

# Review of ecolabelling schemes for fish and fishery products from capture fisheries



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# Review of ecolabelling schemes for fish and fishery products from capture fisheries

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by  
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## Preparation of this document

This document is based on a background report prepared by Keith Sainsbury, Professor of Marine Science, University of Tasmania, for the Expert Consultation on Ecolabelling Guidelines for Fish and Fishery Products held at the Food and Agriculture Organization of the United Nations (FAO) in Rome, Italy, from 3 to 5 March 2008. The background report was reviewed by FAO Fisheries and Aquaculture Department Staff: Kevern Cochrane, Chief, Fisheries Management and Conservation Service; William Emerson, Senior Fishery Industry Officer; and Rolf Willmann, Senior Fishery Planning Officer. Minor changes were made to the background report following the Expert Consultation. Jean-Jacques Maguire, FAO consultant, reviewed this version. The author subsequently updated and revised the text to take account of more recent developments. This version was reviewed by Peter Manning, FAO consultant. Assistance from Tina Farmer, Anne Van Lierde and Françoise Schatto in the preparation of the final document is gratefully acknowledged.

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# Abstract

This review is part of a process by the Fisheries and Aquaculture Department of the Food and Agriculture Organization of the United Nations (FAO) to refine the minimum substantive requirements of the FAO guidelines for ecolabelling of marine capture fisheries, and also to consider whether a single set of requirements could be developed that was adequate to assess both marine capture fisheries and inland fisheries. Ecolabels in this context are the International Organization for Standardization (ISO) Type I environmental labels, and so are voluntary with certification based on third party assessment of the environmental effects of the product. The minimum substantive requirements are the measurable or operational requirements for assessing whether a fishery can be certified and an ecolabel awarded, and they relate to the management system, the stocks under consideration and the relevant ecosystem.

This review summarizes the standards, requirements and practices for well-managed fisheries as applied through internationally-managed fisheries and through national management of fisheries. The standards, requirements and practices of existing fishery ecolabels are reviewed, including government-linked ecolabels, non-governmental ecolabels and seafood guides. Seafood guides are mostly ISO Type II or Type III ecolabels that provide self-declared claims or product descriptions against preset indices, and so are not strictly comparable to the ecolabels covered by the FAO guidelines. However, these guides are reviewed here because they are increasingly widespread, sometimes used in business procurement policies, a source of information on public expectations about sustainable fisheries and some use the results of third party assessments.

The special requirements of the assessment of small-scale fisheries and developing countries fisheries are considered. The primary difficulty in relation to ecolabelling of these fisheries is also the primary difficulty with their management, generally that the cost of monitoring, assessment and management can be out of proportion to the value of the fishery and/or beyond the human and infrastructure capacity that is available. However, ecolabelling requires evidence that is verifiable and auditable through third party assessment. Methods to develop, test and apply proxies, empirical indicators and risk-based assessments are available and have been applied in both small-scale and developing state fisheries. While these assessment and management approaches have not been widely applied, and they require further development, they provide promising methods to manage fishery performance in circumstances where formal (statistical) estimation of stock condition is not possible.

Inland fisheries often involve significant artificial enhancements and practices that are characteristic of aquaculture, such as species introductions and translocations, artificial breeding or feeding, disease control and animal husbandry, nutrient fertilization and intentional habitat modification. These practices are counter to the current norms and requirements of wild capture fisheries, which emphasize use of naturally occurring species and the maintenance of natural biodiversity, productivity and ecosystem processes. The importance of distinguishing between wild capture fisheries, enhanced fisheries and aquaculture in ecolabelling schemes is emphasized, because otherwise products with very different ecological impacts and performance standards could appear in the marketplace with the same ecolabel. Presently, the extent of aquaculture-like enhancements that would be acceptable in a capture fishery ecolabel is unclear, and this requires further development. But suggested interim criteria are provided for enhancements that are consistent with modern capture fisheries management and that could be acceptable in a capture fishery ecolabel.

Based on this review, minimum substantive requirements are suggested for the FAO guidelines on ecolabelling of marine capture fisheries.

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# 1. Introduction

Ecolabelling schemes in the context of this review, certify and promote labels of products from well-managed marine capture fisheries and focus on issues related to the sustainable use of fisheries resources. They are International Organization for Standardization (ISO) Type I environmental labels, and so are voluntary with certification based on third party assessment of the environmental effects of the product (ISO, 1999a; Wessells *et al.*, 2001). Third party ecolabelling for capture fisheries faces several challenges and tensions in delivering ecolabels that are genuinely transparent, voluntary and non-discriminatory. The ecolabel must be accessible to all fisheries that meet the sustainability standard and must not exclude sustainable fisheries because of arbitrary requirements or processes by the ecolabel, such as a requirement to prove sustainability in ways that are not feasible in some situations or use of management systems that are not appropriate or not used in some situations. Flexibility is therefore required. But ecolabelling also requires transparent and consistent demonstration of sustainable performance of the fishery through a third party assessment process. That demonstration is the basis of the credibility, reliability, fairness and truthfulness of the ecolabel. The performance must be transparently demonstrated for all participating fisheries. It is not sufficient for a fishery, industry, government, non-governmental organization (NGO) or certification body to simply state that a fishery is sustainable in its view, or for different standards of proof to be accepted from different fisheries participating in the same ecolabelling scheme. Otherwise there is scope for the ecolabel to become arbitrary and discriminatory in trade and fair competition. Imprecise or general specification of the criteria for assessment can result in arbitrary ecolabelling decisions being applied to different fisheries or by different third party certification bodies. There is, therefore, tension between the need for clear and specific sustainability criteria, including the evidence required to show that they are met, and the flexibility needed to encompass all the various circumstances and approaches in fishery management that can deliver responsible and sustainable utilization.

In addressing these issues it is important to ensure that the purpose and limitations of ecolabelling are recognized. Ecolabelling is not responsible for the management of fisheries – it is the role of governments and competent international bodies to manage fisheries. Ecolabelling identifies well-managed fisheries on the basis of stated criteria relating to sustainable use of the fisheries resources and related marine ecosystems. For the credibility of the ecolabel the criteria must have a high chance of identifying sustainable fisheries and screening out unsustainable ones. The credibility of an ecolabel, and fishery ecolabelling more generally, would rapidly suffer if certified fisheries collapsed or were found to be unsustainable in other important ways. The purpose is not to create an ecolabel that all fisheries can achieve, but rather an ecolabel that all sustainably managed fisheries can achieve. In this it is the sustainability outcome and its transparent demonstration that is paramount to the credibility and fairness of the ecolabel.

In 2005, the FAO Committee on Fisheries (COFI) adopted guidelines for marine fishery ecolabelling (FAO, 2005). These guidelines provide general considerations, definition of terms and principles, and the requirements for institutional and accreditation arrangements so as to ensure independent assessment, audit and verification in conformity with international standards (e.g. the ISO and the World

Trade Organization [WTO]). Ecolabels are required to be voluntary, market driven, transparent, non-discriminatory, not to create unnecessary obstacles to trade (e.g. Technical Barriers to Trade under the WTO) and to promote fair trade and competition.

FAO (2005) also provides an outline of the operational requirements and criteria for assessing whether a fishery can be certified and an ecolabel awarded. These are the minimum substantive requirements and are provided to ensure credibility of the ecolabel and, in particular, that the fishery is well-managed and sustainable. The minimum substantive requirements address each of three issues: the status of the harvested stocks, the impacts of the fishery on the ecosystem and the fishery management system. The minimum substantive requirements in FAO (2005) are based on agreed international instruments addressing fisheries, in particular the 1982 United Nations Convention on the Law of the Sea (UNCLOS), the 1995 United Nations Fish Stocks Agreement (UNFSA) and FAO Code of Conduct for Responsible Fisheries (FAO, 1995a), as well as the 2001 Reykjavik Declaration on Responsible Fisheries in the Marine Ecosystem and related documents (FAO, 2001, 2003). The minimum substantive requirements in FAO (2005) are consistent with more recent United Nations General Assembly resolutions (UNGA, 2005, 2006 and 2007).

In adopting the 2005 guidelines, COFI recognized the need for further consideration and development of the minimum substantive requirements for fishery ecolabelling, especially in relation to:

- The stock under consideration and the impacts of the fishery on the ecosystem for both marine capture fisheries and inland fisheries. Inland fisheries often include greater human enhancement or modification of the species (e.g. translocations, introductions, hatchery rearing), food and habitats than is usual in marine fisheries. The minimum substantive requirements identified for marine capture fisheries (FAO, 2005) are provided in Appendix 2 and those proposed for inland fisheries (FAO, 2006) are provided in Appendix 3. Both are based on the FAO Code of Conduct for Responsible Fisheries.
- The criteria used by existing or developing ecolabelling schemes to assess the status of stocks and the ecosystem impacts of fishing.
- The elements of national, regional and international fishery management and arrangements that are relevant to the minimum substantive requirements for fishery ecolabelling, including the FAO Technical Guidelines for Responsible Fisheries Management and implementation of the ecosystem approach to fisheries.

This review of the ecolabels in fisheries was prepared for the Expert Consultation on the FAO Guidelines for Ecolabelling for Capture Fisheries, held in March 2008 (see Appendix 1 for the background and terms of reference), to help elaborate the minimum substantive requirements provided in the FAO (2005) guidelines. The recommendations of the Expert Consultation were considered by the FAO Sub-Committee on Fish Trade in June 2008 and by COFI in March 2009. At this meeting, COFI adopted revised minimum substantive requirements for the *Guidelines for the ecolabelling of fish and fishery products from marine capture fisheries* (FAO, 2009; Appendix 2).

This report first reviews the standards, requirements and practices for well-managed and sustainable fisheries. The standards, requirements and practices are reviewed for several different situations and applications:

- international agreements and management arrangements;
- national management arrangements;
- national and regional government-based ecolabels;
- non-government-based ecolabels; and
- non-government seafood consumer and business procurement guides.

The particular situations of enhanced fisheries, small-scale fisheries and developing State fisheries are specifically examined, and recommended minimum substantive requirements for fishery ecolabelling are provided. There are some differences between the recommendations made through this review and the minimum substantive requirements that were ultimately adopted by COFI (FAO, 2009 and Appendix 2).<sup>1</sup>

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<sup>1</sup> The minimum substantive requirements recommended by the author in this Technical Paper refer to capture fisheries generally and were proposals for consideration by FAO, initially by a workshop of experts organized by FAO (see FAO Fisheries Report No. 864). Not all of the recommendations in this Technical Paper were endorsed, and the minimum substantive requirements adopted in the revised Guidelines for the ecolabelling of fish and fishery products from marine capture fisheries (FAO, 2009; Appendix 2) show some differences to these original recommendations.



## 2. Standards, requirements and practices for well-managed and sustainable fisheries

### 2.1 INTERNATIONAL AGREEMENTS AND MANAGEMENT ARRANGEMENTS

Over the past decades, especially since the 1982 United Nations Convention on the Law of the Sea (UNCLOS, 1982) established the basis for extended jurisdiction by coastal States and for the sustainable exploitation of the high seas, there have been many changes in the expectations of fishery management. Some of these changes have been reflected in “hard” law, for example, the United Nations Fish Stocks Agreement (UNFSA, 1995). Other changes have been manifest in “soft” law, such as FAO’s Code of Conduct for Responsible Fisheries (FAO, 1995a, 1997) and international guidance documents on the precautionary (FAO, 1996) and ecosystem approaches to fisheries (FAO, 2003). These reaffirm the goal of optimal utilization of fishery resources and promote the responsible fishing practices that have been found to be necessary in order to achieve sustainable resources and human benefits. The international impetus to achieve sustainable fishing has also been strongly reinforced by the 2002 World Summit on Sustainable Development (WSSD) and by General Assembly resolutions (UNGA, 2005, 2006, 2007). These call for responsible governments and regional fisheries management organizations (RFMOs) to prevent overfishing and to restore and maintain stocks at levels capable of producing maximum sustainable yields (MSYs), to reduce or eliminate bycatch, to protect endangered species, to protect vulnerable marine ecosystems (e.g. some sea bed habitats) and to apply the ecosystem approach to fisheries. The United Nations General Assembly will review progress on WSSD and General Assembly resolutions in 2009.

UNFSA provides principles for the management of fisheries on highly migratory and straddling stocks beyond national jurisdiction. These principles are wide-ranging and include the use of the precautionary approach in adopting and implementing conservation and management measures. The Agreement also requires that the principles relating to these measures should be applied consistently and compatibly to highly migratory and straddling fish stocks under national jurisdiction. Furthermore, the 2006 UNFSA Review Conference agreed that these principles should apply to discrete or other stocks in the high seas. Thus, the principles of precaution, conservation and management established by UNFSA have very wide applicability to fish stocks on the high seas and within national jurisdiction. The principles provided by UNFSA in relation to the precautionary approach and to conservation and management measures stipulate the requirement to:

- Adopt measures to ensure long-term sustainability.
- Ensure that such measures are based on the best scientific evidence available and are designed to maintain or restore stocks at levels capable of producing MSYs.
- Apply the precautionary approach.
- Assess the impacts of fishing on target stocks and species belonging to the same ecosystem.
- Adopt conservation and management measures for species belonging to the same ecosystem.

- Protect marine biodiversity.
- Ensure that fishing capacity and fishing effort do not exceed those commensurate with the sustainable use of fishery resources.
- Collect and share in a timely manner complete and accurate data concerning fishing activities.
- Promote and conduct scientific research in support of conservation and management.
- Implement and enforce conservation and management measures through effective monitoring, control and surveillance.

UNFSA also includes more detailed guidance on the implementation of the precautionary approach and conservation and management measures:

- Management shall be more cautious when information is uncertain, unreliable or inadequate.
- Precautionary target and limit reference points shall be established for stocks. Fishery management strategies shall ensure that the risk of exceeding a limit is very low. A minimum standard for a limit reference point is the fishing mortality giving MSY, and the biomass giving MSY is an appropriate target for recovering overfished stocks.
- When reference points are approached, they will not be exceeded; and if they are exceeded, there will be action without delay to restore the stocks.
- New or exploratory fisheries shall use cautious conservation and management measures until there are sufficient data to allow the identification of measures for the long-term sustainability and gradual development of the fisheries.
- If natural phenomena have a significant adverse impact on the stocks, conservation and management measures shall be adopted to ensure that fishing activity does not exacerbate that impact.
- It will be ensured that fisheries do not have a harmful impact on living marine resources as a whole.

The changed expectations in fisheries management in recent decades as reflected by these “hard” and “soft” law agreements are very significant, especially when compared with the previous simpler and target species-focused objectives of most RFMOs and other international fishery management arrangements. The more recent expectations have changed the previously accepted level of depletion of target species. They extend management responsibility to the impacts of fishing on the structure and processes of the broader ecosystem (e.g. the ecosystem-based approach to fisheries management [FAO, 2003]) and require the application of a precautionary approach when information or understanding is insufficient for scientific certainty about the effects of fishing. In addition, the United Nations General Assembly (2007) raised particular concerns about the impact of bottom trawling on sea bed habitats and called for an assessment of whether there were adverse impacts on vulnerable marine ecosystems and, if so, that the fishery be managed so as to prevent such impacts or not be authorized to proceed.

The ecosystem-based approach to fisheries management emphasizes that a whole ecosystem perspective is needed, not just a focus on the species directly utilized. This aims to maintain healthy ecosystems in order to support fishery production and other human activities, to minimize the risk of irreversible or very slowly reversible change, to attain high long-term human benefits and to maintain future options for use and sustainable development. This approach is consistent with the goals of sustainable development more generally (e.g. UNCED, 1992) and, in this context, “slowly reversible” could be taken to mean not reversible on a human generation time and not therefore limiting intergenerational equity and development options. It is also consistent with scientific results on the importance of ecosystem health, including genetic, species and community biodiversity, in sustaining ecosystems that can continue to provide the full range of ecosystem services and that are resilient to

natural variability and anthropogenic change (e.g. Hughes, 1994; Holling and Meffe, 1996; Rapport *et al.*, 1998; Costanza *et al.*, 1997; Hughes *et al.*, 2005).

RFMOs have responded variously to the challenge of these changed expectations. Mooney-Seus and Rosenberg (2007) provide an extensive review of the way in which different RFMOs are addressing the UNFSA, ecosystem-based management and the precautionary approach to fisheries management. From these and other comparisons, Lodge *et al.* (2007) developed a summary of best practices by RFMOs (see Appendix 4). These are measures that are in practical operation in at least one RFMO so as to achieve the stock utilization and ecosystem conservation goals set out in FAO's Code of Conduct for Responsible Fisheries, the UNFSA and the ecosystem approach to fisheries. These measures provide a good guide to the requirements of a well-managed and sustainable fishery. The points of particular relevance to the minimum substantive requirements for fishery ecolabelling are:

- Target and limit reference points are used for fishing mortality and population size of commercially targeted and retained stocks.
- Target reference points are consistent with achieving long-term optimum utilization.
- The limit reference point for fishing mortality is no greater than the mortality giving maximum long-term sustainable yield, as specified in UNFSA.
- The limit reference point for stock size is the size below which it is known or expected that there is a much greater probability of significantly reduced recruitment but at which the probability of significantly reduced low recruitment is still small. This could be at a size that has been historically shown to be safe and/or below which stock dynamics are unknown.
- Key prey species are identified and the reference points are modified to account for dependent predators.
- There are identified limits of acceptable impact for non-target or bycatch species, and for habitats, with management measures to ensure these limits are not exceeded. These limits may be determined through risk-based considerations rather than direct assessment of the populations.
- The management system includes agreed strategies or rules to vary the level of fishing depending on the state of the stock and, in particular, to maintain the stock in the vicinity of the targets, to avoid the limits and to recover overfished stocks in a defined period. Recovery of overfished stocks is to levels that can provide long-term MSYs.
- There are effective mechanisms for collecting the information necessary for assessing and managing the fishery, recognizing that information requirements can be very different for different management systems and measures.
- All sources of mortality are accounted for in assessment of the status of the stocks.
- The fishing capacity is commensurate with long-term optimal and sustainable utilization.

These measures are generic, in that they can be applied to all stocks and fisheries, although there may be a wide range of different ways to achieve the intent. For example, fishing mortality or stock size reference points may be reformulated in terms of other more directly measured quantities (e.g. catch rate, fish density, length distribution in the population or catch, tag recovery rates, area of the fishery in relation to the area of the stock) that are sometimes called empirical indicators or empirical reference points (e.g. Hilborn *et al.*, 2002; Kelly and Codling, 2006). Strategies and rules that vary fishing activities can be triggered by these empirical reference points in the same way that they can be triggered by fishing mortality or biomass reference points. The advantage of empirical indicators and reference points is their simplicity. Their disadvantage is that the easily measured indicators for a fishery are often difficult to interpret uniquely and

so they may not provide reliable guidance in management of the quantities that are of fundamental interest and concern, which are usually related to stock biomass and fishing mortality. This disadvantage may be overcome by simulation testing (e.g. Butterworth and Punt, 1999; Sainsbury *et al.*, 2000) or by observed real-world performance over a long period that demonstrates adequate performance of a management strategy based on empirical reference points and decision rules. A key requirement in the use of empirical reference points and decision rules, particularly in a third party ecolabelling context, is transparent demonstration that they have a good chance of achieving the intended management outcomes despite the uncertainties of fishery assessment and management.

Further guidance on the minimum substantive requirements for a fisheries ecolabel can be drawn from the criteria relating for listing under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The aim of CITES is to ensure that international trade in specimens of wild animals and plants does not threaten their survival. A fishery or fishery product that meets the CITES Appendix I or Appendix II criteria would not be expected to be sustainable. The criteria for listing (CITES, 1994) are provided in Appendix 5, and further elaboration and consideration of their application to fisheries is provided by Mace *et al.* (2002). The CITES criteria provide a standard that is lower (i.e. more depleted) than that appropriate for a fisheries ecolabel. Therefore, the criteria for an ecolabel for sustainable fisheries must exceed the requirements that:

- Populations are not depleted below 5-20% of their historical levels (i.e. the levels prior to fishing or that would be expected in the absence of fishing). The range 5-10% is applicable to species with high productivity, 10-15% to species with medium productivity, and 15-20% for species with low productivity. A natural mortality rate in the range 0.2-0.5 per year may indicate medium productivity.
- The recent rate of decline of a population, if it is likely to continue or resume, is not projected to reduce the population below 5-20% of its historical levels within a ten-year period. The same productivity ranges as above apply to this range of depletion.

The CITES criteria are provided in generic terms and specifically allow for different kinds of empirical evidence to be used for their evaluation (e.g. changes in spatial range, change in the quality or area of habitat, general vulnerability because of the pattern of exploitation, life history characteristics or ecological circumstances of the species).

Further guidance on the international standards is likely to come from the ISO soon. In early 2007, the ISO established Technical Committee 234 to develop standards for sustainable fisheries and aquaculture (ISO, 2007). The Technical Committee has met but as yet there are no draft standards publicly available from that process.

## 2.2 NATIONAL MANAGEMENT ARRANGEMENTS

The national requirements for fishery management are based on national laws, policies and plans. They vary greatly (e.g. see OECD, 2005 and the related annually updated Country Notes on National Fisheries Management Systems; Schmidt, 2003; Marco and Quesada, 2005). Most express an intent similar to that embodied in the United Nations Convention on the Law of the Sea (UNCLOS, 1982) and the FAO Code of Conduct for Responsible Fisheries (FAO, 1995a): to achieve the social and financial benefits of fishing, including attaining the highest or otherwise optimal long-term yield, and to maintain the productive capacity of the fished stocks and their supporting ecosystems. Most provide general and high-level goals, but few provide specific and detailed measures for the adequacy of performance against those goals. Usually, with exceptions that will be discussed further below, there is no description of what is acceptable or unacceptable performance that could be transparently and objectively used as the minimum substantive requirements in a third party assessment for a fisheries ecolabel.

The operational (i.e. measurable) management requirements for sustainable fisheries are very similar across all the jurisdictions where detailed operational requirements are specified, such as the United States of America (NMFS, 1998, 2005a, 2005b), the European Union (ICES, 2003a, 2003b), the Republic of Namibia (MFMR, 2004), the United Mexican States (Alvarez-Torres *et al.*, 2002), Australia (DEWHA, 2001; DAFF, 2007) and New Zealand (NZMF, 2007a, 2008a). These and other approaches were reviewed recently by Sainsbury (2008) and NZMF (2008). They all make use of reference points as operational benchmarks to provide targets and limits and to trigger management responses, as recommended by the FAO Code of Conduct for Responsible Fisheries (FAO, 1995a, e.g. the management system should determine stock specific target and limit reference points and, at the same time, the action to be taken if they are exceeded). The United States of America national standards for fishery conservation and management and related provisions are probably the most comprehensive operational description of the requirements of fishery management to address the issues raised by recent agreements and guidelines (i.e. maintaining or recovering fished stocks to provide an optimal yield not greater than the biological MSY, protecting the productive capacity of the ecosystem, minimizing impacts on vulnerable elements of the ecosystem and endangered species). While the specifications are described in terms of target and limit reference points for fishing mortality and stock biomass they can be replaced by appropriate proxies of these quantities, or different quantities entirely (e.g. empirical indicators and reference points), which achieve the same intent. This point is elaborated in Appendix 16.

The requirements and approaches to the operational specifications for a sustainable fishery are summarized below for (i) target or retained species; (ii) ecosystem considerations; and (iii) the management system.

### 2.2.1 Target or retained species

The target fishing mortality and consequent catch should be chosen to provide an optimum long-term yield. In fisheries where more than one species is targeted or retained the optimum will involve balancing the exploitation across these species so as to give the best outcome. The exact interpretation of the optimum in balancing economic, social and ecological issues is flexible within the constraints provided by the limit reference points. It is expected and accepted that the stock will vary through time above and below the average stock size associated with the long-term optimal yield. But the target fishing mortality is selected so as to result in a low chance of violating the limit reference points in the long term and in the context of the uncertainties, vulnerabilities and limitations of the particular monitoring, assessment and management arrangements used in the fishery (e.g. a probability of violating the limit reference point of less than 0.9 over at least two fish generation times is commonly used in implementing the US National Standard, is required in implementing the Australian Harvest Strategy Policy, is required in implementing the New Zealand Harvest Strategy Standard, and is a criterion for the acceptance of several harvest strategies of the Convention on the Conservation of Antarctic Marine Living Resources [CCAMLR]). Other things being equal, greater uncertainty in monitoring, assessment and management implementation would require a greater safety margin between the target fishing mortality and the limit fishing mortality.

The maximum or limit fishing mortality should be the fishing mortality giving long-term MSY (i.e.  $F_{MSY}$ ). Treating  $F_{MSY}$  as a limit reference point is consistent with the UNFSA (1995) recommendation and is now also implemented in many national management arrangements. There are several proxies for  $F_{MSY}$  in common usage, including the fishing mortality giving a specified reduction in the “spawners per recruit” which can be calculated from life history information alone. The appropriate reduction in the “spawners per recruit” depends upon the productivity of the stock,

with smaller reductions being appropriate for less productive stocks. A proxy with a good general scientific and practical basis (Clark, 2002) is the fishing mortality that reduces the “spawners per recruit” to 40 percent of its unfished level, or  $F_{40\%}$ . General guidance on the relationship between population productivity and the “spawners per recruit” proxy for  $F_{MSY}$  is provided by Sainsbury (2008) and NZMF (2008), with guidelines from NZMF (2008) as shown in Table 1.

**Table 1: Relationship between population productivity and the “spawners per recruit” proxy**

Productivity level	Proxy fishing mortality (F%) for $F_{MSY}$	Resulting average reduction in biomass (% B0)
High productivity	F30%	25%
Medium productivity	F40%	35%
Low productivity	F45%	40%
Very low productivity	$\leq$ F50%	$\geq$ 45%

This combination of targets and limits on fishing mortality is expected to result in the average stock/population size or stock biomass being greater than the average biomass giving the MSY (i.e.  $B_{MSY}$ ). Sustainability advantages are expected from maintaining a high stock size because most of the ecological and fishery properties that are of interest and concern to sustainable fisheries relate to biomass. These include stock productivity, risk of serious or irreversible harm to recruitment and genetic integrity, stock resilience to natural and anthropogenic impacts, recovery time from overfishing, role in ecosystem functions (e.g. food webs), and robustness to uncertainty in fishery assessment and management implementation. Economic efficiency and profitability advantages are also usually expected from maintaining higher stock size.

The minimum or limit stock size, usually the spawning stock size, should be above that at which recruitment overfishing or other irreversible or slowly reversible damage is thought likely (i.e.  $B_{lim}$ ). This limit is commonly set at 20-30 percent of the initial or unfished biomass (and a higher percentage for low productivity stocks) or 50 percent of the biomass giving on average the long-term MSY (i.e.  $0.5B_{MSY}$ ). Another common practice is to set this limit so that it represents the state of the stock and fishery at some time in its history where depletion had occurred but had not caused recruitment overfishing. In some management contexts, especially the International Council for the Exploration of the Sea (ICES), a buffer is used (i.e.  $B_{pa}$ ) to trigger management measures to rebuild the stock and avoid reaching the limit. The size of the buffer depends on the reliability of the estimation of stock size; in practice  $B_{pa}$  is often about  $1.4 B_{lim}$ . Similarly, New Zealand has established a “soft limit” at which stock rebuilding measures are triggered with the intention to avoid reaching the “hard limit” of  $B_{lim}$ , with  $B_{soft\ limit}$  being  $2 B_{lim}$ .

In some situations, there is sufficient information available to estimate the fishing mortality and/or stock size periodically, to check the status against the relevant targets and limits, and to trigger appropriate management responses to maintain a desired status or correct an undesirable one. This is the approach taken to many of the larger and more valuable fisheries. There are many instances, however, in both developed and developing country fisheries where the information necessary to do this is not available and/or could not be provided at a cost commensurate with the scale of the fishery. Two approaches have been developed and applied to achieve the outcomes specified by the fishing mortality and stock size reference points in situations where these quantities are not specifically measured or estimated.

(i) Empirical or proxy indicators and reference points

Empirical indicators are directly measurable aspects of the fishery (e.g. catch per unit effort or sex ratio, proportion mature, size distribution in the catch) in contrast to

indicators such as fishing mortality that typically are not directly measurable and must be estimated through a population or other mathematical model. Particular values of the empirical indicators can be used to define empirical target or limit reference points and to trigger management interventions. A very simple and common application of this is to use catch as a proxy indicator and to fix a catch limit (i.e. an empirical target) at a size that has proved to be sustainable for a long period in the past. This can be successful. But it does not allow for change or variability in the stock abundance, and there must be high confidence that the chosen catch is sustainable in all likely circumstances in the fishery (e.g. recruitment variability or changed fishery selectivity); constant catch strategies lead to rapid collapse if the catch is not sustainable. Use of several other empirical proxy indicators and reference points can address these problems. For example:

- Starr *et al.* (1997) used catch rate and Tuck *et al.* (2001) used a combination of catch rate and tag return rate in lobster and toothfish fisheries, respectively, while Scandol (2003) used catch rate combined with samples of length and age to develop reference points and management triggers for a wide variety of small-scale and mixed-gear coastal fisheries.
- Davies *et al.* (2007) provide a very good example of the use of empirical indicators and reference points in the management of a swordfish fishery, including the decision rules that link changes in the permitted catch to changes in the catch rate and weight composition of the catch. They use simulation testing to show that these decision rules based on empirical reference points meet the fishing mortality and stock size reference points requirements listed above. Earlier attempts using similar empirical indicators with different decision rules gave poor performance (Punt *et al.* 2001), illustrating that it is the combination of rule and indicator that is important and not just the indicator.
- Downing *et al.* (2007) provide catch decision rules based solely or largely on empirical indicators for several small-scale and data-deficient fisheries to meet the requirements for fishing mortality and stock size reference points listed above.
- Sadovy *et al.* (2007) provide a good example of the use of spatial surveys to assess and set quotas for a small-scale fishery in the Republic of Indonesia to achieve fishing mortality outcomes without directly estimating fishing mortality. Comparisons between sites with different fishing pressure, including reference sites without fishing, have been used or proposed as empirical reference points for fisheries management (e.g. Munro, 1979, for an early and effective example of using contrasting sites; Kaufman *et al.*, 2004; Floeter *et al.*, 2005).
- Several of the criteria for recognition of endangered species through CITES (see Appendix 5) and national legislation use empirical proxies for population status.

The simplicity of empirical proxy indicators and reference points makes them very attractive. However, they can be difficult to interpret uniquely because there may be several different causes of change in the proxy indicator – for example, the catch rate can change because of the change in stock size, but also because of the change in fishery targeting, gear efficiency or changes in spatial distribution of the fish or fishery. So a key requirement in the use of empirical proxy reference points and linked fishery management decision rules is transparent demonstration that there is a high chance that they will deliver the required management outcomes in the relevant circumstances despite uncertainty in interpreting the empirical indicators. Experience to date with these empirical proxies suggests it is not the proxies themselves that are important but how they are linked to reference points through management decision rules.

(ii) Risk-based methods

Risk assessment and risk management is a very well-developed formal methodology in many fields involving management of uncertainty, but most applications in fisheries (see Sumner *et al.*, 2004) focus on relatively restricted sources of risk and pathways to impact. Hobday *et al.* (2004) and Smith *et al.* (2007) provide a series of indicators

and reference points for use in fisheries ecological risk assessment. The qualitative and semi-quantitative levels of these risk assessment methods do not require estimation of total catch, stock abundance or fishing mortality because they are based on the general characteristics of the species, the ecosystem and the fishing operations. The risk categorizations (e.g. low, medium, high) are intended to be equivalent across the qualitative, semi-quantitative and quantitative risk methodologies. Consequently, the criteria defining each category contain implicit precautionary allowance for the increased uncertainty when assessment is based on generalization or analogy from other situations, rather than on observations from the assessed fishery.

The qualitative and semi-quantitative ecological risk assessments have been applied to all federally managed fisheries in Australia, including retained species and bycatch species and in many situations where there are no data on the fishery catch (AFMA, 2007). The fishery management response to the ecological risk assessment focuses on using the most appropriate combination of available measures to eliminate high-risk situations, and the risk assessment categories are not linked to predefined decision rules.

### 2.2.2 Ecosystem considerations

Focused recognition and management of the ecosystem impacts of fishing are recent in fisheries management and appropriate indicators and benchmarks for sustainable performance are still under active development. Rapid evolution is to be expected in the understanding and consensus about what is sustainable performance in relation to ecosystem considerations. Currently, the key operational requirements are:

- The bycatch of unwanted and subsequently discarded species should be avoided as far as is feasible.
- There are measures to manage the catch of bycatch species that are caught incidentally (i.e. not specifically targeted) but that have commercial value and are retained when caught. These measures include preventing the targeting of bycatch species without authority (i.e. notification and approval) or ahead of sufficient information to sustainably manage the species to the standards expected of target species.
- The main bycatch species should be within the biological limits, beyond which they are likely to suffer irreversible or slowly reversible impacts, or if they are beyond these limits there should be management measures taken that will protect and recover the populations to above the limits. These limits, in principle, are the same limits as for target species because the limits are biologically based rather than resulting from human use of the catch. However, the limited information available for many bycatch species will result in the frequent use of proxies or risk-based methods to select, monitor and assess limits and performance measures.
- The fishery should not cause species to be at high risk of extinction, with the criteria for this risk being the CITES criteria reproduced in Appendix 5 and relevant national legislation (i.e. reduction below 5-20% of the unfished population size, with reduction below 10-15% being the range for fish species of medium productivity). If the fishery interacts with a species that is recognized as being at risk of extinction then, to the extent that the fishery contributes to that risk, fishery management measures should be taken to allow recovery of the population, and subsequent maintenance of the population, at levels that do not pose a high risk of extinction. Catch limits are commonly used to limit the impacts of the fishery on species at risk of extinction. The Potential Biological Removal (PBR) and similar methods (Wade, 1998; Maunder, *et al.*, 2000; Fletcher, 2004) can be used to determine the maximum catch that will still allow recovery and maintenance of species at risk of extinction, recognizing that this is a maximum and that the desirable or acceptable catch in particular circumstances may be lower.
- If the target or bycatch species is a key prey or forage species in the ecosystem, then the fishery should ensure that the requirements of dependent predator species

are taken into account in order to avoid excessive depletion of these dependent predator species. In particular, the target and/or limit reference points should be altered so that the excessive depletion of dependent predator species is avoided, with excessive depletion being indicated by the limit reference points that would be applied to that species if it were a target species or by the criteria for listing as threatened or endangered. In some cases, such as when the dependent predators are fishery targets or socially important species, it may be appropriate to avoid or prevent the fishery from targeting key prey species.

- Impacts on sea bed habitats that have very long recovery times should be avoided and, more generally, the impacts should be minimal on habitats that are particularly important to key ecological processes and/or the life history requirements of managed species (including target species, major forage species, major bycatch species and species recognized as threatened with extinction). The detailed national requirements in relation to habitat impacts vary widely. They range from no requirements, through various forms of requirement for information and understanding of impacts and the setting of precautionary limits of impact, to requiring no adverse impact and a management response similar to that for an endangered species if an adverse impact on the quality or quantity of essential fish habitat is considered likely (i.e. the United States of America national requirements for essential fish habitat, NMFS 2005b). There are no well-developed operational limits established for the depletion of habitats. However, the general limits for endangered species listing apply to habitat-forming species (e.g. see Appendix 5 for the CITES criteria) and so reduction of such species to 5 to 30% of their unfished abundance can be taken to be a limit of reduction. Furthermore, the limits of reduction for target species imply limits to the reduction of habitats that these target species are dependent upon. Reduction of the essential habitat of a target species to below 20% of its unfished extent would be expected to reduce the dependent target species by a similar amount, even in the absence of fishery catch of the dependent species. In this way, the limit reference points for target species also provide implied limits to the reduction of habitats that are essential to target species. Similarly, if the dependent target species had low productivity, which is often the case, then the implied limit for the essential habitat would be 30% or more to avoid overfishing of the target species. These arguments relate to the limit reference point for the habitats of dependent target species. The habitat requirements to ensure that dependent target species can be maintained at the target abundance will require less reduction than that implied by the limit abundance.

The risk-based methods described previously for the target or retained species (Hobday *et al.*, 2004; Smith *et al.*, 2007) are particularly relevant for the assessment of ecosystem effects. The risks can be characterized by these methods on the basis of general consideration of the ecosystem and the nature of the fishing operations, augmented with appropriate quality assurance by the observations of fishers, scientists and other interested parties. In particular, these methods can be used to identify, relatively quickly, low-risk situations that do not require further management.

### 2.2.3 Management system

The legal requirements for fishery management in the relevant jurisdiction are applied.

The objectives should include achieving an optimum yield that does not exceed the long-term MSY and maintaining the harvested stock at sizes that are associated with high levels of productivity and recruitment. Two situations in which these objectives may be varied are:

Developing fisheries where the transient yield may exceed the long-term sustainable yield and, in such cases, there should be a plan that ensures the successful transition from the transient to the long-term regime.

Multispecies fisheries where obtaining the overall optimum yield may involve the target species being reduced to levels different from those that would apply if the species were being caught alone and, in such cases, none of the species would be allowed to be reduced below the limit reference points.

The objectives should address the ecosystem effects of fishing (e.g. avoid overfishing of bycatch species, minimize the catch of endangered species and foster their recovery, and maintain key ecosystem structure and function such as food webs, habitats and biodiversity at genetic, species and community levels).

There should be a programme for monitoring and understanding the fishery (including the target and retained species, the ecosystem effects of fishing and the operation of the fishery) that is sufficient to meet the management requirements of achieving a sustainable fishery. These requirements can vary greatly with the form of monitoring, analysis and decision-making that is being used to manage the fishery. They invariably require, however, at least monitoring of the implementation of previous management decisions, the kind of fishing gear and number/intensity of fishing operations, and the catch and bycatch at an appropriate level of detail.

The programme to monitor the operation of the fishery, including implementation of previous management decisions, catch and bycatch, should include quality assurance and quality control mechanisms.

There should be stock-specific target and limit reference points, and prior specification of the actions to be taken if limits are approached or exceeded. The specification of actions is ideally in the form of decision rules that relate the permitted fishing activity (e.g. catch, effort, area) to the status of the fishery in relation to the reference points. This includes specification of the actions to recover stocks that are below limit reference points (i.e. are overfished). But the specification could also be in the form of other agreements that provide the actions to be taken in identified circumstances. In any case, there is good expectation that the actions would be undertaken when appropriate and would be effective.

The management regime that is applied should have a demonstrably high chance of achieving the objectives of management in the context of uncertainties, biases or ineffectiveness in monitoring, analysis and management of the fishery. This applies to the objectives for retained species, bycatch species, endangered species and the ecosystem more generally (e.g. managing impacts on habitats and key prey species). For stock-specific reference points, particularly fishing mortality and catch, performance is measured by achieving the target and avoiding the limits reference points.

All sources of mortality and catch, including catches from fisheries other than the one being assessed and estimates of illegal, unregulated or unreported catches, should be accounted for in assessing the status of the stocks.

There should be specific arrangements to ensure that new fisheries, and new target species within existing fisheries, are developed within precautionary catch limits. These limits should have a high probability to be sustainable for the species targeted and fishing operations planned, with scope to increase these limits as further information becomes available.

### **2.3 NATIONAL AND REGIONAL GOVERNMENT-BASED ECOLABELS**

In the last decade, several national or regional fisheries ecolabels have been or are being developed through arrangements that are government-linked and/or that rely on government assessments of the fishery. Development of fisheries ecolabeling schemes have been seriously considered or started in Africa, Australia, Japan and the Nordic countries. The initiatives of Australia, Japan and the Nordic countries have progressed to the stage of publicly available guidelines about the performance required of the fisheries for certification. So far only the Australian ecolabel and the Japanese ecolabel

have certified a fishery against their standard, but there are apparently well-developed plans for the implementation of the Nordic ecolabel.

In the African region there has been a wide-ranging review of the various forms of ecolabelling, the ecolabels already in use by African countries, and the benefits and challenges of ecolabelling in the region (UNEP, 2007a). The review was generally positive about the experience to date, the benefits of ecolabelling and the feasibility of an African regional ecolabel with fisheries as one of the target industries for application (UNEP, 2007b). A detailed work plan for further development of the regional ecolabel has been drafted (UNEP, 2007c). There are currently no operational performance requirements are not available for the prospective African fisheries ecolabel, so it is not possible to judge consistency with the revised minimum substantive requirements of FAO (2009).

The European Union (EU) has operated the voluntary Flower ecolabel since 1992 (EU, 2007). This ecolabel applies to non-food products and aims to reduce the environmental impact of products throughout their entire life cycle. A review of the ecolabel in 2000 agreed to extend the ecolabel to services, but reiterated that the ecolabel did not apply to food (EU, 2000). The ecolabelling criteria for product types are developed by a technical panel and approved by the European Union Eco-labelling Board (EUEB), which is made up of “competent bodies” identified by the Member States and representatives of interested parties (i.e. consumers, environmental NGOs, industry and commerce). Although the European Union ecolabelling programme does not currently include fishery products, the Nordic region has a long history of ecolabelling through the Nordic Swan ecolabel (NE, 2008), and in 1996 the Nordic Council of Ministers established a process to develop ecolabelling criteria for sustainable fisheries (Norden, 2000). The recommended criteria are given in Appendix 6. Some key points in relation to the minimum substantive requirements for fisheries ecolabelling are:

- The “unit of certification” is a combination of the fishing operations and the mix of species caught, not the species throughout their range or all the fisheries that take the species in a jurisdiction.
- There must be a management plan, in the sense of an agreement between the management authority and the interested parties. In the context of third party certification this must be transparently available for review and verification.
- The management plan provides objectives, management rules, limit reference points, and planned or pre-agreed management measures that come into force immediately when a precautionary limit reference point is reached, which requires cessation of target fishing when that limit reference point is reached.
- The management system must have efficient monitoring and control mechanisms.
- The inherent logic of the management plan and arrangements, and empirical observation of long-term stability of a fishery at expected catch levels, can be used as evidence of sustainability. The larger the pressure from fishing the greater the proof that is required of sustainability, and fishing that is “clearly safe” or low risk requires little further proof.
- Destructive fishing practices such as the use of explosives or poisons are not allowed.
- Discards are minimized and monitored.
- The management plan should address scientifically established issues relating to endangered species, seabirds, marine mammals and sensitive biota or habitats.

The Department of Environment, Water, Heritage and the Arts is required to assess all fisheries exporting fish products, and all federal fisheries, to ensure that they are sustainably managed before an export permit can be issued (Department of Environment, Water, Heritage and the Arts [DEWHA], 2008). The guidelines for ecologically

sustainable fishery management (DEWHA, 2007) are summarized in Appendix 7, and the most recent assessments using these guidelines of all relevant Australian fisheries are available at DEWHA (2008). A fisheries ecolabel “Clean Green” was developed by the Australian Southern Rocklobster industry (ASRL, 2008), in which the government assessment of sustainability forms the sustainability requirements of the ecolabel. The Clean Green certification applies to individual fishery operators but the fishery as a whole must both pass the DEWHA assessment for sustainable management and meet any performance requirements contained in the relevant State government fishery management plan. Additional requirements must also be met in relation to conformity with food quality, food safety, workplace safety and animal welfare (ASRL, 2008). The fishery assessments are conducted by a third party assessment body that is accredited by an independent accreditation body, the Joint Accreditation System of Australia and New Zealand (JAS-ANZ). There is an extensive chain of custody procedure based on a numbered tag on each individual certified lobster. So far, one fishery product has been assessed and can carry the ecolabel – lobsters from about half of the operators in the Australian southern rock lobster fishery across the states of Victoria, South Australia and Tasmania – but the ecolabel is available to other fisheries.

In 2007, the Japan Fisheries Association (JFA) announced the development of a fisheries ecolabel “MEL Japan” – Marine Eco-Label Japan – (USAD, 2007), which became available for application in 2008 (JFA, 2008). The JFA is an incorporated association of fishing industry groups and interests. The institutional arrangements and principles against which fisheries are assessed for the ecolabel are provided by JFA (2008; a translation was kindly made available from the MEL Secretariat and is provided in Appendix 8). There are separate requirements, assessments and certifications for the capture fishery and the chain of custody of the products of that fishery through to the end consumer, with the latter to provide assurance against the mingling of product from certified and non-certified fisheries. The fishery assessments are conducted by third party certification bodies that are accredited by the JFA. The certification bodies provide recommendations to MEL Japan who will provide successful fisheries with a certification certificate through the certification body. MEL Japan consists of an Audit Committee, an expert Advisory Body on technical issues and a Council. The eleven-person Council is initially composed of four people from the wholesale and retail sectors, three from government agencies (the Fisheries Research Agency, Japan Fisheries Agency), two from industry associations (Japan Fisheries Association, the National Federation of Fisheries Cooperatives in Japan [ZENGYOREN]) and two from scientific organizations.

While the detailed criteria for assessment are expected to evolve and be elaborated on the basis of experience, the current requirements for assessment of the producing fishery are:

- (1) fisheries should be conducted under an effective management scheme;
- (2) the target resource should be maintained at a level that gives sustainable use; and
- (3) appropriate measures should be taken for the conservation of the ecosystem.

Cooperative or co-management arrangements are explicitly recognized and rewarded in assessment of the management system. To avoid duplication, the certification assessments will utilize to the maximum extent possible the work and management measures that have already been undertaken within these management arrangements.

To date, three fisheries have applied for MEL Japan certification (JFA, 2008; MEL, 2009) and all have passed assessment. These are fisheries for red snow crab (certified in December 2008), stardust shrimp and freshwater clams (both certified in May 2009). The English language part of the MEL Japan Web site (MEL, 2009) does not appear to be updated frequently and in June 2009 all of these fisheries were still described as being under assessment.

## 2.4 NON-GOVERNMENT-BASED ECOLABELS

Four fisheries ecolabels are in operation or under development that are non-government-based: the Marine Stewardship Council, the Friend of the Sea, Naturland and the Marine Aquarium Council.

### 2.4.1 *Marine Stewardship Council*

The Marine Stewardship Council (MSC) was established in 1997 as a joint project between the then largest seafood buyer Unilever and the international conservation organization World Wildlife Fund (WWF). MSC has operated as an independent organization since 1999 (MSC, 2008a). MSC sets the standard for the ecolabel through its board, supported by a Technical Advisory Board. Fishery assessments are conducted by third party certification bodies, which are in turn accredited as competent to perform MSC assessments by an accreditation body that is independent of both MSC and the certification bodies. For products to carry the MSC ecolabel they must meet the MSC standards both for the sustainability of the source fishery and for the integrity of the “chain of custody” through which the product passes from the fishery to the end consumer. The chain of custody requirement is to protect against products from uncertified fisheries carrying the ecolabel. There is an independent dispute resolution process. In late 2007, there were 22 certified fisheries and 30 further fisheries under full assessment, more than 1 000 MSC-labelled seafood products being sold in 34 countries and over 7 percent of the world’s edible wild-capture fisheries involved in the programme (MSC, 2008a). The fisheries certified include large- and small-scale fisheries.

The MSC principles and criteria (MSC, 2008b) provide the standard for assessments of candidate fisheries for the MSC ecolabel and are given in Appendix 9. The operational performance benchmarks used in the interpretation of the MSC principles and criteria for the individual fisheries assessed for MSC certification have been recently revised through the MSC’s Quality and Consistency Project and are provided at MSC (2008c). The unit of certification is a combination of species and fishing operations that are specified by the fishery seeking certification, and so certification can be sought for just a subset of the species targeted in a multispecies fishery or for a subset of the kinds of fishing gear that harvest the species. Principle 1 is applied only to the species nominated for certification and emphasizes maintenance of the productive capacity of those species. Principle 2 is applied to all other species and habitats impacted by the fishery and emphasizes limiting harm and avoiding limits. The MSC principles and criteria are generic and the key points in relation to minimum substantive requirements are:

- Fishing levels maintain high and ongoing productivity of fish stocks (including reproductive capacity) within safety margins for error and uncertainty.
- Depleted stocks are recovered within a specified time frame in order to provide and maintain high and ongoing productivity.
- Fishing does not threaten biodiversity (including genetic and species biodiversity), habitats or associated, dependent and ecologically related species. Fishing maintains functional relationships and should not lead to regime changes in ecosystem state or food webs.
- Fishing avoids or minimizes the capture of non-target species, adverse impacts on habitats, and mortality or injuries to threatened, endangered or protected species.
- The management system has clear objectives consistent with the above requirements of fishing.
- The management system is consultative to all interested parties, including fishing interests, and includes appropriate dispute resolution mechanisms.
- The management system is appropriate to the context, scale and intensity of the fishery.
- The management system includes a research and monitoring programme appropriate to the scale of the fishery, to provide the information necessary for management.

The status of the fishery is periodically assessed; management acts in a timely fashion to effectively control the fishery to achieve the objectives; and appropriate compliance, monitoring and enforcement measures are in place to ensure that limits are not exceeded and any necessary management measures are taken.

The operational benchmarks that have been used for the interpretation of the MSC principles and criteria are generally quite similar to those described above for nationally and internationally managed fisheries. In particular, the following benchmarks are typical for certified species: the target is long-term high yield and associated stock size; the limit reference points are  $F_{MSY}$  for fishing mortality and  $0.5 B_{MSY}$  or  $0.15-0.30 B_{unfished}$  for stock size; and there are agreed management measures to achieve targets and to recover stocks that approach or exceed limits. In relation to the ecosystem impacts, the fishery monitors, avoids and manages bycatch within biological or precautionary limits; monitors and minimizes the catch of threatened, endangered and protected species; modifies fishing or reference points to avoid excessive depletion of key prey species and dependent predators; and considers habitat impacts.

While both large- and small-scale fisheries have been assessed for MSC certification, so far all have been relatively data-rich in that sufficient data have been available to allow evaluation using “classical” scientific analysis and assessment methods. There are fisheries however in both developed and developing States for which the data and other resources to conduct such analysis are not available. To promote greater access to the ecolabel, MSC has developed methods and operational interpretations of its standard that are intended to be more appropriate for small-scale or “data-deficient” fisheries (MSC, 2008d). This is a risk-based methodology to assess fisheries against the MSC principles and criteria, which provides an alternative way to assess a fishery against the MSC standard, and not a different standard. It uses a methodology similar to that applied to Australian federally managed fisheries (Hobday *et al.*, 2004; AFMA, 2007; Smith *et al.*, 2007), modified for the MSC assessment methodology. These qualitative and semi-quantitative risk assessments are based on the general characteristics of the species and fishing operations, rather than estimations of fishing mortality, exploitation rate or stock size, and the risk categorizations include precaution for increased uncertainty due to the limited data available from the fishery. This risk-based methodology is currently in trial through pilot assessments by third party certification bodies on the fisheries for mahi-mahi in the Republic of Ecuador and the Republic of Peru, mullet in Samborombón Bay (the Argentine Republic), sole in the Republic of the Gambia, mullet in Banc d’Arguin (the Islamic Republic of Mauritania), and Cornish sardine in the United Kingdom of Great Britain and Northern Ireland. The Vietnamese Ben Tre clam fishery is also under assessment using both the conventional and the risk-based assessment methodology. The methodology that is being trialled is available on request from MSC.

#### 2.4.2 *Friend of the Sea*

The Friend of the Sea (FoS, 2009a, 2009b) provides an ecolabel – the Friend of the Sea Mark – for both capture fisheries and aquaculture. The Friend of the Sea has a two-person Board, an Advisory Board and a Technical Committee that includes governmental, non-governmental, industry and scientific expertise. Candidate fisheries are first assessed by the Friend of the Sea and may then be submitted to a third party certification body to assess the fishery against the Friend of the Sea principles and criteria. The certification body issues the ecolabel certificate. Objections are reviewed by an Objections Committee that consists of a coordinating chair (independent of Friend of the Sea) and at least three appointed experts, the certification body and the fishing industry. The Objections Committee provides a report to the objector and Friend of the Sea, including any action that the Friend of the Sea should take. The fishery assessments make extensive use of public information, such as RFMO,

government or FAO reports, to screen fisheries and fishing operations for consistency with the Friend of the Sea requirements. This provides for both rapid assessment of candidate fisheries and for *a priori* lists of fisheries or fish products that are likely to meet the requirements (FotS, 2009a). However, these reports and assessments relate to stocks and fisheries that are variously defined for government or international reporting purposes, and are sometimes ill-defined. It is not clear how the unit of certification relates to these varying definitions, especially when the certified stock or fishery is a subset of the stock or fishery used in government or international reporting. The Friend of the Sea lists 54 capture fisheries that have been certified to carry the Sea Mark ecolabel, with certified products sold in 23 countries. Many of the certified fisheries are small scale and in developing States.

The criteria of the Friend of the Sea for certification of capture fisheries are given in Appendix 10. This ecolabel has a list of requirements that categorically exclude a fishery from certification if the requirements are not met, and assessment efficiency is gained because most of the requirements can be relatively easily determined from widely available reports or simple enquiries. Fisheries are categorically excluded from certification if they:

- Have target or bycatch species that are overfished, depleted or recovering (an exception is made for traditional fisheries if less than 10% of the catch is made up of such overfished stocks and the fishery otherwise provides an example of a well-managed fishery).
- Have as target or bycatch species that are on the International Union for Conservation of Nature (IUCN) Red List.
- Are data deficient in relation to determining the stock status of target and bycatch species.
- Use gears that impact the sea bed unless the impact can be shown to be negligible.
- Have a discard level higher than the average worldwide level reported by FAO (currently 8% of total catch).
- Do not respect catch limits if they are set by the management authority.
- Include any illegal, unreported or unregulated fishing, or Flag of Convenience vessels.
- Involve certain labour conditions such as forced or child labour, wages below legal standards or do not respect national or international labour legislation.
- In addition, the Friend of the Sea recommends that the fishery management system use a precautionary approach and incorporate monitoring and research.

These latter two points are recommendations rather than requirements because the key outcomes are expected to be covered by the other criteria. That is, a fishery exerting a very low fishing mortality may not need monitoring or research for its management, but a fishery exerting a high mortality would be categorized as data deficient without monitoring or research. The Friend of the Sea also recommends that the fishery determine its carbon footprint.

### 2.4.3 *Naturland*

Naturland, founded in 1982, provides an ecolabel for a wide range of organic agriculture, including aquaculture. It has a well-developed process of certification and accreditation. This includes third party certification bodies, accreditation bodies and objections procedures, with frequent ISO audits to ensure the accreditation-certification systems meet international requirements. In 2006, Naturland extended its scope to include sustainable inland and marine capture fisheries (Naturland, 2008) with the ecolabel Naturland Wildfish. The Naturland Wildfish assessment includes social and economic sustainability in addition to ecological sustainability. One fishery has been certified under this ecolabel: the Lake Victoria fishery for Nile perch was certified

in April 2009 (UNEP, 2007b; Seafood Source, 2009). It is anticipated that this first assessment will result in further definition and refinement of the Naturland Wildfish criteria and methodology.

The Naturland Wildfish ecological criteria for a sustainable capture fishery are given in Appendix 11. Points of particular relevance to the minimum substantive requirements for fisheries ecolabelling are:

- The fishery must maintain the long-term integrity of the economic species and the other components of the ecosystem.
- All sources of impact and capture are accounted for in the assessment of fishery status.
- The fishery does not:
  - catch marine mammals or turtles;
  - catch sharks only for their fins;
  - use poisons or explosives;
  - damage coral reefs (cold water and tropical);
  - use trawl methods on highly structured sea bed habitats; and
  - use trawls without excluder devices to minimize bycatch.
- The fishery management system controls (directly or indirectly) the minimum size of fish caught, the total catch, the fishing gear and techniques, closed seasons and sanctuaries, and avoidance or mitigation of bycatch.

#### *2.4.4 Marine Aquarium Council*

The Marine Aquarium Council (MAC) was established in 1998 and by 2001 had adopted a standard and process to certify the wild capture and subsequent treatment of fish for the ornamental aquarium trade (MAC, 2001, 2008). In 2004, a standard for live fish for human consumption was developed because many of the operators and communities involved with the aquarium trade are also involved in the trade of live fish for consumption. However, this standard for live fish for human consumption was not formally adopted by the MAC and no fisheries have been certified for this trade. The MAC has a board of directors representing global stakeholders, of which more than half must be from conservation or public interest groups. Ongoing development of the standard and processes are recommended to the board, after multistakeholder consultation, by a Standards Committee. The MAC accredits third party certification bodies to assess the collection and supply chain for compliance with the standard. The MAC is currently revising the certification standards, procedures and complaint resolution mechanisms to meet the International Social and Environmental Accreditation and Labelling (ISEAL) Alliance requirements. The revision is expected to further refine the approach taken to the fishery management system, so as to better deal with situations where there is little or no management by government and to encourage development of new management arrangements in such situations. Certification applies to collectors and locations, and there are a large number of entities certified, particularly in the Asia-Pacific region. Many of the certified fisheries are small scale and in developing States.

The MAC principles and criteria for fishery assessment are given in Appendix 12. Despite the very different scale of fishing for the aquarium trade, the dominance of fisheries in developing States, and the highly multispecies nature of these fisheries, the principles and criteria are very similar to those used for fisheries for consumption. Points of particular relevance to the minimum substantive requirements for fisheries ecolabelling are:

- Exploitation is at rates that maintain productivity and sustainable use of the target species over the long term.
- Fishing is conducted in a manner that ensures sustainability of dependent and associated species, and maintains genetic, species and ecosystem biodiversity. It

specifically maintains the potential of the ecosystem to meet the needs of present and future generations.

- Destructive fishing methods (e.g. poisons and explosives, dredging and methods causing physical damage to habitats) are not used.
- There is a written management plan that details the objectives of management for the target species and the ecosystem more broadly, the decision making process, agreed measures for management of the fishery (e.g. general and specific measures, precautionary measures, contingency plans, issues of particular concern and the actions to address them), and arrangements for monitoring, control, surveillance and enforcement.
- The management plan is periodically reviewed for effectiveness, and changes are made to address changed circumstances and audit results (e.g. correction of measures in the plan that are not achieving the intended outcomes).

## **2.5 NON-GOVERNMENT SEAFOOD GUIDES FOR CONSUMERS AND BUSINESS-TO-BUSINESS PROCUREMENT**

Non-government seafood guides are not formally third party ecolabels, in that they are not based on a formal certification procedure and they commonly identify fisheries with poor practice as well as those with good practice. Several of these guides use the IUCN Red List (IUCN, 2007) to identify fishery species that are recommended to be avoided. These guides and claims are mostly ISO Type II or Type III ecolabels (ISO, 1999b, 2000; Wessells *et al.*, 2001) that provide self-declared claims or product descriptions against preset indices respectively, but some of them also use the results of third party assessments. A very large number of such schemes are in operation; they are a major and rapidly growing element in the public perception of sustainable fisheries and they can include consumer-facing product labels. They range from seafood guides that are designed to be used by consumers in retail outlets and restaurants, to sourcing guarantees that are provided by processor or retail companies, which could include a product label, to “business-to-business” guides on the sustainability of seafood products from different procurement sources (see Section 8). Increasingly, sophisticated methods are used to deliver these guides to the consumer; many individual NGOs provide cards or Web sites that give their recommendations – several groups provide consolidation of these recommendations or “guides to the guides” on integrated Web sites, and with the advent of Web-enabled mobile phones the information is increasingly available and convenient to consumers at the point of purchase.

These seafood guides are considered here because they (i) are increasingly widespread and available to the consumer and public; (ii) provide one source of information on the issues and expectations for sustainable fisheries; and (iii) are being increasingly used by seafood businesses, particularly retail outlets, for procurement, advertising, public relations and corporate social responsibility. An exhaustive review of these schemes is not provided here. Rather, for the purposes of informing the minimum substantive requirements, some examples are provided of the criteria used by schemes that are widespread and that have well-developed, publicly available, and operational criteria for their fishery assessments.

Appendix 13 gives the scoring criteria for the Blue Ocean Institute seafood guide, Appendix 14 gives the scoring criteria for the Monterey Bay Aquarium seafood guide and Appendix 15 gives the criteria for the FishSource business-to-business product sustainability guide. Points of particular relevance to the minimum substantive requirements of fishery ecolabelling from these and other NGO or business seafood guides are:

- There is significant use made of proxy measures and indicators for sustainability, vulnerability and productivity/resilience, as well as more direct measures of fishing mortality and stock size. Many of the proxy measures are the same or

similar to those used in risk-based approaches to ecological impact assessment and are informed by the general characteristics of the species, ecosystems and fishery operations as well as by trends in directly measured empirical indicators (e.g. catch rate, size composition, age composition).

- A definition of limits (i.e. limit reference points) is either used by the seafood guide or required to be provided by the fishery management system. Limits are usually required for fishing mortality, above which overfishing is regarded as occurring, and stock size, below which the stock is regarded as overfished. A minimum acceptable stock size is very common, with this often being  $0.5B_{MSY}$ . And a common limit for fishing mortality is  $F_{MSY}$ .
- A distinction is recognized between overfishing (i.e. fishing that will lead to the stock being overfished) and the stock being already overfished. Overfishing is regarded as undesirable and reflecting future prospects, but acceptable in the short term if management acts to correct the situation. Overfished stocks are usually regarded as an unacceptable failure.
- Data-deficient situations in the fishery is scored neutrally by some systems (i.e. this contributes in neither positively or negatively to the score) and negatively by others. The vast majority of guides emphasize the need for precaution where understanding is low, and score the presence of relevant precautionary measures highly.
- Bycatch and discards are given high prominence. Bycatch of threatened, endangered or protected species is required to be zero or low and occasional to achieve high scores. Mitigation plans and measures are required in situations where capture of such species is an issue.
- Most score general bycatch on the basis of the weight or number of bycatch in relation to the retained catch. High scores require no or low bycatch rates, with 10% being the benchmark for a high score in several systems. About 100% bycatch gives medium scores in several systems, with higher bycatch ratios than this giving low scores. Mitigation plans and measures are strongly supported.
- Habitat impacts are given high prominence. It is usually scored by some combination of intensity of impact and spatial extent of the impact. Large-scale bottom trawling on hard bottom and biogenic habitats is usually scored low in these schemes, alongside the use of explosives and poisons. Research and monitoring to allow habitat impacts to be understood is usually explicitly recognized with higher scores.
- Food web considerations are mostly in relation to the effects on dependent predators, and key prey species (e.g. "baitfish") are often required to be considered explicitly with high scores requiring their management so as not to deplete dependent predators.
- To achieve high scores for the management system normally requires that there is a management plan that considers and establishes sustainability goals for both the target species and the ecosystem impacts; there is a plan with agreed actions to maintain sustainable fishing and to recover overfished stocks; there is monitoring of the target species, bycatch and fishery operations; there are monitoring and research plans that are sufficient and appropriate for management of the fishery within sustainable limits; there is no or minimal illegal, unregulated or unreported fishing; all sources of mortality are estimated and accounted for in determining fishery status; there are plans and mitigation measures (if required) in relation to bycatch minimization; management is effectively implemented; and the fishery is operating according to the relevant laws.
- The management system is commonly evaluated for its past history of following scientific advice and of successfully implementing the chosen management measures (especially catch or other limitations on fishing).

### 3. Enhanced fisheries

One of the main differences in emphasis between the FAO ecolabelling guidelines on minimum substantive requirements provided for marine capture fisheries (FAO, 2005, FAO, 2009; Appendix 2) and those proposed for inland capture fisheries (FAO, 2006; Appendix 3) is the greater recognition and inclusion of enhanced fisheries in the latter. Enhanced fisheries are supported by activities that aim to supplement recruitment or increase production beyond that available and/or sustainable by natural processes. Enhancement (Petr, 1998; FAO, 1999; Lorenzen *et al.*, 2001) can include one or more of:

- the use of species that are not natural or native in the area (e.g. intentional or accidental introductions);
- strains or races of a species that are not natural or native in the area (e.g. selective breeding of new strains from naturally occurring strains in the area or intentional or accidental translocations of strains from other areas within the natural range of a species);
- rearing and release of young individuals into the wild for later capture (e.g. ranching and “culture-based” fisheries);
- capture from the wild and artificial feeding (e.g. caging or grow-out);
- creation of artificial habitat (e.g. spawning habitat or sites, rope culture of shellfish, artificial reefs);
- control of competing, predating or “weed” species in the fished system; and
- fertilization to increase production (e.g. addition of nitrogen and phosphorous to ponds and lakes using inorganic fertilizers or organic waste).

Enhancement is very widespread in inland fisheries, where introductions, fertilization and culture-based fisheries are common (e.g. FAO, 1995b; Petr, 1998; Berka, 1990) and responsible for about 20 percent of the capture fishery catches (Lorenzen *et al.*, 2001). But enhancement is also rapidly expanding in marine fisheries, especially through the use of ranching and caging of fish and the provision of habitat for invertebrates (Caddy and Defeo, 2003; Bartley and Leber, 2004). In marine fisheries, habitat traps (e.g. *casitas* for lobsters, Arce *et al.*, 1997) and fish aggregating devices (FADs) for pelagic fish are usually regarded as changing the catchability in a fishery rather than productivity, but under some circumstances they can change the recruitment or population productivity. Ocean fertilization with micronutrients (e.g. iron) is a form of fishery enhancement if one of the intended outcomes is increased fishery production (e.g. Markels, 1994; Coale *et al.*, 1996; Boyd *et al.*, 2000).

There are three aspects of enhancement of particular relevance to the consideration of minimum substantive requirements for the ecolabelling of capture fisheries and their products.

(i) The boundary between capture fisheries and aquaculture

The increasing use of enhancement results in a continuum between unenhanced “wild” capture fisheries (i.e. wild capture of fish with the natural genome and no intentional augmentation of reproduction, recruitment, habitats, food, carrying capacity or life history parameters) and “pure” aquaculture (i.e. closed life cycle, artificially selected genetic strains, fully supplied food, artificially provided and contained habitat, husbandry practices for reproduction and disease, “owned” organisms). At the two extremes, different issues and criteria are relevant to evaluation for ecolabelling and, recognizing this, the organizations that offer both capture fishery and aquaculture ecolabels use different criteria for the two certification assessments (e.g. Monterey

Bay Aquarium, WWF and Friend of the Sea; see “Additional reading”). But without clarity about the scope and performance requirements of both the capture fishery and aquaculture ecolabels there is potential for confusion among consumers and inequity among producers in the “middle ground” between wild fisheries and pure aquaculture. This would arise if there was not a clear and consistent dividing point between the scope of fisheries and aquaculture ecolabels, and if in any area of overlap between them the same or similar enhancement practices were treated differently. A capture fisheries ecolabel would need to treat the same practices equally in both marine and inland capture fisheries.

Among present ecolabels there is not a clear and consistent dividing point between capture fisheries and aquaculture. For organizations offering both capture fisheries and aquaculture ecolabels, it is not clear what kinds or intensities of enhancement practice would be assessed under the capture fishery or aquaculture criteria and, consequently, whether the same practice would be assessed consistently across fisheries either within a single ecolabelling scheme or (particularly) between ecolabelling schemes. Similarly, for organizations that offer only capture fishery or aquaculture ecolabels, it is not clear what enhancement practices are “in scope” for the ecolabel, and therefore it is not clear that the same enhancement practices will be treated equally in different ecolabelling schemes that purport to be addressing the same kind of fishery product (i.e. either aquaculture or capture fishery product).

In the FAO Code of Conduct for Responsible Fisheries (FAO, 1995a), culture-based fisheries are considered an element of aquaculture, and from that it would follow that culture-based fisheries would be appropriately assessed under the criteria for aquaculture ecolabels. But in the proposed guidelines for ecolabelling of inland fisheries (FAO, 2006) culture-based fisheries are treated as capture fisheries in which management of the supporting aquaculture production/rearing system is required to be linked to the fishery management system but is not a part of the capture fishery for ecolabelling assessment purposes (FAO, 2006; Appendix 3, paragraphs 29.7 and 30b). This is one approach to separating the aquaculture and capture activities. If the production system however is not assessed as a part of the capture fishery certification, then that certification can provide no assurance about the sustainability of the production system and ultimately the sustainability of the dependent capture fishery.

To avoid market confusion and the potential for the same practice to be treated differently it is necessary to clearly identify the scope of capture fishery certification and to differentiate it from aquaculture certification. In the present context, this specifically requires clarity about the enhancements that are within the scope for a capture fishery ecolabel and consistent application of these across both marine and inland capture fisheries.

(ii) The inherent difference in environmental intent between capture fisheries and some enhanced fisheries

Unenhanced “wild” capture fisheries are controlled hunting. The space where fishing occurs and the fish that are harvested are not usually privately owned. Modern fishery management practice is based on maintaining harvested populations that are both naturally productive and within ecological limits of reversibility, with impacts on non-target species and the ecosystem being minimized or managed in order to maintain productivity, biodiversity and natural ecosystem functions. Fishing impacts beyond the target species are incidental and not the intention of fishing. In contrast, aquaculture is farming and has a quite different intent with respect to modification and use of the environment. The intention is to use the most appropriate species and strains of species that are available, to create and maintain a situation, habitat or environment in which those species will flourish, and to have clear ownership rules for the cultured organisms and the facilities for culture. Alteration of the genome of the species and conversion of natural habitats and environments to controlled ones is usually both intended and

accepted. While there is a gradation and continuum in the kinds and scale of fishery enhancements, enhancements are often based on intentions and methods that are more similar to aquaculture than they are to wild capture fisheries.

Both fisheries and aquaculture can deliver large human benefits and be sustainable. But the practices, issues and criteria for sustainability, and hence ecolabelling, are different. These differences are especially relevant to the treatment of species introductions or translocations, modification of the habitat, augmentation of natural production through feeds or fertilizer, and maintenance of biodiversity at genetic, species and community levels. If the objectives of modern capture fishery management in relation to ecosystem impacts are maintained (i.e. those expressed through UNCLOS, UNFSA, the FAO Code of Conduct for Responsible Fisheries and the Reykjavik Declaration on Responsible Fisheries in the Marine Ecosystem), then it would be expected that relatively few of the features of aquaculture could be accommodated in the performance requirements of a capture fishery ecolabel. And this limits the extent to which enhanced fisheries can be accommodated in a capture fishery ecolabel.

From this, the practices and criteria for fishery enhancements to meet the requirements of modern capture fisheries management and a capture fishery ecolabel include:

- The capture activities of the enhanced fishery meet all the requirements of capture fisheries in general relating to the harvested species and the natural ecosystem.
- Ranching and culture-based fisheries use the natural or native genome in the area. The impact of increased populations of the released species meet the same requirements as an unenhanced fishery in relation to the effects on dependent and associated species, species threatened with extinction, habitats and trophic interactions, and biodiversity at the genetic, species and community levels.
- Caging is assessed and labelled at the point of capture from the wild. Subsequent grow-out is treated as aquaculture and not within the scope of a capture fisheries ecolabel.
- Habitat conversion is limited and/or local. The impacts on habitats meet the same requirements as an unenhanced fishery in relation to the effects on dependent and associated species, species threatened with extinction, habitats and trophic interactions, and biodiversity at the genetic, species and community levels. Assessment is in relation to the full extent of the habitat type in the relevant ecosystem.

(iii) Intentional introductions of species or genetic strains

Intentional introductions of species are made for a variety of reasons, including restoration of degraded ecosystems and replacement of globally or locally extinct species, but the majority of freshwater species introductions have been made for aquaculture or fishery purposes (e.g. FAO, 1988). Strictly, the intentional introduction, translocation or genetic alteration (e.g. selective breeding or genetically modified organisms) of species for the purposes of fishery enhancement is not consistent with the requirements of fisheries management and a capture fisheries ecolabel. The FAO (1996) guidelines on the precautionary approach in relation to species introductions reports that “Because of the high probability that impacts of species introduction [and transfers] are irreversible and unpredictable, many species introductions are not precautionary. Therefore, a strictly precautionary approach would not permit deliberate introductions and would take strong measures to prevent unintentional introductions.” Serious concern about the introduction of alien species, and the desirability of avoiding introductions, is also expressed in the guidelines on the ecosystem approach to fisheries (FAO, 2003) and by the United Nations General Assembly (e.g. UNGA, 2006).

The FAO (1996) guidelines on the precautionary approach recognize the considerable benefits that can be achieved by some introductions. In relation to intentional introductions for fishery or aquaculture purposes, the FAO (1996) guidelines on the

precautionary approach recognize that “experience has shown that animals will usually escape [so] introductions ... for aquaculture should be considered as a purposeful introduction into the wild” and that “the difficulty in reversing an introduction and its adverse effects should figure prominently in the decision process on whether to allow an introduction”. FAO (1996) recommends that a formal protocol be applied to the introduction decision, the introduction process, and the subsequent monitoring and management. FAO (1996) recommends and reproduces the ICES (1994) Code of Practice on the Introductions and Transfers of Marine Organisms, which built upon the European Inland Fisheries Advisory Commission (EIFAC) Codes of Practice and Manual of Procedures for Consideration of Introductions and Transfers of Marine and Freshwater Organisms, 1988. The COFI Sub-Committee on Aquaculture is currently developing a revised code and guidance for evaluation and management of intentional introductions, with increased focus on the nature of the risk assessment to be performed and the possible use of zoning (FAO/Regional Commission for Fisheries, 2006).

The proposed minimum substantive requirements for ecolabelling of capture fisheries from inland fisheries (FAO, 2006; Appendix 3) allows for ecolabelling of introduced or translocated stocks that have been introduced historically and that have subsequently become established as part of the “natural” ecosystem and/or have been introduced in accordance with international guidelines (see paragraphs 30a and 30b of Appendix 3).

Because introduction of species or genetic strains is frequently irreversible, and the consequences are highly uncertain and poorly predictable, it is not desirable at present to include new intentional introductions for fishery purposes in the minimum substantive requirements of a capture fishery ecolabel. This could be reconsidered after further development of guidelines for the evaluation and management of intentional introductions, which is under way through the COFI Sub-Committee on Aquaculture. The current guidelines for risk assessment and the decision criteria for intentional introductions need to be developed further, and there is a need for greater operational clarity in this critical process in order to adequately apply the precautionary approach and avoid inappropriate incentives for introductions. Also, the elaborate requirements for capture fisheries to avoid, manage and recover even incidental (i.e. unintended) impacts on species, habitats and biodiversity are somewhat incongruous with the acceptance of intentional species introductions within the same capture fishery ecolabel – the level of risk and required management are not consistent. So it is appropriate at this time that:

- Capture fishery ecolabels should be restricted to introduced species or genetic strains that have been introduced historically and that have subsequently become established as part of the “natural” ecosystem. “Historically”, in this context, is sufficiently long so as to provide no reward for past introductions or incentive for new introductions.
- New and comprehensive methods and guidelines should be developed for risk assessment and decision criteria, consistent with the requirements of modern fisheries management for unenhanced capture fisheries, for the acceptable introduction of species/strains for the purposes of a capture fishery.

## 4. Small-scale and developing state fisheries

Small-scale fisheries are very common in both developed and developing countries. The primary difficulty in relation to ecolabelling is also the primary difficulty with their management more generally – that the cost of meeting the requirements for management (i.e. monitoring, assessment, decision-making and implementation of management measures) can be out of proportion to the value of the fishery. This is particularly true if management is required to provide detailed and formal scientific proof to justify stock status conclusions and management actions.

For developing state fisheries, the challenges are sometimes more profound, and much has been written about these challenges (e.g. SEAFDEC, 1999, 2001, 2006; Petr, 1998; Wessells *et al.*, 2001; ICLARM, 2001; Gardner and Viswanathan, 2004; Jacquet and Pauly, 2007; and contained references). The fisheries are often highly multispecies, with overlapping multiple gears and multiple landing sites. They often contain a mixture of subsistence and various forms of commercial fishing, with a wide range of catch distribution pathways and a wide range of motivations/incentives for fishers and distributors. For example, catch distribution from a fishery or fishing community can simultaneously deliver into local cooperative or barter supply, local markets and animal feeds, regional and national markets, and export markets (including, in some cases, markets requiring sophisticated transport and organization such as the live fish trade). The fisheries in developing States range from small scale to very large scale in terms of the total fishing capacity and fishing mortality exerted. Compounding this ecological and management complexity there is sometimes also a lack of human and material capacity to address monitoring, assessment and management (including compliance) of fisheries.

While there are particular challenges in ensuring that sustainable fisheries that are small scale and/or are located in developing States have full access to ecolabelling schemes, there are good indications that this is achievable and indeed is being achieved in some fisheries. In particular:

- Although relatively few fishery ecolabels are currently in operation, there are already many examples of certified fisheries from developing States. The MSC has certified fisheries in Argentina and Mexico, and has assessments under way in Ecuador, the Gambia, Mauritania, Peru and the Socialist Republic of Viet Nam. There are eight MSC-certified fisheries that could be regarded as small scale. The Friend of the Sea has certified capture fishery products from the Azores Islands, the Kingdom of Morocco, the Republic of Mauritius and the Republic of Senegal, and at least ten fisheries that could be regarded as small scale. The MAC has numerous certified fisheries in Indonesia, the Republic of the Fiji Islands and the Republic of the Philippines, and all are small-scale.
- There is good international consensus on the general requirements of sustainable fisheries and there is considerable convergence in the operational interpretation of these requirements through good practice in international management, national management and various fishery ecolabelling schemes (see Section 5). These are generic requirements that can be implemented through the use of proxies, empirical indicators (with related reference points and triggered management responses) and risk-based methods so that the need for comprehensive data and modelling analysis is reduced. The methods to develop, test and apply

proxies, empirical indicators and risk-based assessments are available and have been applied in both small-scale and developing state fisheries. Specifically, they allow transparent demonstration of fishery performance in circumstances where formal (statistical) estimation of stock condition is not possible. When fishery assessments are based on reduced data and analysis then greater precaution will be required in reaching conclusions about whether the ecolabel standards for stock or ecosystem outcomes are met, but when risks are sufficiently low this could still provide adequate justification to allow certification and this is the basis of the approach in some ecolabels and seafood guides. Local knowledge, provided it can be verified, can be used in these assessments.

- Assessment for ecolabelling is focused on the outcomes – that is a sustainable fishery and a management system capable of maintaining sustainable use – and is not prescriptive about the type of management system used. Provided an adequate case can be made for effectiveness, the management system could take various forms: traditional community management; different kinds of co-management arrangement between industry, the community and government; government management; or international management. The scale of the management system required is appropriate to the scale, impacts and risks of the fishery, with existing ecolabelled fisheries already including examples of local (e.g. reef scale in the aquarium trade), national and international management.

While there are practical examples demonstrating that ecolabelling can be used in small-scale fisheries and in developing state contexts, it is also recognized that key enabling methodologies for this (especially the use of empirical indicators, risk-based methods and related decision rules, assessment and verification of local knowledge, and assessment of traditional management systems) are still relatively poorly developed. In addition, the capacity to implement these approaches is limited in many circumstances, especially developing States.

Accelerated improvement in this situation could be achieved through focused support and capacity building. This is a well-established obligation in international fishery agreements, including UNCLOS (especially Articles 144, 202 and 203), UNFSA (especially Articles 24, 25 and 26) and the FAO Code of Conduct for Responsible Fisheries (especially Article 5). In the context of ecolabelling, there are several topics that would benefit from focused investment and development:

- Further development of methods to assess sustainable use of fishery resources and related marine ecosystems using proxies, empirical indicators and risk-based methods. And specifically to develop these methods for the kinds of empirical indicators that could be measured for small-scale fisheries and in developing countries.
- Further development of management decision rules that can be triggered by empirical indicators and reference points. These methods should be proven to be capable of providing reliable management guidance, and specifically to achieve the required outcomes for fishing mortality and stock size even if fishing mortality and stock size are not directly measured or estimated.
- Further development of performance measures for the management system that are appropriate for a wide range of management approaches, including various types of co-management, cooperative management and traditional management.
- Development of protocols and methods for cost-effective monitoring and surveillance of small-scale and developing State fisheries, including the use and verification of local knowledge and observations in assessing the status and trends in the stock and fishery.
- Specific funding to support ecolabel certification in developing States, especially improvements to fisheries practices, fishery management systems and appropriate fishery documentation.

## 5. Summary comments on ecological requirements and assessment methods

There is remarkably good agreement across international management, national management and existing ecolabels about the issues that should be addressed for a capture fishery to be regarded as well managed in relation to the sustainable use of fishery resources. These issues are the target species, bycatch (including dependent and associated species), threatened and protected species, habitats and feeding interactions.

There is also very good agreement on the operational performance requirements for the target species, and for species in general. But there is considerably more variation in the requirements used for the broader ecosystem issues. This reflects the much longer period of focus, monitoring and experience with target species and other species of management concern within fishery management and research. However, currently there is considerable focus of management and research on the broader ecosystem aspects of fishing, and rapid evolution in understanding and operational performance requirements for ecosystem considerations can be expected in future.

Current understanding and usage of operational performance requirements for target species and the associate ecosystem are:

- Target species have a target reference point that is no smaller than the average stock size that provides the MSY. MSY is well-established as an objective in UNCLOS, UNFSA and the FAO Code of Conduct for Responsible Fisheries. The stock size giving MSY is an average and fluctuations around it are both expected and accepted. This outcome for stock size could be achieved by setting a limit reference point for fishing mortality at the level giving MSY on average, as identified in the UNFSA, or by use of other empirical indicators or risk-based management measures.
- Target species have a limit reference point that prevents irreversible or slowly reversible damage, and that specifically protects against recruitment overfishing. Avoiding long term or irreversible damage is well established in UNCLOS, UNFSA and UNCED. Commonly, the limit reference point is half of the average stock size that provides the MSY yield or 20% of the expected unfished stock size (recognizing that these are not usually the same).
- In multispecies fisheries, where there are several target species, the target reference points may be modified so that the optimum benefits can be obtained from the group of species as a whole. But this flexibility does not extend below the limit reference point for any of the component species.
- There is a specified time frame for the recovery of overfished stocks. The time frame for recovery of overfished stocks is related to the expected time that the stock would take to recover in the absence of fishing, and if possible is less than the typical human generation time (20 to 30 years) in order to provide for human intergenerational equity for sustainable development. One example of a practically applied recovery time frame is the time to recover in the absence of fishing plus 10 years, and another is between one and two times the time to recover in the absence of fishing.

- Bycatch is monitored and minimized. The aim is to prevent irreversible or slowly reversible damage to fishery productivity, ecosystem function and biodiversity. Specifically, there are limits or management measures to prevent overfishing of bycatch species, to ensure the fishery does not cause species to meet the criteria for serious threat of extinction, and to support the recovery of species that are overfished or that do meet the threat of extinction criteria.
- Key prey species are recognized and if they are target species the target reference points are modified as necessary to avoid excessive depletion of dependent predators and ecosystem processes.
- Key habitats are identified and the impacts examined. The definition of habitat is at a resolution that is appropriate for the fishery circumstance, including the critical habitats used by the target, dependent and associated species and the general habitats that provide regional ecosystem and community biodiversity. Damage to habitats is minimized and impacts on habitats that are vulnerable or very slow to recover are avoided. Explosives are not used as a fishing method. The aim is to prevent irreversible or slowly reversible damage to fishery productivity, ecosystem function and biodiversity. This is addressed by different requirements in different management and ecolabelling systems. The minimum requirement is knowledge of the habitats and fishery impacts, but most require that impacts be within specified acceptable limits and some require no impact or negligible impact. In assessing fishery impacts, it is the consequence to the extent and function of the habitat type in the context of the relevant ecosystem that is of interest. Consequently, the full spatial range of the relevant habitat is considered, not just that part of the spatial range of the habitat that is potentially affected by fishing. And, similarly, the local impact of individual fishing activities and operations on elements or patches of habitat is considered in the full spatial range of the habitat.

There has been very useful and recent development of fishery assessment methods that can be applied to fisheries that are small scale or otherwise data deficient (in the sense that there is insufficient data to allow application of statistical estimation and modelling of parameters such as fishing mortality and stock size). These methods include use of empirical indicators and reference points, risk-based assessment methods that can be applied based on general information about the fishery, and management decision rules that are triggered by empirical reference points. Importantly, these approaches can allow a fishery to demonstrate that management is likely to meet fishing mortality and stock size requirements even if these quantities are not measured or estimated. The methods can be generic and can be generically tested by simulation or other scientific procedures to establish that they are likely to deliver the required outcomes in data-deficient situations. Consequently, these methods and approaches can be used by small-scale and data-deficient fisheries without having them to be developed for each fishery individually. In general, it is expected that uncertainty in the assessment of a fishery would be greater if it is based on analogy with similar fisheries rather than on information on the species, ecosystem, fishing methods and management system from the particular fishery seeking certification. Therefore, greater precaution is necessary when using these indirect assessment methods and indicators.

There is widespread recognition that local knowledge (e.g. fisher or coastal community observations) can be used to assess the state of the fishery and fishery performance. But that this information, like other information used in third party assessments, must be verifiable, verified and transparently documented.

It is also acknowledged that the kind and scale of the management system should be appropriate for the context, scale and intensity of the fishery. Specifically, it should be possible for fisheries to be assessed as sustainable if they clearly pose low risk to

the harvested species and ecosystem based on general arguments about the nature of the species, ecosystem, gear and intensity of fishing. Several of the non-government ecolabels focus on management performance and a past record of good performance rather than the details of the particular management methods used to achieve that performance. All evaluation systems require some monitoring, at least to determine the effectiveness of management, and an objective and documented basis for judgement about management performance.



## 6. Recommended minimum substantive requirements for capture fisheries<sup>2</sup>

With this background on the operational criteria and available methods, the following minimum substantive requirements are recommended for capture fisheries.

### 6.1 MANAGEMENT SYSTEMS

- (a) The legal requirements for fishery management in the relevant jurisdiction(s) are met.
- (b) For stocks under consideration there are identified management targets consistent with achieving long-term MSY, or less if that is optimal in the circumstances of the fishery (e.g. multispecies fisheries) or necessary to avoid overdepletion of dependent predators (e.g. for key prey species).
- (c) For stocks under consideration there are identified limits consistent with avoiding recruitment overfishing and other impacts that are irreversible or very slowly reversible.
- (d) For stocks under consideration there is a recovery plan, including a planned or pre-agreed time frame, to rebuild stocks with high probability to the target if limits are approached or exceeded.
- (e) For stocks under consideration there are planned or pre-agreed management measures to ensure that targets are achieved on average and limits not exceeded, with a well-based expectation that the measures will be successful in the context of uncertainties in the management system (e.g. monitoring, assessment, decision making and implementation of management measures).
- (f) There are objectives, and as necessary limits or other management measures, to address the ecosystem effects of fishing. Depending on the relevance to the fishery concerned this includes:
  - Preventing bycatch species from becoming overfished or meeting the criteria for high risk of extinction.
  - Minimizing or avoiding bycatch, especially to foster recovery of species that are caught in the fishery and that meet the criteria for high risk of extinction.
  - Maintaining biodiversity at species and community levels, including maintaining habitats and trophic functions or dependencies.
- (g) There is collection of information from the fishery that is adequate to assess and manage the fishery by the chosen management regime and measures, and to monitor the implementation of previous management decisions. This can include relevant traditional knowledge and fisher or coastal community observations, provided these are verifiable, verified and documented.

<sup>2</sup> The minimum substantive requirements recommended by the author in this Technical Paper refer to capture fisheries generally and were proposals for consideration by FAO, initially by a workshop of experts organized by FAO (see FAO Fisheries Report No. 864). Not all of the recommendations in this Technical Paper were endorsed, and the minimum substantive requirements adopted in the revised Guidelines for the ecolabelling of fish and fishery products from marine capture fisheries (FAO, 2009; Appendix 2) show some differences to these original recommendations.

- (h) All sources of fishing or other anthropogenic mortality are accounted for in assessing the state of the stocks under consideration, including appraisals or estimates of discards, incidental and unreported catches and catches in other relevant jurisdictions, as is necessary to evaluate sustainability.
- (i) There are planned or pre-agreed management measures for development of target fishing on species that were not previously targeted, with a well-based expectation that under these measures fishery development will not exceed the ability of the management system to ensure sustainability.
- (j) Management decisions are based on the best scientific advice and evidence available.
- (k) There is effective implementation of agreed management measures.
- (l) These elements of the management system, at least, are documented.

## **6.2 STOCKS UNDER CONSIDERATION FOR CAPTURE FISHERY ECOLABELLING**

- (a) The species or strain has not been introduced, or has been introduced historically and has subsequently become established as part of the “natural” ecosystem.
- (b) For enhanced fisheries (i) ranching and culture-based fisheries use the natural genome and the production of released organisms meet the relevant provisions of Article 9 of the FAO Code of Conduct for Responsible Fisheries; (ii) caging is assessed and ecolabelled at the point of capture; and (iii) habitat conversion is limited and/or local. Enhanced fisheries meet the same requirements as unenhanced fisheries in all other respects.
- (c) The species stock size(s) fluctuates around the management targets, taking into account the long-term variability due to natural changes in productivity and ecosystems and the effects of human impacts other than fishing.
- (d) The species are not overfished (i.e. stocks are above the limit reference points).
- (e) If overfishing is occurring or is predicted to occur under the current management measures then new measures are being implemented that are predicted to end overfishing and avoid the stock becoming overfished.
- (f) The genetic diversity of the species, including sub-stocks and breeding aggregations, is maintained.

## **6.3 ECOSYSTEM CONSIDERATIONS FOR CAPTURE FISHERY ECOLABELLING**

- (a) Potential impacts of the fishery on the ecosystem are considered, and any impacts posing high risk to fishery production and resilience, or to irreversible or slowly reversible change to biodiversity at species and community levels, are identified and being addressed. Addressing these risks can include immediate management measures and/or action to develop and implement appropriate management measures within a stated time frame that is sufficiently short to be likely to avoid occurrence of the high risk event.
- (b) Bycatch is monitored and minimized, including through measures that prevent overfishing of bycatch species, ensure the fishery does not cause species to meet the criteria for serious threat of extinction, and support the recovery and maintenance of species that are overfished or that are threatened, endangered or protected. Poisons are not used as a fishing method.
- (c) The general role of the species under consideration in the food web is recognized, and if it is a key prey species in the ecosystem then appropriate management measures are taken so as to avoid excessive depletion of dependent predators.
- (d) There is knowledge of the key habitats and potential fishery impacts on them. The objectives of Annex 4 in the FAO recommendations on application of the ecosystem approach to fisheries (FAO, 2003) provide useful guidance on practical

and operational approaches to habitat impacts. Impacts on key habitats are minimized, including:

- Identification, as appropriate, of acceptable limits of change to habitats and management measures to ensure these limits are not exceeded.
- Avoiding impacts on habitats that are at high risk (e.g. habitats that are especially vulnerable to damage by the fishing gear involved or are very slow to recover).
- Explosives or poisons are not used as a fishing method.

In assessing fishery impacts, the full spatial range of the relevant habitat can be considered, not just that part of the spatial range that is potentially affected by fishing.

(e) The precautionary approach is specifically applied in the context of relatively poorly understood ecosystem considerations. This includes:

- Absence of scientific information is not used as a reason for postponing or failing to take management measures to avoid or recover serious impacts.
- Suitable risk-based methods can be used to assess impacts and guide management actions.
- Generic evidence based on similar fishery situations can be adequate for fisheries with low risk but specific information from the fishery would be required for fisheries with higher risk. In general, the greater the risk the more evidence is necessary to support the adequacy of the mitigating management measures.

#### **6.4 ADDITIONAL POINTS FOR CONSIDERATION**

There are two issues central to ecolabelling of capture fisheries that are not currently addressed in the FAO (2005, 2006) guidelines. These are:

##### *Minimum substantive requirements for the chain of custody certification*

Chain of custody certification provides the assurance that products bearing the ecolabel do indeed come from the certified fishery and that there has not been mixing or substitution of uncertified fish into the ecolabelled product. Failure in this chain is recognized as a major contributor to illegal, unreported and unregulated (IUU) fishing and to have undermined fishery management measures in both developed and developing countries (e.g. OECD, 2006; Jacquet and Pauly, 2007). Effective chain of custody is essential to the credibility of an ecolabelling scheme. Although the FAO guidelines include the requirement for chain of custody certification there are no minimum substantive requirements provided for the certification. There is a need to develop minimum substantive requirements for the chain of custody certification.

##### *Assessment and monitoring of ecolabels for compliance with the FAO requirements*

As FAO develops and adopts guidelines for the operation of ecolabels for capture fisheries, and as the number and diversity of ecolabels increases, there will be a need for assessment, monitoring and reporting of compliance with the FAO guidelines. This will be especially critical for ecolabels that claim to comply with the FAO guidelines. To maintain the credibility of FAO, ensure that ecolabels do not confuse consumers, and ensure that requirements of the FAO are being met, periodic FAO reports, similar to the status of fisheries report or performance, should be prepared and made public.



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# Additional reading

## EXAMPLES OF NON-GOVERNMENTAL ORGANIZATION SEAFOOD GUIDES

### 1. Seafood guides for consumers by individual NGOs

Monterey Bay Aquarium: [www.mbayaq.org/cr/seafoodwatch.asp](http://www.mbayaq.org/cr/seafoodwatch.asp)

WWF international and various regional offices: [www.panda.org/about\\_wwf/what\\_we\\_do/marine/our\\_solutions/sustainable\\_fishing/sustainable\\_seafood/seafood\\_guides/index.cfm](http://www.panda.org/about_wwf/what_we_do/marine/our_solutions/sustainable_fishing/sustainable_seafood/seafood_guides/index.cfm)

Environmental Defense Fund: [www.environmentaldefense.org](http://www.environmentaldefense.org)

Blue Ocean Institute: [www.blueocean.org/Seafood/](http://www.blueocean.org/Seafood/)

Forest and Bird: [www.forestandbird.org.nz](http://www.forestandbird.org.nz)

IUCN: [www.iucnredlist.org/](http://www.iucnredlist.org/)

### 2. Seafood guides for use by consumers consolidated across several NGO schemes

Fishonline: [www.fishonline.org/information/](http://www.fishonline.org/information/)

International Seafood Guide: [www.seafoodguide.org](http://www.seafoodguide.org)

INCOFISH Seafood Guide: [www.incofish.org/ISFG.php](http://www.incofish.org/ISFG.php)

Seafood Choices Alliance: [www.seafoodchoices.com](http://www.seafoodchoices.com)

### 3. Sourcing guarantees by processor or retail companies

Young's Seafood "Fish for Life": [www.youngsseafood.co.uk/web/ffl\\_policies.asp](http://www.youngsseafood.co.uk/web/ffl_policies.asp)

Unilever: "Fishing for the Future": [www.unilever.com/Images/es\\_Unilever\\_FSI\\_brochureII\\_tcm13-13238.pdf](http://www.unilever.com/Images/es_Unilever_FSI_brochureII_tcm13-13238.pdf)

Wal-Mart Stores, Inc.: [walmartstores.com/GlobalWMStoresWeb/navigate.do?catg=665](http://walmartstores.com/GlobalWMStoresWeb/navigate.do?catg=665)

McDonalds: [www.mcdonalds.com/corp/values/purchasing/supply\\_initiative/sustainable\\_fisheries.html](http://www.mcdonalds.com/corp/values/purchasing/supply_initiative/sustainable_fisheries.html)

### 4. "Business-to-business" procurement guides on the sustainability of seafood products from different fisheries

EcoFish Inc.: [www.ecofish.com](http://www.ecofish.com)

FishSource: [www.fishsource.org](http://www.fishsource.org)

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The mention of specific companies or products of manufacturers, whether or not these have been patented, does not imply that these have been endorsed or recommended by FAO in preference to others of a similar nature that are not mentioned.



# Appendixes

## APPENDIX 1

### TERMS OF REFERENCE. A REVIEW OF THE GUIDELINES FOR ECOLABELLING OF FISH AND FISHERY PRODUCTS

In 2005, after a number of years of difficult discussions, including Technical Consultations in 2004 and 2005, FAO produced technical guidelines on the ecolabelling of fish and fishery products from marine capture fisheries<sup>1</sup>. Those guidelines were adopted by the 26<sup>th</sup> Session of COFI in 2005, but with some additional considerations (see below). In 2006, FAO held an Expert Consultation on the development of similar guidelines for inland capture fisheries.<sup>2</sup>

The progress made in developing international guidelines has been welcomed by FAO Members who recognise the benefits to fisheries managers, producers, consumers and other stakeholders of voluntary international guidelines that are widely accepted and applied in order to ensure the credibility and trustworthiness of voluntary ecolabelling schemes for fish and fishery products. They have also noted that such schemes needed to be transparent, market-driven, accessible (in terms of costs) to operators irrespective of their size and economic contexts, non-discriminatory based on best available scientific evidence, and fully consistent with WTO rules so as not to create unnecessary obstacles to international trade and to allow for fair competition and respect the sovereign rights of States. It has also been stressed that an additional benefit of the guidelines would be an increase in legitimacy of ecolabels as well as the prevention of proliferation of non-credible ecolabels (see Report of COFI, 2005).

However, in adopting the guidelines, the 26<sup>th</sup> Session of COFI recommended that “FAO should review and further develop general criteria in relation to “stock under consideration” and to serious impacts of the fishery on the ecosystem (see paragraph 27 of the Guidelines)”. This recommendation was subsequently endorsed by the 27<sup>th</sup> Session of COFI in March 2007, where it was agreed that:

“Regarding the draft International Guidelines for the Ecolabelling of Fish and Fishery Product from Inland Capture Fisheries, the Committee recommended that FAO undertake further work in relation to the minimum substantive requirements and criteria for inland capture fisheries ecolabels. This work should be combined with similar outstanding work relating to the minimum substantive criteria laid down in the guidelines for marine capture fisheries ecolabels.” (para 36).

It should be noted that, in the development of both documents, the participants deliberated the level of detail that would be appropriate for the guidelines. In the view of those Consultations, the level of detail agreed upon was considered optimal for generic guidelines. The Consultations were of the view that the nature and contents of more detailed criteria would vary from case to case and therefore could not be specified

<sup>1</sup> FAO. Guidelines for the Ecolabelling of Fish and Fishery Products from Marine Capture Fisheries. Rome, FAO. 2005. 90p. <ftp://ftp.fao.org/docrep/fao/007/y5889t/y5889t00.pdf>

<sup>2</sup> FAO. 2006. Report of the Expert Consultation on the Development of International Guidelines for Ecolabelling of Fish and Fishery Products from Inland Capture Fisheries. Rome, 23-26 May 2006. FAO Fisheries Reports R804. <ftp://ftp.fao.org/docrep/fao/009/a0741e/a0741e00.pdf>

in generic guidelines. Nevertheless, this must be reconsidered in the light of COFI's concerns and recommendations. To this end, the FAO Fisheries Department will be convening an Expert Consultation early in 2008 to review the existing marine guidelines and the report on inland capture fisheries and to formulate recommendations to COFI to address these concerns. These Terms of Reference address the preparation of the primary background paper for the information of that Expert Consultation.

#### Terms of reference

Under the direct supervision of the designated technical officer in FIMF, and advised by the FI Ecolabelling Guidelines Task Force, the consultant will undertake the following in relation to both marine and inland capture fisheries:

- 1) Study the FAO Guidelines on ecolabelling of products from marine capture fisheries and the report of the expert consultation on the development of such guidelines for inland capture fisheries in their entirety, but with particular emphasis on the sections dealing with minimum substantive requirements.
- 2) Review and evaluate the criteria used, where available, that address status of stocks and ecosystem impacts in any other relevant ecolabelling schemes, including schemes already in operation and schemes under development.
- 3) Consider any other sources of relevant information, for example: national and regional management plans; FAO Guidelines on fisheries management, implementation of EAF; and others that could provide valuable information and approaches for consideration in the further development of the sections on minimum substantive requirements in the FAO guidelines and report on the ecolabelling of fish and fishery products from marine and inland fisheries. Compile a list of all sources of relevant information used.
- 4) Formulate recommendations, to be considered by the Expert Consultation, on any changes and additions to the minimum substantive requirements in the existing FAO Guidelines and report as requested by the 26<sup>th</sup> Session of COFI.
- 5) Finalise, to the satisfaction of the designated technical officer, and deliver to FAO a report to serve as a background document for the Expert Consultation.

In formulating recommendations, the consultant should take into account the special circumstances, conditions and concerns applying to developing countries and countries in transition, and the feasibility and implications of the recommendations for such countries. As far as possible, recommended criteria should be equally applicable to countries in all stages of development and should not unfairly disadvantage any or preclude them from participating in, and benefiting from, voluntary ecolabelling schemes. Consideration should also be given to the applicability of the guidelines and criteria to small-scale fisheries.

## APPENDIX 2

### MINIMUM SUBSTANTIVE REQUIREMENTS FOR MARINE CAPTURE FISHERIES

(Extracted from FAO. 2005a. *Report of the Technical Consultation on International Guidelines for the Ecolabelling of Fish and Fishery Products from Marine Capture Fisheries*, 90 pp. Rome)

28. The following sets forth the minimum substantive Requirements and Criteria for assessing whether an ecolabel may be awarded to a fishery. Ecolabelling schemes may apply additional or more stringent requirements and criteria related to sustainable use of the resources. The Requirements and Criteria presented below must be based on and interpreted in accordance with the current suite of agreed international instruments addressing fisheries, in particular the 1982 UN Convention on the Law of the Sea, the 1995 UN Fish Stocks Agreement and the 1995 Code of Conduct for Responsible Fisheries, as well as related documentation including the 2001 Reykjavik Declaration on Responsible Fisheries in the Marine Ecosystem. [Ecolabelling schemes are or may be developed by RFMOs according to their expertise and the characteristics of the fishery under their responsibilities.]

29. Requirements are specified for each of three areas: management systems, the stock or stocks for which certification is being sought (subsequently referred to as “stock under consideration”), [and ecosystem considerations]. For management systems, Criteria are also listed. Although no specific Criteria are suggested for the “stock under consideration” or ecosystem considerations, individual ecolabelling schemes will generally apply specific criteria, as well as measurable performance elements that should be used to assess the conformity of the fishery with the requirements and the criteria of the ecolabelling scheme. In developing and applying the criteria and assessing the conformity of the fishery with the certification [standards] requirements, the views and opinions of Governments, RFMOs and FAO should be fully considered.

#### Management systems

30. Requirement: The fishery is conducted under a management system that ensures the satisfaction of the Requirements and Criteria described in Paragraph 31. The management system and the fishery operate in compliance with the requirements of local, national and international law and regulations, including the requirements of any regional fisheries management organization that manages the target stocks.

31. The following Criteria will apply to management systems for any fisheries, but it must be recognized that special consideration needs to be given to small-scale fisheries with respect to the availability of data and with respect to the fact that management systems can differ substantially for different types and scales of fisheries (e.g. small scale through to large scale commercial fisheries).

31.1 Adequate data and/or information are collected, maintained and assessed in accordance with applicable international standards and practices for evaluation of the current state and trends of the stocks<sup>[2]</sup> (see below: Methodological aspects).

31.2 In determining suitable conservation and management measures, the best scientific evidence available is taken into account by the designated authority, as well as consideration of relevant traditional knowledge, provided its validity can be objectively verified, in order to evaluate the current state of the “stock under consideration”<sup>[3]</sup> in relation to, where appropriate, stock specific target and limit reference points.<sup>[4]</sup>

31.3 [Similarly, data and information, including verified traditional and local knowledge, are used to identify adverse impacts of the fishery on the ecosystem,

and timely scientific advice is provided on the likelihood and magnitude of identified impacts (see Paragraph 35).]

31.4 The designated authorities adopt appropriate measures for the conservation and sustainable use of the “stock under consideration” based on the data, information, and scientific advice referred to in the preceding bullets<sup>[5]</sup>. Short-term considerations should not compromise the long-term conservation and sustainable use of fisheries resources.

31.5 An effective legal and administrative framework at the local, national or regional level, as appropriate, is established for the fishery<sup>[6]</sup> and compliance is ensured through effective mechanisms for monitoring, surveillance, control and enforcement (see also Paragraph 6)<sup>[7]</sup>.

31.6 In accordance with the Code of Conduct Article 7.5, the precautionary approach is being implemented to protect the “stock under consideration” [and the aquatic environment]. *Inter alia* this will require that the absence of adequate scientific information should not be used as a reason for postponing or failing to take conservation and management measures<sup>[8]</sup>. Further, relevant uncertainties are being taken into account through a suitable method of risk assessment (see Paragraph 35), in relation to reference points and levels of fishing mortality<sup>[9]</sup>.

#### “Stocks under consideration”

32. Requirement: The “stock under consideration” is not overfished, and is maintained at a level which promotes the objective of optimal utilization and maintains its availability for present and future generations<sup>[10]</sup>, taking into account that longer term changes in productivity can occur due to natural variability and/or impacts other than fishing. In the event that biomass drops well below such target levels, management measures should allow for restoration within reasonable time frames of the stocks to such levels.

#### Ecosystem considerations

[33. Requirement: In accordance with Code of Conduct Article 7.2, the identified adverse impacts of the fishery on the ecosystem are appropriately assessed and effectively addressed. *Inter alia* the fishery under consideration does not substantially contribute to overfishing of other stocks; biodiversity of aquatic habitats and ecosystems is conserved; identified adverse impacts on protected, endangered or threatened species, as well as on sensitive biota and habitats, are avoided or minimized; where necessary and to the extent possible, steps are being taken to rehabilitate critical fisheries habitats; and depleted stocks are being allowed to recover.<sup>[11]</sup> International cooperation needs to be employed in order to assist developing countries and countries in transition in this regard.]

<sup>[2]</sup> After Code of Conduct for Responsible Fisheries, Article 7.4.4.

<sup>[3]</sup> Code of Conduct for Responsible Fisheries, Articles 6.4 and 7.4.1.

<sup>[4]</sup> Code of Conduct for Responsible Fisheries, Article 7.5.3.

<sup>[5]</sup> Based on Code of Conduct for Responsible Fisheries. Article 7.1.1.

<sup>[6]</sup> Code of Conduct for Responsible Fisheries, Article 7.7.1.

<sup>[7]</sup> Code of Conduct for Responsible Fisheries, Article 7.1.7.

<sup>[8]</sup> Code of Conduct for Responsible Fisheries, Article 7.5.1.

<sup>[9]</sup> Code of Conduct for Responsible Fisheries, Article 7.5.2.

<sup>[10]</sup> Code of Conduct for Responsible Fisheries, Article 7.1.1.

<sup>[11]</sup> Code of Conduct for Responsible Fisheries, Articles 6.8 and 7.2.2 e).

Recommendations on Amendments to the Guidelines for Ecolabelling of Fish and Fishery Products from Marine Capture Fisheries

Following Expert and Technical Consultations in 2003, 2004 and 2005, FAO produced technical guidelines on the ecolabelling of fish and fishery products from

marine capture fisheries. Those guidelines were adopted by the 26th Session of COFI in 2005. In adopting the guidelines, the 26th Session of COFI recommended that “FAO should review and further develop general criteria in relation to “stock under consideration” and serious impacts of the fishery on the ecosystem (paragraph 27 of the Guidelines)”. The recommendation from the 26th Session of COFI was subsequently endorsed by the 27th Session of COFI in March 2007, where it was agreed that FAO undertake further work in relation to the minimum substantive requirements and criteria for both marine and inland capture fisheries.

Following this request by the Twenty-Seventh Session of the Committee on Fisheries, the Expert Consultation on the FAO Guidelines for Ecolabelling of Fish and Fishery Products from Marine Capture Fisheries was convened by FAO in Rome on 3-5 March 2008. The Expert Consultation reviewed the existing marine and inland capture fisheries guidelines and formulated recommendations to COFI to address COFI’s request on “stock under consideration” and “minimum substantive requirements”. The proposed revised minimum substantive requirements for the Ecolabelling of Fish and Fishery Products from Marine Capture Fisheries are listed below. The paragraph numbers are the same as in the FAO Guidelines for Ecolabelling of Fish and Fishery Products from Marine Capture Fisheries.

Extract from FAO, 2008. *Report of the expert consultation on the FAO guidelines for the ecolabelling for capture fisheries*. Rome, 3-5 March 2008. FAO Fisheries Report No. 864:

#### **Unit of certification**

25. The “unit of certification” is the fishery for which ecolabelling certification is called for sought, as specified by the stakeholders who are seeking certification. The certification could encompass the whole fishery, where a “fishery” refers to the activity of one particular gear-type or method leading to the harvest of one or more species; a sub-component of a fishery, for example a national fleet fishing a shared stock; or several fisheries operating on the same resources. The “stock under consideration” exploited by this fishery (unit of certification) may be one or more biological stocks as specified by the stakeholders for certification. The certification applies only to products derived from the “stock under consideration” (see Para. 30). In assessing compliance with certification standards, the impacts on the “stock under consideration” of all the fisheries utilizing that “stock under consideration” that stock or stocks over their its entire area of distribution are to be considered.

### **MINIMUM SUBSTANTIVE REQUIREMENTS AND CRITERIA FOR ECOLABELS FOR MARINE CAPTURE FISHERIES**

#### **Introduction**

26. The following sets forth the minimum substantive requirements and criteria for assessing whether a fishery can be certified and an ecolabel awarded to a fishery. Ecolabelling schemes may apply additional or more stringent requirements and criteria related to sustainable use of the resources. The requirements and criteria presented below are to be based on and interpreted in accordance with the current suite of agreed international instruments addressing fisheries, in particular the 1982 UN Convention on the Law of the Sea, the 1995 UN Fish Stocks Agreement and the 1995 Code of Conduct for Responsible Fisheries, as well as related documentation including the 2001 Reykjavik Declaration on Responsible Fisheries in the Marine Ecosystem.

27. Requirements are specified for each of three areas: the management systems, the stock or stocks fishery and associated “stock under consideration” for which certification is being sought (subsequently referred to as “stock under consideration”), and consideration of serious impacts of the fishery on the ecosystem. Criteria and related measurable performance indicators and a corresponding monitoring system

should be established in order to assess the conformity of the fishery concerned with the requirements and the criteria of the ecolabelling scheme. In developing and applying the criteria and assessing the conformity of the fishery with the standard of certification, the views and opinions of States, RFMOs and FAO should be fully considered.

### **Management systems**

28. Requirement: The fishery is conducted under a management system which is based upon good practice and that ensures the satisfaction of the requirements and criteria described in

Paragraph 29. The management system and the fishery operate in compliance with the requirements of local, national and international law and regulations, including the requirements of any regional fisheries management organization that manages the target stocks fisheries on the “stock under consideration”.

28.1 For the “stock under consideration” there are documented management approaches with a well based expectation that management will be successful taking into account uncertainty and imprecision.

28.2 There are objectives, and as necessary, management measures to address pertinent aspects of the ecosystem effects of fishing as per paragraph 31.

29. The following criteria will apply to management systems for any fisheries, but it must be recognized that special consideration needs to be given to small-scale fisheries with respect to the availability of data and with respect to the fact that management systems can differ substantially for different types and scales of fisheries (e.g. small scale through to large scale commercial fisheries).

29.1 Adequate data and/or information are collected, maintained and assessed in accordance with applicable international standards and practices for evaluation of the current state and trends of the stocks<sup>3</sup> (see below: Methodological aspects) This can include relevant traditional, fisher or community knowledge, provided its validity can be objectively verified.

29.2 In determining suitable conservation and management measures, the best scientific evidence available is taken into account by the designated authority, as well as consideration of relevant traditional knowledge, fisher or community knowledge, provided its validity can be objectively verified, in order to evaluate the current state of the “stock under consideration”<sup>4</sup> in relation to, where appropriate, stock specific target and limit reference points.<sup>5</sup>

29.2bis: Taking due account of paragraph 32, for the “stock under consideration” the determination of suitable conservation and management measures should include or take account of:

- Total fishing mortality from all sources is considered in assessing the state of the “stock under consideration”, including discards, unobserved mortality, incidental mortality, unreported catches and catches in other fisheries.

- Management targets are consistent with achieving MSY (or a suitable proxy) on average, or a lesser fishing mortality if that is optimal in the circumstances of the fishery (e.g. multispecies fisheries) or to avoid severe adverse impacts on dependent predators.

- The management system should specify limits or directions in key performance indicators (see 30.2), consistent with avoiding recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible, and specify the actions to be taken if the limits are approached or the desired directions are not achieved.

29.3 Similarly, data and information, including relevant traditional, fisher or community knowledge, provided its validity can be objectively verified, are used to identify adverse impacts of the fishery on the ecosystem, and timely scientific advice is provided on the likelihood and magnitude of identified impacts (see Paragraph 31).

29.4 The designated authorities adopt and effectively implement appropriate measures for the conservation and sustainable use of the “stock under consideration” based on the data, information and scientific advice referred to in the preceding bullets.<sup>6</sup> Short-term considerations should not compromise the long-term conservation and sustainable use of fisheries resources.

29.5 An effective legal and administrative framework at the local, national or regional level, as appropriate, is established for the fishery<sup>7</sup> and compliance is ensured through effective mechanisms for monitoring, surveillance, control and enforcement (see Paragraph 6).<sup>8</sup>

29.6 In accordance with the Code of Conduct Article 7.5, the precautionary approach is being implemented to protect the “stock under consideration” and to preserve the aquatic environment. Inter alia this will require that the absence of adequate scientific information should not be used as a reason for postponing or failing to take conservation and management measures.<sup>9</sup> Further, relevant uncertainties are being taken into account through a suitable method of risk assessment. Appropriate reference points are determined and remedial actions to be taken if reference points are approached or exceeded are specified.<sup>10</sup>

#### **“Stocks under consideration”**

30. Requirement: The “stock under consideration” is not overfished, and is maintained at a level which promotes the objective of optimal utilization and maintains its availability for present and future generations,<sup>11</sup> taking into account that longer term changes in productivity can occur due to natural variability and/or impacts other than fishing. In the event that biomass drops well below such target levels, management measures (Code of Conduct Article 7.6) should allow for restoration within reasonable time frames of the stocks to such levels (see also paragraph 29.2 bis).

The following criteria are applicable:

30.1 The “stock under consideration” is not overfished if it is above the associated limit reference point (or its proxy).

30.2 If fishing mortality (or its proxy) is above the associated limit reference point, actions should be taken to decrease the fishing mortality (or its proxy) below that limit reference point.

30.3 The structure and composition of the “stock under consideration” which contribute to its resilience are taken into account.

30.4 In the absence of specific information on the “stock under consideration”, generic evidence based on similar stocks can be used for fisheries with low risk to that “stock under consideration”. However, the greater the risk the more specific evidence is necessary to ascertain the sustainability of intensive fisheries.

#### **Ecosystem considerations**

31. Requirement: Adverse impacts of the fishery on the ecosystem should be appropriately assessed and effectively addressed.<sup>12</sup> Much greater scientific uncertainty is to be expected in assessing possible adverse ecosystem impacts of fisheries than in assessing the state of target stocks. This issue can be addressed by taking a “risk assessment/risk management approach”. For the purpose of development of ecolabelling schemes, the most probable adverse impacts should be considered, taking into account available scientific information, and local traditional, fisher or community knowledge provided that its validity can be objectively verified. Those impacts that are likely to have serious consequences should be addressed. This may take the form of an immediate management response or further analysis of the identified risk. In this context, full recognition should be given to the special circumstances and requirements in developing countries and countries in transition, including financial and technical assistance, technology transfer, and training and scientific cooperation.

The following criteria are to be interpreted in the context of avoiding high risk of severe adverse impacts.

31.1 Non target catches, including discards, of stocks other than the “stock under consideration” are monitored and should not threaten these non-target stocks with serious risk of extinction; if serious risks of extinction arise, effective remedial action should be taken.

31.2 The role of the “stock under consideration” in the food-web is considered, and if it is a key prey species in the ecosystem, management measures are in place to avoid severe adverse impacts on dependent predators.

31.3 There is knowledge of the essential habitats for the “stock under consideration” and potential fishery impacts on them. Impacts on essential habitats and on habitats that are highly vulnerable to damage by the fishing gear involved are avoided, minimised or mitigated (Code of Conduct 7.2.2). In assessing fishery impacts, the full spatial range of the relevant habitat should be considered, not just that part of the spatial range that is potentially affected by fishing.

31.4 In the absence of specific information on the ecosystem impacts of fishing for the unit of certification, generic evidence based on similar fishery situations can be used for fisheries with low risk of severe adverse impact. However, the greater the risk the more specific evidence is necessary to ascertain the adequacy of mitigation measures.

### **Methodological aspects**

#### **Assessing current state and trends in target stocks**

32. There are many ways in which state and trends in stocks may be evaluated, that fall short of the highly quantitative and data-demanding approaches to stock assessment that are often used for large scale fisheries in developed countries. Use of less elaborate methods for stock assessment should not preclude fisheries from possible certification for ecolabelling. However it should be noted that, to the extent that the application of such methods results in greater uncertainty about the state of the “stock under consideration”, more precautionary approaches to managing fisheries on such resources will be required which may necessitate lower levels of utilization of the resource. There is a variety of management measures commonly used in small scale or low value fisheries that nonetheless can achieve quite adequate levels of protection for stocks in the face of uncertainty about the state of the resource.

A past record of good management performance could be considered as supporting evidence of the adequacy of the management measures and the management system.

3 After Code of Conduct for Responsible Fisheries, Article 7.4.4.

4 Code of Conduct for Responsible Fisheries, Articles 6.4 and 7.4.1.

5 Code of Conduct for Responsible Fisheries, Article 7.5.3.

6 Based on Code of Conduct for Responsible Fisheries, Article 7.1.1.

7 Code of Conduct for Responsible Fisheries, Article 7.7.1.

8 Code of Conduct for Responsible Fisheries, Article 7.1.7.

9 Code of Conduct for Responsible Fisheries, Article 7.5.1.

10 Code of Conduct for Responsible Fisheries, Article 7.5.2.

11 Code of Conduct for Responsible Fisheries, Article 7.1.1.

12 Code of Conduct for Responsible Fisheries, Article 7.2.

## APPENDIX 3

### PROPOSED MINIMUM SUBSTANTIVE REQUIREMENTS FOR INLAND CAPTURE FISHERIES

(Extracted from FAO. 2006. *Report of the expert consultation on the development of international guidelines for the ecolabelling of fish and fishery products from inland capture fisheries*. Rome, 23–26 May 2006.)

26. The following sets forth the minimum substantive requirements and criteria for assessing whether a fishery can be certified and an ecolabel awarded to a fishery. Ecolabelling schemes may apply additional or more stringent requirements and criteria related to sustainable use of the resources. The requirements and criteria presented below are to be based on and interpreted in accordance with the current suite of agreed international instruments including the 1995 Code of Conduct for Responsible Fisheries, the Convention on Biodiversity, the Ramsar Convention on Wetlands, as well as provisions of relevance for the management of inland capture fisheries contained in the 1982 UN Convention on the Law of the Sea and the 1995 UN Fish Stocks Agreement.

27. Requirements are specified for each of three areas: management systems, the stock or stocks for which certification is being sought (subsequently referred to as “stock under consideration”), and consideration of serious impacts of the fishery on the ecosystem including stock enhancement activities. Criteria and related measurable performance indicators and a corresponding monitoring system should be established in order to assess the conformity of the fishery concerned with the requirements and the criteria of the ecolabelling scheme. In developing and applying the criteria and assessing the conformity of the fishery with the standard of certification, the views and opinions of States, RFBs and FAO should be fully considered.

#### Management systems

28. Requirement: The fishery is conducted under a management system which is based upon good practice and that ensures the satisfaction of the requirements and criteria described in Paragraph 29. The management system and the fishery operate in compliance with the requirements of local, national and international laws and regulations, including the requirements of any regional fisheries management agreement that directs the management of the target stocks.

29. The following criteria will apply to management systems for any fisheries, but it must be recognized that special consideration needs to be given to small-scale fisheries, which are prevalent in inland capture fisheries, with respect to the availability of data and with respect to the fact that management systems can differ substantially for different types and scales of fisheries.

29.1 Adequate and reliable data and/or information are collected, maintained and assessed in accordance with applicable international standards and practices for evaluation of the current state and trends of the stocks<sup>4</sup> (see below: Methodological aspects).

29.2 In determining suitable conservation and management measures, the best scientific evidence available is taken into account by the designated authority, as well as consideration of relevant traditional knowledge, provided its [their] validity can be objectively verified, in order to evaluate the current state of the “stock under consideration”<sup>5</sup> in relation to, where appropriate, stock specific target and limit reference points.<sup>6</sup>

29.3 Similarly, data and information, including relevant traditional knowledge, provided its [their] validity can be objectively verified, are used to identify adverse

impacts of the fishery on the ecosystem, and timely scientific advice is provided on the likelihood and magnitude of identified impacts (see Paragraph 31).

29.4 The designated authorities adopt appropriate measures<sup>#</sup> for the conservation and sustainable use of the “stock under consideration” based on the data, information, and scientific advice referred to in the preceding bullets.<sup>7</sup> Short-term considerations should not compromise the long-term conservation and sustainable use of fisheries resources.

29.5 An effective legal and administrative framework at the local, national or regional level, as appropriate, is established for the fishery<sup>8</sup> and compliance is ensured through suitable mechanisms for monitoring, surveillance, control and enforcement (see also Paragraph 6).<sup>9</sup>

29.6 In accordance with the Code of Conduct Article 7.5, the precautionary approach is being implemented to protect the “stock under consideration” and the aquatic environment. This should take due account of stock enhancement procedures. *Inter alia* this will require that the absence of adequate scientific information should not be used as a reason for postponing or failing to take conservation and management measures.<sup>10</sup> Further, relevant uncertainties are being taken into account through a suitable method of risk assessment, including those associated with the use of introduced or translocated species.<sup>11</sup> Appropriate reference points are determined and remedial actions to be taken if reference points are approached or exceeded are specified.<sup>12</sup>

29.7 In the case of culture based and enhanced fisheries, an effective framework should be established to link the fishery management system with its supporting aquaculture production system (see also 30b).

29.8 In the case of enhanced fisheries, the fishery management system should take due regard of the natural production and other components of the aquatic ecosystem.

#### **“Stocks under consideration”**

30a. Requirement: The “stock under consideration” is not overfished, and is maintained at a level which promotes the objective of optimal utilization and maintains its availability for present and future generations,<sup>13</sup> taking into account that longer term changes in productivity can occur due to natural variability and/or impacts other than fishing. In the event that biomass drops well below such target levels, management measures (Code of Conduct Article 7.6), including measures to favourably enhance the environment, should allow for restoration within reasonable time frames of the stocks to such levels. This requirement also pertains to species introductions or translocations that have occurred historically or in accordance with international guidelines,<sup>14</sup> which become established as part of the natural ecosystem.

30b. In case of enhanced and culture based fisheries, the cultured component of the “stock under consideration” is managed and developed according to relevant provisions of Article 9 of the Code of Conduct for Responsible Fisheries, especially in relation to the protection of the environment,<sup>15</sup> the conservation of genetic diversity, disease control, and quality (fitness for survival) of stocking material,<sup>16</sup> and managed to achieve optimal production.

30c. In the case of enhanced fisheries, natural production components of the “stock under consideration” is managed in accordance with Article 7 of the Code of Conduct and maintained at a level that promotes the objective of optimal utilization.

#### **Ecosystem considerations**

31. Requirement: Adverse impacts of the fishery and any associated culture and enhancement activity on the ecosystem should be appropriately assessed and effectively addressed. Enhanced and culture-based fisheries will be managed to ensure biodiversity of aquatic habitats and ecosystems are conserved and endangered species

protected.<sup>17</sup> Significant scientific uncertainty is to be expected in assessing possible adverse ecosystem impacts of fisheries, including culture and enhancement activities. This issue can be addressed by taking a “risk assessment/risk management approach”. For the purpose of development of ecolabelling schemes, the most probable adverse impacts should be considered, taking into account available scientific information, and local knowledge provided that its [their] validity can be objectively verified. Those impacts that are likely to have serious consequences should be addressed. This may take the form of an immediate management response or further analysis of the identified risk. In this context, full recognition should be given to the special circumstances and requirements in developing countries and countries in transition, including financial and technical assistance, technology transfer, and training and scientific cooperation.

### **Methodological aspects**

#### *Assessing current state and trends in target stocks*

32a. There are many ways in which state and trends in stocks may be evaluated, that fall short of the highly quantitative and data-demanding approaches to fish stock assessment that are often used in developed countries. Use of less elaborate methods for stock assessment frequently used for inland capture fisheries should not preclude them from possible certification for ecolabelling. However it should be noted that, to the extent that the application of such methods may result in greater uncertainty about the state of the “stock under consideration”, more precautionary approaches to managing such resources could be required which may necessitate lower levels of utilization of the resource. There is a variety of management measures commonly used in small scale or low value fisheries that nonetheless can achieve quite adequate levels of protection for stocks in the face of uncertainty about the state of the resource.

32b. Stock assessment of enhanced or culture-based fisheries should not focus on the hatchery output but more on the recruitment of hatchery fish to the fishery and on the contribution of natural reproduction.

<sup>4</sup> After Code of Conduct for Responsible Fisheries, Article 7.4.4.

<sup>5</sup> Code of Conduct for Responsible Fisheries, Articles 6.4 and 7.4.1.

<sup>6</sup> Code of Conduct for Responsible Fisheries, Article 7.5.3.

<sup>7</sup> Based on Code of Conduct for Responsible Fisheries, Article 7.1.1.

<sup>8</sup> Code of Conduct for Responsible Fisheries, Article 7.7.1.

<sup>9</sup> Code of Conduct for Responsible Fisheries, Article 7.1.7.

<sup>10</sup> Code of Conduct for Responsible Fisheries, Article 7.5.1.

<sup>11</sup> FAO Technical Guidelines for Responsible Fisheries No. 2 – Precautionary approach to capture fisheries and species introductions.

<sup>12</sup> Code of Conduct for Responsible Fisheries, Article 7.5.2.

<sup>13</sup> Code of Conduct for Responsible Fisheries, Article 7.1.1.

<sup>14</sup> See for example EIFAC/ICES codes of practice.

<sup>15</sup> Code of Conduct for Responsible Fisheries, Article 9.1.5

<sup>16</sup> Code of Conduct for Responsible Fisheries, Article 9.3

<sup>17</sup> Code of Conduct for Responsible Fisheries, Article 7.2

## APPENDIX 4

### BEST PRACTICES OF REGIONAL FISHERIES MANAGEMENT ORGANIZATIONS IN RELATION TO TARGET STOCKS, THE ECOSYSTEM AND FISHERY MANAGEMENT PRACTICES

(From Lodge, M.W., Anderson, D., Lobach, T., Munro, G., Sainsbury, K. & Willock, A. 2007. *Recommended best practices for regional fisheries management organizations. Report of an independent panel to develop a model for improved governance by regional fisheries management organizations*. Chatham House, London.)

1. The *overarching objective* of the RFMO includes optimal and sustainable long-term utilization, subject to the control of fishing capacity and fishing effort commensurate with these objectives. This control is informed by adequate data collection and sharing, use of the best available science and application of the precautionary approach and ecosystem considerations in decision-making, including the recovery of overfished stocks

2. There are *target and limit reference points* for fishing mortality and population size for all target and commercially retained species and stocks (where stocks are known or are reasonably expected to exist).

3. Assessments and predictions of the status of species or groups of species *include all sources of mortality*, taking in non-fishery mortality and fishing mortality owing to retained catch, discarded catch and deaths that do not involve capture. Fishing mortality is from all fisheries, including those managed under other jurisdictions and illegal, unreported and unregulated fishing.

4. *Target reference points* are consistent with achieving long-term optimal utilization and with the ecological properties and role of the target species (for example, a key prey species), and that they have a low probability of violating the limit reference point in the context of the information available and the management arrangements in place.

5. *Key prey species* affected by fishing are identified and the reference points are modified to take account of the needs of dependent predators as well as those of the fishery. In the absence of detailed understanding of feeding dependencies and for animals low in the food chain the target biomass reference point should be greater than  $B_{MSY}$ , consistent with a precautionary approach (for instance, it might be 75 per cent of the unfished level).

6. The *limit reference point for fishing mortality* is no greater than the mortality giving maximum long-term sustainable yield, as specified in UNFSA.

7. The *limit reference point for stock size* is the size below which it is known or expected that there is a much greater probability of significantly reduced recruitment but at which the probability of significantly reduced low recruitment is still small. The limit reference point for stock size could be at a size that has been historically shown to be safe and/or below which stock dynamics are unknown.

8. There are agreed *management strategies or decision rules* to determine the catch, the level of fishing or other management measures that will be applied, depending on the status of the stock and the information available.

- The management strategy is demonstrated to deliver, in the long term, a balanced probability of the stock being above or below the target and a very low probability of the stock violating the limit reference point.

- The strategy has a high chance of success both in view of the information that is realistically expected to be available to assess stock status and for a reasonable range of stock and ecosystem productivity and variability.

- The fishing mortality caused by the strategy decreases with increasing uncertainty about the present or predicted stock status and decreases as a limit reference point is approached.

9. As a part of the overall management strategy, there is a planned or pre-agreed *rebuilding plan* that is triggered for stocks at or below a biomass limit reference point. The rebuilding plan has a very high chance of rebuilding the stock to a rebuilding target in a specified timeframe, for example, 10–30 years or one to two fish generation times. The recovery target is the stock size giving the maximum long-term yield, as specified in UNFSA. Targeted fishing is very low or ceases below a biomass limit reference point and any catches permitted for monitoring below the limit reference point do not significantly reduce recovery time.

10. As a part of the general management strategy there is pre-agreement on *fishing mortality reduction* to be triggered if fishing mortality is greater than its limit reference point. Fishing mortality may be higher than the limit reference point for an agreed period if it is a part of a planned reduction of biomass in order to attain the target biomass.

11. There is an agreed strategy for the *development of new or exploratory fisheries* that impact on species or ecosystems in ways that have not been fully assessed previously – for example, fisheries that target new species, use significantly modified gear or operate in new areas. These strategies ensure that fishery expansion does not outpace the information needed to determine the management measures for optimal and sustainable use. The strategy provides cautious conservation and management measures until there is sufficient information to allow identification of appropriate measures for incremental development and/or long-term utilization. The strategy includes, *inter alia*:

- notification of new or exploratory fisheries;
- precautionary limits on the catch, the fishing effort and the number of operators, further defined for particular sub-areas as appropriate;
- requirements for information collection and assessment; and
- specification of how this information and assessment is used to trigger decisions about subsequent fishery development.

12. There are identified limits for the acceptable impact on key non-target species (both fish and non-fish species), including associated or dependent species and especially protected or endangered species, and for bycatch of any non-target species as a whole. These limits are intended to ensure that populations and stocks are not excessively depleted, that wastage is avoided, that there is minimal impact on protected or endangered species and that the functional ecosystem of which fisheries are a part is maintained. The FAO international plans of action for relevant bycatch should be implemented. Measures to ensure that limits are not exceeded, and to minimize bycatch generally, are:

- risk-based impact assessment of the effect of fishing activities on non-target species, followed by explicit analytical assessments and/or action when risk is determined to be high;
- bycatch limits or caps for species and species groups;
- shifting fishing from times or areas with high and/or significant bycatch;
- preference for use of fishing gears including mesh sizes and types, that reduces bycatch;
- use of practices and equipment to reduce interactions and bycatch (for example, night fishing, tori poles, hook design, excluder devices, controlled or zero offal discharge and acoustic deterrents); and
- release of captured animals alive and unharmed whenever possible.

13. *Habitats* that are important to fishery production or for non-target species including associated or dependent species, and/or that are affected by fishing are

recognized and that limits of acceptable impact are identified. Management measures to limit the impacts can include:

- risk-based impact assessment of the effect of fishing activities on habitats, followed by explicit analytical assessments and/or action when risk is determined to be high;
- restrictions on fishing in certain areas and/or at certain times (time/area closures);
- restrictions on gear types that could affect the habitat;
- establishment of other area-based management measures such as marine protected areas in order to protect and conserve habitats of special concern;
- moratoria on new fisheries in sensitive habitats until adequate management measures can be identified; and
- appropriate engagement in the management of land-based pollution and coastal development.

14. There is an identified level of *fishing capacity* that is commensurate with long-term optimal and sustainable utilization and that the capacity operating in the fishery is monitored. Authorization and other management measures should be used to limit capacity to the desired level.

15. There are effective provisions and mechanisms for the *collection and reporting of data* to the RFMO that are necessary for the monitoring and management of fishery operations and for tracking the status of the resources and ecosystems.

- There are quality assurance and verification mechanisms to ensure that the data are sufficiently accurate and reliable to ensure optimal and sustainable utilization of the resources and ecosystem.
- Economic and social information is collected that is relevant to allocation decisions, to measuring economic efficiency and to management for optimal utilization.
- The provisions and mechanisms meet the requirements of UNFSA Annex I.
- Scientific observer programmes are used as appropriate and particularly to gather information about the impact on the fishery non-target species and habitats.
- There is coordinated data collection and sharing between RFMOs and coastal States, and among RFMOs, with management responsibility for relevant shared fisheries and/or ecosystem elements.
- Data are shared through recognized international data management arrangements.

16. There are robust methods for measuring and monitoring so as to account for IUU fishing and catch, including bycatch.

17. There is a *scientific body* with appropriate technical expertise to assess issues related to the target species, the broader ecosystem and, as appropriate, the socio-economic impacts of fishing.

- The advice of the scientific body includes management options and risks in relation to target and limit reference points. Fishery data are assessed on a timely basis consistent with the life history of affected species and the management strategy. The advice is publicly available.
- When the advice of the scientific body is not followed by the RFMO's decision-making body, the reasons are given and are made publicly available.
- There is periodic independent advice and peer review of the assessments, reference points and management strategies. The advice and review are made publicly available.

## APPENDIX 5

### BIOLOGICAL CRITERIA FOR LISTING ON APPENDICES I AND II OF THE CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES OF WILD FAUNA AND FLORA

(From CITES 1994, Resolution 9.25)

Appendix I listing includes species threatened with extinction. Trade in specimens of these species is permitted only in exceptional circumstances.

Appendix II listing includes species not necessarily threatened with extinction, but in which trade must be controlled in order to avoid utilization incompatible with their survival.

#### Appendix I

The following criteria must be read in conjunction with the definitions, explanations and guidelines listed in Annex 5, including the footnote with respect to application of the definition of 'decline' for commercially exploited aquatic species. A species is considered to be threatened with extinction if it meets, or is likely to meet, **at least one** of the following criteria.

A. The wild population is small, and is characterized by **at least one** of the following:

- i) an observed, inferred or projected decline in the number of individuals or the area and quality of habitat; or
- ii) each subpopulation being very small; or
- iii) a majority of individuals being concentrated geographically during one or more life history phases; or
- iv) large short-term fluctuations in population size; or
- v) a high vulnerability to either intrinsic or extrinsic factors.

B. The wild population has a restricted area of distribution and is characterized by **at least one** of the following:

- i) fragmentation or occurrence at very few locations; or
  - ii) large fluctuations in the area of distribution or the number of subpopulations;
- or
- iii) a high vulnerability to either intrinsic or extrinsic factors; or
  - iv) an observed, inferred or projected decrease in any one of the following:
    - the area of distribution; or
    - the area of habitat; or
    - the number of subpopulations; or
    - the number of individuals; or
    - the quality of habitat; or
    - the recruitment.

C. A marked decline in the population size in the wild, which has been **either**:

- i) observed as ongoing or as having occurred in the past (but with a potential to resume); or
- ii) inferred or projected on the basis of any one of the following:
  - a decrease in area of habitat; or
  - a decrease in quality of habitat; or
  - levels or patterns of exploitation; or

- a high vulnerability to either intrinsic or extrinsic factors; or
- a decreasing recruitment.

#### Appendix II

The following criteria must be read in conjunction with the definitions, explanations and guidelines listed in Annex 5, including the footnote with respect to application of the definition of ‘decline’ for commercially exploited aquatic species.

A species should be included in Appendix II when, on the basis of available trade data and information on the status and trends of the wild population(s), **at least one** of the following criteria is met:

A. It is known, or can be inferred or projected, that the regulation of trade in the species is necessary to avoid it becoming eligible for inclusion in Appendix I in the near future; or

B. It is known, or can be inferred or projected, that regulation of trade in the species is required to ensure that the harvest of specimens from the wild is not reducing the wild population to a level at which its survival might be threatened by continued harvesting or other influences.

#### Extract from Annex 5

##### *Decline*

A ‘decline’ is a reduction in the abundance, or area of distribution, or area of habitat of a species. The assessment of decline by reference to area of habitat may be more appropriate where there are intrinsic difficulties in measuring the number of individuals. Decline can be expressed in two different ways: (i) the overall long-term extent of decline; or (ii) the recent rate of decline. The long-term extent of decline is the total estimated or inferred percentage reduction from a baseline level of abundance or area of distribution. The recent rate of decline is the percentage change in abundance or area of distribution over a recent time period. The data used to estimate or infer a baseline for extent of decline should extend as far back into the past as possible.

The judgement that a decline is marked is taxon-specific and can be justified by a number of considerations for example, the population dynamics of a related taxonomic group. A general guideline for a marked historical extent of decline is a percentage decline to 5%-30% of the baseline, depending on the biology and productivity of the species.

Productivity is the maximum percentage growth rate of a population. It is a complex function of reproductive biology, fecundity, individual growth rates, natural mortality, age at maturity and longevity. More productive species tend to have high fecundity, rapid individual growth rates and high turnover of generations.

The extremes of 5% and 30% will be applicable to only a relatively small number of species, but some species may even fall outside of these extremes. However, both these figures are presented only as examples, since it is impossible to give numerical values that are applicable to all taxa because of differences in their biology (see footnote with respect to application of decline to commercially exploited aquatic species).

A general guideline for a marked recent rate of decline is a percentage decline of 50% or more in the last 10 years or three generations, whichever is the longer. If the population is small, a percentage decline of 20% or more in the last 5 years or 2 generations (whichever is the longer) may be more appropriate. However, these figures are presented only as examples, since it is impossible to give numerical values that are applicable to all taxa because of differences in their biology.

The historical extent of decline and the recent rate of decline should be considered in conjunction with one another. In general, the higher the historical extent of decline, and the lower the productivity of the species, the more important a given recent rate of

decline is. In estimating or inferring the historical extent of decline or the recent rate of decline, all relevant data should be taken into account. A decline need not necessarily be ongoing. If data are available only for a short period and the extent or rate of decline based on these data are cause for concern, the guidelines above (extrapolated as necessary or relevant) should still apply. However, natural fluctuations should not normally count as part of a decline, but an observed decline should not necessarily be considered part of a natural fluctuation unless there is evidence for this. A decline that is the result of legal activities carried out pursuant to a scientifically based harvesting programme that reduces the population to a planned level, not detrimental to the survival of the species, would not normally be covered by the term 'decline'.

**<sup>1</sup> Application of 'decline' for commercially exploited aquatic species**

*In marine and large freshwater bodies, a narrower range of 5–20% is deemed to be more appropriate in most cases, with a range of 5–10% being applicable for species with high productivity, 10–15% for species with medium productivity and 15–20% for species with low productivity. Nevertheless some species may fall outside this range. Low productivity is correlated with low mortality rate and high productivity with high mortality. One possible guideline for indexing productivity is the natural mortality rate, with the range 0.2–0.5 per year indicating medium productivity.*

*In general, historical extent of decline should be the primary criterion for consideration of listing in Appendix I.*

*However, in circumstances where information to estimate extent-of-decline is limited, rate-of-decline over a recent period could itself still provide some information on extent-of-decline.*

*For listing in Appendix II, the historical extent of decline and the recent rate of decline should be considered in conjunction with one another. The higher the historical extent of decline, and the lower the productivity of the species, the more important a given recent rate of decline is.*

*A general guideline for a marked recent rate of decline is the rate of decline that would drive a population down within approximately a 10-year period from the current population level to the historical extent of decline guideline (i.e. 5–20% of baseline for exploited fish species). There should rarely be a need for concern for populations that have exhibited an historical extent of decline of less than 50%, unless the recent rate of decline has been extremely high.*

*Even if a population is not declining appreciably, it could be considered for listing in Appendix II if it is near the extent-of-decline guidelines recommended above for consideration for Appendix-I-listing. A range of between 5% and 10% above the relevant extent-of-decline might be considered as a definition of 'near', taking due account of the productivity of the species.*

*A recent rate-of-decline is important only if it is still occurring, or may resume, and is projected to lead to the species reaching the applicable point for that species in the Appendix-I extent-of-decline guidelines within approximately a 10-year period. Otherwise the overall extent-of-decline is what is important. When sufficient data are available, the recent rate-of-decline should be calculated over approximately a 10-year period. If fewer data are available, annual rates over a shorter period could be used. If there is evidence of a change in the trend, greater weight should be given to the more recent consistent trend. In most cases, listing would only be considered if the decline were projected to continue.*

*In considering the percentages indicated above, account needs to be taken of taxon- and case-specific biological and other factors that are likely to affect extinction risk. Depending on the biology, patterns of exploitation and area of distribution of the taxon, vulnerability factors (as listed in this Annex) may increase this risk, whereas mitigating factors (e.g. large absolute numbers or refugia) may reduce it.*

#### Vulnerability factors

‘Vulnerability’ can be defined as the susceptibility to intrinsic or external effects which increase the risk of extinction (even when mitigating factors are taken into account). There are a number of taxon- or case-specific biological and other factors that may affect the extinction risk associated with a given percentage decline, small population size or restricted area of distribution. These can be, but are not limited to, aspects of any of the following:

#### Intrinsic factors

- Life history (e.g. low fecundity, slow growth rate of the individual, high age at first maturity, long generation time)
- Low absolute numbers or biomass or restricted area of distribution
- Population structure (age/size structure, sex ratio)
- Behavioural factors (e.g. social structure, migration, aggregating behaviour)
- Density (for sessile or semi-sessile species)
- Specialized niche requirements (e.g. diet, habitat)
- Species associations such as symbiosis and other forms of co-dependency
- Reduced genetic diversity
- Depensation (prone to continuing decline even in the absence of exploitation)
- Endemism
- Seed dispersal mechanism
- Specialized pollinators

#### Extrinsic factors

- Selectivity of removals (that may compromise recruitment)
- Threats from alien invasive species (hybridization, disease transmission, depredation, etc.)
- Habitat degradation (contamination, soil erosion, alteration by alien invasive species, etc.)
- Habitat loss/destruction
- Habitat fragmentation
- Harsh environmental conditions
- Threats from disease
- Rapid environmental change (e.g. climate regime shifts)
- Stochastic events.

## APPENDIX 6

### CRITERIA FOR THE CERTIFICATION OF PRODUCTS FROM SUSTAINABLE FISHING AS RECOMMENDED BY THE NORDIC TECHNICAL WORKING GROUP ON FISHERIES ECOLABELLING CRITERIA

(Extracted from Norden. 2000. *An arrangement for the voluntary certification of products of sustainable fishing*. Nordic Technical Working Group on Fisheries Ecolabelling Criteria.)

#### Proposed Criteria

The primary requirement for labelling is that the fishery be conducted in a sustainable manner. In this context, a fishery is defined as a fishing operation using a certain technology, catching fish of a certain species or a mix of species which may vary from trip to trip but focuses on a certain group of target species, and operates within a specific area. The certification unit is thus not simply individual fish stocks, viewed in isolation, nor is it all the fisheries of a nation.

The proposed criteria relate to the North-eastern Atlantic region and may therefore not be directly applicable to other regions. It is, however, understood that the criteria presented here are not in contradiction to globally acceptable criteria. Further work on the adaptation and elaboration of criteria should be undertaken in each region.

The proposed criteria will be discussed under two headings below: *Stock aspects* covering the sustainability of the fisheries in relation to the fish stocks being targeted, and *ecosystem effects* covering the effects of fisheries on the marine ecosystem beyond the impacts on targeted fish stocks.

#### *Stock aspects*

The main objective is verification that a precautionary approach has been adopted to the management of the fishery.

It is proposed that stock criteria consist of four (4) elements:

1.1. The fishery must follow a fisheries management plan. A fisheries management plan is an administrative instrument for long-term strategic management of fishery resources. According to FAO Technical Guidelines, a fisheries management plan is an arrangement between a fishery management authority and interested parties which identifies the partners in the fishery and their respective roles, the objectives for the fishery and specifies the management rules. The management plan will serve as a reference, summarizing the current state of knowledge on the resource, its environment and the fishery.

1.2. The fisheries management plan must be based on regular (e.g. annual) scientific advice on the state of fish stocks and recommendations for their sustainable exploitation. The advice should be based on the best available science. In the case of nationally managed fisheries, the advice should come from a creditable research organisation. In the case of internationally managed fisheries, advice should be given by the competent international organisation (e.g. ICES in the NE-Atlantic, NAFO in the NW-Atlantic, etc.).

1.3. The fisheries management plan must include planned or pre-agreed management measures that come into force immediately when relevant *precautionary reference*

*points* are reached. A variety of management measures can be considered, including reductions in TAC, reductions in effort, fleet reductions, etc. The measures must be chosen based on scientific study and have a high likelihood of improving the stock situation beyond precautionary reference points. In addition, planned or pre-agreed *limit reference point* must be defined and, if these are reached, fishing targeted on the stock must cease.

#### 1.4. Efficient monitoring and control mechanisms must be in place.

The first three of these elements are easily verifiable; namely, whether there is a fisheries management plan, whether there is scientific advice, and whether there are planned or pre-agreed measures. The fourth element should be verified by independent review, e.g. by certifying organisations.

Taken together, these elements give assurance that ecolabelled fish products derive from fish stocks that are harvested in a sustainable way.

It should be emphasised that the establishment of a fisheries management plan (see FAO 1997) and precautionary reference points need not under all circumstances involve great complexity or cost, especially in cases where stocks are lightly exploited.

This scheme places the emphasis on the logic inherent in the fisheries management process and not just on the state of the fish stock at any given time. The need for considering the management process as a whole stems in part from the fact that fish stocks undergo natural fluctuations that can occur independently of any impact from fisheries. The important consideration is that the process be a self-correcting one such that the sustainability is not subject to unacceptable risk.

Note that even stocks which have been over-fished in the past can be included in the scheme, provided current and future exploitation is set on a precautionary course<sup>1</sup>. This property reinforces the incentive structure of the proposed scheme and enhances its chances of being widely adopted.

Products from mixed fisheries targeting several stocks simultaneously can only be labelled if the criteria are fulfilled for the individual target stocks simultaneously.

Cases of mixed fisheries where limited data exist on some or all the separate target stocks, at the present state of knowledge, present difficulties and require particular attention. However, if it can be shown that a) both effort and catches have been relatively stable for at least a decade and b) catch levels can safely be assumed to constitute a small fraction of total stocks relative to production capacity, then ecolabelling could be favourably considered, provided that a fisheries management plan exists including planned or pre-agreed measures if effort or catch levels change.

#### *Ecosystem effects*

Requests for assurances against ecosystem effects can easily develop into demands on information and predictability which will be insatiable, either in principle or for cost reasons. Furthermore, the problem that poorer countries will be at a disadvantage *a priori* is important here – research and monitoring regarding the ecological effects of fisheries is costly and can hardly be afforded by countries that are just moving into basic resource management.

The precautionary approach can be used to get around this problem. The larger the pressure put on the system, the larger the demands that should be put on documentation of impacts as a condition for continued exploitation at that level. It is thus in principle possible to exploit an ecosystem at an exploitation level which is considered 'safe' without the need for extensive documentation.

This will not necessarily lead to a situation where less economic benefits are produced from the resource system: maximal production and economic yields are generally achieved at considerably lower exploitation levels than those currently prevailing in most situations. Lower exploitation levels will thus work in the same direction in economic and ecological terms.

Avoidance of overfishing will go a long way towards eliminating negative ecological impact associated with fishing.

In discussing criteria to deal with ecosystem effects, it must be kept in mind that it is impossible *a priori* to list all possible effects at the ecosystem level. It is therefore proposed that general criteria are defined for those effects which are found most critical or which are pertinent to many fisheries and that all other possible (and today even largely unknown) effects are dealt with by a requirement for a management plan to address any issues being raised and substantiated by scientific advice.

To aid in avoiding negative ecosystem effects and to help conserve biodiversity, the following three criteria are proposed:

2.1. Destructive fishing practices, such as the use of explosives or poisons to kill fish, are not used.

2.2. Discards of fish, crustaceans and molluscs are minimised through the use of the best available technology for selective fishing methods<sup>2</sup>. Discards are monitored through a sampling program.

2.3. Management plans should exist for any other ecosystem issues properly identified, based on scientific advice, as being of serious concern in the fishery in question. These issues could involve bycatches of red listed species, seabirds and marine mammals and local effects of fishing in relation to sensitive biota or habitats (seabird breeding, coral reefs etc).

<sup>1</sup> This is explained in the following quote from ICES (1999) p.6: "Note that if a stock is regarded as being in a depleted state, or even if overfishing is taking place, the development and effective implementation of a plan which is regarded as sufficient to reduce fishing mortality to no higher than  $F_{pa}$  and to rebuild SSB to above  $B_{pa}$ , within a "reasonable" period, would satisfy the condition that management were consistent with a precautionary approach."

<sup>2</sup>Best available technology' is here understood as that technology which at any point in time utilises the best available knowledge about the selectivity of fishing gear while not jeopardising the economic viability of the fisheries.

## APPENDIX 7

### THE AUSTRALIAN DEPARTMENT OF ENVIRONMENT, WATER, HERITAGE AND THE ARTS GUIDELINES FOR THE ECOLOGICALLY SUSTAINABLE MANAGEMENT OF FISHERIES

(Extracted from DEWHA. 2007. *Guidelines for the ecologically sustainable management of fisheries – 2007*. Australian Department of the Environment, Water, Heritage and the Arts. Canberra, Australia.).

#### PRINCIPLE 1.

A fishery must be conducted in a manner that does not lead to over-fishing, or for those stocks that are over-fished, the fishery must be conducted such that there is a high degree of probability the stock(s) will recover.

**Objective 1.** The fishery shall be conducted at catch levels that maintain ecologically viable<sup>1</sup> stock levels at an agreed point or range, with acceptable levels of probability.

#### *Information requirements*

**1.1.1** There is a reliable information collection system in place appropriate to the scale of the fishery. The level of data collection should be based upon an appropriate mix of fishery independent and dependent research and monitoring.

#### *Assessment*

**1.1.2** There is a robust assessment of the dynamics and status of the species/fishery and periodic review of the process and the data collected. Assessment should include a process to identify any reduction in biological diversity and /or reproductive capacity. Review should take place at regular intervals but at least every three years.<sup>2</sup>

**1.1.3** The distribution and spatial structure of the stock(s) has been established and factored into management responses.

**1.1.4** There are reliable estimates of all removals, including commercial (landings and discards), recreational and indigenous, from the fished stock. These estimates have been factored into stock assessments and target species catch levels.

**1.1.5** There is a sound estimate of the potential productivity of the fished stock/s and the proportion that could be harvested.

#### *Management responses*

**1.1.6** There are reference points (target and/or limit), that trigger management actions including a biological bottom line and/or a catch or effort upper limit beyond which the stock should not be taken.<sup>3</sup>

**1.1.7** There are management strategies in place capable of controlling the level of take.

**1.1.8** Fishing is conducted in a manner that does not threaten stocks of by-product species. (Guidelines 1.1.1 to 1.1.7 should be applied to by-product species to an appropriate level)

**1.1.9** The management response, considering uncertainties in the assessment and precautionary management actions, has a high chance of achieving the objective.

**Objective 2.** Where the fished stock(s) are below a defined reference point, the fishery will be managed to promote recovery to ecologically viable stock levels within nominated timeframes.

#### *Management responses*

**1.2.1** A precautionary recovery strategy is in place specifying management actions, or staged management responses, which are linked to reference points. The recovery strategy should apply until the stock recovers, and should aim for recovery within a specific time period appropriate to the biology of the stock.<sup>4</sup>

1.2.2 If the stock is estimated as being at or below the biological and / or effort bottom line, management responses such as a zero targeted catch, temporary fishery closure or a 'whole of fishery' effort or quota reduction are implemented.

## **PRINCIPLE 2.**

Fishing operations should be managed to minimise their impact on the structure, productivity, function and biological diversity of the ecosystem.<sup>5</sup>

**Objective 1.** The fishery is conducted in a manner that does not threaten bycatch species.

### *Information requirements*

2.1.1 Reliable information, appropriate to the scale of the fishery, is collected on the composition and abundance of bycatch.

### *Assessments*

2.1.2 There is a risk analysis of the bycatch with respect to its vulnerability to fishing.<sup>6</sup>

### *Management responses*

2.1.3 Measures are in place to avoid capture and mortality of bycatch species unless it is determined that the level of catch is sustainable (except in relation to endangered, threatened or protected species). Steps must be taken to develop suitable technology if none is available.

2.1.4 An indicator group of bycatch species is monitored.

2.1.5 There are decision rules that trigger additional management measures when there are significant perturbations in the indicator species numbers.

2.1.6 The management response, considering uncertainties in the assessment and precautionary management actions, has a high chance of achieving the objective.

**Objective 2.** The fishery is conducted in a manner that avoids mortality of, or injuries to, endangered, threatened or protected species and avoids or minimises impacts on threatened ecological communities.<sup>7</sup>

### *Information requirements*

2.2.1 Reliable information is collected on the interaction with endangered, threatened or protected species and threatened ecological communities.

### *Assessments*

2.2.2 There is an assessment of the impact of the fishery on endangered, threatened or protected species.

2.2.3 There is an assessment of the impact of the fishery on threatened ecological communities.

### *Management responses*

2.2.4 There are measures in place to avoid capture and/or mortality of endangered, threatened or protected species.

2.2.5 There are measures in place to avoid impact on threatened ecological communities.

2.2.6 The management response, considering uncertainties in the assessment and precautionary management actions, has a high chance of achieving the objective.

**Objective 3.** The fishery is conducted, in a manner that minimises the impact of fishing operations on the ecosystem generally.

### *Information requirements*

2.3.1 Information appropriate for the analysis in 2.3.2 is collated and/or collected covering the fisheries impact on the ecosystem and environment generally.

### *Assessment*

2.3.2 Information is collected and a risk analysis, appropriate to the scale of the fishery and its potential impacts, is conducted into the susceptibility of each of the following ecosystem components to the fishery.

1. Impacts on ecological communities
  - Benthic communities
  - Ecologically related, associated or dependent species
  - Water column communities
2. Impacts on food chains
  - Structure
  - Productivity/flows
3. Impacts on the physical environment
  - Physical habitat
  - Water quality

Management responses

2.3.3 Management actions are in place to ensure significant damage to ecosystems does not arise from the impacts described in 2.3.1.

2.3.4 There are decision rules that trigger further management responses when monitoring detects impacts on selected ecosystem indicators beyond a predetermined level, or where action is indicated by application of the precautionary approach.

2.3.5 The management response, considering uncertainties in the assessment and precautionary management actions, has a high chance of achieving the objective.

<sup>1</sup> Ecological viable stock has a general rather than a specific meaning. It refers to the maintenance of the exploited population at high levels of abundance designed to maintain productivity, provide margins of safety for error and uncertainty and maintain yields over the long term in a way that conserves the stocks role and function in the ecosystem.

<sup>2</sup> Review should be undertaken by the relevant management authority in a transparent way.

<sup>3</sup> Reference points can allow for seasonal fluctuations in stock recruitment and other areas of uncertainty.

<sup>4</sup> Strategies require that recovery should take place within specified times with certain degrees of probability.

<sup>5</sup> The issues addressed under the principle are those that define components of ecosystem integrity.

<sup>6</sup> The vulnerability of a bycatch species may be its vulnerability to fishing technology (e.g. its catchability), or its vulnerability in terms of ecological impact (e.g. loss of predators or prey).

<sup>7</sup> "Protected" species are those which warrant a higher degree of conservation and for which explicit legislative or other mechanisms exist, e.g. they may be categorised under separate legislation as "endangered", "threatened", "protected".

## APPENDIX 8

### OUTLINE OF THE PROPOSED JAPANESE ECOLABEL FOR CAPTURE FISHERIES, MARINE ECO-LABEL JAPAN

(Extracted from JFA, 2008. Japan Fisheries Association. Marine Eco-Label Japan)

#### 2. Basic principles

(1) Promotion of the conservation and sustainable use of marine resources and the conservation of marine ecosystems.

Marine Eco-label Japan (MEL Japan) “is intended to make provision for informed decisions of purchasers whose choice can be relied upon to promote and stimulate the sustainable use of fishery resources,” as stipulated in the FAO Guidelines.

#### (2) Co-management

MEL Japan pursues utilizing the merits of co-management which have been practiced in order to ensure the sustainable use of aquatic resources in Japan and Asia from olden times. The idea of co-management is that fishermen share in the role of fisheries management and resource enhancement. In fishing communities in Japan, fishers have developed the idea of managing local fishery resources jointly and on their own will in order to ensure subsistence of their communities. As a result, practical and effective resource management-oriented fisheries, incomparable in other parts of the world, have developed and expanded in Japan. In the background of this development, one can point out the presence of many small-scale fishers and fishing boats as well as a variety of target fish species in fisheries. A framework has functioned that encourages fishers and others related to fisheries, who are users of the resources, to fulfill their role in resource management voluntarily and individually. Fishers and regional and central governments are united in participating in the current framework for resource recovery as well. MEL Japan, therefore, effectively applies the concept of co-management to certification as a means to facilitate and reinforce the work of the scheme. MEL Japan aims to create a positive cycle in which fishers, through ecolabel certification, give closer attention to resource management, reinforce cooperation with scientists and administrators, and contribute to the accumulation of scientific data and the improvement of information through fishing activities.

#### (3) Scientific and objective certification

MEL Japan is structured by a council, a board and committees that include representatives of fisheries management authorities, the fishing industry, fishworkers organizations, the scientific community, environmental interest groups, fish processors, traders and retailers as well as consumers, which realize balanced and fair participation by all interested parties. MEL Japan also ensures scientific and objective certification by independent certification bodies which form a certification team comprising scientists and other experts with a profound understanding of the Japanese fisheries and marine environment.

#### 3. Affordable costs of certification

For the ecolabelling scheme to be accepted widely, it is crucial that it contributes to the sustainability of fisheries. What MEL Japan pursues is a practicable framework in which diverse fishers--large and small-scale alike—proactively engaged in sustainable fisheries can obtain certification at low costs.

To that end, the scheme of MEL Japan is being developed into a system that requires recovery of actual costs only and avoids duplication of work, by utilizing to the maximum extent existing data acquired through the management efforts that

have already been undertaken. Furthermore, the system is non-commercial and non-profit in nature, and MEL Japan itself and a third party Certification Body require the minimum necessary fees for maintenance of the project. Needless to say, minimizing certification costs does not mean compromising the sustainability requirements, and sustainability of the examined fisheries is the prerequisite for certification.

#### 4. Present goal

The goal of MEL Japan at the moment is to promote its recognition in the Japanese market, with the aim to gain wider acceptance. MEL Japan also aims to respond to the needs of foreign markets to promote the export of sustainable Japanese seafood.

### Annex (Provisional Document)

#### Outline of MEL Japan

##### 1. Administration of the system

The system will be administered provisionally by MEL Japan established in the Japan Fisheries Association (JFA), and the JFA's Operations Division will serve as the Secretariat.

##### 2. Organization of the system

MEL Japan's Council administers the entire scheme, accredits the Certification Bodies, registers industry organizations, and makes decisions on the certification standard and procedural rules with the aim to ensure fairness and objectivity. Under the Council, the Technical Committee oversees the development and application of the certification standard, the Public Relations Committee publicizes the system in Japan and overseas, and the Audit Committee supervises the requirements of the Certification Bodies and administration of the system. Furthermore, the Board, composed mainly of experts and academics from various areas, is established in order to make the objectives of MEL Japan widely acceptable. The Board examines the basic administrative matters and advises MEL Japan.

##### 3. Certification Body

The Certification Body is an entity having the staff with certain technical knowledge and expertise by type of certification (Fisheries Certification and Chain of Custody Certification) in order to exercise fair and neutral judgment independent from the applicants and ensure highly precise inspections. MEL Japan accredits the body on the basis of its compliance with the objectives of MEL Japan. The effective accreditation period shall be five years unless special reasons exist. The Certification Body conducts inspection activities for certification based on the application from the applicant, reports the results to MEL Japan, and carries out regular management inspections regarding the contents of certification.

##### 4. Industry organizations, etc.

Industry organizations by sector consenting to the activities of MEL Japan shall be recruited to positively participate in, propagate the system and engage in exchanges of views.

Industry organizations shall advise or act as proxy in the application for certification by their members for registration in MEL Japan.

##### 5. Certification methods

Certification consists of two types: certification in the production stage and certification in the distribution and processing stage. In the production stage, producers (including fisheries cooperative associations and fisheries organizations) will

apply for certification to an accredited Certification Body as classified by target species using the identical fishing method. In the distribution and processing stage, application will be made to a Certification Body by operators as classified by target catch and product. Where necessary, a unified application can be made for both certification in the production stage and distribution and processing stage. Certification standard and guidelines shall be determined by the Council after discussion at the Technical Committee on the basis of the following requirements.

(Certification standard in the production stage)

- (1) Fisheries should be conducted under an effective management scheme;
- (2) The target resource should maintain the level of being used sustainably; and
- (3) Appropriate measures should be taken for the conservation of the ecosystem

(Certification standard in the distribution and processing stage)

- (1) A management system should be in place, such as the appointment of persons in charge and custody of related documents;
- (2) Traceability should be secured through (1), etc. and the mixture of seafood other than the target seafood should not occur.

MEL Japan shall conduct certification after consultations at the Audit Committee upon receipt of the certification report of the Certification Body, and issue certificates to the applicants through the Certification Body. Certification shall be effective for five years or less for the production stage and for three years or less for the distribution and processing stage, but regular examinations by the Certification Body may be conducted even in the course of the effective period.

## APPENDIX 9

### THE MARINE STEWARDSHIP COUNCIL PRINCIPLES AND CRITERIA FOR A SUSTAINABLE AND WELL-MANAGED FISHERY

(Extracted from Marine Stewardship Council. 2008b. *Principles and criteria for sustainable fishing*. Marine Stewardship Council.)

#### PRINCIPLE 1:

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.<sup>2</sup>

Intent: The intent of this principle is to ensure that the productive capacities of resources are maintained at high levels and are not sacrificed in favour of short term interests. Thus, exploited populations would be maintained at high levels of abundance designed to retain their productivity, provide margins of safety for error and uncertainty, and restore and retain their capacities for yields over the long term.

#### Criteria:

1. The fishery shall be conducted at catch levels that continually maintain the high productivity of the target population(s) and associated ecological community relative to its potential productivity.
2. Where the exploited populations are depleted, the fishery will be executed such that recovery and rebuilding is allowed to occur to a specified level consistent with the precautionary approach and the ability of the populations to produce long-term potential yields within a specified time frame.
3. Fishing is conducted in a manner that does not alter the age or genetic structure or sex composition to a degree that impairs reproductive capacity.

#### PRINCIPLE 2:

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.

Intent: The intent of this principle is to encourage the management of fisheries from an ecosystem perspective under a system designed to assess and restrain the impacts of the fishery on the ecosystem.

#### Criteria:

1. The fishery is conducted in a way that maintains natural functional relationships among species and should not lead to trophic cascades or ecosystem state changes.
2. The fishery is conducted in a manner that does not threaten biological diversity at the genetic, species or population levels and avoids or minimises mortality of, or injuries to endangered, threatened or protected species.
3. Where exploited populations are depleted, the fishery will be executed such that recovery and rebuilding is allowed to occur to a specified level within specified time frames, consistent with the precautionary approach and considering the ability of the population to produce long-term potential yields.

#### PRINCIPLE 3:

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.

Intent: The intent of this principle is to ensure that there is an institutional and operational framework for implementing Principles 1 and 2, appropriate to the size and scale of the fishery.

A. Management System Criteria:

1. The fishery shall not be conducted under a controversial unilateral exemption to an international agreement.

The management system shall:

2. demonstrate clear long-term objectives consistent with MSC Principles and Criteria and contain a consultative process that is transparent and involves all interested and affected parties so as to consider all relevant information, including local knowledge. The impact of fishery management decisions on all those who depend on the fishery for their livelihoods, including, but not confined to subsistence, artisanal, and fishing-dependent communities shall be addressed as part of this process;

3. be appropriate to the cultural context, scale and intensity of the fishery – reflecting specific objectives, incorporating operational criteria, containing procedures for implementation and a process for monitoring and evaluating performance and acting on findings;

4. observe the legal and customary rights and long term interests of people dependent on fishing for food and livelihood, in a manner consistent with ecological sustainability;

5. incorporate an appropriate mechanism for the resolution of disputes arising within the system<sup>5</sup>;

6. provide economic and social incentives that contribute to sustainable fishing and shall not operate with subsidies that contribute to unsustainable fishing;

7. act in a timely and adaptive fashion on the basis of the best available information using a precautionary approach particularly when dealing with scientific uncertainty;

8. incorporate a research plan – appropriate to the scale and intensity of the fishery – that addresses the information needs of management and provides for the dissemination of research results to all interested parties in a timely fashion;

9. require that assessments of the biological status of the resource and impacts of the fishery have been and are periodically conducted;

10. specify measures and strategies that demonstrably control the degree of exploitation of the resource, including, but not limited to:

a) setting catch levels that will maintain the target population and ecological community's high productivity relative to its potential productivity, and account for the non-target species (or size, age, sex) captured and landed in association with, or as a consequence of, fishing for target species;

b) identifying appropriate fishing methods that minimise adverse impacts on habitat, especially in critical or sensitive zones such as spawning and nursery areas;

c) providing for the recovery and rebuilding of depleted fish populations to specified levels within specified time frames;

d) mechanisms in place to limit or close fisheries when designated catch limits are reached;

e) establishing no-take zones where appropriate;

11. contains appropriate procedures for effective compliance, monitoring, control, surveillance and enforcement which ensure that established limits to exploitation are not exceeded and specifies corrective actions to be taken in the event that they are.

B. Operational Criteria

Fishing operation shall:

12. make use of fishing gear and practices designed to avoid the capture of non-target species (and non-target size, age, and/or sex of the target species); minimise

mortality of this catch where it cannot be avoided, and reduce discards of what cannot be released alive;

13. implement appropriate fishing methods designed to minimise adverse impacts on habitat, especially in critical or sensitive zones such as spawning and nursery areas;

14. not use destructive fishing practices such as fishing with poisons or explosives;

15. minimise operational waste such as lost fishing gear, oil spills, on-board spoilage of catch, etc.;

16. be conducted in compliance with the fishery management system and all legal and administrative requirements; and

17. assist and co-operate with management authorities in the collection of catch, discard, and other information of importance to effective management of the resources and the fishery.

<sup>2</sup> The sequence in which the Principles and Criteria appear does not represent a ranking of their significance, but is rather intended to provide a logical guide to certifiers when assessing a fishery. The criteria by which the MSC Principles will be implemented will be reviewed and revised as appropriate in light of relevant new information, technologies and additional consultations

<sup>3</sup> Outstanding disputes of substantial magnitude involving a significant number of interests will normally disqualify a fishery from certification.

## APPENDIX 10

### CRITERIA FOR THE FRIEND OF THE SEA ECOLABEL FOR CAPTURE FISHERIES

(Extracted from FotS. 2009b. Friend of the Sea sustainable seafood and aquaculture criteria.)

**Essential Requirements:** Compliance with 100% of Essential Applicable Requirements is needed for the Organization to be recommended for certification. Any deficiency against one of these requirements is considered as Major Non Conformity and the relevant Corrective Actions must be implemented by the Organization in a maximum time of 3 months since the date the Major Non Conformity was raised. The Organization must provide Certification Body with satisfactory evidence of all Major Con Conformities having been rectified.

**Important Requirements:** Compliance with 100% of Important Applicable Requirements is needed for the Organization to be recommended for certification. Any deficiency against one of these requirements is considered as a Minor Non Conformity and the relevant proposal of Corrective Action (state of intent & action plan) must be submitted by the Organization to Certification Body within a maximum period of 3 weeks since the date the Non Conformity was raised. In the proposal the Organization must define the timescale to implement every Corrective Action (maximum time to full implementation: 1 year since the date the Minor Non Conformity was raised).

**Recommended requirements:** It is not strictly necessary to comply with this kind of requirement in order to be granted the certificate. Nevertheless all the applicable requirements will be inspected and any gap will be always reported in the Audit Report as a recommendation. In case of recommendation the Organization has to evaluate if corrective actions are needed and, by the next surveillance audit, has to inform Certification Body about its decision and about any Corrective Actions applied.

Friend of the Sea Criteria are categorical in nature and based on the most restrictive and worldwide acknowledged and accepted definition of 'sustainable fisheries'. On this matter Friend of the Sea has taken in due consideration requests from stakeholders, such as NGOs and traditional and artisanal fisheries, for a more limitative definition of 'sustainable fisheries'.

A Sustainable Fishery, in the strictest sense, is indeed one that:

1. Does not insist on an overexploited, depleted or data deficient stock;
2. Has no impact on the seabed;
3. Has lower than average discard level;
4. Complies with all local national and international legislation
5. Apply a management system that assures the respect of above mentioned requirements.

#### 1 - SPECIES AND STOCK STATUS CRITERIA: fisheries targeting not overexploited stocks

n°	Requirement	Level
1.1	The targeted and by-caught species cannot be included in the IUCN Redlist of endangered species	Essential
1.2	The target species stock cannot be Overexploited nor Depleted nor Recovering nor Data Deficient, according to the most recent stock assessment and the following order of priority data source: FAO, Regional Fishery Body, National Marine Research Authority. An exception is made for those traditional fisheries which a) respect all other criteria; b) represent not more than 10% of the total catch of the overexploited stock; c) should be taken as a positive example of well managed low impact fishery and thus be promoted.	Essential

This criterion allows for the approval of only those fisheries insisting on currently not overexploited stocks for which there is sufficient available data for assessment. It is the most restrictive criteria conceivable for sustainable fisheries. It allows for a fast,

categorical and updatable assessment. The criteria also equally considers the health of the stock of occurring bycatch species, further requesting that none of the caught species be among those included in the IUCN Redlist of endangered species. This criterion has allowed Friend of the Sea to generate a list of Sustainable and a list of Unsustainable Fisheries. By referring to FAO and Regional Fishery Bodies assessments, Friend of the Sea takes into consideration the most reliable, complete, official and widely accepted opinions on stocks status.

## 2 – SEABED IMPACT CRITERIA: respect of benthic habitat

n°	Requirement	Level
2.1	<p>The targeted species CANNOT be fished by gears which impact the seabed unless evidence is provided that the impact on the seabed is negligible.</p> <p>Bottom Trawling fisheries must have implemented, as a minimum, the following:</p> <ol style="list-style-type: none"> <li>1) Protected Areas for corals and seamounts, where bottom trawling is prohibited;</li> <li>2) TEDs or similar compulsory, with discard reduction to fulfill criteria 3</li> </ol>	Essential

This criteria acknowledges NGOs and other stakeholders' request for a ban on use of Bottom Trawlers and Dredges, considering the unsustainable impact on the seafloor evidenced by the greatest majority of the published scientific reports.

## 3 – SELECTIVITY CRITERIA: fishing methods with lower than average discard levels

n°	Requirement	Level
3.1	<p>The targeted species CANNOT be fished by gears which have discard levels higher than 8% in weight terms, considered by FAO 2005 to be the average discard level worldwide. As a reference, priority will be given to FAO 2005 'Discards in the World's Marine Fisheries. An Update'.</p>	Essential

The most updated and official information about discards levels per fishing gear is used, in order to assess products against this criteria.

## 4 – LEGAL CRITERIA: TAC, IUU, FOC and legislation

n°	Requirement	Level
	The fleet fishing the audited product must :	
4.1	<p>Respect Total Allowable Catches (TACs), if in place. Last year's TAC has been respected or, in case it has not been respected, at least 2 out of the past 3 years TACs have been respected.</p>	Essential
4.2	<p>Include NO IUU (Illegal, Unreported, Unregulated) fishing vessels.</p>	Essential
4.3	<p>Include NO FOC (Flag Of Convenience) fishing vessels.</p>	Essential
4.4	<p>Respect national and international legislation, in particular legislation related to the reduction of the environmental impact of the fishery (such as, but not limited to:</p> <ul style="list-style-type: none"> <li>- vessel registration,</li> <li>- mesh size,</li> <li>- net size,</li> <li>- minimum size,</li> <li>- distance from the coast,</li> <li>- by-catch reduction measures,</li> <li>- no fishing on protected habitat</li> <li>- verify onboard equipment and absence of banned fishing gears and methods, chemical substances, explosives</li> <li>- log book if compulsory)</li> </ul>	Essential

The criteria focuses on legal aspects which are often given for granted but which can standalone represent a relevant barrier to approval, as the IUU and FOC evidence

is beginning to surface and as several fisheries do not respect TACs. Friend of the Sea maintains a list of IUU and FOC in order to allow companies and stakeholders to monitor their suppliers and the origin of their raw material.

#### 5 – MANAGEMENT CRITERIA: Monitoring and Precautionary Approach

n°	Requirement	Level
	The Organization should:	
5.1	be managed accordingly to its size and cultural context	Recomm.
5.2	Operate following the Precautionary Principle	Recomm.
5.3	Incorporate a monitoring and research process	Recomm.

Differently from criteria 1, 2, 3 and 4 criteria 5 is not categorical nor as stringent. On the field experience has shown that fulfilment of Criteria 5 is a direct consequence of fulfilment of criteria 1, 2, 3 and 4. As an example, a Fishery whose stock is considered as Fully Exploited by FAO, must necessarily have incorporated a monitoring and research process (otherwise it would be data deficient).

#### 6 – SOCIAL ACCOUNTABILITY

n°	Requirement	Level
	The Organization must comply with the following:	
6.1	No child labour.	Essential
6.2	No forced labour.	Essential
6.3	Wages paid must meet the legal standards	Essential
6.4	Respect National and International Labour legislation.	Essential
6.5	The organization should be certified SA8000	Recomm.

#### 7 – FUEL EFFICIENCY/CARBON FOOTPRINT

n°	Requirement	Level
	The Organization is recommended to:	
7.1	Engage at assessing its products' carbon footprint not later than 12 months after certification.	Recomm.
7.2	Engage at offsetting its carbon production by purchase of carbon and acidification offsets not later than 18 months after certification.	Recomm.
7.3	Engage at reducing its products' carbon footprint.	Recomm.

#### 8 – TRACEABILITY: a system is in place

n°	Requirement	Level
8.1	The Organization guarantees that a specific traceability system is in place in order to demonstrate that the product audited respects all requirements of this Standard and there is no possibility of mix with other products not under certification.	Essential

## APPENDIX 11

### CRITERIA FOR THE ECOLOGICAL ASSESSMENT OF SUSTAINABLE CAPTURE FISHERIES FOR THE NATURLAND WILDFISH ECOLABEL

(Extracted from Naturland 2008. “*Naturland Standards for Sustainable Capture Fishery*”.)

**Note:** This ecolabel includes further criteria for the assessment of social and economic sustainability.

#### 1. Project-specific management conditions and certification procedure

1.1 Besides the general regulations for sustainable fishery listed in Part B, project-specific management conditions are imposed on each fishery project. Taken together with the regulations under B 2–3, these special conditions constitute a catalogue of measures to be adopted in the management plan and quality assurance system of the project. The conditions are the result of an expert survey of each fishery project to be performed. Naturland decides whether to accept the list of experts proposed either by the fishery project or a third party and can, where justified, reject the list or ask for changes to be made. The experts on the list should cover the following fields:

- scientific institutions which deal with the respective type of fishery (primarily for current information on the status of the stock and on the aquatic ecosystem)
- fishing authorities (legal requirements, national and international development aims)
- NGOs (social and ecological aspects)
- organisations from the fishing and/or processing industries (technical, social and economic aspects).

1.2 To ensure that the regulations compiled in the project-specific management conditions are kept up to date, each expert survey is performed every two years at the minimum. In principle, the fishery project bears responsibility for the expert survey being performed according to schedule. This also holds true for the case that the project has to supply the experts with pertinent data for them to be able to assess the situation of a fishery. The project-specific management conditions for each individual fishery project must be passed by Naturland’s certification committee.

#### 2. Ecology

2.1 The project performs its fishing activities in such a way that integrity of the ecosystem is maintained long-term, concerning both the stocks of the economically relevant species as well as the other components of the ecosystem.

2.2 Subject of the evaluation is the geographical catchment area of the respective fishery project or the project’s share in the total exploitation of a certain species.

2.3 In the case of species which only occur temporarily in the catchment area of the project, or which do not spend their whole life cycle there, an evaluation is made of whether the management form of the project were compatible with maintaining the total stock volume if this management form were adopted by all the enterprises involved in fishing this species in this way (exemplary character).

2.4 Even if the fishery project is proven to be managed in an exemplary sustainable manner, Naturland reserves the right not to certify the project, or to defer certification, if the total stock of a species should be critically jeopardised by other factors.

2.5 If no exclusively used geographic area can be attributed to the project (e.g. in deep-sea fishery), the evaluation is made based not only on the fishing practices of the project but also on the total situation of the stocks in question.

2.6 Practices which are generally deemed as detrimental or critical from an ecological point of view are prohibited. These include the following regulations in addition to the project-specific management conditions defined:

- catching marine mammals and ocean turtles
- catching sharks for their fins (“finning“)
- the use of poisons and explosives in fishing
- damage to coral reefs (including cold-water corals)
- beam trawl fishing as well as demersal trawling on highly structured sea beds
- demersal trawling without suitable escape hatches to keep bycatches to a minimum.

2.7 The project-specific management conditions govern the following in particular:

- minimum size and maximum quantities
- equipment and techniques employed
- close seasons and sanctuaries
- avoidance or minimisation of bycatches
- other measures which help to protect the aquatic ecosystem and/or individual species (e.g. protection of breeding colonies)
  - protocols for monitoring of relevant pollutants, determination of specific alert/reporting values and threshold values.

## APPENDIX 12

### PRINCIPLES AND CRITERIA RELATING TO THE TARGET SPECIES, ECOSYSTEM AND MANAGEMENT SYSTEM USED BY THE MARINE AQUARIUM COUNCIL TO CERTIFY FISHERIES FOR THE AQUARIUM TRADE

(Extracted from MAC 2001. Marine Aquarium Council. Core ecosystem and fishery management international performance standard for the marine aquarium trade.)

#### *Purpose*

To verify that the collection area is managed according to principles of ecosystem management<sup>1</sup> in order to ensure ecosystem integrity<sup>2</sup> and the sustainable use<sup>3</sup> of the marine aquarium fishery.

#### *1 Management Principles*

- 1.1 Marine aquarium organism collection and fishing shall be managed so that
  - 1.1.1 the collection and fishing of target marine aquarium organisms are undertaken according to the principles of sustainable use<sup>3</sup>;
  - 1.1.2 destructive collection and fishing practices<sup>4</sup> are prohibited;
  - 1.1.3 collection and fishing activities within the collection area support the conservation of biological diversity<sup>5</sup> in the collection area;
  - 1.1.4 basic principles of environmental management<sup>6</sup> and ecosystem management are applied in the collection area; and
  - 1.1.5 collection and fishing are undertaken in a planned and organized manner<sup>7</sup>.

#### *2 Collection Area Management Plan*

- 2.1 Those managing the fishery shall produce and implement a Collection Area Management Plan<sup>8</sup> consistent with the above management principles.
- 2.2 The Collection Area Management Plan shall be consistent with any management plans that encompass the collection area and/or fishery produced by the appropriate authority.

#### *3 Components of a Collection Area Management Plan*

- 3.1 The Collection Area Management Plan shall include the following significant components (see Annex 1 for full description)
  - 3.1.1 geographical boundaries of the collection area;
  - 3.1.2 ownership and political boundaries of the collection area;
  - 3.1.3 identification and listing of all stakeholders relevant to the collection area;
  - 3.1.4 basic annual catch data for the marine aquarium organisms collected or fished in the collection area;
  - 3.1.5 collection and fishing history of the collection area;
  - 3.1.6 listing of significant organisms not collected or fished in the collection area;
  - 3.1.7 a process for monitoring the collection area including the detection and reporting, to the appropriate legal authorities, of the use of destructive collection and fishing practices; and
  - 3.1.8 a process for ensuring no collection and fishing of unsuitable species<sup>9</sup>.

#### *4 Effectiveness of a Collection Area Management Plan*

- 4.1 Periodic audit of the Collection Area Management Plan
  - 4.1.1 Those managing the fishery shall have periodic audits of the Collection Area Management Plan undertaken by the appropriate authority on the timeframe specified in the plan to ensure its proper implementation.

#### 4.2 Review of the Collection Area Management Plan

4.2.1 Those managing the fishery shall at regular intervals review the Collection Area Management Plan on the timeframe specified in the plan to ensure its continuing suitability, adequacy and effectiveness. The review shall address the need and amendments to the plan resulting from changing circumstances and audit results.

### 5 *Communication*

#### 5.1 Stakeholder Communication

5.1.1 Clear lines of communication between stakeholders in the collection area shall be demonstrated.

1. ecosystem management: means management taking due account of all living organisms and their environment in the management area. In practice, this means ensuring sustainability of target, dependent, and associated species.

2. ecosystem integrity: means the ability to support and maintain a balanced, integrated, adaptive biological community having a species composition, biological diversity, and functional organisation comparable to that of the natural habitat in the region.

3. sustainable use: means the use of components of biodiversity in a way and at a rate that does not lead to long-term decline of biological diversity, thereby maintaining the potential of the components to meet the needs and aspirations of present and future generations.

4. destructive collection and fishing practices: means the collection and fishing of live marine aquarium organisms through methods that are environmentally destructive or harmful, including but not limited to practices such as the use of poisons/toxins, other deleterious materials, and explosives; reef dredging; and physical damage to non-target organisms, especially corals and other sessile invertebrates.

5. biological diversity: means the variety and variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species and of ecosystems.

6. environmental management: means management and control of the environment and natural resources systems in such a way so as to ensure the sustainability of development efforts over a long-term basis.

7. planned and organized manner: means collection and fishing activities are consistent with the Collection Area Management Plan.

8. Collection Area Management Plan: means a document or collection of documents, usually prepared by those managing the fishery, the purpose of which is to ensure the collection area is managed according to the principles of the MAC standards. It includes objectives for the fishery (resource, environmental, biodiversity and ecological), details of the decision-making processes, agreed measures for regulation of the fishery (e.g. general and specific measures, precautionary measures and contingency plans, issues of particular concern and the actions to address them, and arrangements for monitoring, control, surveillance and enforcement).

9. unsuitable species: means the species that have been determined by the MAC Committee on Unsuitable Species to be inappropriate for the trade in marine ornamentals. In practice this means species that are unlikely to survive shipment or capture for a considerable portion of their potential lifespan.

## APPENDIX 13

### SCORING USED IN THE BLUE OCEAN INSTITUTE SEAFOOD GUIDE

(Extracted from the Blue Ocean Institute)

For each of the five criteria, scoring entails awarding one, two, or three core points and then applying adjustments (all that apply) that add or subtract 0.5 points each. In cases where data are deficient, we award a middle score assuming neither best nor worst case. A total score of minus one to five points is possible for each criterion. Next, we average the total scores in each category to get a final score. We treat all criteria as equally important. The scores are turned into five colour codes with green being 2.6-4, yellow being 1.8-2.19 and red being 0-1.39, with the two intermediate scores giving intermediate colours.

Life history

#### CORE POINTS

*Intrinsic rate of increase ( $r$ ), age at maturity ( $t_m$ ), and maximum age ( $t_{max}$ ):*

- +1  $r < 0.05$ ; or  $t_m > 10$  years; or  $t_{max} > 30$  years
- +2  $r = 0.05-0.15$ ; or  $t_m = 5-10$  years; or  $t_{max} = 11-30$  years
- +3  $r > 0.16$ ; or  $t_m < 5$  years; or  $t_{max} < 11$  years

#### POINTS OF ADJUSTMENT

*Special behaviors that affect vulnerability or resilience to fishing pressure:*

- 0.5 E.g., site fidelity or concentrated spawning aggregations
- +0.5 E.g., wide dispersal during spawning *Sexual development*
- 0.5 E.g., species is a hermaphrodite
- +0.5 E.g., sexual maturity occurs in less than one year

*Range:*

- 0.5 Very small or restricted, e.g., species found along one coast or endemic to a small region
- +0.5 Very wide, e.g., species distributed throughout the world's oceans

*Worst/best case:*

- 0.5 E.g., species matures at a high age, has special behaviors that increase vulnerability, and has a small range
- +0.5 E.g., species matures very rapidly, has few special behaviors, and has a wide range

Abundance

#### CORE POINTS

*Current population abundance compared to natural or unfished level:*

- +1 Low: Abundance or biomass is far below  $B_{MSY}$  ( $< 50\% B_{MSY}$ ) or population is depleted
- +2 Medium: Abundance or biomass is considered close to  $B_{MSY}$  ( $50-125\% B_{MSY}$ ) or no information is available
- +3 High: Abundance or biomass is estimated to be close to virgin biomass

#### POINTS OF ADJUSTMENT

*Trends:*

- 0.5 Population is declining, e.g., declining catch per unit effort
- +0.5 population is increasing, e.g., increasing catch per unit effort *Age and/or sex*

*distribution:*

- 0.5 Skewed relative to normal, e.g., truncated age structure or anomalous sex distribution

+0.5 Functionally normal *Food web impacts*:

- 0.5 Catch jeopardizes availability of food for other species or changes structure of food web

+0.5 Indications that abundance does not jeopardize availability of food for other species or change food web

*Worst/best case*:

- 0.5 E.g., biomass very low, depleted, or declining, and skewed sex/age distribution

+0.5 Biomass very high or increasing and age/sex distribution is normal

Habitat

CORE POINTS

*Effects of fishing gear on habitat*:

+1 Serious damage, e.g., cyanide blasting, trawling, and dredging on hard bottom

+2 Modest damage, e.g., set gillnets

+3 Little damage, e.g., hook-and-line traps, hand picking, pelagic longlines, midwater trawls, purse seines

POINTS OF ADJUSTMENT

*Habitat health*:

- 0.5 Habitat too compromised by non-fishery causes to support this species

+0.5 Habitat robust and viable

*Habitat protection*:

- 0.5 Important areas (e.g., critical spawning areas) not protected

+0.5 Important areas are protected

*Recovery time*:

- 0.5 Habitat recovery is very slow, e.g., coral reefs

+0.5 Recovery of habitat quality is fast

*Worst/best case*:

- 0.5 E.g., long-term damage to habitat, recovery is slow, ecosystem change or instability is likely

+0.5 E.g., fishing method is very low impact, habitat is greatly improved compared to previous conditions, important areas are protected

Bycatch

CORE POINTS

*Level of bycatch relative to targeted landings and nature of bycatch*:

+1 High: Bycatch > targeted landings; drives decline in bycatch species; endangers a species or prevents recovery of an endangered species

+2 Moderate: Bycatch is 10-99% of targeted landings and does not drive the trend in abundance of the bycatch species; or level of bycatch unknown or unmonitored

+3 Low: Bycatch <10% of targeted landings

POINTS OF ADJUSTMENT

*Bycatch of threatened, endangered, or protected species (TEP) and management response*:

- 0.5 TEP species are regularly caught

+0.5 Specific measures taken to reduce bycatch of TEP species

*Bycatch of nontarget and undersized target species in this fishery or bycatch of this species in other fisheries and management response*:

- 0.5 Bycatch high and no management measures taken to reduce it

+0.5 Measures (e.g., gear changes) are in place over a major portion of species range to reduce bycatch of these species

*Bycatch of depleted target or non-target species (not including TEP species):*

- 0.5 Bycatch weakens recovery

+0.5 Bycatch is not believed to weaken or undermine recovery of these species

*Worst/best case:*

- 0.5 Species is being driven to extinction as a result of fishery, e.g., bycatch of albatrosses in toothfish fisheries

+0.5 Fishery is very selective, e.g., harpoon fishery for swordfish

Management

CORE POINTS

*Presence (e.g., fishery regulations over major portion of species' range) and effectiveness of management (e.g., conservation goals are met):*

+1 No management is in place

+2 Management exists but is ineffective

+3 Management is effective

POINTS OF ADJUSTMENT

*Catch and population monitoring:*

- 0.5 Inadequate, e.g., illegal fishing is significant, stock assessments are not conducted

+0.5 Adequate, e.g., catch levels are enforced, stock assessments are performed

*Response to ecological concerns and industry pressure:*

- 0.5 Management responds insufficiently to concerns about ecosystem disruption; fishers bring political pressure that weakens management

+0.5 Management explicitly considers ecosystem; fishers advocate for sustainability

*Response to species status:*

- 0.5 Species is overfished and no recovery plan is in place, or management is in violation of the law

+0.5 Species is overfished but there's a recovery plan in place or management is on the way

*Worst/best case:*

- 0.5 E.g., species is depleted and management allows continued exploitation with little enforcement of regulations despite public outcry

+0.5 E.g., effective management and enforcement is in place and population is not overfished, or strong recovery plan is in place and population rebuilding

## APPENDIX 14

### SCORING USED BY THE MONTEREY BAY AQUARIUM SEAFOOD GUIDE

(Extracted from Monterey Bay Aquarium Seafood Watch)

Seafood Watch uses five sustainability criteria, corresponding to these guiding principles, to evaluate capture fisheries for the purpose of developing a seafood recommendation for consumers and businesses. These criteria are:

1. Inherent vulnerability to fishing pressure
2. Status of wild stocks
3. Nature and extent of discarded bycatch
4. Effect of fishing practices on habitats and ecosystems
5. Effectiveness of the management regime

A green (G), yellow (Y) or red (R) rank is assigned to each criterion, with green being the most sustainable. The rank for each criterion is assigned on the basis of a series of factors relevant to that criterion, with each factor also given a green, yellow or red rank. In addition there are 'critical conservation concerns' or factors that are scored for criteria 2, 3, 4 and 5. An overall colour rank is then allocated for the species according to:

A species is green if it has three or more green criteria and the remaining criteria are not red.

A species is yellow if

- 1) Criteria "average" to yellow
- 2) There are four green criteria and one red criteria
- 3) Stock Status and Management criteria are both ranked yellow and remaining criteria are not red.

A species is red if

- 1) It has a total of two or more red criteria
- 2) It has one or more Critical Conservation Concerns.

Based on these overall scores green species the consumer's best consumer choice, yellow species are a good alternative and consumers are encouraged to avoid red species.

The factors and 'critical conservation concerns' that are used to rank each criterion for this process are:

#### Criterion 1: Inherent vulnerability to fishing pressure

Intrinsic rate of increase (r)	G: high (>0.16)
	Y: medium (0.05-0.160)
	R: low (<).05)
Age at first maturity	G: low (<5y)
	Y: medium (0.05-10y)
	R: high (>10y)
Von Bertalanffy growth coefficient (K)	G: high (>0.16)
	Y: medium (0.05-0.15)
	R: low (<0.05)

Maximum age	G: low (<11y)
	Y: medium (11-30y)
	R: high (>30y)
Reproductive potential (fecundity)	G: high (>100 individuals/year)
	Y: medium (10-100 individuals/year)
	R: low (<10 individuals/year)
Species range	G: broad (many ocean basins, multiple stocks or highly migratory)
	Y: limited (one ocean basin)
	R: narrow (endemism, evolutionarily significant units, one coastline)
Special behaviours or requirements	G: none known or behaviours decrease vulnerability
	Y: some (1-2) behaviours
	R: many (>2) behaviours
Quality and degradation of habitats from non-fishery impacts	G: habitat robust
	Y: habitat modestly altered by non-fishery impacts
	R: habitat substantially compromised from non-fishery impacts and thus has reduced capacity to support this species (e.g. dams, pollution, coastal development)

**Criterion 2: Status of wild stocks**

Management classification status	G: underutilized <u>or</u> close to virgin biomass
	Y: fully fished <u>or</u> recovering from overfishing or unknown
	R: recruitment overfished <u>or</u> growth overfished, overexploited, depleted <u>or</u> 'threatened'
Current population abundance relative to $B_{MSY}$	G: at or above $B_{MSY}$ (>100%)
	Y: moderately below $B_{MSY}$ (50-100%)
	R: substantially below $B_{MSY}$ (<50%)
Occurrence of overfishing (current level of fishing mortality relative to overfishing threshold)	G: overfishing not occurring ( $F_{curr}/F_{MSY}<1.0$ )
	Y: overfishing is likely/probable <u>or</u> fishing effort is increasing with poor understanding of stock status <u>or</u> unknown
	R: overfishing occurring ( $F_{curr}/F_{MSY}>1.0$ )
Overall degree of uncertainty in status of stock	G: low (current stock assessment and other fishery-independent data are robust <u>or</u> reliable long-term fishery-dependent data)
	Y: medium (only limited, fishery-dependent data on stock status available)
	R: high (little or no current fishery-dependent or independent information on stock status <u>or</u> models/estimates broadly disputed or otherwise out-of-date)
Long-term trend (relative to species' generation time) in population abundance as measured by either fishery-independent (stock assessment) or fishery-dependent (standardized CPUE) measures	G: trend is up
	Y: trend is flat or variable (among areas, over time or among methods) <u>or</u> unknown
	R: trend is down

Short-term trend in population abundance as measured by either fishery-independent (stock assessment) or fishery-dependent (standardized CPUE) measures	G: trend is up
	Y: trend is flat or variable (among areas, over time or among methods) <u>or</u> unknown
	R: trend is down
Current age, size or sex distribution of the stock relative to natural condition	G: distribution(s) is (are) functionally normal
	Y: distribution(s) unknown
	R: distribution(s) is (are) skewed
* A stock is considered a Critical Conservation Concern and the species is ranked red if it is:	G:
	Y:
	R: (1) overfished, overexploited <u>or</u> depleted and trend in abundance is flat or down (2) overfished <u>and</u> overfishing is occurring (3) listed as a 'threatened species' or similar proxy by national or international bodies

**Criterion 3: Nature and extent of discarded bycatch**

Quantity of bycatch, including any species of 'special concern' (i.e. those identified as endangered, threatened or protected under state, federal or international law)	G: Quantity of bycatch is low (<10% of targeted landings on a per number basis) <u>and</u> does not regularly include species of special concern
	Y: Quantity of bycatch is moderate (10-100% of targeted landings on a per number basis) <u>and</u> does not regularly include species of special concern <u>or</u> unknown
	R: Quantity of bycatch is high (>100% of targeted landings on a per number basis) <u>or</u> bycatch regularly includes threatened, endangered or protected species
Population consequences of bycatch	G: low. Evidence indicates quantity of bycatch has little or no impact on population levels
	Y: moderate. Conflicting evidence of population consequences of bycatch <u>or</u> unknown
	R: Severe. Evidence indicates quantity of bycatch is a contributing factor in driving one or more bycatch species towards extinction or is a contributing factor to limiting the recovery of a species of special concern
Trend in bycatch interaction rates (adjusting for changes in abundance of bycatch species) as a result of management measures (including fishing seasons, protected areas and gear innovations). Note: this is not applicable if bycatch is low.	G: trend in bycatch interaction rates is down
	Y: trend in bycatch interaction rates is flat <u>or</u> Unknown
	R: trend in bycatch interaction rates is up
Evidence that the ecosystem has been or likely will be substantially altered (relative to natural variability) in response to the continued discard of the bycatch species	G: studies show no evidence of ecosystem impacts
	Y: conflicting evidence of ecosystem impacts <u>or</u> Unknown
	R:

* Bycatch is considered a Critical Conservation Concern and the species is ranked red if:	G:
	Y:
	R: (1) bycatch regularly includes species of special concern <u>and</u> evidence indicates bycatch rate is a factor contributing to extinction or limiting recovery <u>and</u> trend in bycatch interaction rates is not down.  (2) quantity of bycatch is high <u>and</u> studies show evidence of substantial ecosystem impacts

#### Criterion 4: Effect of fishing practices on habitats and ecosystems

Known (or inferred from other studies) effect of fishing gear on physical and biogenic habitats	G: minimal damage (i.e. pelagic longline, midwater gillnet, midwater trawl, purse seine, hook and line, or spear/harpoon)
	Y: moderate damage (i.e. bottom gillnet, bottom longline or some pots/ traps)
	R: great damage (i.e. bottom trawl or dredge)
For specific fishery being evaluated, resilience of physical and biogenic habitats to disturbance by fishing method. Note: this is not applicable if gear damage is minimal.	G: high (e.g. shallow water, sandy habitats)
	Y: moderate (e.g. shallow or deep water mud bottoms, or deep water sandy habitats)
	R: low (e.g. shallow or deep water corals, shallow or deep water rocky bottoms)
If gear impacts are moderate or great, spatial scale of the impact. Note: this is not applicable if gear damage is minimal.	G: small scale (e.g. small, artisanal fishery or sensitive habitats are strongly protected)
	Y: moderate scale (e.g. modern fishery but of limited geographic scope)
	R: large scale (e.g. industrialized fishery over large geographic areas)
Evidence that the removal of the targeted species or the removal/deployment of baitfish has or will likely substantially disrupt the food web	G: the fishery and its ecosystem have been thoroughly studied, and studies show no evidence of substantial ecosystem impacts
	Y: conflicting evidence of ecosystem impacts <u>or</u> Unknown
	R: ecosystem impacts of targeted species removal demonstrated
Evidence that the fishing method has caused or is likely to cause substantial ecosystem state changes, including alternate stable states	G: the fishery and its ecosystem have been thoroughly studied, and studies show no evidence of substantial ecosystem impacts
	Y: conflicting evidence of ecosystem impacts <u>or</u> Unknown
	R: ecosystem impacts from fishing method demonstrated
* Habitat and ecosystem effects are considered a Critical Conservation Concern and the species is ranked red if:	G:
	Y:
	R: four or more of the Habitat and Ecosystem factors rank red

**Criterion 5: Effectiveness of the management regime**

Stock Status: Management process utilizes an independent scientific stock assessment that seeks knowledge related to the status of the stock.	G: stock assessment complete and robust
	Y: stock assessment is planned or underway but is incomplete <u>or</u> stock assessment complete but out-of-date or otherwise uncertain
	R: no stock assessment available now and none is planned in the near future
Scientific Monitoring: Management process involves regular collection and analysis of data with respect to the short and long-term abundance of the stock.	G: regular collection and assessment of both fishery-dependent and independent data
	Y: regular collection of fishery-dependent data only
	R: no regular collection or analysis of data
Scientific Advice: Management has a well-known track record of consistently setting or exceeding catch quotas beyond those recommended by its scientific advisors and other external scientists.	G: no
	Y: yes
	R: not enough information available to evaluate <u>or</u> not applicable because little or no scientific information is collected
Bycatch: Management implements an effective bycatch reduction plan. Note: not applicable if bycatch is low.	G: bycatch plan in place and reaching its conservation goals (deemed effective)
	Y: bycatch plan in place but effectiveness is not yet demonstrated or is under debate
	R: no bycatch plan implemented or bycatch plan implemented but not meeting its conservation goals (deemed ineffective)
Fishing practices: Management addresses the effect of the fishing method(s) on habitats and ecosystems. Note: not applicable if the fishing methods is moderate or benign.	G: mitigation measures in place and deemed effective
	Y: mitigation measures in place but effectiveness is not yet demonstrated or is under debate
	R: no mitigation measures in place or measures in place but deemed ineffective
Enforcement: Management and appropriate government bodies enforce fishery regulations	G: regulations regularly enforced by independent bodies, including logbook reports, observer coverage, dockside monitoring and similar measures
	Y: regulations enforced by fishing industry or by voluntary/honor system
	R: regulations not regularly and consistently enforced
Management Track Record: Conservation measures enacted by management have resulted in the long-term maintenance of stock abundance and ecosystem integrity	G: management has maintained stock productivity over time <u>or</u> has fully recovered the stock from an overfished condition
	Y: stock productivity has varied and management has responded quickly <u>or</u> stock has not varied but management has not been in place long enough to evaluate its effectiveness <u>or</u> Unknown
	R: measures have not maintained stock productivity <u>or</u> were implemented only after significant declines and stock has not yet fully recovered
* Management is considered a Critical Conservation Concern and the species is ranked red if:	G:
	Y:
	R: (1) There is no management in place (2) The majority of the management factors rank red

## APPENDIX 15

## FISHSOURCE™ CRITERIA FOR TARGET SPECIES SUSTAINABILITY

(Extracted from FishSource)

FishSource is an online resource available to the public about the sustainability status of fisheries and fish stocks. It uses a scoring system is designed to communicate to a lay person what different value of the ratios mean in terms of fisheries sustainability used by existing leading fisheries management agencies and independent certification systems such as the MSC. FishScore has yet to develop criteria and scores for the environmental performance.

If existing measures of sustainability consider a fishery to be relatively well managed, then it will typically score 8 or more out of 10 on FishSource. If the fishery is judged to be doing ok, but requires improvement, then it will typically score between 6 and 8 on FishSource. Fisheries falling short of minimum requirements of existing measures of sustainability are scored 6 or below, with the score declining as the condition of the fishery deteriorates.

FishSource Scores include the following:

**Score 1: Is the management strategy precautionary?** A fishery scores 10 out of 10 if fishing mortality is reduced to zero at biomass levels below the limit reference point. Reducing fishing mortality to zero is preferable because it is the fastest possible way to rebuild the stock above the level at which it may be of risk of collapse. A fishery scores 8 out of 10 if fishing mortality is reduced to 50% of the target reference point for fishing mortality. A fishery scores 6 out of 10 if the fishing mortality is held at the target reference point level.

**Score 2: Do managers follow scientific advice?** A fishery scores 10 out of 10 if managers always set the TAC equal to or below the scientific advice. The score drops to 8 out of 10 if the managers set the TAC 12.5% above the advised level, and drops to 6 out of 10 if they set the level 25% higher than advised.

**Score 3: Do fishers comply with managers decisions?** A fishery scores 10 out of 10 if the estimated total actual catches are always at or below the quota level set by managers. The score drops to 8 out of 10 if catches exceed the quota by 12.5%, and drop to 6 out 10 if catches exceed the quota by 25%.

**Score 4: Is the fish stock healthy?** A fishery scores 10 out of 10 if current spawning biomass is 50% above the target reference point (typically  $B_{msy}$  or some variation). A fishery at  $B_{msy}$  scores an 8, while a fishery at  $0.5B_{msy}$  scores a 6 and a fishery below that level scores below 6.

**Score 5: Will the fish stock be healthy in future?** A fishery scores 10 out of 10 if  $F$  is 50% below  $F_{msy}$ . A fishery where the fishing mortality is at the target reference point scores an 8, while a fishery with fishing mortality 50% higher than  $F_{msy}$  scores a 6 and a fishery with even higher  $F$  scores below 6.

Issue	Measure	Underlying ratio
Is the management precautionary?	Determine whether harvest rates are reduced at low stock levels	$F_{advised}/F_{target\ reference\ point}$ OR $F_{actual}/F_{target\ reference\ point}$
Do the managers follow scientific advice?	Determine whether the catch limits set by managers are in line with the advice in the stock assessments	Set TAC/advised TAC
Do fishers comply?	Determine whether the actual catches are in line with the catch limits set by managers	Actual catch/Set TAC
Is the stock healthy	Determine if current biomass is at long-term target levels	$SSB/B_{40}$ (or equivalent) $B_{40}$ is 40% of the unfished biomass and is a proxy for $B_{msy}$ in the absence of a direct estimate.
Will the fish stock be healthy in future?	Determine if current fishing mortality is at the long-term target level	$F/F_{target\ reference\ point}$

## APPENDIX 16

### ELABORATION ON THE USE OF REFERENCE POINTS AND THEIR PROXIES FOR FISHERY TARGET SPECIES

Target and limit reference points are commonly used and referred to in agreements and guidelines for well managed and sustainable fisheries. The target reference point is selected to give optimal utilisation. The limit reference point is selected to avoid recruitment overfishing or other fishing impacts that are irreversible or very slowly reversible. Stocks below the limit reference point for population size because of fishing are termed overfished and depleted otherwise. In fishery agreements and guidelines the target and limit reference points are commonly expressed in terms of MSY, fishing mortality and stock biomass. For example the UN Fish Stocks Agreement states that the fishing mortality giving MSY should be regarded as a minimum standard for limit reference points..

These MSY, fishing mortality or biomass reference points can be replaced by appropriate proxies or empirical indicators where there is a well-based expectation that use of these alternatives will achieve the same intent or effect. For example a common proxy for the fishing mortality giving MSY is the fishing mortality that reduces the 'spawners per recruit' to 40% of its unfished level and is calculated from life history information alone. Similarly empirical indicators can be used to achieve the same effect as MSY, fishing mortality or biomass reference points without the need for explicit estimation of these reference points. Empirical indicators are directly measurable aspects of the fishery (e.g. catch per unit effort or sex ratio, proportion mature, size distribution in the catch) in contrast to indicators such as fishing mortality that typically are not directly measurable and must be estimated through a population or other mathematical model. Particular values of the empirical indicators can be used to define empirical target or limit reference points and to trigger management interventions. Furthermore the intended direction of change or trends in relevant indicators can be used as performance measures, rather than measures related to the reference points themselves.

In a different but related approach Hobday *et al.* (2004) and Smith *et al.* (2007) provide a series of indicators and reference points for use in fisheries ecological risk assessment. The reference points are the boundaries between high, medium and low ecological risk categories, and these categories can be interpreted in terms of the chance of achieving sustainable use or avoiding recruitment overfishing. The indicators and reference points that are used in the qualitative and semi-quantitative risk assessment methods relate to relatively simple and directly observable properties of the species, ecosystem, and fishing operations. The risk interpretations include greater precaution when the risk assessment is based on fewer direct observations and greater use of proxies for the vulnerability of species and the intensity of fishing.

The use of proxies and empirical indicators may be particularly appropriate in small scale or data deficient fisheries.

This technical paper is part of a process by the Fisheries and Aquaculture Department of the Food and Agriculture Organization of the United Nations (FAO) to refine the minimum substantive requirements of the FAO guidelines for ecolabelling of marine capture fisheries, and to consider whether a single set of requirements could be developed that is adequate to assess both marine and inland capture fisheries. The document summarizes the standards, requirements and practices for well-managed fisheries as applied in internationally-managed fisheries and in national management of fisheries, taking into consideration the special needs and challenges in small-scale and inland fisheries, particularly those in developing countries. The importance of distinguishing between wild capture fisheries, enhanced fisheries and aquaculture in ecolabelling schemes is emphasized. The review concludes with suggested minimum substantive requirements for the FAO guidelines on ecolabelling of capture fisheries.

