12. Implementation of the Precautionary Approach and Reference Points
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Introduction
This chapter addresses an issue that has arisen in the implementation of the provisions of the Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean (WCPF Convention) relating to the precautionary approach, reference points and the adoption of conservation and management measures. The issue is the apparent need to reconcile the provisions relating to the application of the precautionary approach with the provision for the maximum sustainable yield (MSY)-related target of conservation and management measures to be qualified by factors including the special requirements of small island developing states. There have been differences in views among Pacific Islands Forum Fisheries Agency (FFA) members and regional organisations on the appropriate approach to implementation of these provisions which need to be resolved for progress to be made in the Western and Central Pacific Fisheries Commission (WCPFC), especially with respect to the adoption of longer-term management strategies for the multi-species tropical tuna fisheries.

Background
Article 5 of the WCPF Convention (Principles and Measures for Conservation and Management) includes as requirements for WCPFC members to:

(a) adopt measures to ensure long-term sustainability of highly migratory fish stocks in the Convention Area and promote the objective of their optimum utilization;

(b) 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 maximum sustainable yield, as qualified by relevant environmental and economic factors, including the special requirements of developing States in the Convention Area, particularly small island developing States, and taking into account fishing patterns, the interdependence of stocks and any generally recommended international minimum standards, whether subregional, regional or global;
apply the precautionary approach in accordance with this Convention and all relevant internationally agreed standards and recommended practices and procedures.\(^1\)

The WCPF Convention in Article 7 requires these principles to also be applied by coastal States within their exclusive economic zones (EEZs). The application of the precautionary approach is elaborated in Article 6 of the Convention (set out in Attachment I to this chapter) which incorporates by reference the Guidelines for the Application of Precautionary Reference Points in Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks from Annex II of the United Nations Fish Stocks Agreement (UNFSA) (set out in Attachment II to this chapter). Key elements of the precautionary approach for the purposes of this analysis are:

- the use of stock-specific precautionary reference points, including conservation, or limit, reference points and management, or target, reference points. Limit reference points set boundaries which are intended to constrain harvesting within safe biological limits within which the stocks can produce maximum sustainable yield. Target reference points are intended to meet management objectives;
- reference points to be used to trigger pre-agreed conservation and management action; and
- management strategies to ensure that the risk of exceeding limit reference points is very low. If a stock falls below a limit reference point or is at risk of falling below such a reference point, conservation and management action should be initiated to facilitate stock recovery. Fishery management strategies to ensure that target reference points are not exceeded on average.

And most importantly for this discussion,

- \(F_{\text{msy}}\) should be regarded as a minimum standard for limit reference points. For stocks which are not overfished, fishery management strategies shall ensure that fishing mortality does not exceed \(F_{\text{msy}}\) and that the biomass does not fall below a predefined threshold.

The issue arising from these texts that has emerged in WCPFC-related discussions is that:

- on the one hand, the guidelines for the application of precautionary reference points in Annex II of the UNFSA appear to require the adoption of \(F_{\text{msy}}\) as a limit reference point, which would not allow the adoption of \(F_{\text{msy}}\) as a target reference point or the adoption of strategies and measures that involved overfishing of a stock;

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\(^1\) WCPF Convention, Article 5.
on the other hand, Article 5 (b) appears to provide some flexibility in the adoption of measures providing for fishing at levels at or beyond those consistent with MSY for economic and environmental reasons.

Analysis

The Management Issue

Normally, and for most of the stocks covered by the WCPF Convention, there would be no question of considering levels of fishing mortality beyond those associated with MSY, since that reduces yields and increases costs. In fact, it will usually make biological, ecological and economic sense to keep fishing mortality significantly below $F_{\text{msy}}$ and the biomass significantly above $B_{\text{msy}}$, for reasons including the increased risks to stock sustainability and the greater effort at higher costs required as effort approaches MSY-related levels.

The question turns then on whether there are “relevant environmental and economic factors” associated with any significant management issues in the WCPFC that would lead to consideration of levels of effort at or beyond those associated with $F_{\text{msy}}$ (i.e. overfishing) and raise the potential conflict between Article 5 (b) of the WCPF Convention and paragraph 7 of the UNFSA.

The most important among the “relevant economic and environmental factors” referred to in Article 5 (b), are multi-species considerations. These can take a range of forms but for this chapter, the major consideration is that of the occurrence of species in the catch that have different susceptibilities to fishing, so that it is not possible to fish all stocks at optimal levels. In such a fishery, fishing the most resilient stocks at MSY risks damaging the reproductive potential capacity of less resilient stocks while restricting fishing effort to that associated with MSY for the least resilient stocks leaves other, possibly major stocks, substantially under-utilised.

This is precisely the case with tropical tuna fisheries. Bigeye tuna is typically the most susceptible of the major stocks to fishing. However, in the Atlantic, Indian and Western and Eastern Pacific Oceans, feasible/acceptable measures to conserve bigeye typically mean reducing effort on stocks such as skipjack, and in some cases yellowfin, below optimal levels. The apparent failures to conserve bigeye stocks at levels above $B_{\text{msy}}$ in those regions can largely be traced to an unwillingness by at least some members of the relevant commissions to make the trade-off of losses in skipjack and yellowfin for the gains in bigeye.

That trade-off is particularly sharp in the Western and Central Pacific. It is illustrated in the following multi-species yield curve which indicates broadly that
if the 25% reduction in effort recommended by the WCPFC Scientific Committee in 2007 to maintain bigeye biomass at $B_{msy}$ was applied as across the board effort cuts, the result in terms of yields would be a gain of around 3,000 tonnes annually in bigeye yield, and a loss of around 200,000 tonnes annually in skipjack yield.

Figure 1: Multi-Species Yield Analysis

If a more precautionary approach to maintaining bigeye biomass is adopted at an appropriate level above the estimated $B_{msy}$, for example at 25% above, is estimated to require reductions in fishing effort on bigeye of around 40%; while adopting $F_{msy}$ as a limit reference point is likely to require a reduction in fishing effort of around 50%. While it should be possible to reduce fishing effort on bigeye by 25% with relatively small potential losses in overall fisheries net benefits through measures targeted at reduced fishing mortality from fish aggregating devices (FADs) and moderate reductions in fishing effort on longlining targeting bigeye, reductions in fishing effort of 40% to 50% on bigeye are likely to come at a much higher price in terms of overall net benefits.

In addition, most of the benefits from the bigeye yield gain and associated gains in catch rates would accrue to fishing outside FFA members’ waters, while most of the costs associated with reduced skipjack yields would be borne by fishing inside FFA members’ waters. There might also be some costs to FFA members from foregone albacore yields if measures to conserve bigeye required FFA members to limit fishing effort in their albacore longline fisheries below optimal levels.

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2 Hampton et al., 2006.
This is not the whole story. There are opportunities to frame measures which reduce fishing mortality on bigeye with lesser impacts on bigeye and possibly albacore than simple across-the-board effort cuts by targeting reductions in effort on fishing operations that have the greatest impact on bigeye stocks such as purse seining on floating objects and longlining targeting bigeye. There also appear to be opportunities to make fishing methods and forms of operation more selective so that catches of bigeye can be reduced in some fisheries with much lesser impacts on catches of other species. There may also be benefits in terms of skipjack yields and catch values from measures such as reducing sets on floating objects to reduce catches of juvenile bigeye, and reduced bycatch. In addition, there may be opportunities for compensatory arrangements so that Pacific Island States that incur losses from measures to conserve bigeye could be compensated by those who gain.

However, and notwithstanding these considerations, there remains the prospect that limiting fishing effort on bigeye below that associated with $F_{\text{msy}}$ and maintaining the bigeye stock above $B_{\text{msy}}$ may require effort on albacore and skipjack to be limited below optimal levels in ways that would be particularly burdensome on Pacific Island States.

**FFA Position**

This issue has not been formally discussed within the FFA process for a long time. FFA members adopted in 1995\(^3\) as one of principles for the negotiation of the WCPF Convention within the Multilateral High Level Conference on South Pacific Tuna Fisheries (MHLC) process to “prevent any decrease in the size of harvested populations below those necessary to ensure their stable recruitment.”\(^4\) More recently, there has been a difference in view among FFA members and technical experts on the issue at different times within the Forum Fisheries Committee caucus at WCPFC sessions, in FFA workshops, and in the WCPFC Scientific Committee, in which:

- some have argued that the WCPF Convention by incorporation of Annex II of the UNFSA requires $F_{\text{msy}}$ and $B_{\text{msy}}$ to be used as limit reference points, which means that the WCPFC may not adopt strategies and measures that would result in overfishing of bigeye in order to promote the optimum utilization of skipjack and albacore;
- others, notably Pacific Island participants, have argued that the WCPF Convention explicitly provides for economic factors, including their special requirements and multi-species considerations, to be taken into account and that the WCPFC may, if necessary, adopt measures that would involve

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\(^3\) Forum Fisheries Committee (FFC), 1995.

\(^4\) Similar wording, with qualification, occurs in the CCAMLR Convention.
overfishing of bigeye in order to promote optimum utilization of skipjack and albacore, as along as the bigeye biomass remains above some limit level necessary to ensure appropriate levels of reproduction/recruitment, i.e., that the overfishing level is sustainable. Some Pacific Island participants in the Multilateral High Level Conference recall their understanding that Article 5 (b) was specifically modified for this purpose, and that this was an important element in the preparation of the WCPF Convention.

The Texts

The language of Article 5 (b) is not new. It comes from Article 61 of the United Nations Convention on the Law of the Sea (LOSC), relating to conservation of the living marine resources of the EEZ, and can be found in the fisheries legislation of most FFA members. In the context of management of EEZ resources, it has long been interpreted as providing substantial flexibility to the coastal State:

It seems abundantly clear that (if) a coastal State is not obligated to maintain abundance at an MSY level ... This establishes that a coastal State is not required to manage fisheries to produce the maximum sustainable yield if it does not wish to do so. Instead the coastal State is expressly authorized to manage for yields that are suggested by its environmental and economic interests.5

and as “implicitly referring to multi-species considerations.”6

In some recent discussions, it has been suggested that there is some ambiguity in Article 5 (b) with the qualifier being linked to the “measures”, the “levels” or “maximum sustainable yield” in some discussions related to the WCPFC’s work. However, when the text in Article 5 (b) is written in this way:

ensure that such measures are based on the best scientific evidence available and are designed to maintain or restore stocks at or above B_{msy}, as qualified by relevant environmental and economic factors, ...

it seems clear that the qualifier applies to the biomass level. This means that measures must be designed to maintain stocks at or above B_{msy} unless there are environmental or economic reasons otherwise. It should also be clear that the qualifier can only apply to allow a lesser standard. Any stock level above B_{msy} can produce MSY, so the qualifier is not needed to support a higher standard of biomass maintenance – it can only have the effect of supporting a lower standard.

In addition, it should be clear that the effect of the qualifier is to specifically enable the Commission to adopt measures that will not maintain stocks at or above

5 Burke, 1983.
6 Caddy and Mahon, 1995.
Without the qualifier, the Commission is required to maintain stocks at or above $B_{\text{msy}}$ and is free to adopt measures that maintain stocks well above $B_{\text{msy}}$ if it chooses – and it may do so for reasons including those related to the qualifying factors.

The main issue that has arisen with respect to Article 5 (b), especially the qualifying language, is its standing alongside the principle of the application of the precautionary approach, and what happens when there is an apparent conflict between Article 5 (b) and the standards in paragraph 7 of Annex II of the UNFSA, that are incorporated as part of the precautionary approach that WCPFC members are required to apply under Article 5 (c), as discussed below.

The language of Annex II of the UNFSA leaves room for discussion about the status of Annex II as “guidelines”, its standing vis-à-vis the Article 5 (b) qualifier, and the use of “should” rather than “shall” with reference to the use of $F_{\text{msy}}$ in paragraph 7. However, it is clear that:

- Annex II is an integral part of the WCPF Convention;
- it prescribes $F_{\text{msy}}$ as a minimum standard without being precise about the stocks to which this prescription applies;
- as part of the framework for the application of the precautionary approach, which is the subject of a separate article as well as the reference in Article 5 (c), there is relatively great force attached to Annex II and therefore to the standards in paragraph 7;
- however, this can not completely override the effect of the Article 5 (b) qualifier.

The divergence in views emerges at this point. Those supporting the potential scope for the WCPFC to apply the Article 5 (b) qualifier recall the history of that text and its importance to Pacific Island States along with the “without prejudice” chapeau to Article 10 as part of the package to which they signed up in the WCPF Convention, and the general understanding at that time that the WCPF Convention did not preclude the adoption of lower minimum standards than $F_{\text{msy}}$. Those supporting the interpretation of $F_{\text{msy}}$ as a mandatory minimum standard point to the force of the relevant provisions within the WCPF Convention, and might also argue that international law on this issue has moved on to give greater force to the precautionary approach and the minimum standards in Annex II.

One point of convergence in the discussions is the idea of the Annex II minimum standards as, at least, a starting point, or default levels. However, there is a divergence of views on what this means. To some, the “default” standard is one that is used unless there is agreement otherwise. To others, the “default” standard is one that applies unless there are good reasons otherwise, noting that multi-species considerations may provide those reasons.
A further aspect is – if not $F_{\text{msy}}$, as a minimum standard for limit reference points, then what? Article 61 of the LOSC requires coastal States to apply these minimum standards in their EEZs:

a) ensure that the maintenance of the living resources in the exclusive economic zone is not endangered by over-exploitation; and

b) maintain or restore populations of associated and dependent species affected by fishing above levels at which their reproduction may become seriously threatened.\(^7\)

These concepts are further developed in the UNFSA, and then taken up with some modification in the WCPF Convention, which includes as functions of the Commission in Article 10, to adopt measures to

a) ensure the long-term sustainability of highly migratory fish stocks; and

b) maintain or restore populations of non-target, and associated and dependent species, above levels at which their reproduction may become seriously threatened.\(^8\)

No real work has been done on trying to define and measure biomass and fishing mortality levels for Western and Central Pacific Ocean (WCPO) tuna stocks corresponding to points at which reproduction of stocks may be seriously threatened, recruitment becomes unstable or long-term viability is threatened, but the estimated recruitment-spawning biomass relationship for bigeye below illustrates the idea, noting that:

- the initial bigeye spawning stock biomass is estimated as around 560,000 tonnes;
- the spawning biomass corresponding to MSY is estimated as around 100,000 tonnes;
- the current biomass is estimated as around 120,000 tonnes; and
- spawning biomass levels at which reproduction of stocks may be seriously threatened, recruitment becomes unstable or long-term viability is threatened probably lie somewhere below 100,000 tonnes, but these are points that must be associated with very low levels of risk in any management strategy – generally proposed as less than 2%.\(^9\)

\(^7\) LOSC, Article 61.
\(^8\) Reference quotation please
\(^9\) From Hampton et al., 2006.
Figure 2: Estimated relationship between equilibrium recruitment and equilibrium spawning biomass in the 2006 WCPFC Bigeye Assessment.

Note: The grey area indicates the 95% confidence region. Estimated recruitment-spawning biomass points are plotted as open circles.

National Practice

Many countries have included elements from the relevant texts in some form in national legislation, but very few have operationalised them. New Zealand, the United States and Australia are examples of countries with laws and formal policies that set standards for conservation and management measures. These countries include specific provisions in their legislation relating to the trade-offs that arise from multi-species fishery management considerations.

New Zealand law requires the Minister to set a total allowable catch (TAC) at a level that maintains the stock at or above $B_{msy}$, with a limited range of exceptions.
One exception relates to the setting of a TAC that allows the catch of a key target species to be maintained without being unduly constrained by the need to apply a target based on MSY-related reference points to minor bycatch stocks. Under the recent draft Harvest Strategy Standard for New Zealand Fisheries\textsuperscript{10}, a minimum standard for such cases is that the stock must be maintained at or above the soft limit of $\frac{1}{2} B_{MSY}$ or $20\% B_0$, whichever is higher. However, the application of this exception is subject to stringent conditions, which include the following and this exception provision has never been invoked:

a) the stock is taken primarily as an incidental catch during the taking of one or more other stocks and is only a small proportion of the combined catch of the stock and other stocks or stocks;

b) the total benefits of managing the stock at a level other than that permitted under section 13 outweigh the total costs; and

c) the stock is able to be maintained above a level that ensures its long-term viability.

The tropical tuna fishery stocks, and the bigeye stock in particular, would not meet these conditions.

In a similar way, the United States National Standard Guidelines for implementation of the national standards for sustainable fisheries management set out in the Magnuson-Stevens Fishery Conservation and Management Act allow exceptions to the requirement to prevent overfishing in the case of a mixed-stock complex. If one species in the complex is harvested at Optimum Yield, overfishing of other components in the complex may occur if:

(1) long-term net benefits to the nation will be obtained \textit{and};

(2) similar long-term net benefits cannot be obtained by modification of fleet behavior or gear characteristics or other operational characteristics to prevent overfishing; \textit{and}

(3) the resulting fishing mortality rate will not cause any stock or ecologically significant unit to require protection under the Endangered Species Act.\textsuperscript{11}

The recently adopted harvest standards for Australian Commonwealth Fisheries include these elements for the management of multi-species fisheries:

a) within the Policy

• judgment needs to be exercised;

• alternate reference points may be determined;

• where a harvest strategy applies to a multi-species fishery, it may be appropriate for some species to be maintained below $B_{msy}$, but always above $B_{lim}$ to ensure that the fishery maximizes net economic returns;

\textsuperscript{10} Ministry of Fisheries, 2007.

\textsuperscript{11} US NMFS, 1998.
b) within the Guidelines

- Maximim Economic Yield (MEY) applies to the fishery as a whole, and is optimized across all species. This may result in some species being fished at levels that will result in their biomass being maintained at levels below their target reference point (i.e. \( B_{\text{mey}} \)). In such cases, the biomass must be maintained above \( B_{\text{lim}} \) (where the proxy for \( B_{\text{lim}} \) is 50% of \( B_{\text{mey}} \)).\(^{12}\)

The Australian Fisheries Management Authority (AFMA) is in the process of applying these standards to two major multi-species Australian tuna and billfish fisheries.

Some features of these three national cases in respect of reference points for multi-species fisheries are:

- all include provisions to allow for overfishing of stocks in multi-species fisheries if necessary to optimize yields from the fishery, subject to conditions of varying stringency;
- all apparently apply the same standards to highly migratory and straddling stocks as to other stocks, but where appropriate, apply the applicable standards of any international management organisation or arrangement for jointly-managed stocks.

**Practice of Other RFMOs**

A good review of the practice of other RFMOs with respect to reference points was included in a report presented to the WCPFC Scientific Committee in 2007.\(^{13}\) The following table summarises that information, and shows that none of these organisations responsible for highly migratory fish stocks and straddling stocks have adopted the UNFSA Annex II standards for limit reference points, even for target species.

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\(^{12}\) DAFF, 2007.

\(^{13}\) Davies and Polacheck, 2007.
Table 1: RFMO Reference Point Practice

<table>
<thead>
<tr>
<th>RFMO</th>
<th>LIMIT REFERENCE POINTS</th>
<th>TARGET REFERENCE POINTS</th>
</tr>
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<tbody>
<tr>
<td>CCAMLR</td>
<td>20% of initial Spawning Stock Biomass; with a probability of less than 10%</td>
<td>20% of initial Spawning Stock Biomass; with a probability of between 50 and 75%</td>
</tr>
<tr>
<td>CCSBT</td>
<td>Spawning Stock Biomass in 2004</td>
<td>Spawning Stock Biomass in 1980</td>
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<tr>
<td>IATTC</td>
<td>$F_{AMSY}, B_{AMSY}$</td>
<td></td>
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<tr>
<td>ICCAT</td>
<td>$F_{MSY}, B_{MSY}$</td>
<td></td>
</tr>
<tr>
<td>IOTC</td>
<td>MSY, $F_{MSY}$</td>
<td></td>
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</tbody>
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A recent Chatham House report proposes as best practice with respect to limit reference points that:

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.\(^{14}\)

but does not deal with the multi-species aspects discussed above.

**Conclusions**

- there is great force attached within the WCPF Convention to the application of the precautionary approach, and the use of MSY-based reference points;
- this places $F_{msy}$ and $B_{msy}$ and proxies for them at the centre of any consideration of conservation and management measures under the WCPF Convention as minimum standards;
- the UNFSA Annex II establishes $F_{msy}$ and $B_{msy}$ at least as starting points or default standards for limit reference points;

\(^{14}\) Lodge et al., 2007.
• this does not preclude WCPFC members from applying the qualifying factors in Article 5 (b) to adopt measures that result in a stock being fished at levels above \( F_{\text{msy}} \). The most obvious application of these factors is to optimize yields in multi-species fisheries;

• the issue of whether the WCPFC and its members should use \( F_{\text{msy}} \) and \( B_{\text{msy}} \) as limit reference points in these cases is a matter of policy, not law;

• the WCPFC and its members are obliged to adopt management strategies, reference points and measures that are designed to maintain stocks above some measure of \( B_{\text{lim}} \) related to maintaining recruitment;

• unless there are good reasons otherwise, the WCPFC and its members should adopt management strategies, reference points and measures that are designed to keep fishing mortality significantly below \( F_{\text{msy}} \) and maintain stocks significantly above \( B_{\text{msy}} \), and it is highly likely to be in all FFA members’ interests for South Pacific albacore and skipjack to be managed in this way;

• the “good reasons otherwise” for which the WCPFC and its members might adopt management strategies, reference points and measures that do not maintain particular stocks significantly above \( B_{\text{msy}} \) include reasons related to relevant environmental and economic factors, including the special requirements of developing States in the Convention Area, particularly small island developing States;

• consideration of these economic trade-offs involved in conserving bigeye tuna at the possible cost of optimizing yields from other stocks will be important in the Commission’s work on the conservation and management of bigeye tuna, and will likely be particularly important to Pacific Island States;

• progress on analyzing these trade-offs is likely to be important before progress can be made in adopting WCPFC reference points for bigeye tuna.
Bibliography


Forum Fisheries Committee, Sub-Committee on Future Management Arrangements, Summary Record of Discussion of the 1st Meeting, 1995.


Attachment I

Article 6

Application of the precautionary approach

1. In applying the precautionary approach, the members of the Commission shall:
   (a) apply the guidelines set out in Annex II of the Agreement, which shall form an integral part of this Convention, and determine, on the basis of the best scientific information available, stock-specific reference points and the action to be taken if they are exceeded;
   (b) take into account, inter alia, uncertainties relating to the size and productivity of the stocks, reference points, stock condition in relation to such reference points, levels and distributions of fishing mortality and the impact of fishing activities on non-target and associated or dependent species, as well as existing and predicted oceanic, environmental and socio-economic conditions; and
   (c) develop data collection and research programmes to assess the impact of fishing on non-target and associated or dependent species and their environment, and adopt plans where necessary to ensure the conservation of such species and to protect habitats of special concern.

2. Members of the Commission shall be more cautious when information is uncertain, unreliable or inadequate. The absence of adequate scientific information shall not be used as a reason for postponing or failing to take conservation and management measures.

3. Members of the Commission shall take measures to ensure that, when reference points are approached, they will not be exceeded. In the event they are exceeded, members of the Commission shall, without delay, take the action determined under paragraph 1(a) to restore the stocks.

4. Where the status of target stocks or non-target or associated or dependent species is of concern, members of the Commission shall subject such stocks and species to enhanced monitoring in order to review their status and the efficacy of conservation and management measures. They shall revise those measures regularly in the light of new information.

5. For new or exploratory fisheries, members of the Commission shall adopt as soon as possible cautious conservation and management measures, including, inter alia, catch limits and effort limits. Such measures shall remain in force until there are sufficient data to allow assessment of the impact of the fisheries on the long-term sustainability of the stocks, whereupon
conservation and management measures based on that assessment shall be implemented. The latter measures shall, if appropriate, allow for the gradual development of the fisheries.

6. If a natural phenomenon has a significant adverse impact on the status of highly migratory fish stocks, members of the Commission shall adopt conservation and management measures on an emergency basis to ensure that fishing activity does not exacerbate such adverse impacts. Members of the Commission shall also adopt such measures on an emergency basis where fishing activity presents a serious threat to the sustainability of such stocks. Measures taken on an emergency basis shall be temporary and shall be based on the best scientific information available.
1. A precautionary reference point is an estimated value derived through an agreed scientific procedure, which corresponds to the state of the resource and of the fishery, and which can be used as a guide for fisheries management.

2. Two types of precautionary reference points should be used: conservation, or limit, reference points and management, or target, reference points. Limit reference points set boundaries which are intended to constrain harvesting within safe biological limits within which the stocks can produce maximum sustainable yield. Target reference points are intended to meet management objectives.

3. Precautionary reference points should be stock-specific to account, inter alia, for the reproductive capacity, the resilience of each stock and the characteristics of fisheries exploiting the stock, as well as other sources of mortality and major sources of uncertainty.

4. Management strategies shall seek to maintain or restore populations of harvested stocks, and where necessary associated or dependent species, at levels consistent with previously agreed precautionary reference points. Such reference points shall be used to trigger pre-agreed conservation and management action. Management strategies shall include measures which can be implemented when precautionary reference points are approached.

5. Fishery management strategies shall ensure that the risk of exceeding limit reference points is very low. If a stock falls below a limit reference point or is at risk of falling below such a reference point, conservation and management action should be initiated to facilitate stock recovery. Fishery management strategies shall ensure that target reference points are not exceeded on average.

6. When information for determining reference points for a fishery is poor or absent, provisional reference points shall be set. Provisional reference points may be established by analogy to similar and better-known stocks. In such situations, the fishery shall be subject to enhanced monitoring so as to enable revision of provisional reference points as improved information becomes available.
7. The fishing mortality rate which generates maximum sustainable yield should be regarded as a minimum standard for limit reference points. For stocks which are not overfished, fishery management strategies shall ensure that fishing mortality does not exceed that which corresponds to maximum sustainable yield, and that the biomass does not fall below a predefined threshold. For overfished stocks, the biomass which would produce maximum sustainable yield can serve as a rebuilding target.