the Government compiles strandings data under the Cetacean and Turtle Strandings Scheme, which looks at trends and causes of death. There are also regulations which restrict the locations and gears with the highest risk of interaction with cetaceans. The fishery also implemented training on handling practices to enhance release procedures associated with marine mammals and have also implemented the use of biodegradable twine to stop entanglement of cetaceans, in event of gear loss. The strategies and measures outlined above are considered likely to work based on plausible argument. The certifiers concluded that for turtles, otters and for small cetaceans the measures could be considered a strategy, highly likely to achieve national and international requirements for their protection.
SG100	DFA Dutch North Sea ensis (Certified 2012): A comprehensive strategy to manage all potential impacts of the Ensis fishery is in place which ensures that the fishery is well within limits of protection for these ETP species. There are no direct mortalities of ETP species as a result of the Ensis fishery and so measures to minimize mortality are in relation to ensuring adequate food reserves for three ETP bird species (common eider, scoter and scaup). The comprehensive strategy for managing direct and indirect impacts to ETP species as laid out within the Ensis Fishing Plan includes the following measures: • Quota restriction based on Appropriate Assessment which models impact on bird populations; • Minimum landing size set above size preferred by birds; • Limited gear size, effort and speed • Permanent area closures and additional seasonal closures (for bids populations) • Requirement to keep 500m away from concentrations of foraging or molting birds. In addition, a joint management plan has also been developed by the Ensis fisheries and North Sea Foundation. This includes a number of Ecosystem Goals relating to ETP species such as: - Ensure the Ensis fishery has no significant negative or positive effects on populations of shellfish-eating birds; - Ensure that sufficiently large continuous areas of coastal waters are not disturbed by the Ensis fishery; - Ensure the policy reflects the natural dynamics of the coastal ecosystem; and - Prevent disturbance to foraging birds. Therefore the SG100 requirements for the three identified ETP species are met.

Scoring issue (b) – Management strategy in place (alternative)

The second scoring issue has the same focus and the same thresholds as the previous scoring issue (a), but provides alternative SGs in situations where the country has no national legislation or the legislation does not specify requirements for protection and rebuilding of ETP species, or is not party to international agreements for the protection of ETP species that specify requirements for protection and rebuilding.

Scoring issue	SG60	SG80	SG100
(b) Management strategy in place (alternative)	There are **measures** in place that are expected to ensure the UoA does not hinder the recovery of ETP species.	There is a **strategy** in place that is expected to ensure the UoA does not hinder the recovery of ETP species.	There is a **comprehensive strategy** in place for managing ETP species, to ensure the UoA does not hinder the recovery of ETP species.

Good practice

Good practice fisheries will have a comprehensive management strategy that addresses impacts on ETP species. The strategy will be well-supported by appropriate data and monitoring, evaluates its performance to highlight changing risks and consider ways to improve. It would also seek to implement mitigation measures to prevent interactions between fishers and the gear they use with ETP species. In some cases fisheries will be closed to certain areas, or at different seasons to prevent mortality, some fisheries may also have quota allocations and limits that may close a fishery if mortality or interaction with ETP species occurs.

What certifiers check

Certifiers will speak to a range of stakeholders, such as the fisheries and nature protection administrations, the fishers themselves, environmental NGOs to understand the strategies in place. This could be supported by the following documentary evidence:

- A description of the ETP strategy for all/any ETP species – perhaps in a standalone document, or included in the fisheries management plan, or a national sector-wide policy document.
- Any regulatory backing of measures within the strategy or the strategy itself (i.e. licence conditions or regulations on technical measures).
- Evidence of ETP data (scored in 2.3.3) being used by management to inform decision-making processes.
- Research or evaluations of the efficacy of any of the measures which comprise the strategy.

Scoring issue (b) – Management strategy in place (alternative)

Key questions to determine if further action is needed

Q Are there measures in place to minimise the fishery impact on any/all ETP populations?

Q Are these measures brought together in a strategic and cohesive manner, in a way which demonstrates that the measures are appropriate and tailored to the identified risks?

Q Is there evidence which can be used to demonstrate with confidence that these measures/strategy are adequate to ensure the fishery is not hindering recovery of ETP species?

Examples of scoring rationales

Scoring issue (b)	Fishery Example
SG60	*Hoki demersal trawl fishery:* There is national legislation identifying ETP species but it does not include specific measures or a strategy for protecting these species from fishery impacts. The ETP species identified as being vulnerable to fishery impacts are black browed albatross and southern giant petrel. The fishery, as part of its code of conduct and regulations requires streamer lines to be deployed to help minimize trawl warp strikes. This measure is considered likely to ensure that the fishery does not hinder recovery of the two seabird species. This fishery meets SG60 for both seabird species. However, the measure employed is not part of a strategic arrangement that would ensure that the measures would be amended if it were determined that the fishery was causing unacceptable impacts to these two species, so it does not meet SG80.
SG80	*Halibut longline fishery:* The ETP species in this fishery is the short-tailed albatross. The management actions include the mandatory use of seabird avoidance measures that have reduced albatross takes by more than 80% in the past ten years, and a bycatch limit that would close the entire halibut fishery if more than 2 birds are killed in a two year period. The body responsible for the fisheries management considers the effectiveness of the measures deployed on a biennial basis through its Bycatch Working Group. If the measures are shown to be ineffective, additional measures or modifications to existing measures would be considered. The fishery meets SG80 for short-tailed albatross.
SG100	*Plaice demersal otter trawl fishery:* ETP species are spurdog and common skate. There are strategies for threatened elasmobranch species, catches of which are required to be returned alive to the sea where possible. The fishery management agency has recently adopted legislation that requires that landings of both species must, in future, be recorded to species level. At the annual industry-government meeting, data from observer reports and fishery logbooks are reviewed to feed into a strategy for managing the impacts on ETP species, which includes modification of existing measures or additional measures if they are shown to be better at minimizing the ETP mortalities. The linked monitoring, analyses and responses provides a comprehensive strategy for the two ETP species, thus meeting SG100.

Scoring issue (c) – Management strategy evaluation

The third scoring issue addresses the degree of confidence, and the analysis that supports that confidence, that the measures or strategies in place will work.

Scoring issue	SG60	SG80	SG100
(c) Management strategy evaluation	The measures are **considered likely** to work, based on **plausible argument** (e.g. general experience, theory or comparison with similar UoAs/species).	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.	The strategy/ comprehensive strategy is mainly based on information directly about the UoA and/or species involved, and a **quantitative analysis** supports **high confidence** that the strategy will work.

Good practice

Good practice requires that there be a high degree of confidence that the strategy or comprehensive strategy will work and this must be informed by some quantitative analysis of the fishery.

What certifiers check

Qualitative, expert opinion from the likes of research scientists of environmental NGOs may be sufficient to support scores in the lower range, but for scores in the higher range certifiers will seek more quantitative data or analysis provided by the following type of sources:

- Published research on the efficacy of certain management measures (e.g. gear modifications) for any/all ETP species.
- Ecosystem modelling, or appropriate assessments indicating that impacts on ETP populations have been analysed to inform management policy (i.e. setting of catch limits).
- Observer reports quantifying the level of interaction between fleet and ETP species.
- ETP distribution patterns indicating that spatial appropriateness of any management measures.
- ETP population data indicating status improvements that may be attributable to the management measures/strategy.

Scoring issue (c) – Management strategy evaluation

Key questions to determine if further action is needed

Q Is there evidence that can be provided to support the selection of the ETP management measures and provide confidence that they will work?

Q Is there research or analytical assessments, from this fishery or from analogous fisheries that can be used to provide objective basis for confidence that the measures in place will work?

Q Has the strategy for managing the fishery impact on ETP populations ever been analysed or evaluated?

Q If there is only plausible argument to support confidence that the measures in place will work, is this adequate? And how could this be augmented by some appropriate analysis?

Examples of scoring rationales

Scoring issue (c)	Fishery Example
SG60	*Plaice demersal trawl fishery:* There is one ETP species vulnerable to interaction with the fishery: spiny ray. Due to historical depletion there is now a prohibition of deliberate mortality in the region where the fishery operates so there is no incentive to catch this species. This measure is expected to work based on comparison with other fisheries in nearby regions that have set similar measures for this species and that they have worked. This fishery therefore meets the SG60 requirements for spiny ray.
SG80	Surinam Atlantic Seabob shrimp (Certified 2011): There is a published ETP strategy in place for the fishery which has been shown to work, based on the landings data and onboard observer program findings. Confidence in the strategies ability to deliver a low level of risk to ETP is based on reasonable knowledge of the biology, distribution and behaviour of the ETP species as well as on the effectiveness of mitigation measures, in particular the Turtle Excluder Device (TED). This is highly likely to achieve national and international requirements for protection of sea turtles. The TED regulation that is presently enforced in the Seabob fleet is in compliance with US TED regulations and is expected to minimise turtle mortality in the Seabob fleet. The closed area (shallow water no trawling zone) is likely to offer some protection for many ETP species as without this, all aquatic organisms would face a greater probability of capture in shallow waters where they may become spatially concentrated on feeding grounds or near nesting sites. The closed area also ensures that potential indirect ecosystem impacts on ETP species are avoided, such as the potential destruction of shallow water grazing areas by trawl gear.

Scoring issue (c) – Management strategy evaluation

Examples of scoring rationales – *continued*

Scoring issue (c)	Fishery Example
SG100	DFA Dutch North Sea ensis (Certified 2012): The strategy is principally based on information directly about the Ensis fishery, the gear and the ETP species for which management measures are in place. Quantitative analysis is based on annual bird counts and annual Ensis stock assessment. The quota is confirmed on an annual basis taking due regard of bird counts and updated appropriate assessments. There is a high level of confidence that that the comprehensive strategy is working. Analysis of areas closed for seal protection is reviewed annually to ensure seasonal variations are accounted for. Bird counts ensure variations in quota can be considered if necessary.

Scoring issue (d) – Management strategy implementation

The 4th scoring issue primarily seeks to ensure full implementation of the measures/strategy/ comprehensive strategy described in scoring issue (a) or (b).

Scoring issue	SG60	SG80	SG100
(d) Management strategy implementation		There is some **evidence** that the measures/strategy is being implemented successfully.	There is **clear evidence** that the strategy/ comprehensive strategy is being implemented successfully and is **achieving its objective as set out in scoring issue (a) or (b).**

Good practice

Good practice requires that there is evidence of implementation of the strategy and that it is meeting its objective to minimise ETP mortality in line with national or international protection or ensure that the fishery does not hinder its recovery.

What certifiers check

Certifiers will speak to a range of stakeholders, such as the fisheries or nature protection administrations, the fishers themselves, environmental NGOs to understand the implementation status of the measures/ strategies in place. This could be supported by the following documentary evidence:

- Evidence of regulatory implementation of measures (i.e. licence conditions or regulations on technical measures) for any/all ETP species.
- Evidence of compliance of binding regulations (i.e. inspection certificates for any gear modifications).
- Independent observer reports demonstrating that measures are being complied with.
- VMS or other spatial data showing that any spatial or seasonal measures, relevant to ETP species, are being complied with.

Scoring issue (d) – Management strategy implementation

Key questions to determine if further action is needed

Q Is the strategy and the measures which comprise the strategy fully implemented?

Q Is there evidence which can be provided to demonstrate to the certifiers that all measures are indeed implemented?

Q Are inspections carried out on any gear modifications? Are certificates of compliance issued?

Q Are regulations/license conditions enacted where necessary to ensure the measures of the strategy are implemented (and legally binding)?

Q Are there other independent sources of verification to provide evidence of implementation (i.e. observer reports)?

Q Can verification be provided where the fleet is engaged in Codes of Conduct or voluntary reporting? ?

Examples of scoring rationales

Scoring issue (d)	Fishery Example
SG60	No scoring guidepost at the 60 level.
SG80	*Nephrops trawl fishery:* Potential ETP interactions occur with CITES listed basking shark and angel shark. There is a regional and national strategy for managing these species, which includes a ban on directed fisheries for both species and implementation of training on safe handling practices to improve survivability of species in unlikely event of capture. This was fully implemented a number of years ago. There is also strict effort control on the target species, which also limits the potential for interaction with these two shark species. There is good monitoring of catches, evidence that the training has taken place as well as the placing of an ETP guide for safe handling practices on all vessels which indicate that the strategy has been implemented successfully. However, as the logbook monitoring program for interactions has only just started, it is too early to say whether the strategy is meeting its objective, so the fishery meets SG80 for both shark species but not the SG100 level.
SG100	Razor Clam fishery from Ria de Pontevedra (Certified 2013): No detrimental direct effects on ETP species related to this fishery are expected due to the inherent nature of the fishery such as the harvesting technique employed (hand gathering) and distribution of the target species. Indirect effects such as competition for resources are also unlikely as there are no ETP species reliant on razor clams for food in the razor clam fishing grounds. However, given competition for food resources remains perhaps the most theoretically possible impact (although highly unlikely) the assessment team agreed that the only strategy required was in relation to target species stock management (P1). As described in P1 these management measures are fully implemented and trends in both CPUE and size structure of the landings provide evidence that the management strategy is being implemented successfully and is achieving its objective.

Scoring issue (e) – Review of alternative measures

The final scoring issue in relation to the management of ETP requires that there is a review of alternative measures to minimise the fishery related ETP mortality, to the extent practicable, and for these alternative measures to be implemented 'if appropriate'.

Scoring issue	SG60	SG80	SG100
(e) Review of alternative measures to minimise mortality of ETP species	There is a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of ETP species.	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.	There is a **biennial** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality ETP species, and they are implemented, as appropriate.

Good practice

Good practice requires that the review of alternative measures is carried out regularly and at least every 2 years in order to meet SG100, and that the measures are implemented as appropriate, i.e. when they are likely to be more effective at minimising the mortality of the ETP species and also practical and cost effective to implement and do not negatively impact other species and or habitats.

What certifiers check

Certifiers will look for the following evidence:

- Details of gear specification and any modifications currently used to minimise mortality of any/all ETP species.
- Details of supporting evidence, assessing the efficacy of current gear modifications or other measures (e.g. spatial or seasonal restrictions, handling practices etc.) for any/all ETP species.
- Evidence that alternative measures have been considered for any/all ETP species, such as a consultant or management agency report or minutes from a meeting where alternative measures were considered.
- Evidence of either implementation of alternative measures (if they are likely to be more effective at minimising mortality than current measures and are practical etc.) or evidence of why the alternative measures were not implemented (i.e. not likely to further minimise mortality of ETP species, not practical or cost effective, likely to negatively impact another species and/or habitat).
- Evidence of management commissioning or undertaking specific reviews of the ETP strategy and the potential to improve management by the implementation of alternative measures.
- Evidence of the management authority keeping abreast of developments in ETP mitigation measure in other fisheries (globally), which may provide potential within the fishery.

Scoring issue (e) – Review of alternative measures

Key questions to determine if further action is needed

Q Were the measures which comprise the management strategy selected following review of alternative possible measures?

Q Have examples of ETP mitigation measures from other fisheries and/or recommended by national or international bodies been reviewed and considered for the fishery?

Q Does the management strategy for ETP species recognise the need for regular review, with particular emphasis on alternative measures? Is it stated how frequently such reviews should take place?

Q Does management/fleet respond to the conclusions of such reviews and implement any alternative measures that are likely to be more effective than current measures? If not, why not?

Examples of scoring rationales

Scoring issue (e)	Fishery Example
SG60	*Lobster trap fishery:* A strategy for managing impacts on sea lions exists which includes closed areas and seasons. The management body undertook a national review of fishery impacts on sea lions, which also considered alternative measures that could be implemented in any fisheries that impacted on sea lions. It was recommended in this report that the implementation of sea lion excluder devices (SLEDs) might also be used to minimize mortality of sea lions in trap fisheries generally. However, as the review was only recently undertaken, this has not been implemented within the fishery yet. Therefore it meets SG60 for sea lions.
SG80	*Tropical shrimp trawl fishery:* The ETP species is leatherback turtle. Following data collection in 2011 and a review of measures to minimize interactions a strategy was developed to achieve this. This strategy includes the fishery management plan requirements, which are supported by an onboard code of conduct which all skippers must comply with. Any tropical shrimp quota is linked to a requirement to use Turtle Excluder devices (TED). Following the review it was considered that the fishery management plan and code of conduct together with the TED regulation is known to be at least 97% effective in releasing all leatherback turtles. Another review is scheduled (as shown in the minutes of the meeting of the Fishermen's Association) to consider any other alternative measures and their effectiveness compared to the existing TED in 2015 (four years from last review).
SG100	*Yellowfin tuna handline fishery:* The ETP species is a species of albatross. A national review to reduce capture of albatross was carried out in 2012. The fishery-specific management body considered the result of the national review and implemented the use of bird scaring lines (tori lines). The fisheries management agency monitors the success of these measures and initial evidence suggests that there has been a reduction in the number of birds caught. The plan is to review fishery impacts on ETP species at regular intervals, with the next review of alternative measures is scheduled on a biennial basis (every 2 years), so it meets the SG100 level.

Challenges and solutions to meeting PI 2.3.2

The major constraint on the development and implementation of effective ETP management strategies in developing countries relates to the local perception that such strategies are required. It is probable that there will be different local cultural perspectives on the importance of ETP species and the need for their protection. In particular there may be a lack of understanding of importance of ETP management. There is therefore initially a requirement that the need for an ETP management strategy is recognised, before this can be developed or implemented.

ETP management technical measures, such as gear modifications can be unpopular as they can hinder operational practicalities or even affect catch rates. ETP management such as spatial or seasonal restrictions may also be opposed where these overlap with important fishing grounds. Effective management is also reliant on good information (as discussed in 2.3.3). Obtaining the information required for management can be costly and complex and be a drain on limited resources.

Ensuring that management measures are binding (i.e. through regulation or licence conditions), implemented and complied with can require considerable administrate work and may require changes in departmental structures or budget allocations. Ensuring that fishermen comply with management measures (including any voluntary or code of conduct measures) may require considerable outreach and training.

Example actions to improve performance for PI 2.3.2

Process Chronology				Management Actions	
1	2	3	4	Example action	Scoring issue
●				In the context of the ETP species discussed in 2.3.1 (and their biological and legal status) consider which management measures are in place for the fishery and whether these constitute a strategy or comprehensive strategy.	(a) or (b), (c)
●				Identify the potential risks posed by the fishery to ETP species and review the efficacy of the measures/strategies in place to mitigate against these risks. Include in this a critical analysis of the adequacy of the evidence that informs this review.	(a) or (b), (c)
	●			Where necessary develop new measures, bringing these together into an overarching strategy which demonstrates how the identified risks have been addressed, how the measures work together to meet the objectives, and how the performance of management will be monitored and evaluated.	(a) or (b), (c)
		●		Undertake full consultation on new management strategies including relevant outreach and training where required.	3.1.2
		●		Implement new measures and strategies so that, where possible, these are binding and develop monitoring protocols to incentivize compliance.	(d)
			●	Evaluate the performance of the management strategy. This should include review of alternative measures and where recommendations result, these should be implemented in a timely manner.	(e)

Notes

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2.3.3 ETP species information

Performance Indicator overview

PI 2.3.3 assesses the adequacy of information, both to determine the risk posed to ETP species by the fishery and to evaluate the effectiveness of the strategy to manage impacts on ETP species. There is a wide spectrum of information that may be required such as status and distribution of ETP species (migratory patterns etc.), vulnerability of ETP species to impact from fishing (both direct and indirect), fishing effort distribution and gear characteristics (including information of efficacy of any measures applied). Taken in combination, the available information should be sufficient to support the management of fishery impacts on ETP species, including:

- Information to determine the outcome status of ETP species.
- Information for the development of the management strategy.
- Information to assess the effectiveness of the management strategy.

For each of these, there is likely to be a range of information, from the more qualitative (i.e. plausible argument), to the more quantitative (i.e. direct monitoring, empirical modelling or scientifically robust studies). The range and quality of the information available, and how appropriate this is to the scale and intensity of the fishery and its potential for impact will be scored by the certifiers.

It is also important to consider the availability of on-going monitoring and data collection to identify changes within the fishery that could potentially lead to an increase in the risk of impact from fishing activity over time. The MSC ideal is that fisheries should be moving in the desired direction or operating at a low-risk level.

Information may come from a variety of sources, including from local knowledge or research from fishers or community members. By contrast it may also come from regulatory monitoring programs, observer reports, inspections or in some case even electronic monitoring tools such as VMS or CCTV. Specialised scientific studies are also likely to be a vital source of information and may be useful to management decision-making even where not directly based on the fishery.

As with the other P2 species PIs, this PI needs to be addressed on a scoring element basis, with a score determined for each primary species assessed.

Two scoring issues are considered within this PI:

(a) Information adequacy for assessment of impacts

(b) Information adequacy for management strategy

Scoring issue (a) – Information adequacy for assessment of impacts

The first scoring issue focuses on information about the impact of the fishery on the ETP species in the area of the fishery, ideally including the consequential impacts on their population status.

Scoring issue	SG60	SG80	SG100
(a) Information adequacy for assessment of impacts	Qualitative information is **adequate to estimate** the UoA related mortality on ETP species. **OR** **If RBF is used to score PI 2.3.1 for the UoA** Qualitative information is **adequate to estimate productivity and susceptibility attributes** for ETP species.	Some quantitative information is **adequate to assess** the UoA related mortality and impact and to determine whether the UoA may be a threat to protection and recovery of the ETP species. **OR** **If RBF is used to score PI 2.3.1 for the UoA** Some quantitative information is **adequate to assess productivity and susceptibility attributes** for ETP species.	Quantitative information is available to assess with a high degree of certainty the **magnitude of UoA-related impacts, mortalities and injuries and the consequences for the status** of ETP species.

Good practice

Good practice requires quantitative information, of sufficient quality and coverage to provide a high degree of certainty of both the impact of the fishery on ETP species, and the consequence to those populations.

What certifiers check

Certifiers may be keen to speak to nature protection departments or agencies and environmental NGOs to ascertain the level of available information, along with any research scientists working in the field and representatives of any government work in the area. More specifically the following types of documentary evidence are likely to support scoring:

- ETP species distribution maps.
- ETP species status reports or assessment of populations.
- Fleet effort maps (to determine overlap with areas of high ETP concentrations).
- Fishing gear studies (or research papers) on ETP interaction.
- Any recording of information on interactions with ETP species, e.g. logbooks (whether regulatory or voluntary), observer coverage, video surveillance or specific project records.

Scoring issue (a) – Information adequacy for assessment of impacts

What certifiers check – *continued*

- Evidence to support the efficacy of any management measures.
- Key parameters for any species assessed using the RBF – species range, life history traits, and post-capture mortality for any/all ETP species.

Key questions to determine if further action is needed

Q Is there information available on the ETP species present in the fishing area, including population status and trends, spatial and migratory patterns?

Q Are the key productivity attributes of the ETP species known, along with their vulnerability to the fishing gear?

Q Is there reliable quantitative information available on the level of impact (both direct and indirect) on ETP species, particularly catch rates (per unit effort)?

Q Is the information on both the impact of the fishery and the status of the ETP stock adequate to allow the consequences to ETP status to be determined?

Q If qualitative information is used to support management, is this considered robust or reliable?

Q Are there several sources of data?

Scoring issue (a) – Information adequacy for assessment of impacts

Examples of scoring rationales

Scoring issue (a)	Fishery Example
SG60	Fiji albacore tuna longline (Certified 2012): There is some information on the catch numbers, including approximate volume, fate, and condition upon release etc. through observer coverage (coverage is 7.6% of total effort) of the ETP species (Fiji Petrel, Tahitian Petrel, Loggerhead Turtle, Leatherback Turtle). This is supported by robust debriefing and quality control processes that are considered adequate. Information is adequate to broadly understand the impact of the fishery on ETP species. However, it is not adequate to quantitatively estimate outcome status, nor determine the consequences for the status of ETP species because it is insufficient to support species-specific status assessments. Therefore all four species meet SG60, but not SG80.
SG80	*Tropical prawn trawl fishery:* ETP species in the assessment area that have the potential to interact with the fishery include loggerhead sea turtle, white skate, and dead leaf sea snake. The combination of quantitative ecological risk assessment (based on data from comprehensive, although temporally limited research studies) and ongoing logbook-based fishery monitoring is adequate to assess the impact of the fishery on the ETP species and determine whether the fishery is a threat, as well as to measure trends. Fishing related mortality and quantitative estimates of impacts have been undertaken for all ETP species through the semi quantitative risk assessments and analysis of catch rates. The fishery meets SG80 for all ETP species.
SG100	*Sardine gillnet fishery:* According to national and international legislation the fishery is required to undertake monitoring of cetacean bycatch levels. The sardine fishery collects information on interactions with narwhal and beluga on a trip-by-trip basis. Detailed logsheets used by gillnetters provide quantitative data about the impact of the fishery on these species. Logsheets are submitted to inshore management authorities and they use the logsheets together with cetacean surveys to assess the status of cetaceans. The management authority is able to provide estimates of cetacean injuries and mortalities due to fishing and also other forms of mortality. The national environmental authority uses these data to assess the fishery-related impacts in relation to the status of the cetaceans.

Scoring issue (b) – Information adequacy for management strategy

The information requirements in the second scoring issue of PI 2.3.3 are closely linked to the needs of the management strategy referred to in 2.3.2, to enable the efficacy of the strategy to be determined.

Scoring issue	SG60	SG80	SG100
(b) Information adequacy for management strategy	Information is adequate to support **measures** to manage the impacts on ETP species.	Information is adequate to measure trends and support a **strategy** to manage impacts on ETP species.	Information is adequate to support a **comprehensive strategy** to manage impacts, minimize mortality and injury of ETP species, and evaluate with a **high degree of certainty** whether a strategy is achieving its objectives.

Good practice

Good practice requires that information related to the performance of the management strategy allows a high degree of certainty, including information that allows detection of any changes in level of risk to ETP species. This information should be tailored to the management strategy and should be inclusive of injuries and trends.

What certifiers check

Certifiers will refer to the management strategy PI (2.3.2) to determine what the information needs might be to demonstrate the efficacy of the strategy and its component measures. For each component measure there is likely to be a monitoring requirement along with some evaluation of the efficacy of measures. Documentary evidence to support this may include:

- Published research on any ETP interactions with fishing gears and research on the efficacy of any gear modifications tailored to mitigate against ETP impacts.
- Information on spatial and temporal distribution of ETP species, where this is relevant to the management strategies that are in place.
- Quantitative assessments (observer reports, academic studies, logbooks) of ETP impact before and after the application of the management strategy, demonstrating trends in ETP impacts.
- Ecosystem modelling of impacts (including impacts on ETP species) which enable the likely benefits of a range of management measures to be evaluated.

Scoring issue (b) – Information adequacy for management strategy

Key questions to determine if further action is needed

Q Is the information collected tailored to the needs of the management strategy and does it provide a quantitative indication of whether the measures that comprise the management strategy are working?

Q Does the information in relation to impact allow a quantitative assessment over time, which enables changes in relative impact to be determined as management measures (and strategies) are added or refined?

Q Where measures within the management strategy are implemented, is there evidence, either from past research or from evaluations or modelling that these are demonstrably effective?

Q Where new management measures are proposed or introduced, is this linked to a consideration of the information required to monitor its performance and the cost and administrative practicalities of obtaining this information?

Examples of scoring rationales

Scoring issue (b)	Fishery Example
SG60	*Anchovy mid-water trawl fishery:* There is only a limited knowledge on incidental capture of giant petrels by the anchovy fleet, however there is a similar fishery (in terms of gear, management measures and area) for hake which has some quantitative information on species captured and estimates of total mortality. This provides a comparison and stakeholders from eNGOs indicated that they also expected the interactions to be similar for these two fleets. Interviews with vessel skippers indicate that on rare occasions a sea lion or fur seal may be captured, but there is a considerable chance it escapes from the net, even breaking it. This is seen in the context of increasing populations of these species. A new logbook reporting requirement has been implemented for ETP interactions but has only just started the previous season so there is no information on mortalities yet. Whilst this is sufficient to support the development of management measures and provide some indication if interactions are changing over time, there is not the level of local detail or quantitative data to robustly monitor the performance of management strategies or measure trends over time. Therefore the giant petrels, sea lion and fur seal all meet SG60.

Scoring issue (b) – Information adequacy for management strategy

Examples of scoring rationales – *continued*

Scoring issue (b)	Fishery Example
SG80	*Albacore tuna troll fishery:* The management agency for nature protection aims to monitor the effects of commercial fishing on ETP species, namely basking sharks, whale sharks and great white sharks. Monitoring for interactions is part of the role of the observer on board vessels. While expert opinion suggests the fishing strategy is adequate to minimise ETP interactions, the observer coverage of this fishery has historically been very low. Therefore there is a possibility that low level interactions between the fishery and ETP species have gone undetected, although trends should be apparent even from low coverage. In addition, a research study has been undertaken on two of the vessels in the fishery with 100% observer coverage for part of a season. This study is useful in providing verification of the levels of interaction with ETP species. The management agency reviews observer data on an annual basis and uses the estimated mortality levels to determine if there has been a change in risk levels to ETP species in the fishery. Whilst SG80 is met for all three ETP species it is recommended that there is an increase in the level of observer coverage to levels that will provide better statistical estimates of fishery impact and offer greater quantitative basis for evaluating the performance of the management strategy.
SG100	*Hoki trawl fishery:* There is a regulatory, independent Onboard Observer Program (supported by special training in ETP species) which monitors interactions of the fishery with the birds and mammals listed under 2.3.1. This records adequate information to support a comprehensive strategy to manage impacts, minimize mortality and injury of ETP species, and evaluate with a high degree of certainty whether a strategy is achieving its objectives. This also picks up on any trends to help identify changes in risk to ETP species and inform the management strategy. The fisheries management reviews these data on an annual basis to determine if additional or different management measures are needed to manage ETP species. This fishery meets SG100 for all ETP species.

Challenges and solutions to meeting PI 2.3.3

There are a number of potential challenges to the collection of ETP information in developing countries. But equally there are a lot of existing sources of information that may be directly applicable from international studies or from analogous fisheries elsewhere which can provide a useful source of information. Collecting locally specific ETP information can be complex and costly and may sometimes be seen as a lesser priority than other management initiatives. Placing observers on board vessels can be costly, require appropriate training and be further constrained by safety considerations. Undertaking specific research on the efficacy of management measures, for example gear modifications, may also be seen as costly and would require a level of scientific rigour. Studies on ETP species distribution, migratory patterns and status trends may be more likely to be conducted at an international level, but developing countries are likely to have the opportunity to contribute to these. Monitoring of ETP impacts of the fishery should be seen as a priority. This not only identifies the scale of any existing impact, but also provides a baseline by which any future management initiatives may be judged. Even where constrained by resources, some mechanism for obtaining this information should be possible and once in place will go some way toward meeting the requisite MSC level.

Example actions to improve performance for PI 2.3.3

Process 1	Chronology 2	3	4	Management Actions: Example action	Scoring issue
●				Undertake a review of the existing information. This should critically review the amount and quality of information that is available in relation to ETP species (distribution, vulnerability, migratory patterns) and the impact of the fishery on ETP species. Additionally the review should consider whether the information is adequate to show changes in impact over time with adoption of management measures. This should also include studies from elsewhere which may be analogous.	(a), (b)
●				Undertake a review of the likely information needs for the management strategy described in 2.3.2. The strategy is likely to comprise of many measures. Is the existing monitoring and information adequate to evaluate the performance of these (existing or proposed new) measures? Identify any information gaps.	(a), (b)
	●			Consider a range of cost effective ways of addressing information gaps identified in the reviews above. Make proposals for further information collection and routine monitoring.	(a), (b)
	●			Commission any research that may be required to address any gaps identified in the review above – in particular in relation to the efficacy of existing or proposed management measures (e.g. spatial closures or gear modifications.	(b)
	●			Consider potential to engage vessel crews in the collection of ETP management information. This could include training on ETP species identifications and the recording of interactions, via logs and on-board manuals. Engage more widely in regional efforts to collect information and manage impacts on ETP species.	(a), (b)
	●			Where information gaps are identified in relation to the need to quantify fishery impact, consider the potential value in a robust and independent on-board observer program as an effective way of demonstrating the level of impact.	(a), (b)
		●		Implement monitoring programs or expand or enhance existing monitoring programs to ensure that impact (and the trend of impacts) of the fishery on ETP populations are recorded. This should include practical considerations of cost and logistics to ensure the work is adequately resourced and, where possible independent and reliable.	(a), (b)
			●	Undertake consultation with stakeholders on the proposed monitoring and data collections programs to be implemented to ensure these are appropriately tailored.	3.1.2
			●	Carry out periodic evaluation of the information and the monitoring that is available to inform management of the efficacy of the ETP management strategy. Where gaps or potential improvements are identified these should be implemented.	(a), (b)

Notes

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2.4.1 Habitats outcome

Performance Indicator overview

The MSC certification process seeks to ensure that the fisheries under assessment do not cause undue impacts on habitats (PI 2.4.1), that appropriate management is in place to ensure this (PI 2.4.2), and that appropriate information is available to verify this (PI 2.4.3). In simple terms, more heavily impacting gears are likely to require more management to demonstrate that the potential for impact is mitigated, and a larger evidence base to demonstrate that this is the case.

This first habitat PI assesses the impact of the fishery on the habitats that are encountered. The MSC vocabulary describes a habitat as 'the chemical and bio-physical environment including biogenic structure, where fishing takes place'. In theory this therefore includes the water itself (i.e. the pelagic or meso pelagic environment), however in practice, in most past assessments certifiers have focused on the impacts on the seabed habitats. In doing so consideration is given to the following characteristics that should be included in the seabed habitat definition:

- Substratum – sediment type (e.g. hard substrate or mobile sediments).
- Geomorphology – seafloor topography (e.g. flat rocky terrace or shelf edge).
- Biota – characteristic floral and/or faunal group(s) (e.g. kelp-dominated seagrass bed and mixed epifauna, respectively).

The key consideration of the impact is upon the structure and functionality of the habitat in question and whether or not the impact can be described as 'serious or irreversible harm'. For commonly encountered and minor habitats, this is defined by the MSC as reductions 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. For vulnerable habitats (referred to as vulnerable marine ecosystems (VMEs) following the FAO terminology), the expectation is greater, and the assessment will therefore seek to verify that the fishery is unlikely to reduce (or is unlikely to have reduced) VME habitats' structure and function to below 80% of the unimpacted level.

As well as the composition of the habitat and the nature of the change (both described above), the final element to consider is the scale of the impact. The MSC guides certifiers to primarily consider the full area managed by the local, regional, national or international governance body(s) responsible for management in the area(s) where the fishery operates (the 'managed area' for short); however consideration can also be given to the habitat where its range extends beyond this.

When determining the level of impact, certifiers are required to give an indication of the level of confidence in the conclusion, using the following scale:

- **SG60 'unlikely': no more than a 40% probability.**
- **SG80 'highly unlikely': no more than a 30% probability.**
- **SG100 'evidence': no more than a 20% probability.**

Where there is inadequate information on the habitats encountered and where there is not information on the impact of the fishery on habitats encountered, PI 2.4.1 may be scored using the MSC's Risk-Based Framework. The risk-based approach for scoring habitats is known as the Consequence Spatial Analysis. It involves determining a risk score on the basis of proxies for gear type, overlap of gear with habitat, substratum characteristics, biota characteristics and natural disturbance. This is further described in Annex 1.

Three scoring issues are considered under this PI:

(a) Commonly encountered habitat status

(b) VME habitat status

(c) Minor habitat status

Scoring issue (a) – Commonly encountered habitat status

The first scoring issue assesses the likelihood of the fishery causing serious or irreversible harm to the commonly encountered habitat(s). A commonly encountered habitat regularly comes into contact with the gear used by the fishery. For example this could be a habitat whose range overlaps with the fishery range because it is favoured by the target species or be a habitat that the fishery's gear is designed to exploit. Note that there can be more than one commonly encountered habitat.

Scoring issue	SG60	SG80	SG100
(a) Commonly encountered habitat status	The UoA is **unlikely** to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm.	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.	There is **evidence** that 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.

Good practice

Good practice requires there is either very low interaction of the gear with the seabed, or where the gear interacts with the habitat, the interaction does not lead to significant changes in the structure and function of the habitats that are commonly encountered by the gear (or if so these would be rapidly reversible). In addition, the fishery is able to provide evidence that the interaction between the gear and the commonly encountered habitat does not lead to serious or irreversible harm.

What certifiers check

Certifiers are likely to inform their scoring conclusions during stakeholder meetings with fishermen, but this may be augmented by meetings with gear manufacturers, marine environmental scientists, and government officers responsible for marine habitats or representatives of local environmental NGOs. However, justifications will also be supported by evidence taken from (where available):

- Evidence of fishing patterns (i.e. VMS plots).
- Seabed habitat maps.
- Seabed habitat images.
- Assessments of gear impact on commonly encountered habitats – ideally peer reviewed.
- Assessments of rate of recovery from fishing for relevant gears and habitats – ideally peer reviewed.
- Assessment of efficacy of any gear modifications.
- Ecosystem modelling (if available) which captures the habitat functionality.
- Any time series that may provide an indication of changes in commonly encountered habitat status over time.

Scoring issue (a) – Commonly encountered habitat status

Key questions to determine if further action is needed

Q Is there a good understanding of the commonly encountered habitats in the managed area?

Q Can the substratum, geomorphology and biota of the commonly encountered habitats be described?

Q Is the preferred habitat of the target species known?

Q Is there any evidence (such as from the documents listed above) that can support the conclusion that the fishery is not causing a serious or irreversible harm?

Q Are there areas protected from fishing or where fishing does not occur where the habitat being assessed is in a favourable status?

Examples of scoring rationales

Scoring issue (a)	Fishery Example
SG60	*Sea scallop dredge fishery:* This fishery's commonly encountered habitat is 'fine sediments – flat – no flora and fauna'. Some research on the interaction of this habitat type with scallop dredging has been done, and it shows that scallop dredging causes long-term reductions in habitat structure of shelf areas. Mobile demersal fishing gear reduces seafloor habitat complexity by homogenising the sediment, smoothening sedimentary bedforms (which can provide habitat for fish), rolling boulders, erasing tubes, pits and burrows and killing structure-building fauna. Minimal research has been done to determine the recovery time of this habitat following impact from this specific gear type; however research from similar gear types on similar habitats can be used to extrapolate a likely recovery time. Although this fishery causes significant alteration of habitat cover/mosaic that causes major change in the structure or diversity of the species assemblages, parts of some scallop grounds are permanently closed to scallop fishing. Therefore, it is unlikely that this fishery causes serious or irreversible harm to the sand habitat it commonly encounters. The higher degree of certainty could be met by doing additional research on the specific gear-habitat interaction and recovery time and/or constraining fishing effort to areas of shallow, coarse sediments that have relatively rapid recovery times. The fishery should not access areas of hard substratum (e.g. boulders and cobble), especially areas that will be subject to continuous chronic impacts from dredges.

Scoring issue (a) – Commonly encountered habitat status

Examples of scoring rationales – *continued*

Scoring issue (a)	Fishery Example
SG80	*Shrimp demersal trawl fishery:* This fishery's commonly encountered habitat is 'mud – flat – infauna'. The fishery takes place in a restricted band of coastal water (within the country's EEZ, with no fishing permitted within 10nm of the coast). Due to the relatively shallow waters and low towing speeds, there is less need for large heavy trawl doors and ground gear. Trawls are kept open using lightweight otter boards made of wood, reinforced by a skid made of steel. The seabed environment where the fishery occurs is characterised by relatively stable, dynamic mud with low structural complexity due to natural sedimentation processes. This habitat continues well beyond the range of the fishery, meaning that the proportion on which the fishing takes place is very small. Given the spatially restricted nature of the fishery, light gear, the dynamic nature of the habitat, the fishery is highly unlikely to cause serious or irreversible harm to the mud habitat it commonly encounters.
SG100	*Herring pelagic trawl fishery:* Pelagic trawl gear is not designed to withstand impacts with solid objects and is not intended to be fished on or close to the seafloor. This gear is fished in pelagic habitats only and while the pelagic gear has heavy trawl doors designed to make the gear sink, warp length and tow speed mean that this does not come into contact with the seabed except in unforeseen events. Herring is a pelagic species that apart from demersal spawning events spend their entire lifecycle above the seabed. Because they are a shoaling pelagic species, herring are most efficiently caught using mid-water trawls, which are used to fish the upper layers of the water column. There is evidence that the fishery is highly unlikely to cause serious or irreversible harm to any seabed habitat since none are commonly encountered.

Scoring issue (b) – VME habitat status

The second scoring issue of PI 2.4.1 assesses the likelihood of the fishery causing serious or irreversible harm to VME habitats and only applies when VME habitats are encountered. The FAO provide guidance on the definition of a VME habitat , which is essentially those that are either (i) unique or rare, (ii) functionally significant (i.e. supporting a key life stage, such as nursery areas), (iii) fragile, (iv) have life history traits that may make recovery difficult (such as slow growth rates) and/or (v) structurally complex.

Scoring issue	SG60	SG80	SG100
(b) VME habitat status	The UoA is **unlikely** to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.	The UoA is **highly unlikely** to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.	There is **evidence** that the UoA is highly unlikely to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.

Good practice

To perform well against this scoring issue, the interaction of the gear with the VME habitat should not lead to significant changes in the structure and function of the VME it encounters. In addition, the fishery is able to provide evidence that the interaction of the gear with the VME habitat between the gear and the VME does not lead to serious or irreversible harm.

The MSC defines serious or irreversible harm to VMEs as any reduction in habitat structure and function below 80% of the unimpacted level. This difference in definition derives from VMEs generally having longer recovery times (i.e. more than 20 years) and from the special status afforded VMEs in international and customary law.

What certifiers check

Certifiers are likely to inform their scoring conclusions with stakeholder meetings with fishermen, but this may be augmented by meetings with gear manufacturers, marine environmental scientists, and government officers responsible for marine habitats or representatives of local environmental NGOs. However, justifications will also be supported by evidence taken from (where available):

- Evidence of fishing patterns (i.e. VMS plots).
- Seabed habitat maps.
- Seabed habitat images.
- Maps of the distribution of any VME habitats (or habitat-forming species) that occur in the fishery's managed area.
- Assessments of gear impact on VME habitats – ideally peer reviewed.
- Assessments of rate of recovery from fishing for relevant gears and habitats – ideally peer reviewed.
- Assessment of efficacy of any gear modifications.
- Ecosystem modelling (if available) which captures the habitat functionality.

Scoring issue (b) – VME habitat status

What certifiers check – *continued*

- Any time series which may provide an indication of changes in VME habitat status over time.
- Any historical data which provide an indication of the unimpacted level.

Key questions to determine if further action is needed

Q Is there understanding about the presence of all possible habitats that could be classified as VMEs in the managed area?

Q Is there any mapping that captures the location and distribution of VMEs?

Q Have there been dedicated studies looking at the status of VME habitats in the managed area?

Q Can it be demonstrated that the gear would not cause serious or irreversible harm on the VME, if encountered?

Q Are VMEs protected from fishing?

Examples of scoring rationales

Scoring issue (b)	Fishery Example
SG60	*Cod demersal trawl fishery:* This fishery's VME habitat are 'biogenic reefs – low relief – large erect'. Not only are these reefs biodiverse in their own right, but they may be important in supporting a wide range of commercial and non-commercial fish species including ETP species. The locations of these reefs within the managed area have been mapped. In the south and west portion of the managed area, these reefs are protected through a series of closed areas in the managed area, but there are no such closed areas in the north and east. However, national regulations state that intentional and negligent destruction of known biogenic reefs is prohibited and precaution is required when fishing in the vicinity of known biogenic reefs. VMS data on the spatial distribution of fishing effort coupled with the known historical distribution of the VME show that the fishery only impacts 15% of the biogenic reef within the managed area. Anecdotal evidence from vessel captains suggests that substantial hauls of biogenic organisms are rare. Further, the risk of gear loss represents a fundamental constraint on severe impacts on these reefs. It is clear therefore that trawling poses a risk to VMEs. However, given that fishing vessels will avoid areas where loss of gear is likely or areas where substantial hauls of biogenic organisms regularly occur, it unlikely that the fishery would reduce habitat structure and function to the point where there would be serious or irreversible harm. Given the coincidence of fishing patterns and VMEs, the limited

Scoring issue (b) – VME habitat status

Examples of scoring rationales – *continued*

Scoring issue (b)	Fishery Example
SG60 – *continued*	habitat protection for biogenic reefs, the obvious potential of heavy trawl gear to have an impact, and the limited recording and analysis of biogenic bycatch, it cannot be concluded that the fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.
SG80	*Shrimp semi-pelagic trawl fishery:* This fishery's VME habitat is 'solid reef - flat – large erect' specifically corals (Lophelia sp). Otter trawl gear is known to impact habitat structure and function. Coral, which would be particularly vulnerable to trawl impact, are mainly located outside the fishing area and managed area. Only about 5% of the coral within the managed area were ever impacted by the fishery, and this impact last occurred 30 years ago. Skippers stated that given the goal of reducing fuel costs gear contact with the seafloor is minimised by using shorter fishing lines. The fishery is also testing the use of semi-pelagic doors to reduce the impact further. Pictures of the catch from these types of trawls show that there is almost zero coral bycatch. Additionally, since bycatch of coral would affect the shrimp catch negatively, known coral areas are actively avoided. VMS data confirms this. Further, fishing in new areas is regulated by a new national regulations so it is unlikely that the fishery will come into contact with new, unknown corals. The limited spatial intensity of the fishery, the change to the lighter gears, and the fishery's avoidance of known coral areas makes it highly unlikely for this fishery to reduce habitat structure and function to a point where there would be serious or irreversible harm.
SG100	*Hake bottom longline fishery:* This fishery's VME habitat is coral (Lophelia sp). Longlines are a bottom-set gear held in place by weights. As a result, there is limited potential to impact on the bottom habitat, which results from the direct impact of anchors or the movement of anchors due to currents or drag from the gear until the anchor flukes have fully set or at the time of hauling. The lines themselves (between the anchors) are floated to keep hooks off the seabed, though the lines could snag on benthic structures, which could cause localised damage. However, it can be concluded that bottom longline fisheries may be employed without significant habitat damage. There is extensive habitat mapping of the managed area so all coral areas are known, and there is international legislation to protect VMEs by closing all coral areas to bottom fishing. VMS data provide an effective tool to verify that this fishery never fishes these closed areas, which have been in place for the last 40 years. Therefore, the fishery has had a negligible impact on the historical distribution of coral. There is evidence that it is highly unlikely that this fishery causes serious or irreversible harm to coral.

Scoring issue (c) – Minor habitat status

The final scoring issue only applies when scoring at the SG100 level and looks at likelihood of the fishery causing serious or irreversible harm to any minor habitats (i.e. those that are neither commonly encountered nor a VME).

Scoring issue	SG60	SG80	SG100
(c) Minor habitat status			There is **evidence** that the UoA is highly unlikely to reduce structure and function of the minor habitats to a point where there would be serious or irreversible harm.

Good practice

The inclusion of minor habitats in the scoring of PI 2.4.1 only applies at the SG100 level, and as with the previous scoring issues, this requires evidence that it's highly unlikely that the fishery is causing serious or irreversible harm to the structure and function of minor habitats. The conclusion needs to be based on empirical evidence. Fisheries with little or no interaction with the seabed are likely to perform well under this scoring issue.

What certifiers check

The sources for this scoring issue will be the same as for scoring issues (a) and (b). Certifiers are likely to inform their scoring conclusions during stakeholder meetings and based on the following evidence:

- Evidence of fishing patterns (i.e. VMS plots).
- Seabed habitat maps.
- Seabed habitat images.
- Assessments of gear impact on minor habitats – ideally peer reviewed.
- Assessments of rate of recovery from fishing for relevant gears and habitats – ideally peer reviewed.
- Assessment of efficacy of any gear modifications.
- Ecosystem modelling (if available) which captures the habitat functionality.
- Any time series that may provide an indication of changes in minor habitat status over time.

Scoring issue (c) – Minor habitat status

Key questions to determine if further action is needed

Q Are there minor habitats that may be less commonly encountered (but are not VMEs) featured in relevant habitat mapping or gear impact studies?

Q Do fishers and managers have an understanding of the minor habitats that are encountered?

Q Is there any evidence that can support the conclusion that the fishery is not causing a serious or irreversible harm to these habitats?

Q Is there any understanding (ideally supported by data) of the relative abundance of these habitats over time?

Examples of scoring rationales

Scoring issue (c)	Fishery Example
SG60	No scoring guidepost at the 60 level.
SG80	No scoring guidepost at the 80 level.
SG100	*Tuna pole and line fishery:* Since fishing operations for the target and bait species take place in the upper part of the water column, the fishery does not have any direct impact on seafloor habitat. Given the scale and intensity of the fishery with no gear loss, indirect impacts are also considered to be negligible to non-existent. This fishery has no minor habitats so it meets the SG100 level.

Challenges and solutions to meeting PI 2.4.1

Challenges to meeting this PI in the developing world context may include:

- Limited expertise and capacity to undertake the research needed to identify habitat impacts and to map habitat types, including VMEs.
- Limited funding to undertake the research needed – studies on habitat require specialised skills and technology as well as time to undertake the work.
- In certain fisheries it is extremely difficult and costly to measure impacts on habitat (e.g. measuring the impact of trawl gear in deep water or on VMEs requires highly sophisticated equipment such as remotely operated vehicles and other specialised research vessels).

If information is available, it is generally difficult to assess the actual impacts of the fishery on all relevant habitat types. Invariably, well-established fisheries have historically impacted habitat and have in effect 'altered' the system to an extent. The challenge is to understand the ongoing effects and to consider if habitat rebuilding is needed or if the status quo should be maintained.

Where there is limited availability of information the habitats encountered and the impact of the fishery on the habitat, the Consequence Spatial Analysis (CSA) can be used (Annex 1).

Example actions to improve performance for PI 2.4.1

Process Chronology				Management Actions	
1	2	3	4	Example action	Scoring issue
●				Review the current level of knowledge of key parameters related to habitat impact – such as fleet fishing patterns, habitat mapping, gear impact studies and rate of recovery studies.	(a), (b), (c), 2.4.2, 2.4.3
●				Define habitats according to substratum, geomorphology and biota.	(a), (b), (c), 2.4.2, 2.4.3
●				Determine which habitats are 'commonly encountered', 'VME' or 'minor'.	(a), (b), (c), 2.4.2, 2.4.3
	●			Update information base as required, either by undertaking research locally or drawing on relevant studies from comparable fisheries.	(a), (b), (c), 2.4.2, 2.4.3
	●			At the very least an up-to-date map of fishing effort should be available, and a map representing the current state of knowledge of local habitat distributions, highlighting the locations of VMEs, should be available to managers/certifiers.	(a), (b), (c), 2.4.2, 2.4.3
		●		Consider potential for mitigation through gear improvements and use of alternative fishing gear, spatial controls (e.g. zoning and protected areas), etc.	(a), (b), (c), 2.4.2, 2.4.3
		●		Take legislative or regulatory steps required to implement mitigation measures – or detail procedures to ensure voluntary compliance.	(a), (b), (c), 2.4.2, 2.4.3
		●		Initiate any necessary further appropriate research on habitat and gear interactions.	(a), (b), (c), 2.4.2, 2.4.3
			●	Design on-going monitoring requirements to ensure changes in habitat over time are captured and to ensure that any mitigation measures implemented are achieving their objectives. This may include independent at-sea monitoring of habitat impacts.	(a), (b), (c), 2.4.2, 2.4.3

Notes

Notes

2.4.2 Habitats management strategy

Performance Indicator overview

This second habitat PI requires that there is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types. The scoring issues focus on ensuring that a management strategy is in place, which is considered likely to work, and that there is some evidence that the strategy is meeting its objective. The FCR also requires the fishery under assessment to comply with additional relevant management measures which may be in place in other overlapping MSC certified fisheries.

The management that is in place should be appropriate to the scale and intensity of the fishery, so larger scale, more potentially impacting fisheries or fisheries overlapping VMEs may be expected to require a higher degree of management. Typically management should include (if necessary):

- Information based decisions, for example:
    - an understanding of the scale of the activity.
    - an understanding of the habitat types in the management area, their status and their key characteristics (e.g. vulnerability to impact or rate of recovery).
    - an understanding of the scale of impact.
- A strategic combination of management measures designed to limit or mitigate for any adverse impacts. These may include:
    - Technical measures (such as restrictions on fishing gear, spatial or temporal restrictions).
    - Spatial protection measures (such as Marine Protected Areas).
    - Research and monitoring program tailored to the needs of management.
    - Limited fleet access or effort, or further expansion.
- A regulatory basis, detailing clear departmental responsibility and supported by appropriate resources to enable effective management.
- Measures to ensure/incentivise compliance.
- Periodic review/evaluation including review of alternative measures.

Four scoring issues are considered under this PI:

(a) Management strategy in place

(b) Management strategy evaluation

(c) Management strategy implementation

(d) Compliance with management requirements and other MSC UoAs'/non-MSC fisheries' measures to protect VMEs

Scoring issue (a) – Management strategy in place

The first scoring issue looks at the extent of the management in place to address the fishery's impact on habitats to ensure that there is no serious or irreversible impacts to those habitats.

Scoring issue	SG60	SG80	SG100
(a) Management strategy in place	There are **measures** in place, if necessary, that are expected to achieve the Habitat Outcome 80 level of performance.	There is a **partial strategy** in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above.	There is a **strategy** in place for managing the impact of all MSC UoAs/ non-MSC fisheries on habitats.

Good practice

Good practice requires there to be a cohesive, strategically designed set of measures for addressing the particular habitat interaction. Even fisheries that do not regularly contact benthic habitats should have a management strategy in place to mitigate the impact since gear loss or unexpected seafloor change could occur. At SG100, the fishery is expected to have a comprehensive management plan to ensure that that all fishing activities do not cause serious or irreversible harm to VMEs. This comprehensive management plan should include other MSC fisheries and non-MSC fisheries and is focused on ensuring that there is combined management that ensures that impact on VMEs is mitigated.

What certifiers check

All consideration of habitat management will be placed in the context of the habitat outcome status (2.4.1) and the supporting evidence – i.e. studies relating to habitat types, gear interactions and area of fleet operation. In addition, certifiers will look for evidence of management which is appropriate to the scale of the impact described for the gear and habitats in the fishery area. Ideally certifiers would speak with a representative of a government department or administrative body with oversight of marine habitats, with clear responsibility for managing the impact of fisheries – in particular on VME habitats. Supporting evidence may include:

- Evidence of spatial management measures applied within the management jurisdiction, such as areas closed to particular gears, no take zones or measures applied to identify and protect VME habitats.
- Evidence of technical management measures applied to the fishery, such as restrictions on gear design or overall effort.
- Evidence of additional voluntary measures undertaken by the fishery to minimise habitat impacts.
- Evidence of clear management oversight of habitat impacts from the fishery, within the management jurisdiction, such as studies demonstrating an impact and a clear management response.
- Evidence of any statutory requirements for impact studies.

Scoring issue (a) – Management strategy in place

Key questions to determine if further action is needed

Q Does the management authority identify habitats, consider the potential for impact on these habitats from fishing and take appropriate management action?

Q Is there clear administrative responsibility for managing the impacts of fishing on habitats?

Q Has the fishery or management authority specifically considered what the impacts of the fishery may be on habitats and designed a cohesive set of measures to ensure the fishery does not cause serious or irreversible harm to habitats? And is this documented?

Q Has management done all it reasonably can to ensure that the impact of the fishery on habitats does not cause serious or irreversible harm?

Q Does management make use of the information described in PI 2.4.3 to continue to verify that management is achieving its objectives?

Q Are there any other MSC fisheries or non- MSC fisheries which impact on habitats? Is the impact of any other fisheries covered in the management strategies? Are these other fisheries subject to the same rules and regulations to minimise impact on VMEs?

Examples of scoring rationales

Scoring issue (a)	Fishery Example
SG60	Scapêche and Compagnie de Pêche de St. Malo saithe (Certified 2011): There are several measures in place to avoid trawling in sensitive habitat areas. Areas with carbonate mounds have been closed to all bottom trawling and the tracking of fishing vessels by VMS (position given every two hours) make it highly unlikely that these rules are being breached. In addition, the vessels of the fishery have signed up to the French government 'contrat bleu' program to promote responsible fishing. This includes agreements to protect habitats such as not trawling close to shore. Given that it was concluded that the fishery scored 80 for PI 2.4.1 (Habitat outcome status) it is considered these measures in place must be sufficient to achieve this level of outcome status.However, the company has not signed up to the more comprehensive Pêche Responsible scheme (which includes measures specifically designed to avoid all accidental catches of cold water corals and gorgonians and which is controlled by annual audit and an observer trips). The team therefore concluded that there was no 'partial strategy' specifically aimed at avoiding damage to sensitive habitats.

Scoring issue (a) – Management strategy in place

Examples of scoring rationales – *continued*

Scoring issue (a)	Fishery Example
SG80	Tristan da Cunha rock lobster (Certified 2011): There is a good understanding of habitat types in the area and in broad terms the restriction of fishing gear to traps set on hard substrata is a relevant management measure which will restrict habitat damage. The short fishing seasons at each island further limits the numbers of traps being set. The team considered that these measures together comprised a 'partial strategy' to avoid habitat damage, with a reasonable basis for confidence that it would work, given that past and recent habitat surveys do not indicate any signs of damage. However, it cannot be said that there is a formal strategy, nor have impacts of fishing gear on habitats been directly tested. Thus SG80 is met but part of SG100 is not met.
SG100	*Inshore multi-species groundfish hand rake, dredge, gillnet, trap and line fishery:* The management is based around a bioregional marine planning framework, which uses an ecosystem-based fisheries management approach involving ecological risk assessments. Management takes a precautionary approach to risks identified for habitats and includes closed areas for a variety of gears and a system of marine protected areas, offering more permanent protection from any bottom-contacting gears. Habitat mapping is in place and strategic research is addressing any remaining information gaps on the impacts of fishing on habitats, as well as the relative health of relevant habitats. Results are routinely used to inform fishery management decisions. There is another MSC fishery also operating in this area and this fishery is also subject to the bioregional marine planning framework so this impact is included in the strategy to manage impacts on habitats.

Scoring issue (b) – Management strategy evaluation

The second scoring issue relating to the management of habitat impacts assesses the degree of supporting evidence to indicate that the management described in 2.4.1 will meet its objectives.

Scoring issue	SG60	SG80	SG100
(b) Management strategy evaluation	The measures are **considered likely** to work, based on plausible argument (e.g. general experience, theory or comparison with similar UoA/habitats).	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.	**Testing** supports **high confidence** that the partial strategy/strategy will work, based on **information directly about the UoA and/or habitats** involved.

Good practice

Good practice requires that there is some empirical supporting evidence, sufficient to provide a high degree of confidence that the management will work, this may include systematic monitoring or research providing reliable information on all major points of interaction between the fishery and the habitat(s) appropriate to the scale and intensity of the fishery.

What certifiers check

In addition to those sources detailed above for scoring issue (a), certifiers may look for further evidence contained in:

- Any reviews or evaluations of the management measure/partial strategy/strategy that are in place, either at the level of the fishery or the overall jurisdictional level, that indicate the likelihood of success of the management in place.
- Any information that covers the habitat(s) impacted by the fishery that has been used by management to help determine the effects of habitat management measure/partial strategy/strategy.
- Any evaluations of the management jurisdictions adherence to international commitments on the protection of VMEs.
- Any published reviews indicating the effects of any gear modifications or operational measures on the impacted habitats.

Scoring issue (b) – Management strategy evaluation

Key questions to determine if further action is needed

Q Is there a plausible argument to offer confidence that the management measures/partial strategy/strategy described in scoring issue (a) will work to safeguard the habitats from serious or irreversible harm?

Q Is there evidence available to support this 'plausible argument'?

Q Do the management feedback mechanisms in place provide confidence that the management measures/partial strategy/strategy are achieving their objectives?

Q Is there information available on the fishery's habitat impacts to enable the effects of different management measures to be tested?

Q Is there a requirement to review or evaluate management measures in place to safeguard habitats – in particular VME habitats?

Examples of scoring rationales

Scoring issue (b)	Fishery Example
SG60	*Scallop dredge fishery:* The fishery has implemented management measures (spatial, gear, and effort restrictions) to protect the commonly encountered habitats and has established a series of closed areas to protect identified VMEs. These measures are considered likely to work, based on plausible argument, although this argument is partially based on research papers which have reviewed the success of similar spatial and effort restrictions in other comparable fisheries. SG60 is met, but SG80 is not because direct investigations within the fishing area have not been undertaken.
SG80	*Shrimp twin-rig demersal trawl fishery:* The fishery's partial strategy includes spatial restrictions and a cap on fishing effort. When considering the known nature of the fishery and the habitats encountered, combined with evidence from annual drop camera deployment, there is a basis for confidence that the partial strategy will work to protect the habitat from serious or irreversible harm. SG80 is met but SG100 is not because systematic monitoring does not occur.
SG100	*Mussel dredge fishery:* There is a good understanding of mussel bed dynamics as well as distribution of the habitats and their likely vulnerability to fishing activities. The impact of the gear has also been tested in these mussel beds with dedicated research. The local inshore management authority and statutory nature conservancy agency has approved the gear's continued use on the mussel beds, following a comprehensive assessment of impacts. This included modelling of habitat impacts under a range of possible management scenarios (including varying sizes of area closures) which were under consideration. This concluded that the existing management should ensure that likely impacts are negligible, primarily due to the dynamic nature of naturally occurring mussel beds within the estuary. Monitoring of habitat status is also on-going. There is therefore sufficient information and testing to be highly confident that the strategy will work.

Scoring issue (c) – Management strategy implementation

The third scoring issue relating to the management of habitat impacts is intended to ensure that the management described in scoring issue (a) has been implemented.

Scoring issue	SG60	SG80	SG100
(c) Management strategy implementation		There is **some quantitative evidence** that the measures/ partial strategy is being implemented successfully.	There is **clear quantitative evidence** that the partial strategy/ strategy is being implemented successfully and is achieving its objective, as outlined in scoring issue (a).

Good practice

Good practice requires not only that there is clear quantitative evidence of implementation, but also that the management is achieving its aims – i.e. ensuring there is no serious or irreversible harm.

What certifiers check

Certifiers are likely to check with those in management authority or those responsible for monitoring, control and surveillance that any management measures/partial strategy/strategy related to mitigating habitat impacts are fully implemented. Evidence to support this scoring issue may include:

- Evidence of regulation or legislation detailing that management measures/partial strategy/ strategy are legally binding.
- Electronic VMS data indicating that any spatial restrictions are complied with.
- Evidence from observer reports that management measures/partial strategy/ strategy are effectively managing fleet activity.
- Evidence (e.g. risk assessment and/or quantitative modelling) on the status of VMEs indicating that their conservation status is not deteriorating.

Scoring issue (c) – Management strategy implementation

Key questions to determine if further action is needed

Q Is there evidence available to demonstrate that the partial strategy or strategy described in scoring issue (a) is indeed in place and has been implemented as intended?

Q Are there observer reports or evidence from electronic monitoring of vessel movements (such as VMS) to indicate that spatial measures are complied with?

Q Have the measures contained in the partial strategy or strategy been enshrined in legislation or regulation?

Q Are fishers aware of the measures detailed in the partial strategy or strategy and their responsibility with respect these?

Q Is there evidence that the implemented management has been successful in achieving its aims?

Examples of scoring rationales

Scoring issue (c)	Fishery Example
SG60	No scoring guidepost at the 60 level.
SG80	*Shrimp demersal trawl fishery:* Evidence presented to the team by the fishery's national management department and by the fishers suggests that there are no incursions by the vessels into the closed area designated to protect VMEs. VMS records show that the trawling activity is limited to within the permitted zone. The fishery management plan has been formally adopted by the fishery management department, while the on-board Code of Practice has been implemented across all vessels, which includes the completion of vessel reports regarding any sensitive habitat interactions. This evidence shows that the partial strategy is being implemented successfully.
SG100	*Scallop demersal longline fishery:* The fishery's management strategy takes a precautionary approach to risks identified for the all habitats within the fishery's managed area. Habitat mapping is in place, and VMS and observer records of the pattern of fishing activity confirm that no fishing is taking place in the closed areas established to protect VMEs. The VMS data and observer records show no harmful interactions with any habitats; this clear quantitative evidence shows that the strategy is being implemented successfully and is achieving the goal of not causing serious or irreversible harm. Since the introduction of the closed area, there is evidence from scientific surveys of habitat recovery.

Scoring issue (d) – Compliance with measures to protect VMEs

The final scoring issue only applies if the fishery impacts a VME and/or if another MSC fishery or a non-MSC fishery impacts a VME in the fishery's managed area. This scoring issue seeks to ensure that the fishery complies with any relevant management requirements for the protection of VME habitats, including those which may be in place in overlapping MSC or non-MSC fisheries. 'Relevant' means:

1. Area closures that are scientifically based and clearly aimed at the precautionary protection of VMEs – not closures designed for other purposes (e.g. to establish a fishery's market advantage);

2. Area closures (arising from move-on rules) or other management measures implemented by other MSC fishery's; and

3. Move-on areas implemented by non-MSC fisheries if the area coordinates are publicly available.

Scoring issue	SG60	SG80	SG100
(d) Compliance with management requirements and other MSC UoAs'/non-MSC fisheries' measures to protect VMEs	There is **qualitative evidence** that the UoA complies with its management requirements to protect VMEs.	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/non-MSC fisheries, where relevant.	There is **clear quantitative evidence** that the UoA complies with both its management requirements and with protection measures afforded to VMEs by other MSC UoAs/non-MSC fisheries, where relevant.

Good practice

Good practice requires a stronger evidence base of compliance with both the fishery's own management requirements to protect VMEs, as well as those implemented by other relevant MSC and non-MSC fisheries.

What certifiers check

Certifiers will initially be required to review the management requirements for the fishery. At the SG80 and SG100 levels, certifiers will also assess whether or not the fishery complies with relevant protection measures implemented by other MSC fisheries, which may require contact with other certifiers, and non-MSC fisheries. This will be supported by:

- Evidence that the fishery complies with any management measures applied within the 'managed area', such as areas closed to particular gears, no-take zones or measures applied to identify and protect VMEs.
- MSC assessment reports of other relevant MSC fishery's detailing any habitat management strategies.
- Any publicly available coordinates for closed areas or move-on areas that have been established by non-MSC fisheries.
- Where management measures in other MSC or non-MSC fisheries are not complied with, evidence detailing why the protective measure is not required for the fishery (i.e. is not 'relevant').

Scoring issue (d) – Compliance with measures to protect VMEs

Key questions to determine if further action is needed

Q Does the management strategy for this fishery recognise and seek to comply with any specific VME protection measures in place to address the impacts of MSC and non-MSC fisheries?

Q Has the design of the management strategy been tailored to ensure it is compatible with similar strategies in other fisheries?

Q Is the management sufficient to ensure the cumulative impact of all MSC and non-MSC fisheries does not cause serious or irreversible harm to any habitats that have been classified as VMEs by any of the relevant management authorities?

Examples of scoring rationales

Scoring issue (d)	Fishery Example
SG60	*Clam hand collection fishery:* The fishery has established some closed areas to protect known VMEs within the 'managed area'. Stakeholders have stated that the fleet under assessment does not fish within these areas, but there is no quantitative evidence of this. Further, the fishery was not aware of some of the management measures in overlapping fisheries to try and avoid habitat impacts. Therefore, the fishery meets SG60, but since this evidence of compliance is only qualitative and since it does not consider protection measures by other fisheries (MSC/non-MSC) it does not meet SG80 or SG100.
SG80	*Mussel dredge fishery:* The fishery has established one closed area of its own that was based on previous encounters with VMEs. The overarching management entity has closed two additional areas within the managed area to all bottom-contacting gear. One other MSC fishery (also utilising dredge) operates in the same area as the fishery in question. The other MSC fishery enforces a 12 hour fishing curfew, but there is no known scientific-based evidence to support this fishing curfew as a habitat protection measure. Therefore, the fishery in question has deemed this measure irrelevant. Observer coverage confirm that the fishery avoids all the relevant closed areas (i.e. its own closed areas plus those established by management), but there is no additional verifiable electronic data (e.g. VMS data). Therefore, there is only 'some quantitative evidence' so SG80 is met.
SG100	*Plaice set net fishery:* The fishery has established three of its own closed areas where it encountered VMEs in the past. This fishery operates in the same area as one non-MSC set net fishery and one other MSC fishery, which utilises demersal trawl. After encountering VMEs, the non-MSC fishery closed two additional areas and made these coordinates publicly available. Upon receiving this information, the fishery also closed these areas. The overarching management entity has established five no-trawl zones, which are avoided by the other MSC fishery. Since the fishery in question does not use demersal trawl, it is not required to avoid these no-trawl zones. VMS data and extensive observer coverage confirm that the fishery avoids all the relevant closed areas (i.e. its own closed areas plus those of the non-MSC set net fishery and the management entity) so it can be said that there is 'clear quantitative evidence' that SG100 is met.

Challenges and solutions to meeting PI 2.4.2

Ideally, implementation of precautionary management should never be delayed due to lack of information. Instead good management theory suggests that reduced levels of information should just lead to increased levels of precaution. However, in practice it must also be recognised that management is typically only introduced (and included in budget considerations) once there is an awareness of the need for management. The development of management therefore often only occurs following an awareness of the distribution of habitats, and in particular VME habitats, within the management jurisdiction and an awareness of the potential for fishing gear to impact those, potentially to the point of serious or irreversible harm.

It is therefore likely that management will be less advanced where there is poorer understanding of both the seabed habitats and the potential of fishing gear to impact those habitats. Efforts to develop management will often start by saying 'we need more evidence', which may be costly, complex and time consuming to collate and may be beyond the capacity of the administration. Taking genuinely precautionary measures in the absence of such an information base would reflect a commendable adherence to the principles of The Precautionary Principle, but may locally prove politically unacceptable.

Once management measures or strategies have been agreed upon, there may be a delay in getting these implemented and through the relevant regulatory amendments. There is also likely to be a cost of monitoring to verify the effectiveness of the management measures and to ensure good compliance. More voluntary measures at a fleet level may face similar challenges such as the difficulty in getting agreement, the cost of modifications, and the challenge of independently demonstrating that the agreement is achieving its aims.

Example actions to improve performance for PI 2.4.2

Process 1	Process 2	Chronology 3	Chronology 4	Management Actions: Example action	Management Actions: Scoring issue
●				Review the habitat management measures in place in other MSC fisheries and relevant non-MSC fisheries.	(a), (d)
●				Review the current level of knowledge of key parameters related to habitat impact – such as fleet fishing patterns, habitat mapping, gear impact studies, rate of recovery studies (as undertaken for PI 2.4.1).	(a)
	●			Summarise the potential for interaction and impact between the fishery and the habitats within the managed area, highlighting those that are considered VME habitats and highlighting where there is a potential for serious or irreversible harm.	(b)
	●			Evaluate a range of possible habitat management measures that may mitigate against the risk of serious or irreversible harm to the identified habitats. These are likely to include spatial measures, technical measures and/or changes to operational practice.	(b)
	●			Undertake any further or on-going data collection/research as required by management. This could include engaging the fleet in the collection of fishery-dependent data.	2.4.3
		●		Consider the administrative, legislative, financial, data and research requirements necessary to incorporate management measures into a cohesive strategy. Ensure that these are in place.	(a), (c)
			●	Undertake periodic evaluation of the performance of the designed management strategy to ensure that the objectives are being met or, where not met, that management is adjusted accordingly.	(c)
			●	Ensure control and enforcement measures are tailored to the needs of the habitat strategy in order to ensure good compliance with measures contained within the strategy.	(d)

Notes

2.4.3 Habitats information

Performance Indicator overview

PI 2.4.3 assesses the adequacy of information available, both to determine the risk posed to the habitat by the fishery and to evaluate the effectiveness of the strategy to manage impacts on the habitat. There is a wide spectrum of information that may be required such as habitat distribution, fishing effort distribution, gear characteristics, habitat productivity and vulnerability, impact of fishing gears and recovery rates. For each of these, there is likely to be a range of information, from the qualitative (i.e. plausible argument), to the more quantitative (i.e. empirically modelling or scientifically robust studies). The range and quality of the available information how appropriate it is to the scale and intensity of the fishery and the potential for impact will be scored by the certifiers.

It is also important to consider the availability of on-going monitoring and data collection to identify changes within the fishery that could potentially lead to an increase in the risk of impact from fishing activity over time. The MSC ideal is that fisheries should be moving in the desired direction or operating at a low-risk level.

Information may come from a variety of sources, including from local knowledge or research from fishers or community members. It may be place based (i.e. local to a particular geographical area) and may have social, economic or ecological dimensions. By contrast, it may also come from regulatory monitoring programs, observer reports, inspections or electronic monitoring tools such as VMS or CCTV. Specialised scientific studies are also likely to be a vital source of information and may be useful to management decision-making even where not directly based on the fishery.

Three scoring issues are considered under this PI:

(a) Information quality

(b) Information adequacy for assessment of impacts

(c) Monitoring

Scoring issue (a) – Information quality

The focus of the first scoring issue of PI 2.4.3 is on the quality of information relating specifically to habitat distribution (i.e. habitat mapping) and the occurrence of vulnerable habitats.

Scoring issue	SG60	SG80	SG100
(a) Information quality	The types and distribution of the main habitats are **broadly understood**. **OR** **If CSA is used to score PI 2.4.1 for the UoA:** Qualitative information is adequate to estimate the types and distribution of the main habitats.	The nature, distribution and **vulnerability** of the main habitats in the UoA area are known at a level of detail relevant to the scale and intensity of the UoA. **OR** **If CSA is used to score PI 2.4.1 for the UoA:** Some quantitative information is available and is adequate to estimate the types and distribution of the main habitats.	The distribution of all habitats is known over their range, with particular attention to the occurrence of vulnerable habitats.

Good practice

Good practice requires that the distribution of all habitats (main and minor) is known over their entire range and not limited to the specific area in which the fishery operates.

What certifiers check

The scoring of this PI may firstly be informed by stakeholder meetings or potentially more structured stakeholder interviews to capture the extent of local knowledge (in particular if the RBF is used). However it is also likely to be augmented by evidence such as:

- Habitat maps – either in digital format (i.e. GIS) or in published papers.
- Seabed charts.
- The outputs of any regional or international projects to map vulnerable habitat types.

Scoring issue (a) – Information quality

Key questions to determine if further action is needed

Q Is there a good understanding of the spatial distribution of the main habitats and minor habitats, both in the area of the fishery and beyond? And is there an awareness of the locations of vulnerable habitats?

Q Have there been seabed mapping studies (either in the past or on-going), which have provided outputs that can be used by managers to determine the distribution of habitats?

Q Does the available mapping cover the whole habitat range (including beyond the boundaries of the fishery)?

Examples of scoring rationales

Scoring issue (a)	Fishery Example
SG60	*Shrimp demersal trawl fishery:* Published research in 1996 suggested that the distribution of the shrimp species is on the coastal shelf and is closely associated with particular seabed habitats. Two other research papers (one in 1962 and the other in 2001) discuss the general distribution of seabed habitats on the coastal shelf. Available data however only allow for a basic understanding of the types and distribution of main habitats in the area where the fishery operates. However, fishermen themselves have a good understanding of seabed characteristics and how this varies over their fishing range. No recent investigations or studies have examined the nature, distribution and extent of seabed habitats in the fishing zone nor have there been any research on the vulnerability of some the habitat species identified.
SG80	*Scallop otter trawl fishery:* Extensive sampling by trawl and dredge during annual biomass surveys has given a good basic understanding of the main habitat in the fishery's area. The results of this work are presented in a habitat map which details sediment type and fauna. Preliminary investigation of the physical environment of the seafloor has indicated relationships between sediment composition and structure and scallop beds. Although the benthic habitat of the entire shelf has not been systematically sampled, the evidence from this fishery and other fisheries in the area point to there being only those two main habitats (i.e. fine sand and mud, both with low relief). As a result of some relevant scientific study in comparable fisheries, it is known that these habitats are not vulnerable to fishing at the scale and intensity of this fishery.
SG100	*Crab pot fishery:* The distribution of all habitats is known over their range, with particular attention to the occurrence of vulnerable habitats. Detailed habitat mapping for the entire sea has taken place, and this information is used regularly in management and fishing decisions to ensure that vulnerable habitats are not harmed.

Scoring issue (b) – Information adequacy for assessment of impacts

The second scoring issue relating to habitats information seeks to ensure that information is adequate to understand the impact of the fishery's gear on the habitats found within the fishery's area. In order for any impact to be appropriately estimated, the spatial and temporal distribution of the fishing activity and its overlap with different habitats must also be understood.

Scoring issue	SG60	SG80	SG100
(b) Information adequacy for assessment of impacts	Information is adequate to broadly understand the nature of the main impacts of gear use on the main habitats, including spatial overlap of habitat with fishing gear. **OR** **If CSA is used to score PI 2.4.1 for the UoA:** Qualitative information is adequate to estimate the consequence and spatial attributes of the main habitats.	Information is adequate to allow for identification of the main impacts of the UoA on the main habitats, and there is reliable information on the spatial extent of interaction and on the timing and location of use of the fishing gear. **OR** **If CSA is used to score PI 2.4.1 for the UoA:** Some quantitative information is available and is adequate to estimate the consequence and spatial attributes of the main habitats.	The physical impacts of the gear on all habitats have been quantified fully.

Good practice

Good practice requires that there are directly applicable studies relating to the particular gear and the particular habitats, demonstrating the scale of impact. This can be combined with a high level of understanding of the spatial and temporal overlap between fleet operations and habitat distribution.

What certifiers check

Certifiers would look to be informed by:

- Studies looking at the impact of fishing gears on the habitats in the fishery's area. Ideally this would include information on both initial impact and recovery time.
- A map providing a spatial overlap of the fishery's spatial distribution with habitats.
- For fisheries encountering vulnerable marine ecosystems (VMEs), maps and footprint data, position of closed areas to protect VMEs and catch and catch rates of VME-indicator organisms to support precautionary trigger levels.

Scoring issue (b) – Information adequacy for assessment of impacts

Key questions to determine if further action is needed

Q Have any studies been done looking at the impacts of the fishery's gear on the habitats that are present in the fishery's area?

Q Are there gear impact studies from comparable fisheries that may enable the impact of the fishery's gear to be assessed in this case?

Q Is it possible to produce an accurate overlap map of the fishery's spatial distribution and the habitat distribution?

Q Have studies been done on the frequency of fishing gear interaction with habitats?

Examples of scoring rationales

Scoring issue (b)	Fishery Example
SG60	*Clam dredge fishery:* There is significant research available to understand the impacts of dredge fisheries on the main habitats. Stakeholder consultation and VMS data have been used to broadly understand the type, location and impacts of dredging on the main habitats within the fishery's area. However, reliable information on the spatial extent of interaction or timing and location of the fishery's gear is not available to understand the main impacts of the fishery.
SG80	*Sole set net fishery:* The impacts of the fishery on the seabed and associated communities has been the focus of extensive research in the past. A broad range of scientific studies have evaluated the different impacts of the fishery on the main habitats (sand, mud and gravel, all with low relief) within its area, including the consideration of different levels of activity on the main habitats, habitat extent and variability, seabed relief, sediment sorting and bottom damage or alteration. Many studies have also examined the impacts of the fishery using biological indicators such as species diversity, abundance, rates of recovery and other criteria. VMS data provide adequate information on the spatial and temporal extent and location of the fishery. The fishery does not encounter any VMEs so additional information on the position of closed areas to protect VMEs and catch rates of VME-indicator organisms to support precautionary trigger levels does not need to be collected or considered in this case.
SG100	*Herring pelagic trawl fishery:* There are no known direct or indirect physical impacts of the fishery's gear on the seabed or on the pelagic habitat (water column). Several studies have shown that pelagic gear have negligible impact on the water column and the location of the fleet's activity is accurately known. The seabed habitat has also been extensively mapped to a high level of detail to enable the overlap of fishing activity and habitats to be accurately presented.

Scoring issue (c) – Monitoring

The final scoring issue of PI 2.4.3 relates to changes in risk and habitat distribution over time. An understanding of temporal changes in habitat health and distribution is essential, compared with a single snapshot mapping exercise, as it enables management to determine that management measures are working and provides verification that activities are not contributing to increasing risk to the habitats.

Scoring issue	SG60	SG80	SG100
(c) Monitoring		Adequate information continues to be collected to detect any increase in risk to the main habitats.	Changes in all habitat distributions over time are measured.

Good practice

Good practice requires that habitat mapping is repeated at timely intervals so that the relative changes may be recorded and responded to.

What certifiers check

Certifiers would look to be informed by:

- All previous habitat studies on record in the fishery's area.
- Proposals or government policy or funding commitments indicating the likelihood and timing of any future habitat mapping exercises.
- Any additional studies or approaches to data collection that allow habitat information to be routinely augmented.

Scoring issue (c) – Monitoring

Key questions to determine if further action is needed

Q Have more than one habitat mapping exercise been carried out in the fishery's area?

Q Is there clear governmental responsibility for the on-going collection of habitat information?

Q Have any external/academic studies been undertaken on the habitats in the fishery's area that contribute to an understanding of changes in habitat status over time?

Q Where habitat management measures (such as gear restrictions or area closures) are implemented, is there monitoring in place to demonstrate that these are achieving the objective of improving habitat outcome status?

Examples of scoring rationales

Scoring issue (c)	Fishery Example
SG60	No scoring guidepost at the 60 level.
SG80	*Shrimp demersal trawl fishery:* Fishing effort and distribution is monitored through the on-board VMS on all vessels within the fishery. Management of the shrimp species by effort control provides a clear means by which any increased risk to the main habitats can be identified. These data are collected on an on-going basis as part of the management plan as implemented through the licence program. The Code of Practice for the vessels requires the collection of data in relation to encounters with VMEs during fishing operations. The management plan also considers the data when determining the strategy's effectiveness in ensuring that serious or irreversible harm does not occur. There have been a small number of habitat mapping exercises over the last 30 years, although there is no further mapping exercise currently scheduled. These historic habitat studies would provide a baseline to any future mapping exercises.
SG100	*Lobster pot fishery:* The local fisheries research institute has a detailed research plan, which includes a program for surveying all habitats within the fishery's area on a three-year basis. Therefore, changes in the distribution of all habitats within the fishery's area are measured over time, building upon the existing evidence of habitat distribution. In addition, routine fishing effort and fishing location information forms part of the statutory monitoring program. This would enable any changes in fleet effort or spatial extent to be identified by management. This level of information collection and monitoring is sufficient to meet SG100.

Challenges and solutions to meeting PI 2.4.3

There are a number of possible challenges for developing countries in meeting PI 2.4.3. This requires there to be (i) an understanding of habitat distribution, (ii) evidence of the fishery's spatial distribution, (iii) understanding of the impact of the gear on the relevant habitats and (iv) some understanding of how these patterns (and in particular that of habitat distribution) changes through time.

This implies that a certain amount of research has been undertaken in the past and will continue to be done in the future. Habitat mapping exercises can be expensive and time consuming, and gear impact studies require a high level of research expertise. In the case of a widely distributed fishery, the area requiring some form of mapping may be extensive and possibly beyond a single jurisdiction. This also implies a certain degree of vessel monitoring is already on-going. This is easiest where some form of electronic vessel tracking (such as VMS) is in place – which can be an expensive tool to introduce across a fleet and which may require additional staff resources to monitor properly.

However, in all these challenges, it should be considered that the MSC requires information and measures which are 'appropriate to the scale and intensity of the fishery'. In this context, the constraints may not be insurmountable. For example, it is reasonable to draw on relevant and applicable research already undertaken in different fisheries, such as gear impact studies. Fisheries knowledge can also be captured to build up an evidence base – indicating fleet spatial patterns, habitat distribution or gear/habitat interaction. Further, less expensive research, such as drop-down camera work or grab sampling, can be usefully done where well planned and well executed. Additionally, MSC has developed the Consequence Spatial Analysis (CSA) to be used in assessments where there is little understanding of habitats encountered, their distribution and the impact of the fishery on the habitats – see Annex 1 to learn more about the CSA.

Example actions to improve performance for PI 2.4.3

Process Chronology				Management Actions	
1	2	3	4	Example action	Scoring issue
●				Undertake a review of the existing habitat information, monitoring programs and relevant supporting information such as gear impact studies and fleet effort and spatial patterns. Evaluate the adequacy of this information for effective habitat management purposes. Identify any gaps in the information currently available.	(a), (b), (c)
	●			Propose a program of monitoring or commission research to address any gaps identified in step 1 (above). This should include focus on: i) habitat distribution and changes over time, with particular emphasis on the distribution of vulnerable habitats; ii) habitat/gear interactions to quantify the scale of impact; and iii) patterns of fishing effort so that overlap with habitats may be determined.	(a), (b), (c)
	●			Practicalities of information and monitoring requirements should be addressed so that reasonability for monitoring is clarified, any capacity building steps may be addressed and the legal basis for monitoring can be firmly established.	(a), (b), (c)
	●			Explore the potential to engage the fleet in monitoring or research programs or collecting information during routine fishing operations.	(a), (b), (c)
	●			Consult upon any new monitoring proposals to ensure these are practical and workable and the reason for the programs are well understood.	3.1.2
	●			Implement all required monitoring programs or research. Ensure that results and findings are disseminated in a timely and transparent manner.	(a), (b), (c), 3.2.2
	●			Ensure that the information is collated, analysed and passed to the relevant management authority to enable habitats management strategy to be reviewed and amended as required. This should enable fleet effort to be overlaid upon habitat distribution informed by gear impact studies so that the overall impact of the fishery may be quantified and the potential for recovery may be understood.	(a), (b)
	●			Management to respond to the information presented in a timely and transparent manner.	2.4.2
		●		Continue to collect habitat information to detect any changes in risk over time.	(c)
		●		Undertake periodic review of the information used to support habitat management.	(a), (b), (c)

Notes

Notes

2.5.1 Ecosystem outcome

Performance Indicator overview

PI 2.5.1 assesses the status of the ecosystem as a whole, and in particular the fishery's impact on the ecosystem. This requires that the fishery does not cause serious or irreversible harm to the key elements of ecosystem or the underlying ecosystem structure and function to a point which would hinder the ecosystem resilience or ability to recover from impact. In doing so this seeks to ensure that regardless of natural background changes in ecosystem dynamics, its capacity to sustain itself whilst producing food and economic opportunities is maintained indefinitely for the benefit of present and future generations.

This assessment of ecosystem status or outcome is not intended to be a repeat of the earlier assessments of the impact of the fishery on habitats and other species caught in the fishery (whether targeted, unwanted or ETP). Instead this considers the wider ecosystem structure and function, including consideration of the removal of the target stock which is not considered elsewhere in P2. This would include consideration of the impacts of the fishery on both the ecosystem's inherent health and balance (e.g. structure, trophic relationships and biodiversity) but also the impact on the services provided by the ecosystem (e.g. to the benefit of the target fishery itself, to other fisheries and human uses). The FCR guidance provides some helpful indications of the types of ecosystem impacts which would be the subject of consideration under this PI. These include:

- Wider ecosystem impacts of removal of 'keystone' predators or important prey species which disrupts overall balance of the ecosystem.
- Major changes in the overall species biodiversity of the ecological community (e.g. loss of species, or major changes in species evenness and dominance).
- Changes in the genetic diversity of species caused by, for example, selective fishing.
- Other indirect impacts, such as introduction of invasive species or pollution.

Where there is no information available to support an analysis of the impact of the fishery on the ecosystem, the outcome PI in relation to ecosystem may be scored using the MSC's Risk Based Framework, see Annex 1.

Only one scoring issue is considered under this PI:

(a) Ecosystem status

Scoring issue (a) – Ecosystem status

There is only a single scoring issue for PI 2.5.1. This seeks to determine whether there is an impact from the fishery (either direct or indirect) that is likely to cause serious or irreversible harm to ecosystem structure and function.

Scoring issue	SG60	SG80	SG100
(a) Ecosystem status	The UoA is **unlikely** to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	The UoA is **highly unlikely** to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	There is **evidence** that the UoA is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.

Good practice

Good practice requires that the operation of the fishery does not reduce those key features that are crucial to maintaining the integrity and structure of the ecosystem and does not adversely impact ecosystem productivity. This includes not causing serious changes to biological diversity.

What certifiers check

There is recognition in the MSC guidance that this PI may sometimes lack supporting evidence. This may be particularly the case in less advanced fishery management systems. Certifiers may therefore rely on general observations, qualitative assessment and expert judgement (or seek to identify surrogates) to provide an indication of impacts on ecosystem structure. It may also be possible to draw inferences from directly measured impacts on populations, species and functional groups. It is therefore likely that stakeholder consultation will play an important role in informing this PI. However, in addition certifiers are likely to consider the following documentary evidence (where available):

- Status (ideally stock assessments) of key predators of the target species and key prey of the target species.
- Evidence of consideration of the ecological role of the target species in setting exploitation rates.
- Any ecosystem modelling undertaken in the area of the fishery or analogous areas.

Scoring issue (a) – Ecosystem status

Key questions to determine if further action is needed

Q Is the fishery small scale, using selective and low impact gear, targeting a well-controlled and precautionary quantity of a resource which shares an ecosystem niche with many other species? If so, no further action is likely to be required.

Q Is there an understanding of the trophic relationships in the ecosystem in which the fishery operates?

Q Is the ecosystem role of the target species and any species or habitats impacted by the fishery under assessment understood?

Q Is there any evidence available to indicate the changes in ecosystem balance (changes in relative balance of key species, habitats)?

Q Is there an understanding of the indirect effects of the fishery on the ecosystem which have not been considered elsewhere in P2, such as impacts of waste products from the fishery?

Examples of scoring rationales

Scoring issue (a)	Fishery Example
SG60	*Scallop dredge fishery:* The fishery affects the wider ecosystem through alterations in invertebrate community structure. There can be benefits to certain scavenging species but detrimental effects on other organisms, particularly invertebrates. The dredge fishery reduces seafloor habitat complexity by homogenising the sediment, rolling boulders, erasing tubes, pits and burrows and killing long-lived fauna (as addressed under the habitats PI). The ecosystem consequences of the on-going use of dredges (and other similarly impacting fisheries) is to maintain the benthos in an altered ecological state. Where large closed areas have led to a cessation of mobile demersal fishing, there has been marked increases in benthic megafaunal production with species such as skates, haddock and flounders shown to be generally larger inside than outside the closed areas (although no differences were detected in the size of 11 other species). This is seen as evidence of slow ecosystem recovery in areas that have been closed to demersal gears (including scallop). The scallop fishery is therefore known to have widespread impacts on ecological and biological components of the ecosystem, with recovery rates for some key features of ecological importance known to be very slow. The fishery meets the scoring guidepost 60 since there is evidence for ecosystem recovery in a permanently closed area. The fishery, as it is currently conducted, does not meet the higher degree of certainty required for SG80.

Scoring issue (a) – Ecosystem status

Examples of scoring rationales – *continued*

Scoring issue (a)	Fishery Example
SG80	*Lobster trap fishery:* The rock lobster is a scavenger and a large proportion of its diet consists of kelp and algal material. Its main predators are probably octopus and some fish and shark species. Octopus are predators, and in this environment may feed largely on lobster, as well as on bivalves and other crustacean and mollusc species. Octopus species in general are fast growing and have a rapid turnover, making the populations resilient to fishing pressure. Given its high abundance and large size, the rock lobster clearly plays an important role in the trophic organization of the benthic environment. However, the relatively high CPUE, and some evidence of density-dependence suggests that populations are not very depleted relative to natural levels. The fishery does not give rise to any by-catch; has successfully mitigated against known interactions with ETP species; and does not appear to affect the physical structure of the subtidal habitat around the islands. Taking the above factors in consideration, the team considered that it was highly unlikely that the fishing mortality of lobsters or the indirect impacts of the fishery would disrupt the trophic functioning of benthic ecosystems. Nonetheless, there have been no direct studies on the roles of lobster in the ecosystem, so hard evidence is still lacking in some respects – thus SG100 is not met.
SG100	*Saithe demersal trawl fishery:* This is a relatively clean fishery dominated by the target species. Thus, the fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm. The fishery research institute has a wide ranging research and stock assessment program dating back over half a century, much of which is aimed ultimately at developing an ecosystem model for all regional seas. While much progress has been made this objective has not yet been attained. As yet these studies have not identified any critical role that saithe may play in the overall stability of the marine ecosystem. However, the stock management advice resulting from the stock assessment shows explicit ecosystem consideration, in particular in determining the reference points used as part of the HCR. Saithe prey upon a variety of fish and invertebrate species and, in turn, are prey to larger species such as seals, toothed whales and possibly even some baleen whales (sei whale: sei = saithe). Thus, they have their part to play but there is no evidence that they are a keystone link within the system nor are they considered a low trophic species. The Marine Resources Act makes it an explicit requirement that an ecosystem approach is taken to all aspects of marine resource management. It is highly unlikely therefore that the fishery at the current level will disrupt ecosystem structure or function.

Challenges and solutions to meeting PI 2.5.1

A key hindrance to meeting this PI in developing countries is likely to be the lack of evidence available to support scoring. The ability to address this constraint may in turn be influenced by a lack of resources or expertise required to undertake ecosystem modelling exercises. In order to have a good understanding of ecosystem balance and dynamics there is an implicit requirement to have a record of changes in status of key species and habitats and any other relevant parameters/indicators within the ecosystem over a number of years. This would suggest that some rudimentary stock assessment has been undertaken on other key species within the ecosystem. Where comprehensive data is unavailable the RBF can be used.

Example actions to improve performance for PI 2.5.1

Process Chronology				Management Actions	
1	2	3	4	Example action	Scoring issue
●				Review the current level of knowledge of key species within the ecosystem and trophic relationships.	(a)
●				Consider the direct and indirect impacts of the fishery (including cumulatively) on the ecosystem structure and function.	(a)
●				Where supporting evidence is lacking but the perceived impacts are low, it may be prudent to undertake a stakeholder consultation exercise (as would be undertaken as part of a SICA scoring exercise) to ensure widespread stakeholder agreement on the low level of perceived impact.	(a)
	●			Where a need is identified, develop a proposal for a simple ecosystem modeling exercise.	(a), 2.5.3
	●			Where a need is identified, develop a proposal for further studies on the direct and indirect impact of the fishery on the ecosystem.	(a), 2.5.3
	●			Implement data collection program for any parameters that may be used as proxies to inform managers about ecosystem health.	(a), 2.5.3
		●		Give consideration to the ecosystem role of the target species and the wider ecosystem impacts (both direct and indirect) in the setting of fishing opportunities.	(a), Principle 1, 2.5.3
		●		Ensure that the Fishery Management Plan gives due consideration to the direct and indirect impacts of the fishery on ecosystem aspects	(a), 2.5.2
			●	Design on-going monitoring requirements to ensure changes in ecosystem balance over time are captured and to ensure that any mitigation measures implemented are achieving their objectives.	(a), 2.5.3
			●	Undertake more refined and ecosystem modeling and seek to move management toward an ‘Ecosystem Based Approach to Fisheries Management’.	(a), 2.5.2

Notes

2.5.2 Ecosystem management strategy

Performance Indicator overview

PI 2.5.2 requires that there is management in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function. Scoring issues focus on the degree to which measures are combined into an effective overall strategy, the level of implementation and the likelihood of success.

In some cases the management measures in place to manage the impact of the fishery on other components (such as target catch controls, spatial management or gear selectivity) may also be included for consideration under this PI – where it can be demonstrated that these contribute to safeguarding long term ecosystem balance. However it is likely that for many fisheries there may need to be further evidence of explicit consideration of ecosystem functionality in management decision-making. In particular, in order to be considered as a strategy (as opposed to simply measures) it is likely that there should be evidence of a dedicated management feedback response, which demonstrates that appropriate ecosystem information (scored under the next PI) is being used by management to shape decisions and tailor management measures accordingly. Where management is aware of gaps in understanding, it should be demonstrated that research is tailored to address management needs.

It may be that management of ecosystem impacts may be the responsibility of a different department than the one responsible for commercial fisheries. If so, it should be demonstrated that the management efforts are cohesive and compatible. Voluntary management measures may also contribute to this PI, such as industry Codes of Conduct, education or training program or voluntary reporting. In order for these to receive credit it must be demonstrated that they are functioning as intended.

Three scoring issues are considered under this PI:

(a) Management strategy in place

(b) Management strategy evaluation

(c) Management strategy implementation

Scoring issue (a) – Management strategy in place

The first scoring issue rates the extent of the management that is in place to address ecosystem impacts and the degree to which measures are strategically combined to specifically address ecosystem impacts.

Scoring issue	SG60	SG80	SG100
(a) Management strategy in place	There are **measures** in place, if necessary which take into account the **potential impacts** of the fishery on key elements of the ecosystem.	There is a **partial strategy** in place, if necessary, which takes into account **available information and is expected to restrain impacts** of the fishery on the ecosystem so as to achieve the Ecosystem Outcome 80 level of performance.	There is a **strategy** that consists of a **plan**, in place which contains measures to **address all main impacts of the UoA** on the ecosystem, and at least some of these measures are in place.

Good practice

Good practice requires that a fishery, regardless of how benign their impact, has a strategy (i.e. a focussed, cohesive and strategic arrangement) to address all of the fisheries impacts on the ecosystem.

What certifiers check

Certifiers will consider this scoring in the context of scores and justification provided in relation to removal of target stocks (P1) and the impact on other species and habitats (P2) to determine the degree to which further ecosystem-specific addition management is necessary. Certifiers will also look for evidence of specific ecosystem management such as:

- Evidence of management referring to ecosystem indicators in setting fishery rules.
- Evidence of management considering indirect ecosystem consequences of the fishery and shaping controls to mitigate these.
- Evidence of explicit ecosystem objectives, included in the management plan (discussed further in P3).
- Evidence of explicit ecosystem consideration in stock assessment and advice.
- Evidence of management tailoring future research needs to include addressing gaps in ecosystem understanding.
- Industry codes of conduct, relating to minimising environmental impact.
- Additional measures taken by industry or management to safeguard the ecosystem.
- Ecosystem status reports, indicating state of knowledge on ecosystem health, threats and proposed management.
- Ecosystem model – which is referred to by management in taking fishery decisions.

Scoring issue (a) – Management strategy in place

Key questions to determine if further action is needed

Q Is there any ecosystem-specific management in place?

Q Do the measures in place to address impacts of the fishery on target species (P1) and habitats and other species (P2) collectively fully address the need for ecosystem management?

Q Is the ecosystem where the fishery occurs subject to specific data collection, analysis and review and does this in turn influence management decision-making?

Q Is there a requirement within the management framework, or management plan, to give consideration to ecosystem effects in setting fishery-specific rules?

Examples of scoring rationales

Scoring issue (a)	Fishery Example
SG60	*Sardine purse seine fishery:* There are measures in place, or available to managers, that take into account potential impacts of the sardine fishery on key elements of the ecosystem (e.g. the size composition of the catch is monitored, fishing areas can be closed if certain set limits are reached, other areas are closed to fishing). However, the fishery does not achieve a higher score because these measures are not combined into a strategy (or partial strategy) to restrain impacts of the fishery on the ecosystem.
SG80	*Shrimp demersal trawl fishery:* The partial strategy comprises many measures which combine to limit ecosystem impact. These include the shrimp fishery management plan, the on-board Code of Practice (CoP), VMS monitoring of fishing effort, mandatory reporting to the fishery department of shrimp (target) and other catch, inspection, control and enforcement, the mandatory use of turtle excluder devices; as well as the strategy to reduce bycatch of fish through use of bycatch reduction devices.
SG100	*Cockle hand rake fishery:* The fishery is principally managed with regard to ecosystem components. Appropriate assessments (of ecosystem impact) are used as the primary basis for setting limits for cockle removal, to ensure adequate ecological food reserves. The fishery is managed through a fishery management plan and annual conditions set by national permit and provincial license, as well as a long term agreement in certain areas. The catch limit is set differently in different areas but the emphasis is on limiting ecological impact. Catch varies from just 2.5% of harvestable cockle stock (with an average of 1.1% taken across 5 year period) to a management approach which only opens the fishery when a minimum level of food resource (5,000 tonnes of cockle meat) is available for birds. Annual counts of birds ensure that catch limits remain appropriate.

Scoring issue (b) – Management strategy evaluation

The second scoring issue of the ecosystem management PI examines the likelihood that management will work and the degree to which this has been demonstrated objectively or through testing.

Scoring issue	SG60	SG80	SG100
(b) Management strategy evaluation	The **measures** are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar UoAs/ecosystems).	There is **some objective basis for confidence** that the measures/partial strategy will work, based on some information directly about the UoA and/or the ecosystem involved.	**Testing** supports **high confidence** that the partial strategy/strategy will work, based on information directly about the UoA and/or ecosystem involved

Good practice

Good practice requires that a fishery demonstrate that something more than general theory and plausible argument are being used to justify ecosystem management measures. There would need to be at least objective (i.e. empirical) reasons but ideally the measures would have been subject to full testing.

What certifiers check

Certifiers will look for the following types of information.

- Evidence of testing of proposed management measures – such as ecosystem modelling.
- Evidence of dedicated impact assessments for management policy.

Scoring issue (b) – Management strategy evaluation

Key questions to determine if further action is needed

Q Does management subject proposed decisions to ecosystem modeling, or some form of ecological impact assessment to ensure that there are no unintended impacts on the ecosystem?

Q Are ecosystem management measures/strategies objectively tested in any other way?

Q Are there any systems for review of ecosystem health, perhaps at a regional level, which identifies which management measures are in place, how these are working, and what future requirements may be?

Examples of scoring rationales

Scoring issue (b)	Fishery Example
SG60	*Mulloway, Pike and Mullet gillnet, handline and set net fishery:* The management uses reference points that are derived from catch history, and while this is suitable for the purposes of maintaining fishery production, they are not constructed to be directly applicable indicators of lake ecosystem structure and function. While some of the measures (such as constraints on gear type and locations of fishing) are likely to work in respect of habitat impacts and ETP and bycatch species (to the level consistent with SG60) the measures for stock management of target species do not form a cohesive strategy that will considers the relative balance of species within the lake, it gives inadequate consideration to predator prey relationships (and so do not fully meet SG80). There is scientific evidence which points to the potential for reduced resilience, and possible risks associated with maintaining some of these fish populations with truncated population structures in this ecosystem.
SG80	*Shrimp demersal trawl fishery:* Effort reductions through reductions in license numbers have added to the security of the shrimp resource and on-going CPUE controls are likely to provide some safeguard in the context of the role of shrimp in the food web and its function as a prey species for many other aquatic species. Closed areas or Marine Protected Areas are established and effective tools for controlling many potential impacts of fishing by protecting vital or vulnerable habitats, nursery areas and feeding grounds. In combination, these factors provide objective basis for confidence that the partial strategy will work.
SG100	*Mackerel pelagic trawl:* Ecosystem considerations play an important part of the management strategy for mackerel stock as considered and provided by the work of independent stock assessment scientists. The management strategy is informed by this scientific advice and addresses the main potential ecosystem impacts of the fishery. The scientific advice makes use of available knowledge on such topics as food chain functioning and functional component relationships within the pelagic ecosystem. The management strategy is considered highly likely to work and is supported by a regulatory regime that underpins the scientific rationale. It is likely that existing regulations are effective at ensuring that the operation of the fishery does not pose serious or irreversible harm on the pelagic and wider oceanic ecosystem. The rigorous scientific input into the management strategy and continual evolution of the fishery management plan to address ecosystem impact as well as its successful implementation means that SG100 is met.

Scoring issue (c) – Management strategy implementation

The final scoring issue in relation to ecosystem management seeks to confirm that management described earlier in the same PI is being implemented as intended. And that the stated management approach is indeed shaping operations and outcomes.

Scoring issue	SG60	SG80	SG100
(c) Management strategy implementation		There is **some evidence** that the measures/ partial strategy is being **implemented successfully**.	There is **clear evidence** that the partial strategy/ strategy is being **implemented successfully and is achieving its objective as set out in scoring issue (a)**.

Good practice

Good practice requires that the management is being implemented and seen to be achieving its aims. This implies that not only has the management been put in place, but that it is shaping operations and decision-making and that there is some evidence to demonstrate this.

What certifiers check

Evidence of implementation may come from stakeholder consultations. For example, are enforcement officers, environmental NGOs or other potentially affected sectors satisfied that the Management strategy that may exist on paper, is implemented as intended on the ground. In addition the following documents may provide further evidence:

- Records of inspections/enforcement of any measures included in the ecosystem management strategy.
- Evidence from stock assessments/advice demonstrating that ecosystem considerations are shaping management decision-making.
- Evidence that any voluntary measures at the fleet level are being carried out – i.e. completed logbooks, or inspection records.
- Evidence that focused research in support of ecosystem management has taken place.
- Reviews or evaluations of ecosystem management measures – indicating the efficacy of past management.
- Independent observer reports.

Scoring issue (c) – Management strategy implementation

Key questions to determine if further action is needed

Q Are all of the management measures/strategies that have been described earlier in the PI fully in place?

Q Is there evidence that can be presented to the certifiers to confirm that the measures are fully implemented?

Q Have ecosystem management measures been in place for several years and does this enable the results of these measures to be clearly indicated?

Q Is there agreement among stakeholders that the ecosystem management measures/ strategies are functioning as intended?

Q Where the fleet has undertaken to do additional voluntary measures is it possible to demonstrate that this is actually happening?

Examples of scoring rationales

Scoring issue (c)	Fishery Example
SG60	No scoring guidepost at the 60 level.
SG80	*Cod demersal trawl fishery:* Monitoring of stock status indicates relative stability in recent years. Monitoring of VMS provides evidence of implementation of measures within the partial strategy, such as closed areas and effort control. The license also provides evidence of implementation of fishing day's limitation. Other aspects of the partial strategy are also implemented and evidenced by inspections such as gear modifications.
SG100	*Herring purse seine fishery:* There is evidence that the strategy is being implemented and enforced successfully. The main aspect of the strategy is the setting of catch limits based primarily of safeguarding ecosystem elements. The ecosystem appropriate assessments provide a clear evidence of implementation, as do the records of compliance with those catch limits. The fishermen interviewed during the site visit were well informed about all measures in place. Inspections at sea, at the point of landing and in factories provide evidence of compliance/implementation.

Challenges and solutions to meeting PI 2.5.2

Formal consideration of ecosystem management and formal adoption of ecosystem based approaches to fisheries management is a comparatively new concept. Even in well-developed fishery management systems with excellent scientific resources and capacity genuine ecosystem based approaches to management are in their infancy. Empirically robust ecosystem models can be complex and therefore require considerable expertise and can be expensive. Evidence of ecosystem change or evidence of a fishery impacting on the ecosystem require good datasets with reasonable time series. A lack of reliable baseline may compromise efforts to determine the degree of ecosystem change.

None the less it is possible for management to demonstrate a commitment to ecosystem objectives, by giving explicit consideration to potential ecosystem consequences of management actions. It may also be possible to tailor data collection and research to help inform management consideration of ecosystem impacts in the future. This PI does not automatically require complex science, expensive data collection or sophisticated modelling, but it does require that management gives sensible and explicit consideration of ecosystem functionality in the operations of the fishery.

Example actions to improve performance for PI 2.5.2

Process Chronology				Management Actions	
1	2	3	4	Example action	Scoring issue
●				Review the current measures that are in place which may contribute to safeguarding ecosystem balance and trophic relationships. Consider whether these are sufficient and whether these may be combined into a formal strategy.	(a), (b)
●				Review the current fishery management regulations and fishery management decision-making processes to identify where there is scope to increase explicit consideration of the ecosystem?	(a), (b)
●				Review impacts of the fishery on the ecosystem to determine whether there are any indirect or cumulative impacts of the fishery on the ecosystem which are not addressed by the management system.	(a), (b)
	●			Where necessary, develop data collection, monitoring, scientific study and modeling to address any gaps identified in step 1.	(a)
	●			Develop ecosystem objectives, which are well defined and measurable, and include these in the fishery management plan. These should be fully consulted on with industry and other stakeholders.	(a)
	●			Implement ecosystem management proposals and ensure control is in place to ensure compliance with newly adopted measures/strategies.	(c)
		●		Over time move toward a greater (and more empirically supported) adoption of the Ecosystem Approach to Fisheries Management. Where possible incorporate trophic models into the assessment of stock status and demonstrate that the levels of fishery exploitation are not simply target-oriented management approaches.	(a)
	●			Consider whether there are additional measures that could be undertaken by the fleet to safeguard the ecosystem.	(b), (a)
		●		Design on-going monitoring requirements to ensure changes in ecosystem balance over time are captured and to ensure that any mitigation measures implemented are achieving their objectives.	(c)
		●		Undertake periodic review and evaluation of the performance of ecosystem management measures/strategies to ensure they remain adaptive and provide objective basis for confidence.	(b)

Notes

Notes

2.5.3 Ecosystem information

Performance Indicator overview

The final PI of Principle 2 focuses on ecosystem information. This requires that there is adequate understanding of:

- the elements of the ecosystem and their function.
- the impacts of the fishery on the ecosystem.
- the ecosystem role of the other P1 and P2 components (i.e. target species, primary and secondary species, ETP species and habitats).
- the impact of the fishery on those components and the consequential impact on the ecosystem.

The FCR indicates that at the SG100 level it is expected that the fishery management system should be capable of adapting management to environmental changes as well as managing the effect of the fishery on the ecosystem. In addition, monitoring the effects of environmental change on the natural productivity of species and habitats should be considered good practice and should include recognition of the increasing importance of climate change.

Above all, information which is collected about the ecosystem should provide the management system with all the information that it requires to ensure that the impacts of the fishery and proposed changes to fisheries policy or regulation can be fully understood.

Five scoring issues are considered under this PI:

(a) Information quality

(b) Investigation of UoA impacts

(c) Understanding of component functions

(d) Information relevance

(e) Monitoring

Scoring issue (a) – Information quality

The first scoring issue examines the state of knowledge of the ecosystem (without reference to the fishery).

Scoring issue	SG60	SG80	SG100
(a) Information quality	Information is adequate to **identify** the key elements of the ecosystem.	Information is adequate to **broadly understand** the key elements of the ecosystem.	

Good practice

Good practice requires that the ecosystem information is sufficient to enable the key elements of the ecosystem to be broadly understood.

What certifiers check

Certifiers will look to see evidence of information describing the ecosystem in which the fishery operates.

- Any published ecosystem descriptions.
- Any ecosystem summaries, which combine descriptions of species, trophic levels and habitats.
- Any reviews of changes in the ecosystem over time, which may provide an indication of the key elements of the ecosystem.
- Any species lists or guides (both flora and fauna) for the area where the fishery operates.

Scoring issue (a) – Information quality

Key questions to determine if further action is needed

Q Is there good understanding of all the species in the area of the fishery?

Q Is there a good understanding of the fauna and habitat forming species in the area of the fishery?

Q Is there spatial understanding of the ecosystem functionality of different areas (spawning, nursery or feeding areas).

Q Is there understanding of which species are the key predators, which are the key prey and any keystone species?

Q Is there an understanding of the trophic relationships that exist between the key species in the ecosystem?

Q Is there an understanding of ecosystem variations and the possible impacts of climate change on the ecosystem?

Examples of scoring rationales

Scoring issue (a)	Fishery Example
SG60	*Groundfish trawl fishery:* The ecological role of the target species has been the subject of a targeted study and this indicates that the key element of the ecosystem is the impact of prey removal on trophic relationships. Trophic structures have not been studied in this area, but studies in nearby continental shelf areas are adequate to provide a general picture of trophic relationships in the fishery area. With respect to general ecosystem issues, sizes of groundfish are monitored annually and there have been no indications of significant long-term shifts to smaller size.
SG80	*Sardine purse seine fishery:* It is considered that there is adequate information to broadly understand the key elements of the ecosystem. This includes information on stock structure and abundance, stock interactions and trophic structure for the pelagic ecosystem and extensive information in relation to the ecosystem (e.g. oceanography, physico-chemistry, habitats, community structures and relationships).
SG100	No scoring guidepost at the 100 level.

Scoring issue (b) – Investigation of UoA impacts

The second scoring issue on ecosystem information assesses the state of knowledge of the impacts of the fishery under assessment on the key elements described in the previous scoring issue (a).

Scoring issue	SG60	SG80	SG100
(b) Investigation of UoA impacts	Main impacts of the UoA on these key ecosystem elements can be inferred from existing information, but **have not been investigated** in detail.	Main impacts of the UoA on these key ecosystem elements can be inferred from existing information, and **some have been investigated in detail.**	Main interactions between the UoA and these ecosystem elements can be inferred from existing information, and **have been investigated in detail.**

Good practice

Good practice requires that the impacts of the fishery on the key ecosystem elements have been investigated.

What certifiers check

The focus of this scoring issue is on the degree of investigation of fishery impacts. Therefore certifiers are likely to speak with members of the scientific or academic community to learn about past research in the area of fishery impacts on the ecosystem. Ideally this would be supported by the following documentary evidence:

- Published research on fishery impacts in the area of the fishery.
- Applicable studies from other fisheries in similar ecosystems.
- Unpublished academic or government research investigating impacts of the fishery on the ecosystem.
- Modelling outputs which enable the impacts of the fishery on other key elements of the ecosystem to be inferred.

Scoring issue (b) – Investigation of UoA impacts

Key questions to determine if further action is needed

Q Has government research or local academic research investigated the impacts of the fishery on the key elements of the ecosystem?

Q Are there any other sources of information that enable the impacts of the fishery on key elements of the ecosystem to be inferred?

Q Does ecosystem modeling work enable the impacts of the fishery on key ecosystem elements to be inferred?

Examples of scoring rationales

Scoring issue (b)	Fishery Example
SG60	*Lobster trap fishery:* Traps are among the least impacting gear on both the habitat and other species and modelling of the rocky coastal ecosystem, suggests that even for exploited lobster populations, predation and competition are stronger stressors than current fishing effort, however, this has not been investigated in detail, so an accurate assessment of the impact of the fishery on this element is not available.
SG80	*Mussel dredge fishery:* The main impacts of hand dredging on key ecosystem elements are understood. The key elements are considered to be direct impacts to habitats (eelgrass, mussel beds), direct disturbance to ETP species (seals and birds) of steaming vessels including transport ship and removal of food source for birds (oystercatcher and common eider). The impact to birds with regard to ecological food requirements have been investigated in detail and are the principle consideration in the management of the fishery.
SG100	*Crab trap and pot fishery:* Key features of the ecosystem are well known. Crab prey on a wide variety of benthic species, primarily shrimp, starfish, sea urchins, worms, molluscs, etc. Smaller and especially soft-shell crabs are preyed upon by a variety of groundfish species as well as seals. Large, hard-shell male crabs targeted by the fishery are not known to be an important prey item for any species. As part of a broader focus in support of ecosystem based management, initiatives to identify ecologically and biologically significant as well as sensitive benthic areas and to identify and evaluate areas of interest for possible MPA designation, provide detailed knowledge and understanding of the various components of the ecosystem and their functions. The area has been the focus of intense ecological research. There has been no indication that the crab fishery causes any disruption of key elements of the ecosystem.

Scoring issue (c) – Understanding of component functions

The third scoring issue of the ecosystem information PI assesses the degree to which the ecosystem functions of the other P1 and P2 components (i.e. target, primary, secondary and ETP species and habitats) are understood.

Scoring issue	SG60	SG80	SG100
(c) Understanding of component functions		The main functions of the components (i.e. P1 target species, primary, secondary and ETP species and Habitats) in the ecosystem are **known**.	The impacts of the UoA on P1 target species, primary, secondary and ETP species and Habitats are identified and the main functions of these components in the ecosystem are **understood**.

Good practice

Good practice requires that not only are the ecosystem functions of the other P1 and P2 components understood, but that the impact of the fishery on these are identified.

What certifiers check

- Any published ecosystem descriptions.
- Any ecosystem summaries, which combine descriptions of species, trophic levels and habitats.
- Evidence of components (i.e. target, primary, secondary and ETP species and Habitats) function in ecosystem descriptions.
- Evidence of components (i.e. target, primary, secondary and ETP species and Habitats) function in ecosystem models.
- Impacts of the fishery on components (this is likely to have already been described earlier in P1 and P2).

Scoring issue (c) – Understanding of component functions

Key questions to determine if further action is needed

Q Are the species described in P1 and earlier in P2 (both flora and fauna) all included in an ecosystem description?

Q Is the contribution of the suite of species affected by the fishery to ecosystem structure and function fully understood?

Examples of scoring rationales

Scoring issue (c)	Fishery Example
SG60	No scoring guidepost at the 60 level.
SG80	*Cod demersal trawl fishery:* The main functions of ecosystem components are known, though not in detail for some species. Diet studies have been integral to the development of this knowledge.
SG100	*Hake demersal trawl fishery:* The area in which the fishery operates has been the focus of intense ecological research. Several initiatives have been undertaken as part of a broader focus in support of ecosystem based management. These include initiatives to identify ecologically and biologically significant as well as sensitive benthic areas and to identify and evaluate areas of interest for possible MPA designation, and to provide detailed knowledge and understanding of the various components of the ecosystem and their functions.

Scoring issue (d) – Information relevance

The fourth scoring issue of in relation to ecosystem information seeks to ensure that the information of the impacts of the fishery on the components described earlier in P1 and P2 (i.e. target, primary, secondary and ETP species and Habitats) is sufficient to allow the consequential impacts on the ecosystem to be inferred.

Scoring issue	SG60	SG80	SG100
(d) Information relevance		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 information is available on the impacts of the UoA on the components **and elements** to allow the main consequences for the ecosystem to be inferred.

Good practice

Good practice requires that there is at least adequate information to allow 'the main' consequences for the ecosystem to be inferred.

What certifiers check

Certifiers are likely to review the information already presented in relation to the information PIs for the other P1 and P2 components (i.e. target, primary, secondary and ETP species and Habitats) to determine whether this includes consideration of their ecosystem role and whether in turn this is sufficient for the ecosystem consequences of the impacts of the fishery on these components to be inferred.

- Any published ecosystem descriptions.
- Any ecosystem summaries, which combine descriptions of species, trophic levels and habitats.
- Evidence of components (i.e. target, primary, secondary and ETP species and Habitats) function in ecosystem descriptions.
- Evidence of components (i.e. target, primary, secondary and ETP species and Habitats) function in ecosystem models
- Impacts of the fishery on components (this is likely to have already been described earlier in P1 and P2).

Scoring issue (d) – Information relevance

Key questions to determine if further action is needed

Q Is the information available on the impacts of the fishery on components (i.e. target, primary, secondary and ETP species and Habitats) sufficient that the ecosystem consequences of those impacts may also be inferred?

Q Are there any studies or research that looks at the impacts on the overall ecosystem caused by the fishery impact on target, primary, secondary and ETP species or Habitats?

Q Has the ecosystem consequences of any habitat loss caused by the fishery been assessed?

Q Have the knock-on ecosystem consequences of the removal of species (whether target, primary, secondary or ETP) been modelled?

Examples of scoring rationales

Scoring issue (d)	Fishery Example
SG60	No scoring guidepost at the 60 level.
SG80	*Albacore tuna purse seine fishery:* Information from the observer program and the logbooks allow the major consequences for the ecosystem to be inferred. The model developed for this albacore tuna population has also indicated the changes that may have occurred as a result of population trends in different tuna species and their inter-relationships, which allows the impacts of the fishery on components to be examined, although this analysis has not yet been specifically performed.
SG100	*Crab trap fishery:* There have been significant efforts to document impacts associated with all fishing activity and to implement measures to mitigate negative impacts where possible. The southern fishing area in particular has been the focus of intense ecological research. And, as part of a broader focus on the ecosystem, initiatives have been undertaken to identify ecologically and biologically significant as well as sensitive benthic areas and to identify and evaluate areas of interest for possible MPA designation. The components of the ecosystem (and the elements within these) and their functions are known well enough to understand the consequences of fishing.

Scoring issue (e) – Monitoring

The final scoring issue in relation to ecosystem information examines the degree of on-going monitoring and requires that data 'continue to be collected'. This focuses on ensuring that future changes to the ecosystem attributable to the fishery would be reflected in future data collection exercises.

Scoring issue	SG60	SG80	SG100
(e) Monitoring		Adequate data continue to be collected to detect any increase in risk level.	Information is adequate to support the development of strategies to manage ecosystem impacts.

Good practice

Good practice requires continued collection of information adequate to give management good feedback response.

What certifiers check

Certifiers would seek to get an understanding of the on-going data collection programs that are in place, both for the fishery and the ecosystem to ensure that future impacts of the fishery on the ecosystem would not go unobserved.

- A list of routine ecosystem sampling requirements.
- Ecosystem specific work included in research plans.

Scoring issue (e) – Monitoring

Key questions to determine if further action is needed

Q Is the information collected adequate to inform management about whether ecosystem management efforts are working or not?

Q Would future changes in the ecosystem, in particular those changes caused by the fishery, be identified in routine data collection programs?

Q Do the ecosystem elements of the fishery management plan specify the data that should be collected in relation to the ecosystem?

Q Where ecosystem objectives expressed in the management plan are 'well defined and measurable', is data being collected to enable the progress against these objectives to be measured?

Examples of scoring rationales

Scoring issue (e)	Fishery Example
SG60	No scoring guidepost at the 60 level.
SG80	*Hoki trawl fishery:* Monitoring of hoki catch (including target catch, and all other species) by fisheries observers, as well as vessel-based reporting of the main species caught continue as part of the fishery management regime. Monitoring of ETP species captured is also part of ongoing management. Fishing practices are also documented to varying degrees of detail (e.g. tow location, date, and gear type). Annual research trawl surveys (unrelated to fishing vessel activities) continue. Together, these data are expected to be sufficient to detect increased risks of fishing to ecosystem components. The ongoing research priorities relevant to the hoki fishery are reported to the Ministry of Fisheries.
SG100	*Mussel dredge fishery:* Data is routinely collected on an ongoing basis to allow for the detection of any change or increase in risk level to the main ecosystem components. These data include landings data, effort data, spatial data in relation to habitats and species distributions and annual bird counts. These data have been and continue to be crucial in the development of strategies to manage the fishery. These data are used to determine whether and to what extent the fishery is open. These data also enable the impact of the management regime of a wide range of ecosystem components, such as seal haul out/breeding areas, bird feeding/breeding/overwintering areas and eelgrass and mussel reef habitat to be considered.

Challenges and solutions to meeting PI 2.5.3

Part of the challenge for developing countries in addressing this PI will be in availability of data to understand and manage ecosystem impacts. There may be challenges understanding what information should be collected. Perhaps a simple summary would be that information should provide an understanding of the ecosystem and that adequate information should also be collected for any possible impacts of the fishery (whether direct or indirect) to be understood. Primarily, certifiers will look to ensure that there is adequate ecosystem information available to managers to inform their decisions and that this is appropriate to the scale and intensity of the fishery.

If there is a challenge in obtaining information about the direct impacts of the fishery on target stock, habitats, primary, secondary and ETP species (as discussed in earlier PIs) then it is likely that going a step further to infer the ecosystem consequences of these impacts is likely to present a still greater challenge. Similarly, if there is a challenge in presenting an ecosystem description which captures key elements and components, then it is likely to be a further challenge to capture the roles and functional relationships that are present and the potential fishery impact upon those roles.

In both cases this goes a step further than simple collection of information of a direct impact. It requires that information is used to help shape understanding of the ecosystem, its key elements and the roles of the components within the ecosystem. At its most literal, this would imply a fairly complex and sophisticated level of ecosystem data collection, analysis and modelling (i.e. expensive and requiring considerable scientific capacity), but certifiers are likely to take a more practically minded interpretation and seek to verify that where it is reasonably possible to collect and use ecosystem information, then this is done.

Example actions to improve performance for PI 2.5.3

Process 1	Chronology 2	3	4	Management Actions: Example action	Scoring issue
●				Review the current information that is available or that is collected in relation to ecosystem balance and trophic relationships. Consider whether this is adequate to understand the fisheries impact on the ecosystem?	(a), (b)
●				For each key element or key component of the ecosystem, review the degree to which it's role in the ecosystem is understood.	(c)
	●			Consider the types of information that would need to be collected in order to get a complete understanding of ecosystem changes over time? Seek practical and cost-effective means of undertaking this data collection.	(a), (b), (c), (d), (e)
	●			Examine how data collected on impacts of the fishery on target stock, habitats, primary, secondary and ETP species can be used to infer ecosystem consequences.	(d)
		●		Plan for any future research or information collection as required, so that gaps in understanding can be addressed.	(a), (b), (c), (d), (e)
		●		Ensure all data gathering, monitoring or research is implemented as required, properly resourced and where necessary given regulatory backing.	(a), (b), (c), (d), (e)
		●		Consider the potential for unintended or indirect ecosystem impacts of the fishery and ensure that on-going research and data collection are adequate to identify these changes.	(a), (b), (c), (d), (e)
			●	Design on-going monitoring requirements to ensure changes in ecosystem balance over time are captured and to ensure that any mitigation measures implemented are achieving their objectives.	(e)

Notes

Notes

Principle 3 - Effective management

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

Overview of Principle 3 Performance Indicators

Principle 3 states that 'the fishery is subject to an effective management system that respects local, national and international laws and standards and incorporates institutional and operational frameworks that require use of the resource to be responsible and sustainable'.

The intent of Principle 3 is to ensure that there is an institutional and operational framework appropriate to the size and scale of the UoA for implementing Principles 1 and 2, and that this framework is capable of delivering sustainable fisheries in accordance with the outcomes articulated in these Principles.

There are two components in Principle 3. The 'governance and policy' component has three PIs (PI 3.1.1 – PI 3.1.3) which capture the broad, high-level context of the fishery management system within which the UoA is found.
The 'fishery specific management system' component has four PIs (PI 3.2.1 – PI 3.2.4) which focus on the management system directly applied to the fishery. For some fisheries this management system will include both national and international components.

3.1.1 Legal and customary framework

Performance Indicator overview

This first PI of Principle 3 provides the legal foundation for all subsequent P3 questions. It requires that a management system exists within an appropriate and effective legal and/or customary framework which ensures that it:

- Is capable of delivering sustainable fisheries in accordance with MSC principles 1 and 2
- Includes cooperation where stocks are shared
- Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood, and
- Incorporates appropriate dispute resolution frameworks.

The legal framework plays a key role in delivering sustainable fisheries by ensuring that rules or the general terms and conditions under which the fishery is managed are appropriate and adequate to ensure the on-going health of the fisheries resources and ecosystem. At its most basic, the legal framework should clearly define who can fish, where, when, for what species and under what conditions. However, the legal framework needs to also provide for a diverse range of other governance issues, such as where responsibility for management lies and the power of management, the monitoring of compliance, how other ecosystem commitments are adhered to and how stakeholders may engage with or appeal management.

Because of the international nature of many fisheries in terms of stock dynamics, fleet composition and markets, fisheries management has been the subject of international agreements for many years. For stocks which are shared between jurisdictions, straddling, highly migratory or those on the high seas, there is a clear requirement for international cooperation in management. Consequently, a number of international and regional instruments have been developed to lay down principles and rules for sustainable fisheries management which must be implemented at the national level. These may cover the collection and sharing of scientific data, the assessment of stock status, the development of advice and the establishment and delivery of management actions and monitoring and control. When considering the legal framework it is therefore important to consider all relevant jurisdictions.

The only fisheries which do not require this international element are those where the stock dynamics, fleet and market are not subject to international cooperation because the fishery is entirely within the internal waters, archipelagic waters or territorial sea of a sovereign state. An example would be a fishery that targeted a sedentary species found within a small coastal region, such as on the continental shelf. For these fisheries the focus of consideration will be on national legislative structures. For these fisheries, although the international dimension maybe less, there remains the same need for appropriate and adequate legal frameworks and often cooperation between locally devolved agencies and national agencies will become more important.

The important role that informal and traditional management systems sometimes play are also recognised by the MSC Standard where more formally documented management systems may be absent. These may exist as accepted norms that are established across the fishery, commonly held values or agreed rules across the fishing communities. Further guidance is provided within the MSC Standard in these circumstances.

Three scoring issues are considered under this PI:

(a) Compatibility of laws or standards with effective management

(b) Resolution of disputes

(c) Respect for rights

Scoring issue (a) – Compatibility of laws

The first scoring issue seeks to ensure that all the necessary legal frameworks required for effective management are in place.

Scoring issue	SG60	SG80	SG100
(a) Compatibility of laws or standards with effective management	There is an effective national legal system and a **framework for cooperation** with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2.	There is an effective national legal system and **organised and effective cooperation** with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2.	There is an effective national legal system and **binding procedures governing cooperation with other parties**, which delivers management outcomes consistent with MSC Principles 1 and 2.

Good practice

Fisheries that perform well under this PI have an effective national legal system. Where stocks are shared there is international cooperation or national cooperation between regional and national entities that is shown to be organised and effective and unequivocally binding. Such cooperation would generally involve collection and sharing of data, assessment of status of stocks and development of scientific advice.

What certifiers check

The range of documents certifiers will consult to find evidence of compliance with scoring issue (a) include:

- Fishery and relevant environmental legislation (Acts, Regulations) at all relevant jurisdictions – regional, national, international.
- Relevant international instruments and evidence of domestic implementation.
- Regional Fishery Management Organisations (RFMO) conservation and management measures.
- Fisheries policy documentation.
- Documents on fishery management arrangements, such as legal and policy research papers.
- Accepted norms, values and agreed rules held across the fishery.

Scoring issue (a) – Compatibility of laws

Key questions to determine where further action is needed

Q Does the legal framework include all tiers of jurisdiction required to deliver management outcomes?

Q Is the national management authority party to effective international cooperation as required?

Q Does the framework for cooperation include all relevant aspects of science, data collection, management rules and control and enforcement?

Q Is there appropriate engagement at the level of RFMO?

Q Are the rules that govern the fishery applicable to all vessels and to all areas where the species are targeted?

Q Do national legislation and implemented rules of operation comply with international agreements?

Q Are all relevant international instruments ratified and implemented and can this be demonstrated?

Q Are there traditional or informal practices and rules that are consistent with ensuring cooperation?

Examples of scoring rationales

Scoring issue (a)	Fishery Example
SG60	*Tropical sole gill net fishery:* The fishery (and the majority of catches) occur mainly within the jurisdiction of a single country. The majority of management occurs at this national level within the clear framework of an appropriate national legal system. All decisions over licencing, stock management and regulations occur at this level. However, the stock boundaries are thought to extend into a neighbouring counties EEZ, at least at certain times of the year, where it is believed that some artisanal catches occur. Although in the past there have been some efforts to cooperate with the neighbouring country and the artisanal fleet representatives on the management and to obtain accurate landings information, this process has not been regular or formalised and there is the obvious potential to make this engagement and cooperation more organised and effective.
SG80	DFPO Denmark North Sea Sole (Certified 2012): It was concluded that there was an effective legal framework, both nationally and within the European Union's Common Fisheries Policy. However, a weakness was highlighted within the management system, relating to the lack of international binding procedures to agree catch allocations in some fisheries with other non-European Union member states (e.g. Norway and Iceland).

Scoring issue (a) – Compatibility of laws

Examples of scoring rationales – *continued*

Scoring issue (a)	Fishery Example
SG100	Tristan da Cunha rock lobster (Certified 2011): There is no need for binding procedures with other parties as the fishery takes place entirely within the territorial waters of this isolated nation. There is a full and effective national legal system.

Scoring issue (b) – Resolution of disputes

The intent of the second scoring issue is to ensure that there are appropriate and effective dispute resolution mechanisms, within the legal framework and that these exist at all relevant levels – fleet, regional, national and international.

Scoring issue	SG60	SG80	SG100
(b) Resolution of disputes	The management system incorporates or is subject by law to a **mechanism** for the resolution of legal disputes arising within the system.	The management system incorporates or is subject by law to a **transparent mechanism** for the resolution of legal disputes which is **considered to be effective** in dealing with most issues and that is appropriate to the context of the UoA.	The management system incorporates or is subject by law to a **transparent mechanism** for the resolution of legal disputes that is appropriate to the context of the fishery and has been **tested and proven to be effective.**

Good practice

High performing fisheries have dispute resolution mechanisms at all jurisdictions that are relevant to the scale of the fishery (e.g. fleet level, national and international) and the dispute resolution mechanism is transparent and proven appropriate and effective.

What certifiers check

Stakeholder meetings will often be a key source in informing the scoring of this scoring issue to determine the extent that stakeholders are aware of any dispute resolution process. Hypothetical questions may also inform the considerations (e.g. what would happen if.....). Certifiers may also wish to consult the documentation at all jurisdictions relevant to the fishery, to determine whether mechanisms for resolving disputes are explicitly outlined. The following documents may contain reference to dispute resolution processes:

- Fisheries legislation.
- Bilateral or multilateral fisheries agreements.
- RFMO rules and policy documents.
- Documents on fishery management arrangements, such as legal and policy research papers.

Scoring issue (b) – Resolution of disputes

Key questions to determine where further action is needed

Q Are dispute resolution mechanisms in place at all relevant jurisdictions?

Q Are informal or traditional mechanisms for dispute resolutions in place?

Q Are dispute resolution mechanisms appropriate to address all disputes that may be likely to occur?

Q Are all parties signed up to the dispute resolution mechanisms, such that the outcome of any process would be binding (i.e. considered effective)?

Q Are there examples of disputes being resolved through this process?

Q Is the process transparent? For example, is it possible to review past findings in previous disputes?

Examples of scoring rationales

Scoring issue (b)	Fishery Example
SG60	UK Fisheries (DFFU & Doggerbank) Arctic Cod & Haddock (Certified 2012): Although within the fishery management system and the national legal framework there are effective dispute resolution mechanisms, the scoring focused on the Units of Certification which take place in the Svalbard Fisheries Protection Zone. These were scored at SG60 for this scoring issue because of a dispute over perceived irregularities in the way regulations apply to different nationalities. It is argued that this is contrary to the stipulations of the Paris Treaty and in spite of the matter being raised by EU Delegation in Oslo with the Norwegian Ministry of Foreign Affairs, this potential dispute had not been effectively resolved.
SG80	Sian Ka'an and Banco Chinchorro Biosphere Reserves Spiny Lobster (Certified 2012): An appropriate dispute resolution framework is provided through a full-scale judicial system. Sanctions by authorities for failures to comply with the law and its subsidiaries have to meet the requirements of the Federal Law of Administrative Procedure. The mechanism for the resolution of legal disputes is appropriate to the context of the fishery, and the assessment team was not aware of any legal disputes. Nevertheless the assessment team did not find evidence that the system has been tested and proven to be effective.
SG100	Annette Islands Reserve Salmon (Certified 2011): Disputes trigger an appeal process through the US Bureau of Indian Affairs. Larger disputes involving management authorities of the State of Alaska and the Metlakatla Indian Community have been resolved through the US Federal Court system. Both processes have proven to be effective in clearly establishing authorities and frameworks for effective management.

Scoring issue (c) – Respect for rights

The intent of the third scoring issue is to ensure that the established rights of any indigenous or aboriginal groups or individuals dependent on fishing for either food or livelihood are fully recognised within the management system.

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

Good practice

Fisheries that perform well under this scoring issue have a system or means within management to ensure that the legal rights that have been established by custom or law for those dependent on fishing are observed.

Higher levels of performance require that these rights are not just demonstrated in practice but that they are explicitly codified in the binding rules of the fishery.

What certifiers check

Field observations and stakeholder meetings will often be a key source in informing the scoring of this scoring issue to determine the extent of established rights. In particular, certifiers may wish to speak with representatives of any groups dependent on fishing for food or livelihood.

Certifiers may also review relevant legislation and decisions of legislatures (through statutes or national treaties relating to aboriginal or indigenous people) or courts to determine if rights have been conferred on any particular group or individual and that there is a mechanism to implement such rights.

Scoring issue (c) – Respect for rights

Key questions to determine where further action is needed

Q Are the rights of any groups of aboriginal or indigenous people dependent on fishing for food or livelihood recognised in the fishery management system?

Q Are the established rights of any such groups or individuals formally recognised in treaties or other relevant legislation?

Q Have past court cases established relevant rights and if so, are these recognised in management?

Q Does the management system have an appropriate mechanism to acknowledge these rights?

Q Are there norms and practice across the fishery that is supportive of established rights?

Examples of scoring rationales

Scoring issue (c)	Fishery Example
SG60	*Lobster trap fishery:* Besides the lobster trap fishery there is an aboriginal group that is also known to periodically catch small quantities of the lobster in coastal waters. This aboriginal fishery has a long history. The national fishery authorities generally respect (and do not try to stop) this fishery so long as this activity does not appear to be overly commercial and so long as traditional catching techniques are employed. However, representatives of these communities are not actively engaged in the overall management process and the level of fishing mortality from this fishery is poorly understood. Aboriginal community representatives have expressed some concern that the lack of formal recognition within the management system for their fishery means there is a risk that their fishing activity could be restricted in the future.
SG80	Suriname Atlantic seabob shrimp (Certified 2011): The main indication of Respect for Rights is the continued importance given to the artisanal sector in Surinamese fisheries management and support for their representative at the top management table (i.e. the Suriname Fisheries Advisory Committee). In addition, a representative of the artisanal sector sits on the seabob working group. An inshore zone (<10 fathoms) is protected from any trawling activity and reserved for artisanal vessels. The introduction of compulsory VMS on trawl vessels was specifically to safeguard this inshore zone.
SG100	Fiji Albacore Tuna Longline (Certified 2012): The Western and Central Pacific Fisheries Commission (WCPFC) Convention provides for recognition of the interests of small scale and artisanal fishers within the overall framework for sustainability. This explicitly recognises the rights of artisanal and subsistence fishers and the dependence of coastal States and States fishing on the high seas on the stocks concerned. The Convention identifies as a function of the Commission, the development of criteria for the allocation of catch or effort. To date, the Commission has not allocated fishing rights but has sought and received external advice on allocation mechanisms and options.

Challenges and solutions to meeting PI 3.1.1

A number of challenges may be faced by developing countries in implementing an effective legal framework for sustainable fisheries, including the requisite elements of dispute resolution and respect for rights. These challenges, which would need to be addressed and also taken into account in assessing the performance of developing states in meeting MSC Fisheries Standard and requirements, include:

- Lack of updated legislation that takes into account modern international fisheries law and evolving requirements under regional fisheries management agreements.
- The slow and costly procedure for developing legislation in many countries, which does not allow for timely management intervention.
- Non-participation in regional fisheries management organisations.
- Non-ratification of relevant international instruments.
- Lack of domestic legislation implementing relevant international instruments.
- Limited awareness of international and regional fisheries obligations.
- Limited capacity at the national level to draft relevant fisheries legislation.
- Lack of transparency within established management systems.

In some countries unstable government, or major changes in government institutions or policy direction at the time of governmental change, may lead to a lack of continuity in fisheries policy, and increased potential for political decision-making. For example, there may be political resistance to restrict catch and effort, because of social, economic and political costs.

It is also important that the management framework is at an appropriate jurisdictional scale to the biology of the resource that it is being targeted. For example, highly migratory or transboundary fish stocks require multi-lateral management agreements. In order for this to happen there must be some scientific understanding of the stock population dynamics and some forum for international cooperation in the field of fisheries management and science.

Example actions to improve performance for PI 3.1.1

Process Chronology				Management Actions	
1	2	3	4	Example action	Scoring issue
●				Develop management requirements and criteria using international standards (i.e. FAO Code of Conduct for Responsible Fisheries)	(a)
	●			Review national legislation and management plans against criteria developed	(a)
	●			Where stock boundaries cross international limits, or for highly migratory species engage and participate in regional fisheries management organisations, cooperate on science and encourage multi-lateral fisheries management agreements.	(a)
		●		Undertake legislative modification.	(a)
		●		Ensure there are binding procedures in place (and signed up to) governing the management of shared resources and the resolution of disputes between parties.	(a), (b)
			●	Keep legislation under review every five years, at least.	(a)
	●			Review dispute resolution mechanisms at each relevant tier of the fishery management process	(b)
	●			Consult with industry on their understanding of dispute resolution processes.	(b)
	●			Develop or refine transparent appeals process/complaints procedure.	(b)
		●		Ensure appropriate dispute resolution is included in legislative updates	(b)
			●	Review efficacy of past dispute resolutions and transparency of process	(b)
	●			Review legislation, treaties and past court cases to determine rights recognition for those dependent on fishing for food or livelihood. Undertake structured interviews with affected parties.	(c)
		●		Ensure appropriate rights recognition is included in legislative updates, or draft dedicated treaties	(c)

Notes

3.1.2 Consultation, roles and responsibilities

Performance Indicator overview

Fisheries management has been shown to be more successful where the management system identifies and actively engages with all parties with an interest in the fishery, sometimes referred to as 'stakeholders'. Stakeholders may include people and organisations not directly related to fishery activities, but that interact with or have an interest in a fishery.

By effectively consulting with stakeholders at key stages in the management process, managers provide and obtain relevant information, and this helps to ensure that subsequent decisions are appropriate and that the process of decision-making is both transparent and well understood. If carried out effectively this should ensure that stakeholders are supportive (or at least understanding) of the management process, which may lead to an increased sense of stewardship and potentially increased compliance with fisheries laws and regulations. Effective consultation also assists management and stakeholders to adapt to changes in the fishery and is therefore recognised as a key aspect of sustainable fisheries management.

Additionally, successful fisheries management requires that the organisations and agencies involved in the fisheries management process, and ideally also the individuals within those bodies, are well known and that their roles and responsibilities are clearly understood by all stakeholders.

These roles and responsibilities may be identified within existing fisheries management legislation or more likely in the fishery management plan, which should identify the function of the management authority, its objectives and the interested parties, while clarifying their respective roles, rights and responsibilities.

Three scoring issues are considered under this PI:

(a) Roles and responsibilities

(b) Consultation processes

(c) Participation

Scoring issue (a) – Roles and responsibilities

This scoring issue looks at the function and the roles and responsibilities of stakeholders within the management system.

Scoring issue	SG60	SG80	SG100
(a) Roles and responsibilities	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are **generally understood**.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are **explicitly defined and well understood for key areas** of responsibility and interaction.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are **explicitly defined and well understood for all areas** of responsibility and interaction.

Good practice

Fisheries that score well under this scoring issue have at least identified the key areas of responsibilities within the fishery management system. The individuals or organisations with responsibilities for those areas have also been identified. Key areas of responsibility include data collection, science, licensing, decision-making, monitoring and surveillance (at all relevant locations) administration and training.

What certifiers check

Certifiers will consult a range of documents and seek meetings with key stakeholders in the fishery to get an understanding of the key roles and responsibilities within the fishery and the extent to which this is understood by stakeholders. The following documents are likely to help inform the certifiers:

- Fisheries legislation, policy documents, sector studies, annual reports and reports by scientists describing the fishery.
- Management plans for specific fisheries often have well defined stakeholder roles and responsibilities.
- Rules of procedure.
- Minutes of meetings of advisory groups.
- Organisational chart and staff job descriptions.

Scoring issue (a) – Roles and responsibilities

Key questions to determine where further action is needed

Q Are key areas of responsibility within the fishery identified?

Q Are the different parties involved in the management of the fishery clearly identified and documented?

Q Do stakeholders in the fishery know how the management system works and the relative roles of each of the key organizations and individuals?

Q If stakeholders have a question, a concern or a relevant contribution for consideration, is it understood where these should be addressed and to whom?

Q If roles and responsibilities within the fishery change, either as a result of personal changes or reorganisation within management bodies, are these changes communicated to ensure clarity of understanding?

Examples of scoring rationales

Scoring issue (a)	Fishery Example
SG60	*Tuna pole and line fishery:* There is a good level of general understanding of the roles and responsibilities of most relevant individual organisations and individuals, such as data collection, licencing, enforcement and science. However, there is a lack of up to date legislation explicitly defining these roles and although decisions emerge from the management authority on issues such as licence numbers, gear restrictions or effort limits it is not always well understood by stakeholders exactly how these decisions are reached or by who.
SG80	Suriname Atlantic seabob shrimp (Certified 2011): There is clear definition and good comprehension of key areas of responsibility (data collection, VMS inspection, management decision-making, technical innovation (i.e. bycatch reduction). Where new tasks have arisen, these are clearly defined e.g. responsibility for verification of landings and issuing of the EU IUU catch certificates. Although the responsibility for monitoring of fleet effort and calculation of CPUE, used to inform the application of the HCR is clearly defined, certifiers concluded that overall responsibility for scientific research was less clearly defined – in part due to the low level of scientific infrastructure in Suriname. This meant that not all (i.e. SG100) roles and responsibilities were explicitly defined.

Scoring issue (a) – Roles and responsibilities

Examples of scoring rationales – *continued*

Scoring issue (a)	Fishery Example
SG100	Fiji Albacore Tuna Longline (Certified 2012): At an international level, the management function, roles and responsibilities of the Western & Central Pacific Fisheries Commission (WCPFC) are clearly defined and well understood. This includes the division of responsibility between the Commission and national governments and the division of responsibility between working groups and committees, such as the Scientific Committee, Technical and Compliance Committee and Finance and Administration Committee. Each group has well defined terms of reference. Nationally, The Fisheries Act 1941 is currently the principal legislation for the regulation of fishing activity within Fiji. The legislation provides a clear indication of roles and responsibilities as does the annual business plan. Additionally, the Ministry has an organizational chart and all staff have job descriptions. The organizations and individuals involved in the management system are therefore clearly explicitly identified. There is a Fisheries Advisory Council in place with appointees including non-government organizations with an interest in fisheries. The recently established 'offshore fisheries taskforce' has involved stakeholders in discussions on the management of the fisheries.

Scoring issue (b) – Consultation processes

The second scoring issue focuses on the process by which managers seek stakeholder input and communicate how this is used.

Scoring issue	SG60	SG80	SG100
(b) Consultation processes	The management system includes consultation processes that **obtain relevant information** from the main affected parties, including local knowledge, to inform the management system.	The management system includes consultation processes that **regularly seek and accept** relevant information, including local knowledge. The management system demonstrates consideration of the information obtained.	The management system includes consultation processes that **regularly seek and accept** relevant information, including local knowledge. The management system demonstrates consideration of the information and **explains how it is used or not used.**

Good practice

All fisheries should be able to have clear consultation processes, however fisheries should show that these processes are regular, that key organisations are consulted and that the information obtained is accepted and considered by management.

What certifiers check

Certifiers will consult a range of documents and seek meetings with key stakeholders in the fishery to get an understanding of the extent and effectiveness of consultation mechanisms within the fishery. The following documents are likely to help inform the certifiers:

- Evidence of past (recent) consultations, relevant to the fishery.
- Fisheries legislation and policy documents which may state requirements for consultation with stakeholders or the need to have stakeholders involved in the management advisory process.
- Stakeholder consultation may be specified in a co-management process or in respect of consulting with traditional fishers.
- Records of consultation or committee meetings.
- Annual reports and specific stakeholder meeting reports.
- Mechanisms in place to facilitate stakeholder engagement such as newsletters, broadcasts, invitation letters, posters, etc.

Scoring issue (b) – Consultation processes

Key questions to determine where further action is needed

Q Does the management system include consultation processes? And are there recent relevant examples of these?

Q Does the consultation process collect relevant information?

Q Does the management system consult with stakeholders at all key points and in support of major decisions and policy changes?

Q Is the management system effective at engaging with all relevant stakeholders during consultations?

Q Does the management system consider the information provided by consultation?

Q Are stakeholders provided with feedback indicating how the consultation processes have been considered and the extent to which information obtained has been used?

Examples of scoring rationales

Scoring issue (b)	Fishery Example
SG60	UK Fisheries (Deutsche Fischfang Union & Doggerbank) Arctic Cod & Haddock (Certified 2012): Although within the fishery management system and the national legal framework there are some consultation mechanisms (for example within the EU Common Fisheries Policy), the scoring focused on the Units of Certification which take place in the Svalbard Fisheries Protection Zone, and highlighted for fishers operating in this area there was not any regular consultation, indeed even an organisation as large as the EU was not consulted on some management decisions.
SG80	Ashtamudi Estuary short-necked clam (Certified 2014): Evidence has been presented to show that the formal management system has sought and accepted information about the management of the stock and also the structure of the management regime. In response to this the State Government has established the Village Clam Fisheries Council (VCFC) to create a mechanism for integrating local knowledge into the management system; the VCFC also provides an opportunity for environmental NGO input (WWF-India are members of the Council) as well as the local village council. The VCFC has, in turn, held stakeholder consultation meetings. This activity demonstrates that the management system is actively seeking and accepting relevant information. The creation of the VCFC and changes to the HCRs for the clam fishery demonstrate that the management system considers and responds to the information obtained. This meets the SG80 requirements; the SG100 requirements are not met because there is no evidence that explanations are provided of how information has been used or not used.

Scoring issue (b) – Consultation processes

Examples of scoring rationales – *continued*

Scoring issue (b)	Fishery Example
SG100	Argentine anchovy (Certified 2011): Every year the National Institute of Fisheries Research and Development (INIDEP) establishes a research program to obtain information and knowledge in order to advise the management system. The Federal Fisheries Council makes public their minutes (Acts), Resolutions, and technical reports and other documents received. It also convenes regularly with researchers or interest groups for technical advice prior to the decision-making and reports it in their minutes. Something similar happens with the Undersecretary of Fisheries and Aquaculture, although there are not saved detailed records (minutes) of these meetings.

Scoring issue (c) – Participation

The third scoring issue focuses on the process by which stakeholders are engaged in consultations, and the efforts made by management to support this.

Scoring issue	SG60	SG80	SG100
(c) Participation		The consultation process **provides opportunity** for all interested and affected parties to be involved.	The consultation process provides **opportunity and encouragement** for all interested and affected parties to be involved, and **facilitates** their effective engagement.

Good practice

In fisheries that score well against this scoring issue, consultations are made widely available to all parties. Opportunities are presented in an appropriate format for stakeholders and are widely publicised in appropriate locations, ensuring that it is easily possible for all those who may have an interest to participate. Such opportunities may include representation of different stakeholder groups in advisory bodies or other similar entities.

What certifiers check

Certifiers will review past consultations and speak to stakeholders to determine the extent to which participation in past consultations was facilitated. There may be less in the documentary record, although the following documents/data may support scoring:

- Documented evidence of past participation in consultation exercises.
- Sectoral representation in consultation committees as shown by committee membership and minutes.
- Fishery legislation or other policy documents which detail a minimum level of consultation and the process by which this will be achieved.

Scoring issue (c) – Participation

Key questions to determine where further action is needed

Q Are there good levels of participation in consultative exercises and does the management system consider how best to maximise stakeholder participation in these processes?

Q Are consultative processes designed to make it easy for stakeholders to respond?

Q Are sector representatives consulted within the management process and do these representatives in turn consult with their members?

Q Have stakeholders been well aware of past consultation processes and understood how to participate?

Examples of scoring rationales

Scoring issue (c)	Fishery Example
SG60	No scoring guidepost at the 60 level
SG80	Suriname Atlantic seabob shrimp (Certified 2011): Any individual fisherman or fishing business is in theory represented by a member of their sector sitting on the fisheries advisory council. In short, the opportunity and mechanism for consultation exists. If there are shortcomings in this system it appears to be more associated with the effectiveness of sector representation and the flow of information both from sector representatives to members of their sector and vice versa. For this reason it is not possible to conclude that effective engagement of individual stakeholders are facilitated.
SG100	SSMO Shetland inshore brown & velvet crab, lobster and scallop (Certified 2012): At EU level a good recent example of consultation has been the consultation process on the reform of the Common Fisheries Policy (CFP) (which itself closely mirrors the consultation process that preceded the drafting of the reformed CFP in 2002). The 2009 Green paper on the reform of the CFP expressly states that its purpose is 'to trigger and encourage public debate and to elicit views on the future CFP. The Commission invites all interested parties to comment on the questions set out in this Green Paper'. At a local level, where much of the stock level management occurs, consultation mechanisms are excellent, with a good board representative structure, which includes other interests. As a result, there is a strong sense from fishermen that their voices are heard and contribute to shaping management. The Shetland Isles Council also plays an important role in this regard through their active involvement in the Shetland Shellfish Management Organisation enabling excellent consideration of interaction with other marine users, through local marine planning including for marine recreation, aquaculture, aggregate extraction and offshore industries.

Challenges and solutions to meeting PI 3.1.2

In developing country fisheries there may be gaps in the consultation framework that can prevent the fishery from meeting this PI. Some of the reasons developing countries may perform poorly on this PI may include:

- Stakeholders may assume government runs the fishery and are unclear as to their role, as stakeholders, in providing information about the fishery and advice on issues that impact them.
- Lack of funding or staff resources to carry out necessary consultation and perform analysis and reporting of results.
- Lack of harmonised process for consultation at the national and state (local) levels.
- Inadequate flow of information to stakeholders, perhaps as a result of difficulty in communicating directly with a wide range of stakeholders due to issues such as poor rural on-line access or low levels of literacy.
- The committees or advisory committees established to ensure consultation and compliance may not be fishery-specific or may lack appropriate representation.
- Absence of systems to facilitate engagement for interested parties.
- Lack of explanation on how information collected from stakeholders is utilised – again the communication medium may be problematic.

Undertaking a review of roles and responsibilities within the fishery and determining the specific roles of various departments, agencies and institutions through a participatory approach can contribute to addressing these issues.

Example actions to improve performance for PI 3.1.2

Process Chronology				Management Actions	
1	2	3	4	Example action	Scoring issue
●				Review the degree to which all roles and responsibilities within the fishery are clearly defined. Consult with industry and other stakeholders to ascertain how well the functions and responsibilities of the different management agencies are understood.	(a)
	●			Ensure that all agencies within the fisheries management framework clearly identify their role, through publicity material, or website. This should include details of how stakeholders can provide input and feedback.	(a)
		●		The fishery management plan should clearly identify which agencies, departments or associations will undertake which roles in the fishery.	(a)
●				Identify all stakeholders with an interest in the fishery.	(b), (c)
	●			All management proposals should be fully and widely consulted upon. The findings of this consultation process should be communicated widely.	(b), (c)
	●			Encourage wider representation of different types of stakeholders like environmental NGO's or fishing sector representatives in relevant advisory bodies.	(b), (c)
		●		As management becomes more formalised, the management plan and enacting legislation should clearly identify the need for effective consultation and detail how and when this will be done.	(b), (c)
		●		Ensure all formal management decision-making processes are committed to stakeholder consultation and give full consideration to the findings of these consultation exercises.	(b)
	●			Develop strategy to ensure widespread engagement in consultations on management proposals is facilitated. This may include considering how those with limited literacy or limited access to communications tools, such as phones or internet may still be engaged in the consultation.	(c)
		●		Develop communication strategies to disseminate the results of consultations. This may be through fishery meetings, or industry press, or on-line resources.	(b)
			●	Periodically review the efficacy of the consultation processes and the degree to which the management process is understood and actively engaged with by all stakeholders.	(a), (b), (c)

Notes

Notes

3.1.3 Long term objectives

Performance Indicator overview

This PI seeks to ensure that management policy has clear long-term objectives to guide decision-making that are consistent with MSC Fisheries Standard and incorporates the precautionary approach.

This PI therefore looks at the objectives which are contained in high level or broader government policy (beyond the particular fishery in question). It is not concerned with the operational implementation of day-to-day management decisions.

Typically management decisions are taken in the context of broader pre-stated objectives and the success of management decisions is therefore judged against how well those decisions deliver against objectives. To ensure clear strategic direction, government policy and laws should provide management with a clear set of objectives, against which to design and implement management. Fishery-specific management policy (such as a fisheries management plan) will be developed in the context of these high level, long term objectives, demonstrating how these will be met. Below are some key considerations in developing long term objectives:

- Clearly state that long term sustainable use of fisheries resources is the overriding objective of fisheries management in order to avoid overfishing or stock depletion.
- Clearly state how decisions will be based upon best available scientific evidence available and will be based on the precautionary approach. This should guide policy makers to be cautious when information is uncertain, unreliable or inadequate. The lack of scientific information should not be used as a reason to postpone or failing to take conservation or management measures.
- Clearly define the wider ecosystem objectives (aligned with the ecosystem approach to fisheries), indicating that fishing operations will be conducted in a manner that allows for the maintenance of the structure, productivity, function and diversity of the ecosystem on which the fishery depends.
- Finally, the management system should respect local, national and international laws and standards in providing effective governance.
- There may be other long term high level objectives which are appropriate to the context of the country which may also be included here, but these should not be contradictory to any of those stated above.

Only one scoring issue is considered in this PI:

(a) Long term objectives

Scoring issue (a) – Objectives

There is only one scoring issue for this PI. The scoring issue therefore addresses all aspects of the PI and assesses long term objectives in the fishery and extent to which they ensure decision-making is consistent with the MSC Standard.

Scoring issue	SG60	SG80	SG100
(a) Objectives	Long term objectives to guide decision-making, consistent with MSC Fisheries Standard and the precautionary approach, are **implicit** within management policy.	**Clear** long term objectives that guide decision-making, consistent with MSC Fisheries Standard and the precautionary approach, are **explicit** within management policy.	**Clear** long term objectives that guide decision-making, consistent with MSC Fisheries Standard and the precautionary approach, are **explicit** within **and required by** management policy.

Good practice

Good practice requires objectives are explicitly stated. This means clearly written down in a binding document, which is relevant to both the fishery under assessment and the management jurisdiction of the fishery. In traditionally and informally managed fisheries the decision and practices in the fishery must be influenced by factors that are consistent with achieving the intent of the MSC Standard.

What certifiers check

The certifiers will review the content of the relevant acts and policies (as described in 3.1.1) to support the scoring of this scoring issue. These are likely to include:

- International legal instruments and binding international conventions.
- National fisheries legislation.
- Fisheries policy documents or fisheries sector strategy documents.
- The legal status of any such documents and how they shape decision-making.
- Certifiers may refer to fishery management plans, to ascertain to what extent these refer to overarching high level objectives (more fishery-specific and day-to-day operational objectives contained in fishery management plans will not be used to inform this scoring issue).

In traditionally or informally managed fisheries certifiers may look at alternative sources for information. These may include referring to the process and outcomes of recent management decisions, determining to what extent these have been guided by high level objectives, determining what extent these objectives appear to be in line with the needs of sustainability and whether there is evidence of management decision-makers adopting appropriate levels of precaution. In developing countries where explicitly stated objectives are absent in relevant documentation, certifiers may investigate recent decisions to help inform the scoring of this scoring issue.

Scoring issue (a) – Objectives

Key questions to determine where further action is needed

Q Are the high-level, long term objectives explicitly stated and binding in relevant documents or legislation?

Q Are these objectives consistent with the MSC Standard and do they mention the precautionary approach?

Q Are the high level objectives relevant to the jurisdiction of the fishery?

Q Are all fisheries decisions taken in relation to these objectives?

Q Is there any higher level policy document which requires management to set out its long term objectives?

Q Are decisions in the fishery guided by a notion of long term objectives that are consistent with the MSC Standard?

Examples of scoring rationales

Scoring issue (a)	Fishery Example
SG60	*Snapper gill net fishery:* Long term objectives are not explicitly defined in the Fisheries Act, which was enacted many years ago. In addition, there is no explicit mention of the precautionary approach in any legislation or management policy documents, however this is implied. In particular the phrase 'long term sustainability' is regularly referred to in fishery policy documents and there is evidence of precautionary decision-making on issues such as licencing and fishery exploitation rates (relating to MSC Principle 1) and the closure to fisheries or a number of areas of sensitive seabed habitats (relating to Principle 2).
SG80	Ashtamudi Estuary short-necked clam (Certified 2014): The explicit long-term objective for fisheries management in the state of Kerala is 'The Kerala State's objective is to conserve and utilise marine resources in a sustainable manner, as fishes are significant renewable resources in its territorial sea and exclusive economic zone.' This objective guides decision-making for fisheries management and is the basis of the precautionary management policy that has been developed for the clam fishery by Central Marine Fisheries Research Institute and formally adopted by the Village Clam Fishery Council (VCFC). Some elements of this plan have already been adopted (such as the creation of the VCFC itself), and also the proposal to formalise the MSY objective through a regular stock assessment with the setting of a precautionary TAC based on this stock estimate. These action provides explicit evidence that long-term objectives and a precautionary management policy are in place for the fishery.

Scoring issue (a) – Objectives

Examples of scoring rationales – *continued*

Scoring issue (a)	Fishery Example
SG100	Australian Northern Prawn (Certified 2012): The long term objectives of the management system are specified in the Fisheries Management Act and the Environment Protection and Biodiversity Conservation Act (EPCB), and further defined in the Commonwealth Fisheries Harvest Strategy Policy and Guidelines. The objectives and policy guidance are consistent with MSC's Principles and Criteria and explicitly require application of the precautionary principle. The fishery is also subject to the Commonwealth Environmental Protection and Biodiversity Conservation Act (EPBC). which requires periodic assessment against the Guidelines for the Ecologically Sustainable Management of Fisheries. These Guidelines are consistent with the MSC Principles and Criteria and encourage practical application of the ecosystem approach to fisheries management.

Challenges and solutions to meeting PI 3.1.3

The key challenges for many countries in meeting the requirements for PI 3.1.3 is often in highlighting exactly where explicit and binding long term objectives are contained and secondly in showing that these meet the requirements, in terms of content, outlined above.

In some cases the documentation that the certifiers refer to for evidence of long term objectives may either be absent, out of date, or lacking specific objectives. In particular older fisheries acts, legislation and sector policies, may have been written before the need for stating overarching objectives was widely recognised. Older legislative tools tend to focus more on the 'what' and less on the 'why'.

Notions of the 'precautionary principle' and 'ecosystem approach' are also more recent in their widespread adoption, so again older pieces of legislation may not refer to these. In these instances there may be a need to either update fisheries legislation, sector policies or point to other binding government policies, or evidence of binding international agreements, which do contain the types of binding long term objectives required by this PI.

Example actions to improve performance for PI 3.1.3

Process Chronology				Management Actions	
1	2	3	4	Example action	Scoring issue
●				Review the high level fisheries policies, regulations and acts to determine what long term objectives are stated. Also review the objectives contained within any binding international conventions which the country may be signed up to.	(a)
●				Review past fishery management decisions to determine the extent to which these have been more informally guided by a notion of long term, high level objectives. Document how decisions made in the fishery are compatible with achieving ecological health of the fishery and associated ecosystems in the long term.	(a)
	●			Where long term objectives are lacking, consider how these can be incorporated into management policy, ideally at a high legislative level, or potentially, within a fishery management plan.	(a)
	●			Consult on proposed long term objectives, with sector and other stakeholders (NGOs). The findings of this consultation process should be communicated widely.	(a)
		●		Seek to incorporate binding long term objectives in relevant legislation (giving full consideration to the findings of the consultation exercises).	(a)
		●		Ensure that all formal management decision-making processes recognise the long term objectives and take decisions in relation to these guiding principles and objectives.	(a)
			●	Periodically review the extent to which long term objectives are being adhered to, to ensure that the objectives are achieving their aims. Consider changes to objectives, or changes to the degree to which they are required to be considered.	(a)

Notes

3.2.1 Fishery-specific objectives

Performance Indicator overview

Objectives are important statements of what an individual and/or organisation intends to achieve and against which progress can be measured. Fishery-specific objectives (or operational objectives) provide direction for management measures or regulations and are designed around the overarching national, international or regional goals and/or policies set by governments for their fishery sector (assessed in 3.1.3).

Objectives are usually located in the management or strategic plan for the fishery and while they may be unique to a specific fishery they should still be consistent with the commitments, overarching goals, long-term objectives, and/or policies set for the fisheries sector.

For example, an overarching national policy may be to keep the target stock at levels necessary to ensure their future biological productivity, while a fishery-specific objective addressing this policy could be to limit catches to maintain the stock at population levels equivalent to 40% of unexploited biomass. Fishery-specific objectives are usually precise and measurable so that decision-makers can determine whether the objective is being achieved or has been successfully implemented. Hence for fisheries under assessment, individual harvest or management strategies scored in Principles 1 and 2 are examined against the fishery-specific objectives score under Principle 3.

Apart from the need to establish clear and measurable fishery-specific objectives, it is also important to set out the process for defining such objectives, including the various elements that may be considered in decision-making. In almost every fishery there are multiple, and sometimes conflicting, economic, social and ecological objectives that would need to be negotiated amongst stakeholders and balanced by decision-makers.

For example, measures to improve employment in a fishery may not increase overall efficiency and profits of the fishing fleet. Stakeholders may need to agree what conflicting overarching goals should be expressed as fishery-specific objectives in the management plan before developing management measures to achieve them.

Only one scoring issue is considered under this PI:

(a) Fishery-specific objectives

Scoring issue (a) – Objectives

There is only one scoring issue for this PI. The scoring issue therefore addresses all aspects of the PI. It assesses the presence of objectives in the fishery and the extent to which these are leading to outcomes that are consistent with the MSC Standard.

Scoring issue	SG60	SG80	SG100
(a) Objectives	**Objectives**, which are broadly consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are **implicit** within the fishery-specific management system	**Short and long term objectives**, which are consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are **explicit** within the fishery-specific management system	**Well defined and measurable short and long term objectives**, which are demonstrably consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are **explicit** within the fishery-specific management system

Good practice

Good practice requires that the objectives for the fishery management system, as well as being consistent with MSC Principles 1 and 2 must also include both short term and long term operational targets and must also be explicitly stated. This implies that it is stated in a fishery-specific management document or plan. At the highest scoring level, the stated objectives should be measurable, so that management can undertake an empirical review of performance against objectives.

What certifiers check

The range of documents certifiers will consult to find evidence of compliance with this scoring issue includes:

- Fishery-specific international, bilateral or multinational fisheries agreements.
- Fishery-specific management plans.
- Fishery-specific scientific management advice, which may detail the operational objectives shaping the advice.

Scoring issue (a) – Objectives

Key questions to determine where further action is needed

Q Is there a management plan for the fishery, which clearly states the long and short term objectives of management?

Q Are the objectives measurable against targets or timelines?

Q Are there other relevant documents, legislation or plans which clearly state the objectives that shape management decision-making?

Q Do stakeholders understand the objectives that managers are seeking to meet with their decisions?

Q Do the stated objectives reflect the aims of MSC Principles 1 and 2, namely sustainable stock management and healthy ecosystems?

Q Do management decisions follow these objectives – both in the short and longer term?

Examples of scoring rationales

Scoring issue (a)	Fishery Example
SG60	Maine lobster trap (Certified 2013): The Atlantic States Marine Fisheries Commission (ASMFC) management plan had measurable and quite detailed objectives relating to MSC Principle 1 but none that referred explicitly to Principle 2 (habitat, ecosystem and bycatch considerations).
SG80	Ashtamudi Estuary short-necked clam (Certified 2014): The explicit long-term objective that guides decision-making is to maintain a yield from the stock that is consistent with estimates of its maximum sustainable yield. This is estimated to be approximately 50% of the standing stock and is currently set at 12,000t of clams per annum. This objective is transposed into the fishery's management system as a TAC based upon the most recent stock survey and implemented by the Village Clam Fishery Council. The objective of sustainable management of the fishery also sets the context for the established management policy for the fishery (the 30mm mesh size; ban on mechanical harvesting; maximum of 1,400 clams meats per kg; seasonal closure of the fishery). These HCRs serve to ensure that exploitation is limited and that a breeding stock of clams is maintained in the fishery. The SG80 requirement is met because there is an explicit long term objective for the fishery that guides decision-making. If all of the clam fishery management plan is implemented it is likely that the performance of the fishery against the Standard would improve.

Scoring issue (a) – Objectives

Examples of scoring rationales – *continued*

Scoring issue (a)	Fishery Example
SG100	Spencer Gulf king prawn (Certified 2011): The Government of South Australia's published management plan for the Spencer Gulf prawn fishery sets out well-defined objectives, strategies and activities which are consistent with achieving the outcomes expressed by MSC principles 1 and 2. Some of these have objectively verifiable indicators which are very explicit within the management process. However, timelines do appear to have been historically extended or are extensive (over 5 years) causing some delays in implementation of some activities, especially in the context of ecosystem management and by-catch mitigation.

Challenges and solutions to meeting PI 3.2.1

Both in developed and developing countries, the main challenge for many fisheries in meeting PI 3.2.1 is that fisheries do not have explicit short and long-term objectives that meet the requirements of MSC Principles 1 and 2. Often fisheries managers will make good decisions and comply with high level objectives, but the objectives that shape management decisions will not be explicitly stated, in the context of the specific fishery. However, where there is a comprehensive fishery management plan in place the objectives should be explicitly stated.

Even in cases where a fishery-specific management plan is in place, it is not unusual for this to focus on Principle 1 objectives, relating to stock sustainability, and failing to state the Principle 2 objectives in relation to ecosystem impacts (habitat protection, minimising bycatch, interactions with threatened, endangered and protected species etc).

Countries or regions have also had difficulties in meeting the 'measurability' good practice requirements of the MSC. While many countries have explicit objectives formulated they may not have the capacity or routine review system in place to measure the performance of the management authority in meeting both short and long term objectives.

Reviewing and documenting fishery-specific management objectives and making improvements to these objectives as appropriate, in consultation with stakeholders is a useful first step in addressing this issue.

Example actions to improve performance for PI 3.2.1

Process Chronology				Management Actions	
1	2	3	4	Example action	Scoring issue
●				Review the current fishery-specific management objectives that are in place and determine the extent to which these are explicit, measurable and applicable to a full range of MSC Principle 1 and 2 criteria.	(a)
●				In situations where the fishery is managed by a traditional management system and where specific objectives are not documented, review and document the informal objectives which shape management decision-making in relation to fish stock health (P1), ecosystem impacts (P2).	(a)
	●			Seek to develop fishery-specific objectives, which serve as an operational interpretation of the long term objectives (PI 3.1.3). These should be clearly defined and measurable. They should also include elements focused on stock health (P1) and ecosystem health (P2). Whilst these may also include objectives in relation to social/economic needs, these should not be at the expense of ecological considerations.	(a)
		●		Ensure all proposals for formal management objectives are committed to stakeholder consultation and give full consideration to the findings of these consultation exercises.	(a)
		●		Formally adopt fishery-specific management objectives into the management decision-making process. This may require objectives to be explicitly detailed in the fishery management plan or in relevant legislation or regulation.	(a)
			●	Periodically review the appropriateness of fishery-specific objectives to ensure that they are achieving the management aims, and that they are acting as indicators of performance of the fishery in a fully measurable manner.	(a)

Notes

3.2.2 Decision-making processes

Performance Indicator overview

There are many key decisions involved in successful fisheries management. How many fish to catch, when, where, how and by whom are just a few of these. But there are many more complex decisions such as how to balance the needs of different stakeholders, how to incorporate meaningful ecosystem considerations, how to ensure the management system is robust and reviewed or how to share resources between parties. The process by which these decisions are informed and made, and against what criteria is therefore critical to the success of fisheries management in meeting its stated objectives. It is the process of decision-making, rather than the outcomes of decisions that is the focus of this PI.

The importance of effective decision-making in the fisheries context is highlighted in the FAO Code of Conduct for Responsible Fishing, which states that countries should:

- "...ensure that decision-making processes are transparent and...facilitate consultation and the effective participation of industry, fishworkers, environmental and other interested organizations in decision-making with respect to the development of laws and policies related to fisheries management..." (FAO Code of Conduct para. 6.13).
- "...recognise that responsible fisheries requires the availability of a sound scientific basis to assist fisheries managers and other interested parties in making decisions" (FAO Code of Conduct para. 12.1).

Fishery decision-making may occur at various jurisdictions. National fisheries decision-making may be undertaken centrally within one organisation or regionally, among multiple organisations. Some fisheries-related decision-making powers may also be delegated to local governments. For shared or straddling stocks, decisions may be taken at a bilateral or multi-lateral level or within the framework of RFMOs. The role of RFMOs in international fisheries decision-making is recognised under the UN Fish Stocks Agreement, particularly Article 10, which includes the obligation for States to 'agree on decision-making procedures which facilitate the adoption of conservation and management measures in a timely and effective manner.' (UN Fish Stocks Agreement, Article 10(j)).

Regardless of the government system, there are key features of decision-making processes that facilitate effective fisheries management. These include:

- An established and understood process for making decisions.
- A timely and adaptive process, responsive to changes in circumstance.
- Access to relevant information – up to date, reliable, accessible.
- Decisions informed by best scientific evidence available and following the precautionary principle where evidence is lacking.
- A transparent process that is accountable to stakeholders.
- A framework for resolving fisheries disputes.

Most governmental decision-making frameworks have formal mechanisms for interest groups and the public to participate, which are based around advisory committees and working groups along with public comment periods. The decision-making framework at both domestic and regional levels is usually based around an annual cycle where stock status and fishing mortality are assessed and where in use, TACs and regulations are modified to take into account current trends.

Five scoring issues are considered under this PI:

(a) Decision making processes

(b) Responsiveness of decision-making processes

(c) Use of the precautionary approach

(d) Accountability and transparency of management system and decision-making process

(e) Approach to disputes

Scoring issue (a) – Decision-making processes

The first scoring issue seeks to ensure that the process by which key management decisions are taken is established.

Scoring issue	SG60	SG80	SG100
(a) Decision-making processes	There are **some** decision-making processes in place that result in measures and strategies to achieve the fishery-specific objectives.	There are **established** decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.	

Good practice

It is likely that all fisheries will be able to point to some decision-making process, but for good practice these processes should be well established. This would imply that the decision-making process is recognised within the management system and should be clearly described. There should be evidence to show that the process can be triggered and has been used in the past.

What certifiers check

The certifiers will seek to get an understanding of the process by which fisheries management decisions are taken through stakeholder interviews, in particular through focusing on the process by which past decisions have been taken. Certifiers will also seek to support this through review of relevant documentation, such as:

- Fisheries legislation – indicating powers and responsibility.
- Management policy documentation, including the fisheries management plan – may set out decision-making process.
- Scientific advice – may refer to decision-making process.
- Sector studies or economic and social studies or papers.

Scoring issue (a) – Decision-making processes

Key questions to determine where further action is needed

- **Q** Is a decision-making process for key fisheries decisions established and understood?
- **Q** Are there informal processes that can be triggered and which have led to decisions in the past?
- **Q** Where multiple jurisdictions are involved in management decisions, are the decision-making processes at each of these levels equally established and/or overlapping?
- **Q** Looking at a previous important decision relating to the fishery, can the process by which that decision was taken be clearly described?
- **Q** Is the decision-making process set out either in governing legislation or in relevant policy documents of the fishery management plan?
- **Q** Do relevant government departments describe their role in the decision-making process, for example on government websites?

Examples of scoring rationales

Scoring issue (a)	Fishery Example
SG60	*Tuna handline fishery:* Decisions have historically been taken as required by the management authority for issues such as licensing, area and gear restrictions and whether to adopt output controls. However, the fishery has undergone a recent management change and a new decision-making process is now in place at the national level which follows a more formal timeframe and stipulates how monitoring, scientific advice and stakeholder input will be used to take decisions in the context of the measurable objectives stated in the management plan. However, due to its recent adoption this process remains untested and some stakeholders are unaware of this change, so it is too soon to conclude that the process is 'established'. The decision-making processes at the regional level (including allocation of fishing entitlement) is not so well established or formally described.
SG80	Suriname Atlantic seabob shrimp (Certified 2011): There is an established decision-making process, based around provision of timely scientific advice from The Caribbean Regional Fisheries Mechanism (CRFM), which is reviewed by the Suriname Fisheries Advisory Committee and the stakeholder Seabob Working Group, prior to decisions being enacted by the fisheries department and the responsible minister. The process certainly exists and has been shown to work on several occasions (for example in the establishment of an artisanal inshore zone, implementation of VMS and setting license conditions).
SG100	No scoring guidepost at the 100 level.

Scoring issue (b) – Responsiveness of the decision-making process

The second scoring issues seeks to ensure the decision-making processes (outlined in scoring issue (a)) are responsive to relevant information and enable decisions to be taken in a timely, transparent and adaptive manner.

Scoring issue	SG60	SG80	SG100
(b) Responsiveness of decision-making processes	Decision-making processes respond to **serious issues** identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take some account of the wider implications of decisions.	Decision-making processes respond to **serious and other important issues** identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.	Decision-making processes respond to **all issues** identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.

Good practice

Fisheries are expected to respond to serious issues and be transparent, timely and adaptive. In good practice fisheries, a broader range of issues (not just the most serious) are subject to the relevant decision-making process and greater consideration is given to the wider implications of decisions.

What certifiers check

Certifiers will need to check the transparency, timeliness and range of issues that management decision-making responds to and the range of considerations given to the wider implications of decisions. This will be informed by stakeholder interviews along with reviewing a range of documents such as:

- Fisheries legislation – may detail the range of decisions and requirements for consideration of wider implications.
- Management policy documentation – the fishery management plan may detail what issues should be responded to and what implications of decisions should be taken.
- Evidence of management taking decisions in response to issues raised in scientific advice, research, management evaluations or consultancy.
- Evidence of assessments of potential impact of decisions (i.e. social or environmental impact assessments) being undertaken, prior to decisions being finalised.
- Economic and social studies or papers.

Scoring issue (b) – Responsiveness of the decision-making process

Key questions to determine where further action is needed

Q Are there examples of management taking timely action in response to scientific advice, the results of evaluation or recommendations from studies?

Q Does management consider the implications of management decisions, perhaps through impact studies, or modeling, or via consultation exercises?

Q Does the legislation, or management policy state what information should be used to inform decisions and how the implications of possible management action should be taken account of?

Q Is the timescale of management decision-making, appropriate to the possible impact?

Q Is the process transparent to enable all stakeholders to understand how management has responded to relevant issues?

Examples of scoring rationales

Scoring issue (b)	Fishery Example
SG60	South Brittany sardine purse seine (Certified 2010): Decision-making processes respond to serious issues identified in relevant research, monitoring (landings), evaluation and consultation, in a transparent, timely and adaptive manner and take some account of the wider implications of decisions. The extraordinary meeting of the French committees for Fisheries and Marine Farms (CRPMEM) on 25th March 2009 to deal with the credibility gap between trades involving the purse seiners is a recent example. However, there is no fishery-specific strategy or objectives that can be achieved, and therefore no established decision-making processes that result in measures and strategies to achieve the fishery-specific objectives. In the absence of a strategy, all the problems are not examined systematically, in response to important issues identified regularly, using a precautionary approach and with regular reports.
SG80	Sian Ka'an and Banco Chinchorro Biosphere Reserves spiny lobster (Certified 2012): At the government level, information available to decision-makers is appropriate for the small scale of the fishery, meaning that data are more limited than might be the case in a larger scale fishery. Much of the research and recommendations originate at the cooperative level and there are indications that the authorities respond to these. Nevertheless, based on information shared during the stakeholder meeting and the site visit, the decision-making process at the government level does not respond to all issues in a timely and adaptive manner, therefore SG100 is not met.
SG100	U.S. Atlantic spiny dogfish (Certified 2012): All issues identified are considered in the decision-making process and where needed, actions can be taken quickly, while in-season monitoring allows for changes in approach and related regulations. The process takes account of the consequences of decisions on management objectives for spiny dogfish on the ecosystem, and of the impacts on those who depend on the fishery for their livelihoods.

Scoring issue (c) – Use of precautionary approach

The third scoring issue requires that decision-making processes follow the precautionary approach. The FAO Technical Guidelines define the precautionary approach as 'the application of prudent foresight, taking account of the uncertainties in fisheries systems and the need to take action with incomplete knowledge'.

Scoring issue	SG60	SG80	SG100
(c) Use of precautionary approach		Decision-making processes use the precautionary approach and are based on best available information.	

Good practice

There is a requirement that the management policy should be informed by best available information and an appropriate degree of precaution. Fisheries that perform well on this scoring issue have a formal commitment to the precautionary approach and have examples of practice that demonstrates how precaution is being applied.

What certifiers check

Certifiers are required to verify that the absence of adequate scientific information is not used as a reason for postponing or failing to take conservation and management measures. Examples of past management decisions may inform this, but it is also likely that relevant documents and legislation will point to the degree to which the precautionary principle has been formally adopted. The following documents may refer to the precautionary principle:

- International conventions that the county has ratified, which may commit them to the precautionary approach.
- Fisheries legislation – if this is more recent it may include an explicit commitment to the precautionary approach.
- Fisheries policy papers of fisheries management plans – may make formal commitment to the precautionary approach.

Scoring issue (c) – Use of precautionary approach

Key questions to determine where further action is needed

Q Has the country ratified international conventions with a formal commitment to the precautionary approach?

Q Do any of the national legislation of fisheries sector policies (including management plans) make explicit reference to the precautionary approach?

Q Are there examples of conservation focused management decisions being taken in the fishery which have been precautionary, in the absence of adequate scientific information?

Examples of scoring rationales

Scoring issue (c)	Fishery Example
SG60	No scoring guidepost at the 60 level
SG80	Suriname Atlantic seabob shrimp (Certified 2011): There is a HCR that takes account of the precautionary approach and is based on the best available information. The target biomass is set at 10% above MSY – a further indication that a sensible degree of precaution has been applied. Furthermore, the recent reduction in licenses from 30 to 20 is a further indication of precautionary management. These practical examples of precaution are supported by documentary evidence; the seabob management plan explicitly states that the precautionary approach will guide decision-making.
SG100	No scoring guidepost at the 100 level

Scoring issue (d) – Accountability and transparency of management

This scoring issue seeks to ensure that the management system is accountable to the stakeholders that it serves, that the decision-making process is transparent and that the reasons for management decisions are clearly communicated. It also focuses on the availability of information about the fishery to allow stakeholders to effectively contribute to decision-making.

Scoring issue	SG60	SG80	SG100
(d) Accountability and transparency of management system and decision-making process	Some information on fishery's performance and management action is generally available on request to stakeholders.	**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.	Formal reporting to all interested stakeholders **provides comprehensive information on the fishery's performance and management actions** and describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.

Good practice

The scoring issue requires that explanations are provided which detail both the reasons for management action or lack of action. Information on fishery performance that is not legally confidential (fisheries data, allocation, management action, etc.) should be available at least on request by stakeholders.

What certifiers check

Certifiers will seek to understand the degree to which openness and transparency is embedded within the management system. This will be informed by stakeholder interviews to ascertain the extent to which the reasons for management decisions are communicated. Certifiers are also likely to review past management decisions to determine the degree to which the information basis for those decisions has been communicated. Certifiers will also look at documentary evidence such as:

- Management policy documentation – does this detail how management decisions will be communicated?
- Minutes of advisory group meetings – are these publically available?
- Fishery performance data (stock assessments and management advice etc.) – are these widely communicated and available?
- Other means of stakeholder communication – annual fishery meetings, websites, direct mailing, notice boards?
- Descriptions of past fishery issues and their resolution, examples of past advice to stakeholders.

Scoring issue (d) – Accountability and transparency of management

Key questions to determine where further action is needed

Q Is there formal communication with fishery stakeholders explaining reasons for management action? This could be via stakeholder meetings, direct mailing, websites etc.?

Q Is the information that informs management decisions, such as scientific advice, management evaluations, simple landings and effort data, made widely available to stakeholders?

Q Are there examples of past management decisions which have been effectively communicated to stakeholders, including the reasons for those decisions?

Examples of scoring rationales

Scoring issue (d)	Fishery Example
SG60	Suriname Atlantic seabob shrimp (Certified 2011): The explanation of both the decision-making process and the outcomes of decisions was identified as an area of potential improvement in the management, thus triggering a condition to be raised. Although The Fisheries Advisory Council and the Seabob Working Group play key roles both in informing the Minister on management proposals, and enabling sector representatives to be informed about management decisions, there were examples of confusion over the reason for some decisions. This included the decision to set exploitation rates by application of a HCR, informed by novel stock assessment techniques. The lack of clear explanation undermined the adoption of a well-informed decision based on best available evidence.
SG80	Sian Ka'an and Banco Chinchorro Biosphere Reserves spiny lobster (Certified 2012): Certifiers concluded that explanations were provided when relevant. This however, was taken in the context of a small scale of the fishery, with a relatively simple management framework (size, closures, gear, prohibition of catching females bearing eggs), with a less frequent requirement for management to communicate management changes or the outputs of research, review and monitoring. None the less, there has been some formal reporting in México since 2000, in which the health of resources and the strategic management direction for the main fisheries are described (including the fisheries covered by this assessment). This includes directives on concessions, management policies toward sustainability, and research studies such as of migrations and interconnectivity of subpopulations. Nevertheless, this formal document does not explain how the management system responds to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.
SG100	Maine lobster trap (Certified 2013): There is formal reporting to all interested stakeholders on the findings, actions and recommendations resulting from research and management review. Reporting to all interested stakeholders of 'how' and 'why' the management system responded is formalised in both the Maine Department of Marine Resource and the Atlantic States Marine Fisheries Commission, through letters newsletters, web-site posting, and personal outreach.

Scoring issue (e) – Approach to disputes

The final scoring issue of PI 3.2.2 assesses the approach taken by management to disputes.

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

Good practice

Good practice requires that the management system actively seeks to avoid disputes and that the management system is designed to enable this. Management should be seen to be making the effort to comply with any decisions resulting from any legal challenge. This includes the need for management to be 'proactive' in avoiding legal disputes.

What certifiers check

Certifiers will ascertain if there have been past disputes or court challenges within the management system in order to determine their focus, frequency and to determine how these have been resolved. In addition, consultations with managers and stakeholders will provide insight into how the management system acts proactively to avoid disputes. The following documentary evidence may also be important:

- Proceedings of courts or other judicial processes relating to the fishery.
- Evidence of dispute avoidance and resolution mechanisms built into the management system as detailed in a fishery management plan.
- Evidence of implementation of any legal decisions.

Scoring issue (e) – Approach to disputes

Key questions to determine where further action is needed

Q Is there general respect and compliance with the management system, as evidenced by a lack of continuing legal challenge of the management system?

Q Are the results of any legal dispute decisions quickly enacted or applied?

Q Does the management system specifically address the need for mechanisms which seek to proactively avoid disputes arising?

Q Is there evidence of the management system responding to the results of any legal disputes?

Examples of scoring rationales

Scoring issue (e)	Fishery Example
SG60	*Hake trawl fishery:* The management body has recently been subject to a court challenge about the allocation of quota among fishers. Although this is under challenge the system of quota is being respected and adhered to. The management body has already stated that they will make any changes as required resulting from the legal challenge at the conclusion of the case. While management is not acting systematically in defiance of the law, it is not possible to clearly demonstrate that the management system is attempting to comply in a timely fashion with judicial decisions.
SG80	Sian Ka'an and Banco Chinchorro Biosphere Reserves spiny lobster (Certified 2012): The management system is inclusive and no constraints to the timely and fair resolution of disputes have been identified. There are no pending legal challenges associated with the lobster fishery. However, the assessment team did not find evidence that the management system or fishery acts proactively to avoid legal disputes and thus the issue satisfies the SG80 level but not the SG100 level.
SG100	Suriname Atlantic seabob shrimp (Certified 2011): A key instrument in the proactive management and resolution of fishery disputes is the Suriname Fisheries Advisory Committee. This 10 man committee is chaired by the permanent secretary of the Ministry of Agriculture, Livestock and Fisheries, and includes 5 representatives from commercial fishing sectors (including seabob, and artisanal representatives) and representatives of the other main government departments with marine concerns (such as Coast Guard service and the Suriname Maritime Authority). This committee has a powerful influence on management decisions, and management reflects the information obtained through this committee. A more recent important addition to the proactive management within the Seabob fishery has been the Seabob Working Group. This group is made up of representatives of the two seabob fishing companies, technical and statistical staff of the fisheries department, and representatives of the artisanal sector and NGO observers (WWF). By achieving broad agreement on management proposals and initiatives at this level, before passing recommendations to the Fishery Advisory Committee or minister, there is increased likelihood of disputes being avoided.

Challenges and solutions to meeting PI 3.2.2

This PI focuses on the need for clear, fishery-specific decision-making processes. This implies that the fishery under assessment is subject to very clear management oversight, with clearly defined, fishery-specific jurisdiction and that appropriate management issues are considered, consulted upon and decided upon by the management authority in an appropriate, timely and transparent manner. It is particularly notable that for scoring issue (b), if a fishery management system does not respond to issues in a 'transparent, timely and adaptive manner' then it does not meet the minimum MSC Standard and would fail the overall assessment.

Simply allowing a fishery to take care of itself, based on assumptions that the level of fishing is low, or the impact of the gear is minimal, or that the fishery has been going on for a long time without any obvious problems is not sufficient, however plausible these arguments may be. This PI requires that there is an active and clear management oversight and an active decision-making process. This process should be carried out by those described in the 'roles and responsibilities' in PI 3.1.2 in accordance with the objectives described in PI 3.1.3 and PI 3.2.1.

It should be possible to explicitly describe the process by which management decisions will be taken. These may be routine management decisions, such as annual quota or effort adjustments in response to changing stock status, or these may be less frequent management decisions, such as adjustments to fleet operations, balance between sectors, or incorporation of ecosystem management measures. Above all departmental responsibility for fishery-specific decisions should be clearly defined and stakeholders should understand what decisions are taken, when, by whom and on what basis. This all implies the need for well organised departmental processes. In itself this is not a costly or complex requirements, so lack of scientific capacity or available budgets should be less of a constraint here than in other PIs.

Example actions to improve performance for PI 3.2.2

Process Chronology				Management Actions	
1	2	3	4	Example action	Scoring issue
●				Review the current fishery-specific management decision-making processes that are in place at all relevant jurisdictions and determine the extent to which these are clearly defined, transparent, timely and adaptive.	(a), (b)
●				Review the degree to which current fishery-specific management decision-making seeks appropriate information and research on which to base decisions and how the management processes respond to issues and communicates the reasons behind management decisions.	(a), (b)
	●			Begin process to develop and clearly define fishery-specific management decision-making processes. This should be defined within a fishery management plan and should include details relating to the scope of decisions, the information sources that will be used as a basis for decisions, the process for consulting upon decisions, the process for communicating outcomes and the process for rapid implementation.	(a), (b), (d)
	●			Consider how the precautionary approach will be formally committed to and how this will be practically applied within the management decision-making process.	(c)
	●			Seek to incorporate within the design of the management decision-making process a mechanism to help to proactively act to avoid disputes.	(e)
		●		Ensure all proposals for formal management decision-making processes are subject to stakeholder consultation and give full consideration to the findings of these consultation exercises.	3.1.2
		●		Formally adopt fishery-specific management decision-making processes into the management decision-making process.	(a), (b), (c), (d), (e)
		●		Begin routine management decision-making as part of an adaptive approach to P1 and P2 management.	(a), (b), (c), (d), (e)
			●	Periodically review the appropriateness of fishery-specific decision-making process to ensure that it is achieving the management aims in a way which is timely, transparent and adaptive.	3.2.4

Notes

Notes

3.2.3 Compliance and enforcement

Performance Indicator overview

PI 3.2.3 assesses whether the Monitoring, Control and Surveillance (MCS) mechanisms are adequate to ensure the management and conservation measures in a fishery are enforced and complied with, and that illegal, unreported or unregulated (IUU) fishing is avoided or minimised. MCS systems are considered one of the key principles of effective fisheries management. The scoring for this PI considers the effectiveness of the overall system, the appropriateness of any sanctions for non-compliance and the overall record of compliance and cooperation within the fishery.

The design of the MCS system will depend upon the scale and nature of the fishery. Different fisheries will have different areas of risk of non-compliance, so the MCS system should be designed to recognise these. Typically the MCS system for a fishery will comprise a variety of tools which may include logbook systems, port and dockside monitoring, VMS, fisheries observer programs, at sea monitoring, boarding and inspection, IUU vessel listing and nominated landing ports and times.

The MCS system should apply at all relevant jurisdictions of the fishery. In most cases, MCS measures such as logbooks and port monitoring are undertaken by National Authorities within their EEZs. Domestic fisheries legislation should clearly stipulate the scope of permitted activities and violations for both domestic and foreign fishers and fishing vessels, as a basis for the application of penalties and fisheries enforcement. Where a fishery occurs on the high seas the system should also be designed to address the risk of non-compliance. For example, for fisheries on the high seas many RFMOs require the application of fisheries observer programs, VMS and transhipment regulation. This will be combined with enforcement requirements of the flag state to adopt measures necessary to ensure that vessels do not undermine the effectiveness of international conservation and management measures. These measures include fishing vessel registration, authorisation to fish, record of fishing vessels, application of sanctions of sufficient severity, and monitoring, control and surveillance.

Since the application of MCS systems in small-scale fisheries can present a challenge due to large number and widely dispersed participants, fostering local awareness and increased involvement in fisheries management offers an effective way of addressing enforcement. It is recognised that compliance with fisheries regulations may not in all cases only depend on fisheries enforcement by national authorities. The MSC gives some recognition to the role of more informal or traditional approaches to MCS – in particular in smaller scale coastal fisheries. This recognises that the design of the management system may increase the sense of stewardship over the resource and incentivise compliance with regulations, for example where fishers have greater participation in the management process, through consultations and decision-making. Factors influencing the success of these more informal aspects include prevailing social norms and social disapproval, which in turn may be influenced by factors such as accessibility of the resource, mobility of the fisheries, access to landing sites and market opportunities.

Another important component of an effective enforcement system is the application of consistent and transparent sanctions to provide effective deterrence against non-compliance. Effective sanctions should be clearly stipulated in regulatory provisions and mechanisms. Penalties should outweigh the benefits derived from conducting illegal fishing and sanctions should be applicable at all relevant jurisdictions for the fishery. Sanctions may include administrative and criminal penalties ranging from fines, withdrawal of fishing licence or other fishing opportunities and gear, denial of port landing and trade-related sanctions.

Finally, this PI considers the overall record of compliance of fishers with the controls and regulations in the fishery. This also includes an examination of the degree of cooperation of fishers with management authorities in providing accurate fisheries data or additional information that may assist managers in adopting appropriate fisheries management measures.

Four scoring issues are considered under this PI:

(a) MCS compliance

(b) Sanctions

(c) Compliance

(d) Systematic non-compliance

Scoring issue (a) – MCS implementation

The first scoring issue examines the components of the MCS system and the extent to which these have been effectively linked together into a 'system' designed to address risks of IUU, and which has been shown to be effective.

Scoring issue	SG60	SG80	SG100
(a) MCS Implementation	Monitoring, control and surveillance **mechanisms** exist and are implemented in the fishery and there is a reasonable expectation that they are effective.	A monitoring, control and surveillance **system** has been implemented in the fishery and has demonstrated an ability to enforce relevant management measures, strategies and/or rules.	A **comprehensive** monitoring, control and surveillance system has been implemented in the fishery and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules.

Good practice

Fisheries that perform well against this scoring issue will have a range of MCS mechanisms in place that work together to ensure compliance in the fishery. This may include inspections, monitoring, patrols, surveillance, vessel blacklists, etc. The SG80 and SG100 both contain the word 'system'. This implies that MCS mechanisms not only exist, but these have been coordinated and linked to ensure all areas of risk are covered, ideally comprehensively. The performance level described in SG80 and SG100 also require a 'demonstrated' efficacy, rather than simply an expectation of efficacy.

What certifiers check

Where possible the certifiers will seek independent and credible information, and would typically meet with the relevant compliance and enforcement agencies. In addition the range of documents certifiers will consult include:

- Fisheries legislation.
- Records of court cases.
- MCS plans and strategies.
- Information on MCS mechanisms in place such as VMS, vessel inspections (both at sea and on landing), logbook, sales note and landing declarations, landing restrictions, etc.
- Regional MCS reports – including reviews/ evaluations of MCS efficacy.
- Conservation and management measures adopted by RFMOs.
- Fishery management plans.
- Any agency reports, such as fishery meetings, annual reports and stakeholder committee minutes which may detail compliance information and details of fishery offences and prosecutions.

Certifiers may also use stakeholder interviews to review the existence and effectiveness of informal mechanisms such as social norms and peer to peer control.

Scoring issue (a) – MCS implementation

Key questions to determine where further action is needed

Q Does the MCS system contain all relevant tools/mechanisms to minimise the risk of IUU, including informal mechanisms?

Q Is the MCS system well established and has it been demonstrated to work?

Q Has the MCS system been designed with an understanding of the likely risks of IUU and shaped accordingly?

Q Does the MCS system adequately cover all vessels in the fishery and all areas where the fishery operates?

Examples of scoring rationales

Scoring issue (a)	Fishery Example
SG60	Maldives pole & line skipjack tuna (Certified 2012): There are MCS mechanisms and effective ways to inform fishers of their obligations. However, MCS mechanisms are poorly integrated and there is not a very clear demonstration of its effectiveness.
SG80	New Zealand albacore tuna troll (Certified 201): The following monitoring, enforcement and compliance measures are in place at the RFMO level - VMS, transhipment control, at-sea inspections, port inspections, observer monitoring, monitoring of trade and domestic distribution, seagoing patrols, aerial surveillance and inspections of domestic only vessels. In addition, there is an IUU vessel black list. Within national waters, further monitoring, control and surveillance tools are used including VMS, observer program, vessel inspections (licence, gear and logbook inspections), control of landings (e.g. requirement to land only to licensed fish receivers), inspections of licensed fish receivers, control of transshipment, monitored unloads of fish, Analysis of catch and effort reporting and comparison with VMS, observer, landing and trade data to confirm accuracy, aerial surveillance. This was concluded to be a 'system'.
SG100	Australia Northern prawn (Certified 2012): The management system takes a risk-based approach to compliance. Compliance risk assessments are undertaken in consultation with the industry and compliance plans are developed for the fishery. Primary compliance tools include vessel monitoring systems on all vessels, prior to landing-reports, catch disposal records and fish receiver records. At-sea and in-port vessel inspection, fish receiver inspections, and trip and landing inspections are carried out. Management acts on intelligence provided and there is a considerable degree of peer pressure applied within the industry to ensure compliance. This is also cemented by the industry Code of Conduct which ensures the application of best practice such as reporting ETP interactions, and applying appropriate handling practices. Fishers regularly participate in compliance workshops. Information of importance is shared through this process. This was concluded to be a 'comprehensive system' with a consistent ability to enforce relevant management measures, strategies and/or rules.

Scoring issue (b) – Sanctions

The intent of the second scoring issue of PI 3.2.3 is to ensure that the management system contains clear sanctions to deter fishers from participating in IUU fishing and that these sanctions are consistently applied and effective.

Scoring issue	SG60	SG80	SG100
(b) Sanctions	Sanctions to deal with non-compliance exist and there is some evidence that they are applied.	Sanctions to deal with non-compliance exist, **are consistently applied** and thought to provide effective deterrence.	Sanctions to deal with non-compliance exist, are consistently applied and **demonstrably** provide effective deterrence.

Good practice

Fisheries that perform well against this scoring issue have penalties or repercussions that are applicable when there are violations of fisheries regulations. To achieve higher scores requires greater evidence of consistent application of sanctions and a proven effective deterrence.

What certifiers check

Where possible the certifiers will seek independent and credible information and would typically meet with the relevant compliance and enforcement agencies. In addition certifiers are likely to speak to fishers about their understanding of sanctions for different infringements. Certifiers will also check documents such as:

- Provisions in fisheries legislation about penalties.
- Court cases as evidence of level of sanctions.
- Past records of regional fisheries management arrangements (delisted vessels etc.), and reports from national fisheries.
- Stock modelling may in some cases provide an indication of 'unaccounted mortality' which may provide an indication of IUU fishing.
- Reviews and evaluations (both internal and external) of the monitoring, control and enforcement system in the relevant jurisdictions of the fishery.

Scoring issue (b) – Sanctions

Key questions to determine where further action is needed

Q Do fishermen have a clear understanding of the sanctions for different IUU infringements and is this understanding consistent across the fleet?

Q Are the penalties for repeat infringement also clearly and consistently understood (and applied)?

Q Do regulations clearly state the sanctions for different infringements?

Q Is there evidence of past infringements resulting in sanctions? Where infringements were similar, were the sanctions consistent?

Q Are there any evaluations or reviews which provide a reliable indication of the effectiveness of the deterrence provided by the MCS system?

Examples of scoring rationales

Scoring issue (b)	Fishery Example
SG60	*Snapper gillnet fishery:* There are sanctions which are applied as appropriate within the fishery, but there is no evidence to show that the sanctions provide effective deterrent. For example, there is an administrative penalty in place in event of pingers either not working or not being in place. Although this has been applied in the past, it has been difficult to prove that pingers are being used and there is evidence that the sanction has not been consistently applied.
SG80	Mexico Baja California pole and line yellowfin and skipjack tuna (Certified 2012): There are strong sanctions for non-compliance and it is considered that these provide effective deterrence; however given the status of the sector with low levels of activity it is not possible to conclude that these demonstrably provide effective deterrence.
SG100	Ashtamudi Estuary short-necked clam (Certified 2014): Local fishery officers and the police are able to enforce fisheries regulations. Infringement of these regulations can result in confiscation of fishing equipment and a penalty of up to ₹2500 Rupees. The level of non-compliance is reported to be low, with only 3-4 prosecutions per year. This suggests that deterrence is effective; the clam fishing areas are easily observed by both enforcement officers and stakeholders, so any transgressions are readily apparent. The combination of sanctions, and the low risk of transgressions being missed is considered to demonstrate that levels of non-compliance are low as a result of the deterrent effect of the sanctions, meeting the SG100 requirements.

Scoring issue (c) – Compliance

The intent of the third scoring issue in PI 3.2.3 is to verify that there is a good record of compliance by fishers in the fishery and that fishers are providing any information requested to contribute to the effective management of the fishery.

Scoring issue	SG60	SG80	SG100
(c) Compliance	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.	**Some evidence exists** to demonstrate fishers comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery.	There is a **high degree of confidence** that fishers comply with the management system under assessment, including, providing information of importance to the effective management of the fishery.

Good practice

In fisheries that perform well against this scoring issue, there is also evidence and a high degree of confidence that fishers comply with regulations. In addition to achieve higher scores fishers provide additional information, such as daily catch landings or bycatch data to managers for effective management.

What certifiers check

It will be important for certifiers to meet with fisheries enforcement personnel to ascertain not only the level of compliance, but also their degree of confidence in that compliance record. It is likely that confidence may be linked to the overall efficacy of the MCS system, perceived weaknesses or incentives to infringe regulations. The range of documents certifiers will consult include:

- Regional and national fishing licencing records.
- Access permission documents (observer/ scientific trips).
- Logbooks – evidence of inspections.
- Documents/records indicating past vessel and crew conduct.
- Records of past infringements.
- Reviews/evaluations of the effectiveness of the MCS system.

Scoring issue (c) – Compliance

Key questions to determine where further action is needed

Q Can it be demonstrated that fishers comply with all relevant regulations?

Q Do fisheries enforcement personnel have confidence in the MCS system and the resulting level of compliance?

Q Do fishers provide additional information to managers to support the effective management of the fishery? This could include voluntarily carrying observers, recording bycatch data, reporting suspected illegal activity, providing operational or economic data?

Examples of scoring rationales

Scoring issue (c)	Fishery Example
SG60	Razor clam from Ria de Pontevedra (Certified 2013): The divers are generally aware of the importance of complying with the fishery's management system and cooperate practically in the management plan design process. They are organised internally and provide relevant information for effective management of the fishery.
SG80	Lake Hjälmaren pikeperch fish-trap and gillnet (Recertified 2013): Fishermen's organisations, including most fishers, are fully informed of regulatory requirements. Any other changes in the management system are discussed with the fishermen through established procedures. Information and training is provided in the aims of the system and key factors such as care of undersize individuals to maximise survivorship. Fishermen are actively engaged in data collection and support the aims of management bodies, showing both knowledge and support of the aims of the management system. Awareness of management measures, and compliance with these, appears very good and provides sufficient information.
SG100	Falkland Island toothfish (Certified 2014): The high level of observer coverage in the fishery, close monitoring of fishing activity using surveillance equipment, and inspection of landings provides a high degree of confidence that the fishery is complying with all relevant management measures. Further confidence is provided by information showing that there has been no enforcement action or legal action taken against the fishery for over 7 years. The fishery also assists management through the provision of daily catch data via an electronic logbook scheme which supports effective stock management.

Scoring issue (d) – Systematic non-compliance

The intent of the 4th and final scoring issue at PI 3.2.3 is to confirm that there is no systematic non-compliance.

Scoring issue	SG60	SG80	SG100
(d) Systematic non-compliance		There is no evidence of systematic non-compliance.	

Good practice

If there is any systematic non-compliance SG80 is not met and a condition is triggered. Good performance against this scoring issue is simply a lack of systematic non-compliance.

What certifiers check

Again it will be important for certifiers to meet with fisheries enforcement personnel to ascertain whether there are any non-compliances that are particularly widespread across the fleet or whether there have been systematic attempts to circumvent particular enforcement controls. Interviews will be supported by referring to relevant documents such as:

- Reports from stakeholders of possible illegal practices that should be verified by the agencies MCS system.
- Evaluations of the MCS system.
- Records of infringements indicating persisting enforcement controls including the same offence occurring overtime.

Scoring issue (d) – Systematic non-compliance

Key questions to determine where further action is needed

Q Are there indications – either from enforcement officers, or other stakeholders, or fishers themselves – of particular enforcement issues (infringements) that continue to occur and which the management regime has not addressed?

Q Are there certain infringements that regularly occur and that the sanctions have not deterred?

Q Are there any regulations that are widely ignored where the scale of the infringement means that the enforcement authorities are unable to or unwilling to enforce?

Examples of scoring rationales

Scoring issue (d)	Fishery Example
SG60	No scoring guidepost at the 60 level.
SG80	Sian Ka'an and Banco Chinchorro Biosphere Reserves spiny lobster (Certified 2012): The cooperatives and the fishers that belong to them respect the authority, comply with law and assist with enforcement. Although some illegal fishing by non-cooperative fishers occurs there is no evidence of systematic non-compliance.
SG100	No scoring guidepost at the 100 level.

Challenges and solutions to meeting PI 3.2.3

Historically, MCS procedures directed to control the amount of catch and fishing effort have been comparatively weakly implemented in developing countries. This is primarily due to the potentially high number of fishers with easy access to high unit value resources, widely dispersed along extensive and sometimes inaccessible coastlines, coupled with the challenge of ensuring adequate surveillance and enforcement at landing sites, in the face of generally reduced budgets and staff.

Effective monitoring, control and enforcement can be expensive – both in terms of personnel and equipment cost. However, expensive MCS tools do not guarantee either effective enforcement or good compliance. As with any management system it is the design and performance of the system that is important. Demonstrating that the enforcement system is tailored to the risks of non-compliance is important; whatever the resources available for enforcement. Similarly, providing records of infringements and reviews/evaluations of the performance of the MCS system are as important in a poorly resourced MCS system as in a state of the art system. In addition, fishers may use more informal and traditional approaches to ensure compliance through various forms of local stewardship or using peer pressure as a deterrent in the fishery.

The other challenge for developing country fisheries may be the requirement for fisheries restrictions, infringements and sanctions to be officially documented – ideally legally binding in the form of regulation or other legal instruments. Where these are not legally binding there is reduced likelihood of consistent application of sanctions, and the overall effective deterrence is likely to be reduced.

Example actions to improve performance for PI 3.2.3

Process		Chronology		Management Actions	
1	2	3	4	Example action	Scoring issue
●				Undertake a review of the MCS system in place in the fishery. This should identify the risk of potential infringements, the appropriateness/adequacy of the measures in place to address these risks and amend the degree to which the measures are strategically linked to tackle these risks.	(a)
●				A further review could be undertaken to review the history (and evidence) of non-compliance in the fishery, to determine the degree to which the existing system provides an effective deterrent.	(b), (c) (d)
	●			Design and start an action plan to address the weaknesses identified in the reviews focusing closing any gaps in the MCS system and addressing any systemic non-compliant practices.	(a), (b)
	●			Proposed changes may require the amendment to existing laws, working practices and departmental structures or budgets. These proposals should be fully consulted upon.	(a), (b), 3.1.2
		●		With the increase in activity and the action plan, produce publicity on sanctions and penalties and work with local industry and regional partners to inform fishers of sanctions and penalties. Reinforce compliance with communication and education of the relevant stakeholders.	(b), (c)
		●		Implement new working practices which strategically allocate resources to main identified risks. This may include a requirement for staff training.	(a)
			●	Undertake periodic review of the effectiveness of the MCS system. Ideally this should include occasional external review.	3.2.4

Notes

Notes

3.2.4 Monitoring and management performance evaluation

Performance Indicator overview

Transparent and accountable fisheries institutions and decision-making processes allow for on-going internal and external evaluation that ensure effective and improving management performance. This is the focus of the final PI of Principle 3.

The design of the evaluations and reviews should be appropriate to the cultural context, scale and intensity of the fishery. The focus of the evaluation should be both overarching (the overall performance against objectives) and also focused on particular components of the management system. The component parts evaluated may include the performance of the compliance and enforcement system, the effectiveness of scientific and research feedback and the effectiveness of consultation and decision-making processes.

The status of the resource, management priorities and stakeholder focus are dynamic. As such regular evaluation by the management institutions or agency will consider the suitability and cost effectiveness of current management practices and regulations to determine when appropriate modifications are required. Where there has been considerable investment in building management capacity, it is also good practice to carry out an evaluation of whether this investment has resulted in intended changes.

The process of evaluation or review should ideally be stated in legislation or regulation or be stated in an underlying business or corporate plan. Fishery management plans should also state the intended duration of the plan, the timing and process of evaluation and whether it is to be internal or external. Internal review has the advantage of being quicker and cheaper, but may be less well suited to identifying more systemic issues. For this reason it is good practice to have periodic external evaluations. Depending upon the scale and intensity of the fishery, the external review, which is required to meet good practices, could be:

- By another department or agency
- By another agency or organisation
- Through a government audit that is external to the fisheries management agency
- By a peer organisation nationally or internationally
- By external expert reviewers and consultants

Two scoring issues are considered in this PI:

(a) Evaluation coverage

(b) Internal and/or external review

Scoring issue (a) – Evaluation coverage

The intent of the first scoring issue of PI 3.2.4 is to ensure that various evaluations are undertaken of the component parts of the management system.

Scoring issue	SG60	SG80	SG100
(a) Evaluation coverage	There are mechanisms in place to evaluate **some** parts of the fishery-specific management system.	There are mechanisms in place to evaluate **key** parts of the fishery-specific management system.	There are mechanisms in place to evaluate **all** parts of the fishery-specific management system.

Good practice

To meet this requirement at SG80 requires that at the very least 'key' parts of the management system should be evaluated. Good practice may involve having a range of approaches for evaluation. These may include peer review of stock assessments by scientific committees, internal or external audits of components of the fishery or review of implementation of management regulations by government agency, NGO or donor.

What certifiers check

Certifiers will look to obtain all evaluations that have been completed on different aspects of the management system in recent years. It is also likely that certifiers will ask stakeholders in site visit meetings, whether evaluations have been carried out relevant to their area of focus. Certifiers will look to identify the following evaluations (both internal and external):

- High level evaluations of the overall fisheries management framework within the relevant jurisdictions.
- Evaluations of fishery-specific laws and regulations.
- Evaluations of the monitoring, control and surveillance system.
- Evaluations of any fisheries sector development plans or funding programs.
- Evaluations of the performance of stock assessment (bench mark assessments).
- Evaluations of performance in meeting environmental objectives and international commitments and targets.

Scoring issue (a) – Evaluation coverage

Key questions to determine where further action is needed

Q Have any evaluations been carried out in recent years on any parts of the management system, such as the management plan, or MCS, or stock assessment procedures?

Q Are there processes in place which provide the management system with a clear indication of whether the measures and regulation in place are meeting the intended objectives?

Q Do stakeholders in the fishery have an opportunity to review the performance of the fishery management?

Q Do outside agencies (e.g. FAO) undertake reviews of the fisheries sector?

Examples of scoring rationales

Scoring issue (a)	Fishery Example
SG60	Full Bay Scallop Association (FBSA) Canada Full Bay sea scallop (Certified 2013): There is ongoing monitoring and evaluation through logbooks, VMS and dockside observers. Research surveys supply additional data for full scientific assessments. While not a formal evaluation process the post-season meetings review the outcomes of the past fishery and discuss proposals to be put forward for the following season. These meetings review some parts of the system including the stock status report, fishing success or lack of, enforcement issues or problems with specific management measures in use etc. However the focus appears to be on productivity and enforcement issues while P2 elements receive little review, therefore a 'key' part of the management system is not evaluated.
SG80	Fiji albacore tuna longline (Certified 2012): The Western and Central Pacific Fisheries Commission (WCPFC) has committed to an independent performance review. Stock assessments conducted are subject to internal peer review by other members of the Scientific Committee. A recent Independent Review of the Commission's Transitional Science Structure and Functions suggested the need for periodic external review of the stock assessments, which has been adopted. An annual report is also provided to the Commission on compliance of members. Progress with implementation of management regulations is monitored through the reporting provisions or the Annual Reports by members to the Commission. Commission meetings provide an overall review of processes and outcomes. Nationally, a review of Fiji fisheries legislation is currently underway, involving stakeholder inputs. An audit of Fiji fisheries is also currently occurring. Regular audits are carried out by the Fisheries Department on catch information, record keeping, compliance with licence conditions and observer data. The observer processes used by the Ministry were recently audited and certified by an external agency. The Department of Fisheries performance is evaluated in the annual report.

Scoring issue (a) – Evaluation coverage

Examples of scoring rationales – *continued*

Scoring issue (a)	Fishery Example
SG100	Australia Northern prawn (Certified 2012): The management body, Australia Fisheries Management Authority (AFMA) that oversees the Northern prawn fishery management system is subject to internal and external performance review of all aspects of the management system. This includes AFMA's Annual Report on overall performance against the legislative objectives, statutory requirements and financial reporting, the effectiveness of internal controls and adequacy of systems; and the Authority's risk management processes as well as questioning by the Australian Commonwealth Government Senate Standing Committee on Rural and Regional Affairs in Senate Estimates hearings (three times/year). There is also a regular review of the by-catch program and a very high level of assessment applied to MSC P2 components.

Scoring issue (b) – Internal and/or external review

This scoring issue focuses in on the fishery-specific management, rather than the other component parts of the fisheries management framework.

Scoring issue	SG60	SG80	SG100
(b) Internal and/or external review	The fishery-specific management system is subject to **occasional internal** review.	The fishery-specific management system is subject to **regular internal** and **occasional external** review.	The fishery-specific management system is subject to **regular internal and external** review.

Good practice

In fisheries that perform well against this scoring issue there is greater regularity of review and presence of external review, rather than just internal review.

What certifiers check

Certifiers will check the following documents for evidence of reviews of the fishery-specific management system:

- The fishery management plan.
- The regulation or order which enshrines the management plan in law.
- Past evaluations of the fishery-specific management system.

Scoring issue (b) – Internal and/or external review

Key questions to determine where further action is needed

Q Does the management plan or other binding document setting out the process of management of the fishery state the frequency and scope of evaluations?

Q Are there past evaluations of the management plan (either internal or external)?

Q Was the current management plan (or fishery-specific management system) reviewed prior to implementation?

Q Are there feedback mechanisms within the management system which means that the performance of the management (and the fishery) is subject to on-going review and refinement?

Examples of scoring rationales

Scoring issue (b)	Fishery Example
SG60	Mexico Baja California pole and line yellowfin and skipjack tuna (Certified 2012): At a national level the Carta Nacional Pesquera (CNP) provides the vehicle for review of the fisheries. However, this is only occasional and not regular and the fishery therefore meets the SG60 but not SG80.
SG80	Maldives pole & line skipjack tuna (Certified 2012): At the national level, internal review is permanent while external review by consultants is occasional although IOTC review is permanent. At the regional level there is permanent internal review. The recently conducted external review of IOTC allows the finding that this takes place occasionally therefore the external review at the national and regional level cannot be regarded as regular.
SG100	Burry Inlet cockles (Recertified 2013): Regular reviews of the management system are led internally by the national statutory environment agency, but these also involve consultation with external bodies such as the national statutory nature conservancy agency and relevant national government departments. In addition stakeholders are engaged in this review process through the Burry Inlet Management Advisory Group. Given the scale and cultural context of the fishery, this was concluded to meet the requirements of 'regular internal and external review'.

Challenges and solutions to meeting PI 3.2.4

The process of on-going review and evaluation to ensure the performance of management is refined and improved may not be a common process across all government departments. Similarly, where management systems are changed it may not be common practice to formally review the outcomes of these changes against prior stated objectives. Where such reviews do occur, they may be irregular and only rarely external.

The process of review or evaluation can be slow and can be sometimes seen as an impediment, particularly where the findings indicate the need for management changes. Any changes resulting from review or evaluation may also have logistic or financial implications which may present a challenge to governmental budgets. Finally, most reviews or evaluations require some form of data to provide indications of performance and trends. Where there is a historical paucity of data or the management system is relatively new, there may be a reduced timeline with which to draw comparisons.

Some of the approaches to addressing some of the issues include using a provincial or national government agency, university, NGO or donor organisation to undertake the external evaluation as opposed to using expensive services to undertake the review.

Example actions to improve performance for PI 3.2.4

Process Chronology				Management Actions	
1	2	3	4	Example action	Scoring issue
●				Undertake a review of reviews. This should list all aspects of the fishery management process and ascertain the degree to which these management processes are subject to review or evaluation, whether or not any such reviews are regular, internal or external. In addition, it is important to identify whether a holistic review of the overall performance of the management system, as well as its component parts, is subject to evaluation.	(a), (b)
●				Check whether the management system, or its component parts require reviews or evaluations to be undertaken, and whether there is any stipulation over the frequency of these or the need for external evaluation.	(a), (b)
	●			Develop proposals for management review and evaluation, addressing any gaps identified in step 1 (above).	(a), (b)
	●			Consult on proposals for management review and evaluation.	3.1.2
		●		Incorporate commitments for review/evaluation into relevant legislation, management policy, strategic plans and departmental work plans. In particular the fishery management plan should detail those parts of the management system that will be subject to review, indicating how this will be done, how often and by whom. This should also include practical considerations such as how reviews/evaluations will be funded.	(a), (b)
		●		Ensure that all (or at least 'key') parts of the management system are subject to review/ evaluation, including external evaluation.	(a), (b)
			●	Continue to undertake reviews/evaluations as set out in the management plan or departmental guidelines.	(a), (b)
			●	Implement changes as recommended by reviews/evaluations, or where not implemented set out the reasons for this in a timely and transparent manner.	3.2.2

Notes

Section 4

Annexes

Annexes

Overview

Annex 1
Risk-Based Framework

Introduction to the Risk-Based Framework

The Risk-Based Framework (RBF) is designed to score the 'outcome' Performance Indicators (PIs) associated with Principles 1 and 2 of the MSC Fisheries Standard when there is insufficient data to score a PI using the default assessment tree.

These outcome PIs score the performance of a fishery with regard to its impacts on the target species (dealt with in Principle 1) on species identified as primary, secondary, or ETP; on habitats; and on ecosystems (dealt with in Principle 2).

The RBF comprises a set of methods for assessing the risk of the fishery to each of these ecological components. Each method provides a risk-based estimate of the impact of the fishery on the ecological component (or on individual elements of that component, such as individual species or habitats). These risk estimates in turn translate into a parallel outcome score.

Triggering the RBF

The RBF is triggered when there is insufficient data to score one or more scoring elements categorised under an outcome PI. The schematic below shows when the RBF is triggered and which assessment methods should be used for that PI.

Table 1: Criteria for triggering the use of the RBF

PI 1.1.1 Stock status

- No stock status reference points are available, either derived from analytical stock assessment or using empirical approaches.

PI 2.1.1 Primary species and PI 2.2.1 secondary species

- No stock status reference points are available, either derived from analytical stock assessment or using empirical approaches.

PI 2.3.1 ETP species

- There are no national requirements for protection and rebuilding, and
- The impact of the fishery in assessment on ETP species cannot be analytically determined.

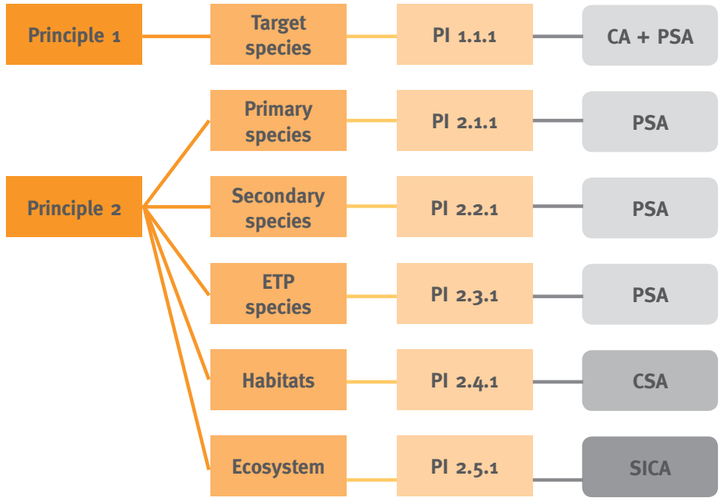
PI 2.4.1 Habitats

- Information is not available to (1) determine the habitats encountered by the fishery, and (2) understand the impact of the fishery on the habitats encountered.

PI 2.5.1 Ecosystem

- Information is not available to support analysis of the impact of the fishery on the ecosystem.

Figure 1: Performance Indicators and associated RBF methodologies



RBF methodologies

The MSC RBF comprises four methodologies:

Method 1: Consequence Analysis (CA) - Principle 1 species

The CA is a semi-quantitative analysis that assesses the consequence of fishing activity on a particular target species subcomponent. The CA is based on the structured collection of qualitative information from a diverse group of stakeholders, as well as use of biological indicator trend information to estimate changes to the relevant subcomponent of a scoring element.

Method 2: Productivity Susceptibility Analysis (PSA) – Principle 1, primary, secondary and ETP species

The PSA is a semi-quantitative analysis that is based on the assumption that the potential risk to a species (scoring element) will depend on the extent to which the species is subject to impact and the inherent productivity of that species (or ability to recover from that fishing impact). The PSA uses information about a species life-history and the fishing activity on the scoring element to determine a risk score for a predefined set of attributes. Any attribute for which there is insufficient data is automatically assigned the highest risk score. At least some information is thus needed to demonstrate low risk in the fishery. These risk scores are entered into the RBF worksheet, which automatically calculates and converts these risk scores into MSC equivalent scores.

Method 3: Consequence Spatial Analysis (CSA) - Habitats

The CSA is a semi-quantitative analysis that assesses the impact of fishing activity on habitat structure and function. The CSA is based on the assumption that the potential risk to a habitat (scoring element) is a function of the interaction between the gear and the habitat, the productivity of the habitat being impacted and the spatial overlap of the fishery with the habitat. The CSA requires information about the gear type; habitat type and spatial overlap of gear with habitat types and uses this to assign a risk score to a predefined set of attributes. Any attribute for which there is insufficient data is automatically assigned the highest risk score. At least some information is thus needed to demonstrate low risk in the fishery. These risk scores are entered into the RBF worksheet, which automatically calculates and converts these risk scores into MSC equivalent scores.

Method 4: Scale Intensity Consequence Analysis (SICA) - Ecosystem

The SICA is a qualitative analysis that assesses the impact of the fishery on the wider ecosystem. It considers the risk the fishery has on wider ecosystem structure and function by evaluating the scale and intensity of the fishery and how this affects the state of the ecosystem. The state of the ecosystem is determined by looking at indicators of health such as species composition, functional group composition, distribution of the community and trophic/size structure. SICA is based on the structured collection of qualitative information from a diverse group of stakeholders.

Note: all RBF methodologies take a precautionary approach in scoring. Where there is not enough data to support a low risk score an assessment team will assign a high risk score. Although the RBF has been developed to enable assessment of data-deficient fisheries, MSC encourages fisheries to collect more data in order to increase their understanding of the fishery and the increased certainty will potentially also allow for higher scores.

What data to collect and what is checked?

The methods included in the RBF can be used to manage fisheries and data collected below can support a fishery manager to manage the fishery. In an MSC assessment, the RBF is used to assess the risk of the effect of fishing activity on an ecological component in relation to the Standard. Regardless of whether the methods included in the RBF are already being used to manage a fishery, if the fishery is being assessed against the MSC Standard the assessment team will apply the RBF methodology as detailed within the FCR.

In the following section an overview is given of what certifiers check. This is followed by examples of scores and corresponding rationales for each methodology. *Note:* in fisheries where RBF is triggered there is likely to be limited information available in published form. Certifiers will additionally use stakeholder interviews and participatory methods to obtain information required to score the fishery.

Method 1: Consequence Analysis (CA)

What certifiers check

Certifiers require indicator trend information about the target species to support scoring of this PI. Where no indicator information is available a fishery cannot be scored using the RBF so a key question is whether there is enough indicator information available to score the data-deficient target species. Prior to scoring certifiers will identify the most vulnerable subcomponent for each scoring element from the following options: Population size, reproductive capacity, age/size/sex structure or geographic range.

Information that can be used include:

- Landings.
- Empirical catch composition data (perhaps with seasonal and spatial patterns).
- Exploitation rates and CPUE time series.
- Geographical species distribution data.
- Biomass and recruitment estimates.

Examples of scoring rationales

CA score	Most vulnerable subcomponent	Rationale
60	Population size	*Sardine purse seine fishery:* Surveys which estimate abundance and distribution of sardine recruits and pre-recruits are carried out every three years. Combined with logbook data which provide catch per unit effort (CPUE) trends it can be confirmed that although stock is exploited at full exploitation rate long-term recruitment dynamics are not adversely impacted.
60	Age/size/sex structure	*Crab pot fishery:* Landings data indicates that there is a detectable change in size/sex structure. However information about abundance and recruitment indicates that the long-term recruitment dynamics have not been adversely damaged. There appears to be a reduced number of large males of sufficient size to mate with the largest females and that has potential effect of reducing the reproductive capacity of the largest females. Smaller male crabs may not be able to mate with large females. There is a concern that a reduced abundance of large male crabs may lead to sperm limitation and reduced levels of egg production if there are not sufficient males left in the population to mate with the larger females.
80	Reproductive capacity	*Redfish trawl fishery:* Redfish are a slow-growing, long-lived species (max reported age: 40 years). Results from a selectivity study indicate that the 50% selectivity (22 years) is well above the age at 50% maturity (6 years). Individuals should therefore have over 17 years of spawning before they enter the fishery, therefore ensuring the protection of a significant part of the adult population allowing for multiple spawning events. Although a significant part of the adult population is protected before they enter the fishery, size class indices suggest there has been a reduction in reproductive capacity, however, the impact on population dynamics is minimal.
80	Geographic range	*Snapper handline fishery:* Fishing effort is very low with four boats targeting the stock. Only 2% of the stock distribution area (1132 km^2) has been swept by the gear (26km^2). Species distribution time-series indicate a shift in the geographic range of the snapper. Additionally, information from a research program indicates there is no evidence of local depletion nor has there been a change in the population distribution.
100	Population size	*Cod longline fishery:* CPUE trends show stability over the last 20 years and recruitment indices have shown no major changes over the last 10 years. Changes to the population as a consequence of fishing are not detectable against the natural variability of the population.

Method 2: Productivity Susceptibility Analysis (PSA)

What certifiers check

Certifiers require information about life history characteristics of a species as well as information about the degree of overlap between the distribution of the fishery and the distribution of the stock and whether the species occurs at the same depth in the water column as the fishing gear. Information sources can include the following:

- Reports describing life history characteristics of a species.
- Fish species life history database e.g. FishBase and SeaLifeBase
- Maps showing the distribution of fishing effort (also including other and particularly MSC fisheries impacting the same species).
- Empirical catch composition data and specific tonnages of a species caught per fishery.
- Any information on gear selectivity or post-capture mortality.

The PSA score is calculated automatically within the RBF worksheet which can be downloaded from the MSC website. The final MSC score for PI 1.1.1 is a combination of the CA and PSA score while for P2 species the final score is solely determined by the PSA.

PSA scores that are entered into the RBF worksheet are risk scores that range from 1-3 that are determined based on Table PF4 and Table PF5 in the FCR.

Examples of scoring rationales - Productivity attributes

	Productivity attributes [1-3]								
Total productivity score	Average age at maturity	Average max age	Fecundity	Average max size	Average size at maturity	Reproductive strategy	Trophic level	Density dependence	Rationale
1.57	1	2	1	1	1	2	3		Herring matures when it is 2 years (average size at maturity). The maximum recorded age is between 18 years (average maximum age). Average size at maturity is approximately 27 cm and average maximum size is about 39 cm. Herring deposit approximately 10,000-60,000 demersal eggs on a variety of substrates in areas with strong tidal currents (reproductive strategy). Trophic level of herring is 3.4 ± 0.1 SE.
1.50	1	1	1			1	2	3	Blue swimming crab (BSC) matures when it is approximately 1 years old (average age at maturity) and can reach an average maximum age of 3 years old. Each female produces a huge amount of eggs, between 180,000 and 2 million in a single spawning (fecundity). Berried females incubate eggs for 18 days and when embryos are mature the female shakes the eggs of her abdomen and they hatch into zoea (reproductive strategy). BSC has a tropic level 3. There is no evidence that BSC display depensatory dynamics at low population sizes. BSC can be found in a large area but it is likely they have distinct brood stocks. If these distinct brood stocks are heavily fished there is a likelihood that the crab population will have reduced fitness (density dependence).
1.71	1	2	1	2	2	1	3		Cod matures when it is approximately four years old (average age at maturity) and it can reach an average maximum age of 20 years old. Cod is around 60cm when it reaches maturity (average size at maturity) and can reach up to 160cm (average maximum size). Cod form spawning aggregations (reproductive strategy) and they lay between 2.5 and 9 million eggs (fecundity). Trophic level is 4.4.

Examples of scoring rationales - Susceptibility attributes

		Susceptibility attributes			
Areal Overlap	Encounterability	Selectivity	Post-capture mortality (PCM)	Rationale
2	3			*Hake longline fishery:* Hake is widely distributed in a variety of habitats, from the shoreline to the continental shelf (180km). Adults are usually found in deeper, colder waters and depth range is 0-600 m, but they are more usually found between 150 and 200m. The fishery operates from 50km to 100km from shore. Longline has leaders fixed at regular intervals (every 2-2.5m) with baited hooks. Depth range of the longline line is between 150-250m. Areal overlap is 27%, while the encounterability is high.
3	2			*Sea bass gillnet fishery:* Sea bass is distributed in a variety of habitats, from the shoreline to the continental shelf which is approximately 30nm from shore. The depth range of the seabass is thought to be from 0-20m (from sea level). The gillnet fishery operates in from 5nm to 30nm from shore. The gillnet fishery nets are set at all depths from 5-10m. Areal overlap is >80% and encounterability is medium.
		2		*Cod longline fishery:* The fishery uses bait to attract cod. Looking at catch composition data it becomes clear that mature species (> 64cm) make up a high percentage of the catch. Occasionally individuals <60cm but >40cm are caught. Undersize individuals are attracted to the bait but are not caught often.
		2		*Sardine gillnet fishery:* The gillnets have a minimum mesh size of 3cm. A study to determine optimum mesh sizes for gillnets in the fishery concluded that tangling is the most common way the fish are caught in the gillnet. Additionally, this study indicates that the mesh size retains individuals from 13-22cm in length. Average length of sardine landed in the gillnet fishery is 18cm while length at maturity is 15cm. Individuals < size at maturity are rarely caught.
			1	*Shrimp trawl fishery:* Trawls retain starfish all of which are sorted and put back into the sea. Scientific studies on the survivorship of starfish indicate that at least 60% survivorship of individuals returned to sea.
		3	1	*Octopus pot fishery:* The catch composition of the fishery indicates that approximately 60% of the catch is smaller than the size at maturity and they are captured often (selectivity). Evidence presented on the biology of the species and the handling of the individuals indicates that the majority of the juveniles are released alive (PCM).

Note: Where the impacts of multiple fisheries have to be taken into account the Areal Overlap and the Encounterability score should reflect the combined impact of these fisheries while the Selectivity and Post-capture Mortality are scored separately for each fishery impacting that species/stock.

Method 3: Consequence Spatial Analysis (CSA)

What certifiers check

Certifiers require information about types of habitats encountered, their distribution and information about the interaction of the gear with the habitat, this can include the following:

- Maps showing the distribution of fishing effort.
- Maps showing the habitat distributions throughout and beyond the fishing areas.
- Information about the types of biota found in each habitat.
- Information about the types of substrata found in each habitat and its characteristics.
- Reports describing the recolonisation of biota.
- Reports describing natural disturbance of habitat at depth.
- Information about the depths at which habitats are found.

The CSA score is automatically calculated in the RBF worksheet which can be downloaded from the website. The final MSC score for 2.4.1 is a combination of CSA scores for all habitat types in the fishery. CSA attribute scores that are inputted into the RBF worksheet are risk scores ranging from 1-3 and are determined based on Table PF11 through to Table PF17 in the FCR.

Examples of scoring rationales - Consequence attributes

Consequence attributes

Consequence score	Regeneration of biota	Natural disturbance	Removability of biota	Removability of substratum	Substratum hardness	Substratum ruggedness	Seabed slope	Rationale
1.67	2	1	1	1	3	3	1	The habitat is categorised as follows using SGB nomenclature: Fine – Flat – small erect. It is distributed throughout the inner shelf from approximately 25-50m (seabed slope). The fishery utilises gillnets. There is no information available to score the regeneration of biota or the natural disturbance which is why the surrogates – small encrusting/inner shelf – are scored for those two attributes. Removability of biota score is based on gillnet/small erect while removability of substratum score is based on gillnet/ fine substratum combination. The substratum hardness score is based on fine sediments/gillnet combination while substratum ruggedness score is based on the flat surface of the habitat and gear type.
2.11	3	2	3	1	1	3	1	The habitat is categorised as follows using SGB nomenclature: Large – Outcrop – Large erect. It is distributed on the outer shelf from approximately 60-200m (seabed slope). The fishery utilises demersal trawls. There is no information available to score the regeneration of biota score or the natural disturbance which is why the surrogates – large erect/outer shelf – are scored for those two attributes. Removability of biota is based on demersal trawl/large erect while removability of substratum score is based on demersal trawl/cobbles combination. The substratum hardness score is based on fine hard rock type/demersal trawl combination while substratum ruggedness score is based on the fact that habitat is a low relief outcrop and gear type.

Examples of scoring rationales - Spatial attributes

Total Spatial score	Gear footprint	Spatial Overlap	Encounterability	Rationale
1.36	1	2.5	1	*Lobster trap fishery:* The habitat is categorised as follows using SGB nomenclature: Solid reef – High relief – Small erect. It is distributed throughout the inner shelf from approximately 25-60m. The managed area is the EEZ of the country, but the habitat extends beyond the EEZ and has an area of approximately 1300km². The lobster is not found in the EEZ of the neighbouring country and the fishery operates from the shore up to 50m throughout the EEZ. The EEZ of the neighbouring country is about 1/3 of the size of the EEZ of the country where the fishery operates. This means that the spatial overlap of the fishery and the habitat is approximately 70%. The traps (gear footprint) are set on the bottom and close to crevices where lobsters are often encountered. Although the traps are set throughout a wide area they are small and do not encounter the habitat very often. Stakeholders indicate that there is approximately 25% probability that the gear encounters the habitat (encounterability).
2.08	2	1.5	3	*Cod demersal longline fishery:* The habitat is categorised as follows using SGB nomenclature: Medium – Low relief – small erect. It is distributed throughout the inner shelf from approximately 25-50m. The managed area comprises the EEZ of the country, and the fishery operates along the coast from 0-35m as prescribed by the management agency. The spatial overlap of the fishery with the fishery is approximately 40%. The habitat does not extend beyond the EEZ. The fishery sets the demersal longline (gear footprint) on the bottom to attract the cod, so there is a high likelihood that it encounters the habitats probably >75% (encounterability).

Method 4: Scale Intensity Consequence Analysis (SICA)

What certifiers check

Certifiers require information about the ecosystems in which the fishery operates and specifically their structure and function. The first three steps of the SICA are to determine the spatial and temporal scale and the intensity of the fishery on the ecosystem. Using this information and similar to the CA, the certifier then identifies the most vulnerable subcomponent from the following options: Species composition, functional group composition, distribution of the community and trophic/size structure. Once the most vulnerable subcomponent has been identified, the certifier scores the consequence of the fishery on this subcomponent.

Information to inform scoring of the SICA may include:

- Empirical catch composition data (perhaps with seasonal and spatial patterns).
- Reports about (if any) keystone species retained in the fishery.
- Information about community distribution (maps, reports).
- Number of functional groups.
- Information on trophic levels within the ecosystem.
- Information about the fishing operation: where it operates and how often.

Examples of scoring rationales

SICA score	Most vulnerable subcomponent	Rationale
60	Species composition	*Scallop dredge fishery:* The fishery affects the wider ecosystem through alterations in invertebrate community structure. Besides scallops, dredges capture rocks, shells, sponges, tunicates, sea urchins and lobster. There is evidence that the fishery affect the species composition such that robust and fast growing species are favoured, but information about historical community distributions does not indicate that the species composition has changed more than 10%. Additionally, large closed areas indicate a slow process of recolonisation by some invertebrate that are vulnerable to scallop dredging.
80	Trophic/size structure	*Sardine purse seine fishery:* Sardine are a forage species which play a key role in the ecosystem. A scientific study concluded that there has been a 4% change in the number of in each size class due to a reduction in plankton (sardine prey). This change was attributed to a combination of temperature and salinity conditions in the ecosystem.
100	Functional group composition	*Mussel hand collection fishery:* Mussels are filter feeders and play a key role in the wide estuarine ecosystem. The role they play is key in combination with other filter feeders in the functional group. The level of removals from the fishery both of target species (mussels) and secondary species (clams) is low. Stakeholders indicated that dynamics of community constituents are not detectable against natural variation.

Annex 2
Data limited methods

Introduction

The MSC assessment methodology is an auditing procedure and therefore must be based on evidence. A lack of evidence that a fishery meets Performance Indicators (PIs) could lead to more conditions and, at worst, a failure of the fishery to meet the MSC Standard.

This annex is designed to help identify or produce the evidence required specifically for Principle 1. However, this guide may also be useful for managed and unmanaged bycatch performance indicators, which form part of the ecosystem Principle 2 (PI 2.1.2; 2.1.3; 2.2.2; 2.2.3).

The main constraints to meeting the MSC requirements for these PIs are a lack of capacity to conduct the technical work or to sustain a scientific monitoring program. The opportunities are to develop simple approaches based on testable assumptions and independent review, which are within the technical capacity of the local fisheries research institutes and that address PIs directly.

This annex should help you review what useful data you might have and what you need to do with it to produce the information required for good fisheries management decision-making and, by extension, the MSC assessment. It can reduce costs of the MSC assessment and increase the chance of passing if evidence is well prepared.

What is required?

If independent or scientific evidence is lacking, there is a need to be aware that the stock may be overfished, and the first task is to determine the stock status. Stock status is estimated using a variety of scientific methods and research, which together are called a stock assessment. The type of stock assessment that is carried out primarily depends on what information is available about the stock and the fishery.

There are a variety of ways to carry out a stock assessment from very simple risk assessments to complex mathematical models of population dynamics. However, even simple basic methods are based on biology, ecology and population dynamics, and good scientific principles. The more accurate the information available, the more precise the estimate of stock status should be.

Current best practice in stock assessment consists of:

- Combining all data sources together into a single assessment, if possible. This deals with apparently conflicting information explicitly as part of the assessment.
- Developing sensitivity analyses and other methods to assess uncertainty, which always forms a significant consideration in stock assessment.
- Using projections (simulations) to test proposed harvest control rules (HCR) and provide evidence that they are precautionary and will help achieve fishery objectives.
- Carrying out an independent expert review of the assessment to ensure it meets minimum quality and provide guidance on future improvements.

However, what needs to be done should also take account of the scale and context of the fishery. Strictly speaking, all that is needed is to show that the exploitation is precautionary enough (i.e. low enough) so that the stock is not at risk. This is much easier than determining stock status precisely.

Generally, the less information available, the more precautionary the exploitation will need to be (Figure 1). So, there is always the choice of either increasing the level of knowledge through research, stock assessment and monitoring, or decreasing the amount of fish that is caught to ensure the stock is not overfished. To safely increase the yield from the fishery, monitoring may need to be increased and the stock assessment improved to show that the probability of overfishing remains low at the higher exploitation levels (Figure 2).

If stock status is not determined precisely enough, improving information could either determine the stock is in good condition, or alternatively confirm that it is at risk. Therefore, it should not be presumed that once a stock assessment is complete, that the result will reduce the risk. Although an assessment may indicate that the stock needs to be rebuilt, it will also determine more precisely what needs to be done and when such rebuilding is likely to be complete. The lack of clear targets is one of the problems with very imprecise assessments.

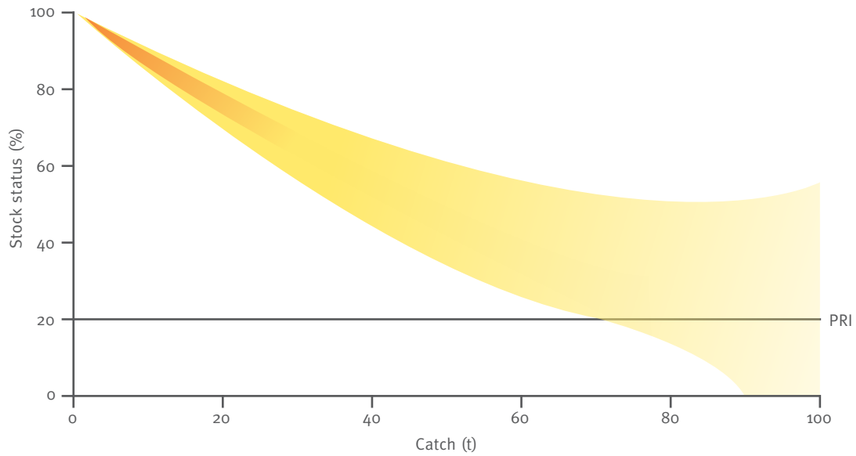


Figure 1 – This diagram illustrates how uncertainty increases with the level of exploitation (catch). In a watercolour plot, probability is represented by the density of ink, so as the values become increasing uncertain, the ink washes out over a greater range of values. In this diagram, when catches are zero or very small, we are certain the stock is close to unexploited (100% stock status). As catches increase, not only do we see that the stock status decreases further below the unexploited level, but the actual status becomes increasingly uncertain. The critical issue is, for any exploitation level (catch), how much probability (ink density) is below the PRI (solid horizontal line).

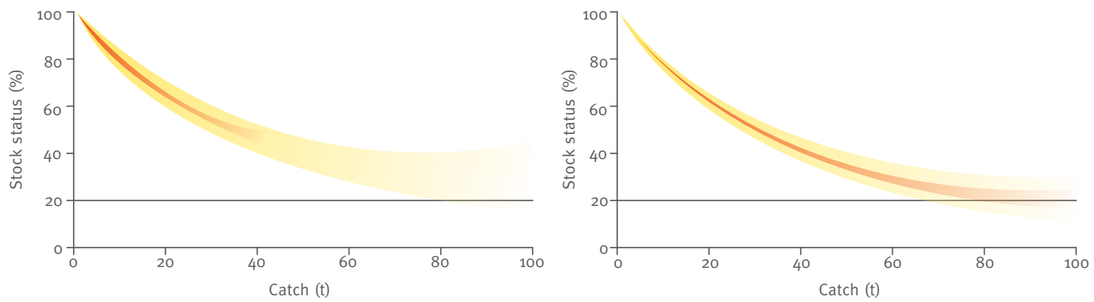


Figure 2 – The graph illustrates how an increase in knowledge may improve the determination of stock status. The left graph shows the same catch (exploitation) levels as for Figure 1, but due to the improved stock assessment, the probability range is much narrower. This is illustrated by the higher density of colour as the catch increases to the right of the graph. However, the outcomes of such improved assessments may indicate the stock is likely above a limit reference point (graph on the left), or likely overfished (graph on the right). If overfished, the stock requires rebuilding.

Stock assessments and MSC PIs

There are four things that a stock assessment can usefully determine:

- Maximum sustainable yield (MSY), which is defined as the largest long-term average annual catch that can be sustained over time. A constant fishing mortality that gives this MSY is F_{MSY}, and the average spawning stock biomass while the MSY is provided is B_{MSY}. The MSC requirements provide a default precautionary B_{MSY} of 40% of the unexploited stock size (40% B_0) as acceptable for stocks with average productivity.

- Point of recruitment impairment (PRI) is the point below which recruitment is put at risk. Recruitment failure can lead to long recovery times as well as the possibility of ecosystem change. Default precautionary PRI levels are provided in the MSC requirements (50% B_{MSY} or 20% B_0), which might apply to stocks with average productivity. Values different to these would need some scientific justification and expert consensus.

- Current stock status needs to be determined in relation to the MSY and/or PRI reference points described above. MSC allows that some assessments may operate with only one or the other reference point, but in these cases, the nature of the reference point should be clearly identified.

- Whether the HCR is likely to maintain the stock at a target level that is fluctuating around MSY and is highly likely to avoid falling below PRI.

The role of an HCR is to achieve the MSY (or more precautionary status), or some equivalent highly productive level. It should recognise risks, however, by allowing for reduced fishing if the status is determined to be temporarily below the MSY level, driving it back towards its target level. A good HCR therefore not only limits fishing mortality to the MSY level or below, but reduces it when necessary to avoid the fishery being subject to any risk of recruitment overfishing.

The primary, and perhaps only, reliable way to determine whether a proposed HCR will achieve these objectives is to test it within a computer simulation built on the stock assessment. This should project the stock forward under the HCR incorporating uncertainties, such as variable recruitment and alternative scenarios to test alternatives to default assumptions (e.g. stock structures or changing catchability). Very sophisticated methods incorporate the whole management process, including simulated stock assessments and decision-making, within a simulation (called a Management Strategy Evaluation), but it is rarely possible to apply these more complex approaches in small scale fisheries due to their high cost.

Stock assessment is not easy, but it may not be necessary to carry out a full stock assessment frequently as long as there is some monitoring of stock status and/or exploitation between major analyses. Simple monitoring indices might be used to check for any significant changes between full stock assessments, triggering a new stock assessment, data collection or management response.

PI 1.2.3 - Information and monitoring

Scoring issue (a) - Range of information

This scoring issue addresses all basic needs of information to support the harvest strategy. What information is required depends upon the harvest strategy itself, but information to support the definition of the management unit (a population or sub-population that will respond to management interventions to protect the stock), the type and extent of fishing, productivity of the stock and other basic information are likely required. If the strategy depends on fishing effort, for example, information on selectivity and catchability might also be required to ensure they do not change over time, which would undermine the strategy.

Scoring issue (b) - Monitoring

This scoring issue addresses all the needs specific to the HCR. The requirements here are therefore much narrower than those for 1.2.3 (a) above. Essentially, stock abundance is the information required to determine stock status and removals the information required to determine the level of exploitation. Monitoring needs to be sufficiently accurate and regular so that changes can be detected early enough for appropriate management action can be taken.

Scoring issue (c) - Comprehensiveness of information

This scoring issue is mainly concerned with catches which may be taken outside the unit of assessment. For example, if an industrial fishery is being certified, this scoring issue considers catches by other fleets, which could include artisanal fishery, fisheries in other countries and IUU catches. All these need to be considered in determining stock status and the exploitation rate. Whether information on other catches is 'good' enough should be determined by the stock assessment and the level of precaution in the harvest strategy.

PI 1.2.4 - Assessment of stock status

Scoring issue (a) - Appropriateness of assessment to stock under consideration

It is important that the stock assessment produces output relevant to management of the fishery. Inappropriate assessments might, for example, rely on unsound assumptions about the fish, the fishery or the way the data are collected. Whether the stock assessment is appropriate should be addressed by a review (see 1.2.4.(e) below). Clearly, if data and research are insufficient, it will not be possible to carry out an appropriate stock assessment.

Scoring issue (b) - Assessment approach

Stock assessments must address the issue of reference points, and in particular identify the MSY and PRI or any proxies that are used in their place. These should be used to develop the HCR. Clearly, these points need to be estimated for the stock.

Scoring issue (c) - Uncertainty in assessment

Any stock assessment is based on a simple model of a very complex system, so errors and uncertainty are always very important. These must be addressed. There are generally three types of error. Observation error represents the difference between measured data and the 'true' values. Process error represents randomness in the system being studied (e.g. recruitment may be random from year to year). Structural error represents the difference between the stock assessment model and reality. These errors can be addressed through use of statistics and through techniques such as sensitivity analyses. They need to be explicitly addressed as part of the stock assessment.

Scoring issue (d) - Evaluation of assessment

There is no SG80, only SG100. This scoring guidepost is not required, but should be met if possible. Testing the assessment to show it is robust can be carried out through sensitivity analyses. Whether all assessment approaches have been 'rigorously' explored should be addressed by reviewers (see 1.2.4 (e) below).

Scoring issue (e) - Peer review of assessment

A peer review requires that more than one expert who is familiar with the fishery and the assessment methods used, studies the assessment to ensure that it applies best practice and does not contain significant errors or mistakes. Ideally, experts with different expertise (e.g. stock assessment, data collection and fishery management) should be allowed to question the assessor so that possible problems can be explored and consensus reached on the best model. The experts could be requested to write a report that expressly addresses the MSC requirements (i.e. the requirements could be included in their terms of reference).

How to Review Your Data and Research Program

The main types of data are measurements of the removals of fish from the population (catches), indices of abundance (a time series of values related to changes in fish abundance), and stock structure (sampling of catches or surveys for size, age and/or sex of individual animals). Generally, the more data available the better. With more data, and more types of data, more types of stock assessment become possible, there is less reliance on assumptions, and importantly, it becomes possible to test the assessment, producing evidence that it is reasonable or providing information on how it needs to change. It is worth noting that preparing data is usually the most time consuming task in completing a stock assessment.

The time series of data should be as long as possible. The best stock assessments model how the fish population changes over time (dynamics). To understand this, a long period of time is needed. This is often not appreciated by some sources of data (such as industry) who may view older data as less valuable. In fact, all data are equally useful in assessing the current status, and data from early periods in the history of the fishery may be particularly valuable.

For some short-lived species, such as many crustaceans (shrimp) and molluscs (squid, octopus), it is possible to lengthen the effective time series by choosing a time-step other than annual, such as month or week. This may have the additional advantage of creating contrast in the data series where recruitment is strongly seasonal. For this, dates and times of fishing or landing should be as accurate as possible so that alternative time steps can be explored.

It is also important that data have contrast which the model can fit to. In the case of dynamic fisheries models, data needs to be recorded through different levels of depletion. Monitoring through low, high and then low levels of exploitation improves the estimate of the productivity of the stock. If the time series is short within which there is little change in levels of exploitation, more assumptions will have to be made. This adds considerably to the uncertainties in the stock assessment results.

If the data lacks contrast in depletion levels, you might consider creating contrast in the management that is applied. For example, closed seasons or well-designed closed areas (or no take zones) provide information on the stock under low exploitation. This can provide more contrast which can help with the stock assessment and providing more reliable stock assessment advice.

Although data poor fisheries usually rely on fishery dependent data (e.g. catch, fishing effort, commercial size category or catch sampling), fishery independent data (e.g. sampling surveys) may also be useful in testing stock assessment assumptions. Maintaining a full fishery independent sampling program is likely to be expensive, but some short-term monitoring of this type, if well-designed, can greatly enhance the fishery dependent monitoring. Where budgets are limited, the first priority should be to ensure that the fishery dependent data are reliably sampled.

If data collection can be organised to provide data in a standard form consistent with standard stock assessment assumptions, this can make later analysis much easier. While it is possible to

analyse non-standard data (for example, with a complex sampling methodology or non-standard measures), this may require developing special methodologies and models in specialised software. It is much easier to have in mind specific software in which the data will be used, and then try to ensure that it is collected in a manner which meets the assumptions of that software. Usually these software require strict but simple random sampling protocols and accurate measurement of key data, such as catch.

Background research, particularly biological research, will be useful and is sometimes necessary to interpret data correctly. Research to estimate key parameters or test key assumptions include estimates of growth models, natural mortality, selectivity, length-weight relationships, size/age at maturity and stock identification. For example, a growth model is usually required to interpret length composition, and growth is usually difficult to estimate within a stock assessment unless age data are collected routinely.

Research directed at specific issues to enhance monitoring data should have priority. If length data are collected routinely, it would be worth conducting a research project to estimate length-weight and growth parameters so that length can be routinely linked to age and biomass.

More generally, you should prioritise research so that projects that are likely to have high impact on management are carried out first. So, research that might lead to an immediate and significant change in harvest strategy should be given high priority. For example, research mapping size composition to identify juvenile areas, leading to their closure, is likely to be more important than long-term stock identification studies among separate areas which have harmonised harvest strategies anyway.

The most common problem is missing data. Examples of missing data would be failure in some periods of the data collection system or some strata not being sampled due to their high sampling costs. Although there are ways to deal with these problems, they all increase the uncertainty in estimates, and you are always better off if data are not missing and some sampling can be conducted across all strata and time periods. Methods to deal with missing data include 'borrowing' values from similar samples or guessing them based on expert assessment (both of which risk significant estimate bias), to applying sophisticated techniques within stock assessments to estimate missing values as parameters. Which is the best approach will depend on what is missing. The former approaches are almost always the best approach for missing total catch data, while in many cases periods missing catch and effort, survey or other sampling data can be estimated, if necessary, within a stock assessment.

Infrequent frame surveys (on vessel numbers as needed to estimate total catches from samples), IUU catch and change in catchability are common problems for small scale fisheries. These cause problems because there are usually no formal data to estimate them, but they are critical in stock assessments, because if they are not handled well, stock assessment results will not be robust. One of the best ways to deal with these sorts of problems is to conduct a workshop with the sole aim of providing one or more alternative approaches that minimise their negative effects.

For example, a group of local experts who are familiar with a fishery could be brought together to decide on how a fishery might have changed over the last ten years since the last vessel frame survey. They would be tasked with generating three time series of change in the fleet and fishing activity, consisting of lower and upper bounds, which they are confident that the fishing activity is within, and a 'best guess' for the most likely fishing activity. They would bring together their own expertise and any and all information to bear, including incomplete surveys, catch and effort sampling and vessel registration information that might be available. These time series could then be used to generate alternative total catch time series in stock assessments. Exactly how this was done and what assumptions were made would need to be clearly documented.

Annex 2 - Data limited methods

Table 1 – Data sources you might have for use in a stock assessment.

Data Type	Description	Uses
Log books	Log books record activities at sea, including catch and fishing operations. The data are particularly useful for providing a standardised measurement of fishing effort and to record catches (landings and discards). Where location information is collected also, this can help to explain changes in fishery catches over time.	To estimate total catch and indices of abundance.
Observer records	Scientific or other observers on board vessels at sea can provide useful information on the catch and vessel operations, as for log books, but data are verified. They can also provide scientific samples (length, sex and age) from catches.	To estimate effective fishing effort (proxy for fishing mortality) and other reliable data from at-sea activities.
Landing site trip interviews	In the same way as for log books, interviews can provide catch and effort data, but may be limited to a sample of trips. Because the data are collected at the end of a trip, measures of both effort and catch may be imprecise.	To estimate total catch and indices of abundance.
Purchase receipts	Purchase receipts from transactions between buyers and sellers, record commercial category landings and value. These data are usually accurate because the buyer and seller verify the information. Commercial categories records product which is used in the same way and has the same price, which may separate species or size dependent on whether markets recognise differences.	To estimate catches by species or size class and for abundance indices, depending on where data are recorded and what the commercial categories are.
Processor Records	Processor records can include purchase and sales receipts as above, but can also include information on commercial categories and size composition collected for commercial reasons (e.g. quality control). These data would most likely be available where product is exported (for example the EU requires information linking fish imports to individual fishing trips).	To estimate catches by species or size class and for abundance indices, depending on where data are recorded and what the commercial categories are.
Length, sex and age samples	Scientific sampling may be carried out routinely where landings are sampled for size or for aging. If this is done routinely, it is likely that it would be carried out by the government research institute responsible for stock assessment. However, length samples may also have been taken to estimate growth parameters or for other research purposes (e.g. international surveys, a university research project or as part of an environmental impact assessment).	Length and age data are useful for stock assessments that include age structure, and will contribute to estimates of mortality rates.

Data Type	Description	Uses
Research and project work	Reports from scientific and monitoring projects that have been conducted in the past often contain useful information, including data tables, observations, estimates of key parameters as well as more general descriptions of species, distributions and fishing activity. Qualitative information can also be useful for providing baseline information on the fishery and species concerned. Any such reports or sources of information should be secured if at all possible for review and reference.	To provide independent estimates of key population parameters such as maximum size, growth and mortality rates.

Suitable Fisheries Models

The aim of a standard stock assessment is to detect decreases or increases in abundance that might be attributed to changes in catch. For this to work, data will be required that cover different periods and levels of catches and stock abundance. Other methods may not require this, but depend less on data and more on assumptions about how the stock will behave based on general biology and life history traits.

You will need to identify a method which can use your data. Many new stock assessment methods are being developed and proposed all the time and it is not possible to provide an exhaustive list[1]. In any particular situation, a review of the data you have should give an expert an idea of what might be possible. The availability of data is often the limiting factor on what methods can be used, so data types and methods can be linked to some extent (Table 2).

In general, no specific method can be supported above any other. All methods have key weaknesses and key assumptions. In all cases, assumptions need to be critically evaluated to ensure results and subsequent scientific advice is valid. It will be the responsibility of the fishery to demonstrate a credible monitoring and stock assessment.

All methods share the requirement to identify a management unit (or stock), from which the data are taken. Ideally this should be an isolated self-recruiting fish population, but such units can rarely be proved. Fishery management units are more pragmatic. They represent a fishery and the stock which is exploited and, most importantly, can respond to management actions. As long as the stock can be managed, it can form a management unit. It may also be necessary to support and co-operate with the management of neighbouring units if it is suspected that the population is shared, through recruitment for example. For many species of crustaceans and molluscs, the adults do not move much, and it would likely be only the larval stages which mix before settlement. It is always appropriate and precautionary to manage such units now, while research might continue that can lead to better stock definitions.

[1] Documents for stock assessment methods and reviews of methods can be freely downloaded, such as:

Sparre, P., Venema, S.C. 1998. Introduction to Tropical Fish Stock Assessment - Parts 1 (Manual) and 2 (Exercises). FAO Fisheries Technical Paper 306 Rev. 2.

Honey, K.T., Moxley, J.H., Fujita, R.M. 2010. From Rags to Fishes: Data-Poor Methods for Fishery Managers. Managing Data-Poor Fisheries: Case Studies, Models & Solutions 1:159–184, 2010.

However, it should be noted that new methods are being introduced all the time, so it is always worth searching for new articles and software.

Annex 2 - Data limited methods

A fishery which is not data poor would have total catch, data sufficient for an abundance index, size and age composition. If you have all of these data, a full stock assessment should be conducted using the more sophisticated approaches, such as CASAL[2] or Stock Synthesis 3[3]. Bespoke models can be developed in spreadsheets, using sophisticated platforms like R[4] (general but powerful statistical software) or ADMB[5] (software for complex non-linear optimisation). Note that all computer software used for stock assessment is freely available and no licences are required. Appropriate skills and training are however needed (see section 7 below).

In all cases, independent assessments can be conducted on each data type. So, for example, a production model could use available total catch and the catch and effort data, while a length-converted catch curve could separately use length frequency data. However, best practice is to include all these data into a single model, as this allows the assessment to look for consistency and compromise between these different information sources. Otherwise, it is difficult to reach a conclusion if there is an apparent inconsistency in the results of different stock assessment methods.

There is always considerable uncertainty that should be communicated with any stock assessment. An important advantage of situations where more data are available is that methods are able to supply diagnostics and are able to assess their own accuracy to some extent. This means that the level of confidence in results can be used in the scientific advice. Generally, methods that use limited data are unable to assess their own accuracy, which can lead to greater confidence in their results when the reverse is true.

The main way to approach assessments of uncertainty is to deal with observation and process error within the estimation method (e.g. estimate parameter standard errors, 'bootstrapping' or using Markov Chain Monte Carlo (MCMC) methods), and structural error through sensitivity analysis. Sensitivity analysis conducts the same stock assessment, but changes the assumptions across the range of likely alternatives to check how results and scientific advice might change. This allows the assessment process to map out the uncertainty. Clearly, ensuring that an appropriate range of alternative assumptions are included in the analysis is important.

There are more sophisticated methods to address structural uncertainty, but they need to be shown to be appropriate. The main one is to integrate alternative model structures into a single Bayesian assessment. However, for the added complexity, this approach may not be better than simpler sensitivity analyses and may even obscure how uncertainty is dealt with. They may be appropriate, however, where it is considered necessary to combine a range of model structures which become too complex to be dealt with by separate sensitivities.

[2] https://www.niwa.co.nz/fisheries/tools-resources/casal
[3] http://nft.nefsc.noaa.gov/Stock_Synthesis_3.htm
[4] http://www.r-project.org/
[5] http://www.admb-project.org/

Table 2 – Data types and possible stock assessment model approaches. This is not an exhaustive list, but outlines some types of analyses that are available.

In any particular case, the method will need to be justified and tested to ensure it is valid.

Data Types (PI 1.2.3)		Method (PI 1.2.4)	Key Assumptions and Tests
Primary	**Secondary**		
Life history parameters	Stakeholder knowledge on distribution of stocks and fishing	Productivity Susceptibility Analysis	Simple risk-based scoring methods are static and need to be highly precautionary. Therefore, they are only able to identify lightly exploited stocks. All scoring should be justified as much as possible with observations and research. See Annex 1 for an outline of the PSA methodology.
Total Catch	None	Catch-only methods such as Depletion-Corrected Average Catch (DCAC), Depletion-Based Stock Reduction Analysis (DB-SRA) or Vasconcellos and Cochrane (2005)[6]	These methods are sensitive to the assumption about the initial depletion level at the start of the time series and generally require total catches extend back to the start of the fishery.
	Survey Index or Catch and Effort	Production models	These models require complete total catch and an abundance index that is a good proxy for biomass.
	Size Composition	Length based cohort analysis (LCA)	The classical LCA method assumes long-term equilibrium, but with a time series it may be possible to allow a more dynamic approach analogous to an age-based Virtual Population Analysis. In all cases, mortality and stock size is estimated.
Survey Index or Catch and Effort	None	Abundance index trends[7]	It will be necessary to establish reference points for the abundance indices. There is no standard way to do this, but ways to estimate what the index would be if the stock was lightly fished (e.g. a reference lightly exploited area) may be sufficient.
Size Composition	None	Length converted catch curve Other methods based on capture size statistics[8] 'Per recruit' methods	A growth model is required and measures of size at maturity are very useful. These can be used to generate a time series of mortalities. Reference points might be generated using 'per recruit' methods.
		Length frequency data analysis[9]	Length frequency data analysis can be used to estimate growth and mortality rates, if discrete cohorts can be identified in the data as modes in the length frequency.
Survey Index or Catch and Effort	Size Composition	See methods for separate approaches above	Combining these data into a single assessment will be difficult without the total catch. Separate assessments of each data type can be used to see if a consistent picture emerges.

[6] Vasconcellos, M. and Cochrane, K. (2005) Overview of World Status of Data-Limited Fisheries: Inferences from Landings Statistics. Fisheries Assessment and Management in Data-Limited Situations. Alaska Sea Grant College Program. AK-SG-05-02, 2005.

[7] For example, An Index Method (AIM) is available in the US NMFS toolbox (http://nft.nefsc.noaa.gov/).

[8] For example:

Gedamke, T., Hoenig, J. M. Estimating Mortality from Mean Length Data in Nonequilibrium Situations, with Application to the Assessment of Goosefish. Transactions of the American Fisheries Society 135:476–487.

Cope, J.M., Punt, A.E. 2009. Length-based reference points for data-limited situations: applications and restrictions. Mar. Coast. Fish. Dyn. Mgmt. Ecosys. Sci. 1:169-186.

[9] Pauly, D., David, N., 1981. ELEFAN I, a BASIC program for the objective extraction of growth parameters from length frequencies data. Meeresforsch 28:205-211.

Table 3 – Stock assessment methods and how they might address Principle 1 PIs.

Method	PI 1.1.1 - Stock status	PI 1.1.2 - Stock rebuilding	PI 1.2.2 - Harvest control rule	PI 1.2.3 - Information and monitoring	PI 1.2.4 - Assessment of stock status
Productivity Susceptibility Analysis	The PSA method provides a determination of risk at the current exploitation rate, which can be converted directly to an MSC score.		PSA does not provide any direct information on HCRs. These will need to be developed separately, but a PSA might be used to determine when risk levels will increase so that timely management action can be planned.	The information PI will not only include information used in the PSA, but other more general information used to support the overall harvest strategy.	
Abundance index (or other empirical approaches)	Without catch information, the methods provide estimates of stock status relative to a reference point, which may be derived through research or rational argument.	Although an abundance index provides a very good monitoring index on which the HCR might be based, a method limited to an abundance index only may not provide a sufficient basis to justify any particular HCR. Other information may be necessary, such as catches and landings size composition, so that appropriate justified reference points can be proposed, i.e. that the values adopted are consistent with MSY or a similar highly productive level.		These methods provide formal stock assessments and supporting information which can be evaluated.	
'Catch Only' methods or Production models	These methods provide estimates of stock status and exploitation rate relative to an MSY reference point.	These methods can be used to project the fishery under an HCR, as long as the link between the HCR and catches can be determined.		These methods provide formal stock assessments and supporting information which can be evaluated.	
Length based cohort analysis (LCA)	LCA provides estimates of stock status and exploitation rate relative to an MSY reference point. However, this represents an average state over the lifespan of the fish.	Although in theory LCA estimates the exploitation rate, because it assumes the stock is at equilibrium, it is not suitable to develop or test a HCR by itself. Further computer simulation work may be necessary to do this.		LCA provides a formal stock assessment and supporting information which can be evaluated. However, the assessment will need to show in particular that the results are robust to the equilibrium assumption.	
Length converted catch curve **Other methods based on capture size statistics** **'Per recruit' methods** **Length frequency data analysis**	These methods provide estimates of the exploitation rate relative to an MSY reference point. The stock state in terms of biomass may need to be inferred from a time series of information on fishing activity or proxies for landings.	These methods, by themselves, are not suitable to develop or test a HCR. It may be possible to propose HCR on the size composition or mean size or some other measurement of the catch which meets the MSC requirements, but further information and computer simulation work may be necessary.		These methods provide formal stock assessments and supporting information which can be evaluated.	

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Annex 2 - Data limited methods

Developing and Justifying the HCR

Although it is not the main focus of this guide, the harvest control rule (HCR) is an important target for the data collection and stock assessment activities. The HCR links determinations of stock status to management action. It is worth noting that stock status estimates need not be accurate and can rely on proxies, but the response must always be appropriately precautionary to allow for any errors in the approach taken.

A simple HCR (Figure 3) consists of three parts. A maximum limit on harvest rate when the stock is in its 'normal state', at or above the target stock status, a reducing harvest when the stock is below some trigger level and a minimum harvest when it is below the limit level. The trigger is set between the limit and target stock levels, when the stock is unacceptably below the target and may not be able to climb back up without management intervention. Other features can be incorporated into the HCR as required. MSC does not explicitly require any particular form, except that the exploitation rate must be reduced as the PRI is approached, and the HCR should be expected to keep the stock fluctuating around a target level consistent with (or above) MSY, or a similar highly productive level.

The HCR can be based on outputs from stock assessment, but this may then require regular and frequent stock assessments, which can be prohibitively expensive. If the HCR is defined in terms of simple proxies, such as CPUE, rather than stock assessment estimates, not only may this make it easier to test the HCR, but also it avoids the need to have frequent stock assessments, keeping the interim assessments within the technical capacity of the local management system. Evidence on whether the HCR meets the MSC requirements will still be needed. Although this can be based on argument and evidence that assumptions are met, in many cases computer simulations based on the stock assessment can be used to provide basic evidence in choosing and supporting an HCR (Figure 4).

Some stock assessment methods described in this document may provide an indication of current stock status, but do not lend themselves to developing HCRs (Table 2 and 3). These methods are relatively static rather than dynamic, and cannot be used for population projections. Projections are the main way for computer simulations to test HCRs.

If the stock assessment methodology, such as PSA, does not address HCRs directly, it still might be used as a basis to develop and implement an HCR. A low risk score requires a substantial

proportion of the stock remains unexploited. On-going monitoring could test whether this remains the case, and should be linked to well-defined actions if the fishery expands to increase the PSA susceptibility score, for example. Note that the well-defined HCR will still have to have the attribute of reducing the exploitation rate as the PRI is approached, and any HCR will still need to be credible and highly likely to achieve fishery objectives.

For example, a particular stock might be considered at low risk from a fishery because a substantial proportion of the population is too deep for the handline gear being used. An HCR could be proposed based on monitoring the operational depth of gears. Any significant increase in depth (use of deep water traps for example) would then trigger a management response, limiting or reducing the exploitation rate, as well as, perhaps, triggering an improved stock assessment program.

As well as proposing an HCR which includes an active management response, it is possible to conceive of passive controls which also might meet the MSC Standard. These work by protecting a proportion of the unexploited stock from the fishery (see Table 4). As long as that protected portion remains unexploited, as the remaining stock is depleted, the overall exploitation rate will decline. The stock would not become overexploited as long as a sufficiently large proportion is protected. In these cases, there should still be some 'strategic' stock assessments, perhaps updated on an occasional basis that confirm that the approach taken should maintain the fishery at sustainable levels.

Although there may be no examples, it is easy to consider HCRs in the same vein which might work, such as limiting catches to males only of a protogynous species[10]. Whether these HCRs would be practical would depend entirely on the local fishery, but there is nothing stopping local fisheries from adopting innovative approaches that suit local conditions. The MSC assessment team will still need to be convinced that any HCR, whether of innovative form or not, meets the MSC requirements. Therefore, all HCRs will still benefit from a wide variety of evidence supporting the approach, including computer simulations and independent expert review.

[10] A species where the fish starts as a female and changes when older to a male.

Annex 2 - Data limited methods

Table 4 – Some HCR which could work automatically without management intervention.

Management Measure	Description	Key Assumptions
Minimum Size »» Size at maturity	A minimum size or technical measure (e.g. mesh size) is set so that only fish well above the size at first maturity suffer fishing mortality. This means that a significant proportion of the spawning stock is protected.	Fish are not caught and discarded dead.
Mark and release	Some fish are released through an operational rule applied after capture. For example, v-notching and release of berried female lobsters. This could provide additional protection to the spawning stock as an increasing proportion are released marked, effectively decreasing exploitation.	As well as demonstrating that the rules are adhered to, this type of more complex HCR will need to be supported by computer simulation to show that it is effective and robust.
Single Claw Removal	Specific fisheries may have attributes that can be used to ensure their sustainability. For example, for a fishery based on crab claws, limiting the claw removal so that all male crabs retained at least one claw would most likely meet the HCR requirements.	Survival of single claw male crabs was significant.
Closed area over spawning and recruitment sites	A closed area can be used to protect a proportion of the stock from fishing. Unfortunately, it may be difficult to show such protection is sufficient without significant increased data collection.	The area is large enough so that the animals do not move to the extent they are not vulnerable to fishing and a significant proportion are protected.

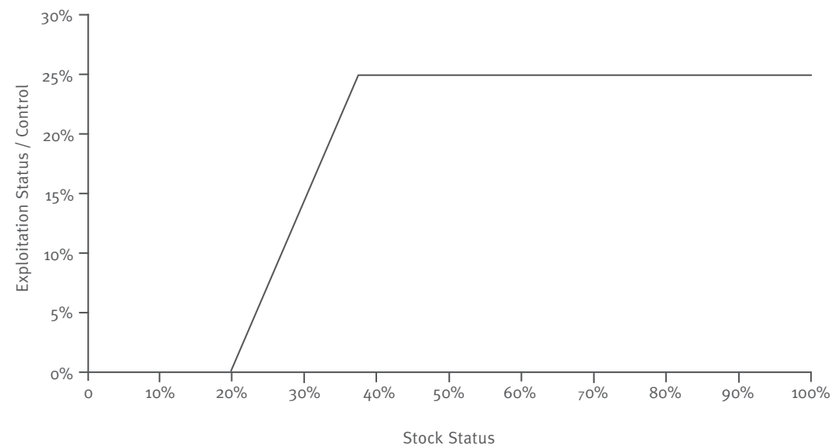

Figure 3 – Example simple harvest control rule that links an indicator of stock status to the exploitation level, controlled by management measures.

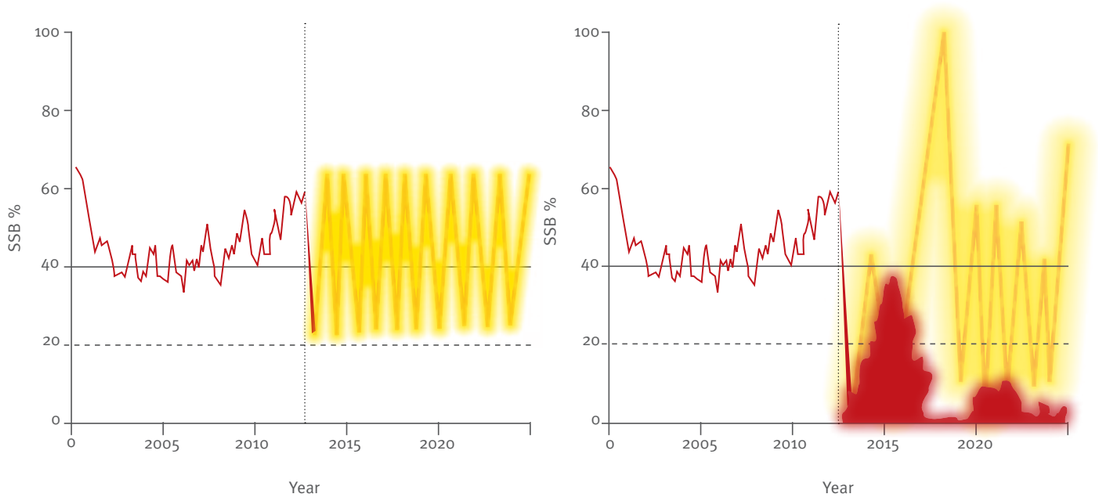

Figure 4 – The graphs illustrate how stock assessment projections might be used to test harvest control rules and provide evidence that a particular HCR is sustainable. The graphs show a stock assessment for a shrimp species for two harvest control rules. In both cases, the stock assessment indicates the stock status to 2013, to the left of the vertical dotted line. To the right of the line, different HCR have been applied. Uncertainty is represented by ink density, and red histograms in the right-hand graph indicate stock collapse. The simulation clearly indicates the HCR tested on the right is not precautionary.

Carrying Out a Stock Assessment

Stock assessments and fisheries data management require specialist expertise. If the necessary expertise cannot be sourced in-house, external consultants may be required to fit stock assessment models, or conduct computer simulations to provide evidence that the harvest strategy meets stock status and ecosystem objectives.

Hiring consultants (for example modellers from government fisheries research institutes) can be expensive, however it may be possible to seek out alternative expert help. The invited expert should complement the skills already available to you.

A stock assessment in data poor situations should focus on risk assessment rather than a precise estimate of stock status. You just need to know that a strategy will exclude or minimise the possibility that the stock is overfished. The more data available and the better the quality of the data, the more precisely you might be able to determine stock status.

You need to ensure that the assessment is appropriate for the stock and for the HCR. Stock assessments are primarily driven by the available data, but you may also need to justify an assessment in terms of population dynamics and biology.

The stock assessment should also be able to model the effect of the HCR. Both the proposed management controls and stock status indicator should be modelled as part of the stock assessment or as a separate analysis. This will allow the stock assessment to assess whether the HCR, at least in theory, should achieve the stated objectives. For example, a HCR using minimum size may not be assessed appropriately using a stock assessment based on total catch and fishing effort – some modelling of selectivity would be required.

Therefore, before embarking on a stock assessment, you should have a broad harvest strategy and potential HCRs laid out. A stock assessment should be used to fine tune these and test them, at least in theory, to check that they will work. The harvest strategy includes the list of all controls that you will apply to avoid overfishing and could include the following:

- **Limits on the overall harvest level:** either setting a Total Allowable Catch (TAC) that is taken, or limiting somehow the amount of fishing that is done. These methods are often used in heavily managed, industrial fisheries and have high management and monitoring costs. Without limited entry (limited licensing), effort controls could still be based on local population size, socio-economic factors such as opportunity cost and other limits on access to the fishery (vessels, skills, fishing gear etc.).

- **Size/condition limits:** This may be applied through gear controls (e.g. mesh size) or regulation. In the latter case, it is important to assess whether the regulation leads to greater discarding of dead fish, which will undermine the value of the management measure. Maximum size could be applied with similar effect to minimum size, but is rarely used. In some cases, actively reproductive females cannot be landed (e.g. berried lobsters). Some innovative local controls may be highly effective (e.g. prohibiting the removal of more than one claw from captured crabs).

- **Closed areas:** These are areas which may be closed to protect habitat, improve selectivity, protect main spawning areas, or reduce conflicts between gears (e.g. trawls and gillnets). To be effective as a control to protect the stock, closed areas need to reduce catch at least in the short term, so establishing closed areas where there is little or no fishing will not benefit the target stock directly.

- **Closed seasons:** These are usually established to protect key life history stages, such as juveniles or spawners. They usually also reduce fishing effort overall, especially where combined with some limitations on the numbers of vessels in the fishery.

The controls that are implemented will depend not only on what will achieve the fishery objectives, but also what will be enforceable. Regulations that cannot be enforced and are routinely ignored should be removed.

The stock assessment will need to estimate stock status relative to MSY and/or PRI reference points that are appropriate to the stock. The stock assessment can usually be used to derive and justify any such reference points or their proxies.

The assessment will need to take uncertainty into account, and ideally should be probabilistic (e.g. Bayesian). Basic uncertainty can be covered by sensitivity analyses. Each sensitivity analysis applies the same assessment, but with fundamental changes in assumptions, either in terms of model structure or assumed parameters. For example, a model might be fitted with growth rates at the upper and lower range of likely values to see whether the assessment changes much in relation to this issue. The sensitivities should seek to bracket the uncertainty, so that reality is highly likely to be within the two extremes. More sophisticated methods will try to estimate probability density for different outcomes and can be used to define confidence or credibility intervals mathematically.

Using Independent Scientific Review

It will be very useful to have an independent scientific review of the data collection, stock assessment, and HCR. It is not the job of the MSC assessment team to carry out a technical review of your harvest strategy, but they will rely to a large extent on general evidence that is available. An independent peer review adds very considerably to the credibility of your approach, including any expert judgement that has had to be made.

Apart from having access to experts with relevant skills who have no interest in the fishery, you will need to state their terms of reference carefully to ensure they produce the information you require. Reviews can be destructive if they are not well designed, and every effort should be made to ensure reviews provide constructive recommendations that lead to a better monitoring and assessment system in future. Specifically, it is important that the review:

- Takes into account the context and size of the fishery, so that recommendations are appropriate and can be achieved.
- Provides a strong recommendation on how to fix each short-coming, where the stock assessment may not be providing the ‘best science available’. Only pointing to a problem without a corresponding solution is generally not helpful (but sometimes unavoidable).
- Addresses specific technical requirements of the MSC scoring guideposts (PI 1.1.1; 1.2.4), and where the data or assessment falls short, makes one or more recommendations to bring the system up to the necessary level.

It is worth noting that reviewers are not automatically correct in their opinions. In most cases, consensus can be reached between scientists who have undertaken the assessment and invited experts as to what the weak points in the assessment are and what needs to be done to correct these. If such consensus cannot be reached, you may need some system to lead to a final conclusion through some sort of additional independent expert judgement. This problem is a possibility in cases where demands placed on a fishery in terms of research and data collection are beyond the local capacity and so are not considered appropriate. Note that even if such demands are not considered possible, they may prevent MSC certification because without them the fishery cannot meet the MSC Standard.

Annex 3 Glossary

Glossary

This glossary defines terms and abbreviations used throughout the guide. For the complete MSC vocabulary please refer to the MSC scheme documents.

Term	Definition
Assessment	A process that connects knowledge and action regarding a problem. Review and analysis of information derived from research for the purpose of informing the decision-making process. It may not require new research and involves assembling, organising, summarising, interpreting and reconciling existing knowledge, and communicating it to the policy-maker or other actors concerned by the problem. Assessment is used to refer to the initial certification and re-certifications of fisheries.
Assessment Tree	The hierarchy of Principles, Components, Performance Indicators and Scoring Guideposts that is used as the basis for assessment of the fishery for conformity with the MSC Fisheries Standard.
Certification	Procedure by which a third party gives written or equivalent assurance that a product, process or service conforms to specified requirements.
Certification Requirements	Mandatory requirements applicable to conformity assessment bodies.
Certifier(s)	Person(s) conducting a fishery assessment on behalf of a body that performs conformity assessment services and that can be the object of accreditation.
Chain of Custody (CoC)	The procedures implemented by a fishery and subsequent entities handling fish and fish products to ensure that products from a certified fishery are not mixed with products from any other fishery and remain fully traceable during processing, storage, distribution and sale.
Component	The second level of three within the assessment tree structure.
Condition	A requirement to achieve outcomes in order to achieve a score of 80 or above.
Default tree	The standard assessment tree used as a starting point to develop an assessment tree for each fishery assessment.
Ecolabel	A label that conforms to the principles described in ISO 14020:2000 Environmental labels and declarations: General Principles.
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. The MSC requirements also use this term to refer to a Unit of Assessment (or a group of such UoAs) that is under assessment or certified against the MSC Fisheries Standard. In Principle 3, however, it is the management of the wider fleet which denotes the specific 'fishery' that is the subject of assessment under the fishery-specific management system PIs (i.e. 3.2.1-3.2.4).
Maximum Sustainable Yield	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.

Term	Definition
MCS	Monitoring, control and surveillance.
MSC	The Marine Stewardship Council.
MSC Principles and Criteria	The MSC Principles and Criteria for Sustainable Fishing.
MSC Standard	Annex SA in the Fisheries Certification Requirements.
P1	Principle 1 of the MSC Principles and Criteria.
P2	Principle 2 of the MSC Principles and Criteria.
P3	Principle 3 of the MSC Principles and Criteria.
Performance Indicator (PI)	The lowest level of sub-criterion of a MSC Criterion in the decision tree; the level at which the performance of the fishery is scored by the certifier.
Principle	A fundamental element, in the MSC's case, used as the basis for defining a well-managed and sustainable fishery.
Risk-Based Framework (RBF)	A framework of assessment tools for scoring 'outcome' Performance Indicators in cases where insufficient information is available to score the UoA using the default Scoring Guideposts.
Scoring Elements	A list of matters that are to be taken into account when determining the performance score on an indicator; also the matters used in determining a SG benchmark. In the case of Principles 1 or 2, used to mean a sub-division of individual parts of the ecosystem affected by the fishery, such as different species/stocks/sub-stocks or habitats within a Component.
Scoring Guidepost	The benchmark level of performance established by the team in respect of each numeric score or rating for each indicator sub-criterion.
Scoring Issues	The different parts of a single scoring guidepost, where more than one part exists and covering related but different topics.
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.
Stock Assessment	An integrated analysis of information to estimate the status and trends of a population against benchmarks such as reference points.
Unit of Assessment (UoA)	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 an MSC fishery assessment. In some fisheries, the UoA and UoC may be further defined based on the specific fishing seasons and/or areas that are included.
Unit of Certification (UoC)	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 that are covered by an MSC fishery certificate. Note that other eligible fishers may also be included in some Units of Assessment but not initially certified (until covered by a certificate sharing arrangement)

Annex 4
Further sources and guidance

Sources and further guidance

Marine Stewardship Council website
www.msc.org

MSC accessibility tools

Pre-assessment template
www.msc.org/go/PA-template

Fishery Improvement Action Plan tool
www.msc.org/go/fip-action-plan-tool

Partnering for sustainable fisheries tool
www.msc.org/go/partnering-tool

Benchmarking and Tracking Tool
www.msc.org/go/bmt

More information

Introduction to the MSC
Leaflet that introduces the MSC's mission, vision and ecolabelling program
www.msc.org/documents/msc-brochures

Get Certified! Fisheries
Find out more about the fishery certification process
www.msc.org/go/get-certified-fisheries

Get Certified! Chain of Custody
Find out more about the chain of custody certification process
www.msc.org/go/get-certified-coc

Technical consultants
Find consultants who can provide support
www.msc.org/go/technical-consultants

MSC scheme documents
Find all MSC requirements, guidance documents and templates used during Fishery and Chain of Custody assessments
www.msc.org/go/msc-scheme-requirements

Risk-Based Framework
Find out more about this set of assessment methods that are used when assessing fisheries that lack extensive quantitative data.
www.msc.org/go/rbf

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