



**Food and Agriculture  
Organization of the  
United Nations**



**A review of the application of the FAO ecosystem approach  
to fisheries (EAF) management within the areas beyond  
national jurisdiction (ABNJ)**

**ABNJ Deep Seas Project**

**Sustainable Fisheries Management and Biodiversity Conservation of Deep-sea Living Marine  
Resources and Ecosystems in the Areas Beyond National Jurisdiction**



**GLOBAL ENVIRONMENT FACILITY**  
INVESTING IN OUR PLANET



**A review of the application of the FAO ecosystem approach  
to fisheries (EAF) management within the areas beyond  
national jurisdiction (ABNJ)**

**by**

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## **PREPARATION OF THIS DOCUMENT**

This publication on the review of the application of the FAO ecosystem approach to fisheries (EAF) management within the areas beyond national jurisdiction (ABNJ) was prepared by Rick Fletcher (FAO Consultant) as part of the five-year GEF funded ABNJ Deep Seas Project jointly implemented by FAO and UN Environment.

The publication documents the results of the review of the level of implementation of the FAO Ecosystem Approach to Fisheries (EAF) by the fisheries management bodies in each of the different ABNJ regions. The review was designed to help identify future activities by the ABNJ Deep Sea Project to address gaps and capacity development and make recommendations to strengthen EAF among deep-sea fisheries management bodies and/or their members.

The information to complete the EAF reviews was largely obtained from web-based materials. To assist with the accuracy of these desktop assessments, following initial drafting of each EAF background report and associated EAF assessment, both documents were sent to the respective RFMO secretariats. Comments and/or suggestions provided by the secretariats were then addressed with revised versions of the background reports and review assessments generated. Based on these revised reports, the comparative analyses were finalized and a full report was drafted.

Being a desk-top assessment of the level of implementation of the EAF approach by each of the RFMO management bodies, the study had a number of caveats including only being able to measure systems and processes, not outcomes. A more complete assessment of EAF adoption and especially the outcomes would require direct involvement of the various stakeholders, including all relevant management, compliance and scientific bodies, contracting parties (CP), non-contracting parties (NCP), vessel owners, crews, non-governmental organizations (NGOs), etc.

The publication was formatted by Jessica Fuller and editorial and design assistance was provided by Chorouk Benkabbour and Marianne Guyonnet of the FAO Fisheries and Aquaculture Department.



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The author would also like to acknowledge the significant assistance provided by the secretariats of each of the RFMO/ABNJ fishery management bodies. They provided valuable feedback and suggestions on the draft EAF background reports and EAF reviews for their specific ABNJ/RFMO plus also on the combined report.

Valuable input was obtained for inclusion in the final draft from the feedback provided by participants at the Deep Sea conference held in Rome May 2019. This included both direct comments following the presentation on this project but also from general discussions about the issues during the conference.

The critical use of publications and other materials obtained from the various RFMO and FAO websites that were used to generate the background reports and complete the EAF assessments must be duly acknowledged.

Finally, thanks must go to the production team at FAO for getting the publication ready for printing during the COVID-19 crisis.

## ABBREVIATIONS AND ACRONYMS

ABNJ	areas beyond national jurisdiction
ACCOBAMS	Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area
AFMA	Australian Fisheries Management Authority
ARK	Association of Responsible Krill harvesting Companies
ASO	Antarctic and Southern Ocean
ASOC	Antarctic and Southern Ocean Coalition
ATS	Antarctic Treaty System
BBNJ	biodiversity beyond national jurisdiction
BGI	Blue Growth Initiative
CAQ	GFCM Scientific Advisory Committee on Aquaculture
CBD	Convention on Biological Diversity
CC	Compliance Committee
CCAMLR	Conservation of Antarctic Marine Living Resources
CCSBT	Commission for the Conservation of the Southern Bluefin Tuna
CCRF	Code of Conduct for Responsible Fisheries
CEMP	CCAMLR Ecosystem Monitoring Program
CM	conservation neasures
CMM	conservation management measures
COLTO	Coalition of Legal Toothfish Operators
CITES	Convention on International Trade on Endangered Species of Wild Flora and Fauna
COFI	Committee on Fisheries (FAO)
CP	Contracting Parties
CPUE	catch per unit of effort
CSIRO	Commonwealth Scientific Industrial Research Organization (Australia)
DCRF	Data Collection Reference Framework
EAF	ecosystem approach to fisheries
EBM	ecosystem based management
EEZ	exclusive economic zone
FAD	fish aggregating device
FAO	Food and Agriculture Organization of the United Nations
FC	Fisheries Commission
FIAF	FAO Fisheries Resource Branch
FRA	fisheries restricted area
GEF	Global Environmental Fund
GFCM	General Fisheries Commission for the Mediterranean
GSA	geographical subarea
IATTC	Inter-American Tropical Tuna Commission
ICCAT	International Commission for the Conservation of Atlantic Tunas
ICES	International Council for the Exploration of the Sea
ICNAF	International Commission for the Northwest Atlantic Fisheries
IMO	International Maritime Organization
IO	Indian Ocean
IOC	Intergovernmental Oceanographic Commission
IUCN	International Union for Conservation of Nature
IUU	illegal, unreported and unregulated (fishing)
IWC	International Whaling Commission
MBS	Mediterranean Black Seas
MCS	monitoring, control and surveillance
MCY	maximum jobs
MEY	maximum economic yield
MJ	maximum jobs/employment
MOU	Memorandum of Understanding

MPA	marine protected area
MSE	Management Strategy Evaluation
MSY	maximum sustainable yield
MVP	maximum overall value of production
NAFO	Northwest Atlantic Fisheries Organization
NAO	Northwest Atlantic Ocean
NCEM	NAFO Conservation and Enforcement Measures
NCP	Non-Contracting Parties
NEAFC	North East Atlantic Fisheries Commission
NEAO	North East Atlantic Ocean
NGO	Non-Governmental Organization
NPFC	North Pacific Fisheries Commission
NPO	North Pacific Ocean
NRA	NAFO Regulatory Area
OSPAR	Convention for the Protection of the Marine Environment of the North-East Atlantic
PSC	Project Steering Committee
PSMA	Port State Measures Agreement
RAC/SPA	UNEP/MAP Regional Activity Center for Specially Protected Areas
RFMO/A	Regional Fisheries Management Organizations or Arrangements
SAC	GFCM Scientific Advisory Committee on Fisheries
SC	Scientific Committee
SCAF	Standing Committee on Administration and Finance
SCIC	Standing Committee of Implementation and Compliance
SDG	Sustainable Development Goal
SEAFO	South East Atlantic Fisheries Organization
SEAO	South East Atlantic Ocean
SIOFA	Southern Indian Ocean Fisheries Agreement
SIODFA	Southern Indian Ocean Deep-sea Fishers Association
SISO	CCALMR Scheme of International Scientific Observation
SPO	South Pacific Ocean
SPRFMO	South Pacific Regional Fisheries Management Organization
SRC	GFCM Subregional Committee
SSB	spawning stock biomass
SSF	small-scale fisheries
TAC	total allowable catch
UNCLOS	United Nations Convention on the Law of the Sea
UNEP	United Nations Environment Program
UNEP/MAP	UNEP/Mediterranean Action Plan
UNGA	United Nations General Assembly
VME	vulnerable marine ecosystem
WCPFC	Western and Central Pacific Fisheries Commission

## EXECUTIVE SUMMARY

### PURPOSE

The ABNJ Deep Seas Project, Sustainable Fisheries Management and Biodiversity Conservation of Deep-sea Living Marine Resources and Ecosystems in the areas beyond national jurisdiction is a five-year GEF-funded initiative, jointly implemented by FAO and UN Environment. One of the key objectives of the ABNJ Deep Seas Project is to improve the planning and adaptive management for deep-sea fisheries. Consistent with this objective, in 2017, the Project Steering Committee (PSC) agreed to undertake a regional overview and document the various approaches taken in the different regions in relation to the FAO Ecosystem Approach to Fisheries (EAF) management framework. The overview was designed to identify where the project could best provide assistance to address gaps and capacity development at the regional and national levels.

### BACKGROUND

The FAO–EAF management framework has developed progressively over the past 20 years to implement the principles of sustainable development (WCED, 1987), the Convention on Biological Diversity (CBD) and the Code of Conduct for Responsible Fisheries (CCRF) in a practical, operational manner. EAF was adopted as the appropriate approach to implement these principles by the FAO Committee on Fisheries (COFI) Member Countries at their 25th meeting, in 2003.

To assist with the adoption of EAF, FAO has subsequently undertaken a number of initiatives to improve understanding and the level of uptake by Member Countries. This includes the development of technical guidelines (e.g. FAO, 2003) and the creation of the EAF toolbox,<sup>1</sup> which includes detailed instructions and a number of different options for completing each of the steps required for the full EAF process.

EAF is a participatory, risk-based planning process that seeks to develop holistic fishery management systems. Importantly, as outlined in the EAF Toolbox:

*“EAF not only deals with all the ecological consequences of fishing, but it also explicitly deals with the social and economic implications (good and bad) generated by the management and institutional arrangements related to fisheries.*

*It seeks to improve all fishery management processes by adopting risk management principles that recognises complete knowledge is never available and is not essential to start the process. It works by the identification and assessment of all relevant issues and the establishment of participatory processes to help address high priorities effectively and efficiently.*

*It assists make the best decisions with the information available by using a precautionary (to reflect the risk) and an adaptive approach (to improve knowledge and adjust decisions). Implementing EAF helps to develop comprehensive fishery management systems that seek the sustainable and equitable use of the whole system (ecological and human) to best meet the community’s needs and values”.*

Despite growing expectations and awareness of the need to take a holistic approach to achieve the suitable sustainable development outcomes from the utilisation of natural resources, many still think that EAF only deals with the ecological effects of fishing operations. On the contrary, EAF offers a broad framework to facilitate planning and actions, not only in their ecological repercussions, but also for the socio-economic and institutional aspects required for holistic fisheries management (see for example, Fletcher and Bianchi, 2014).

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<sup>1</sup> [www.fao.org/fishery/eaf-net](http://www.fao.org/fishery/eaf-net)

## OVERVIEW OF PROJECT AND ACTIVITIES

As outlined above, the PSC agreed to a regional overview of the management approaches undertaken in the different RFMOs in relation to their adoption of processes consistent with the Ecosystem Approach to Fisheries (EAF) framework. The overview was designed to help identify where the ABNJ Project could best provide assistance to address EAF-related gaps and therefore capacity development, at the regional and national levels.

The agreed project activities included:

- using mainly web-sourced information and reviewing how the ecosystem approach is being applied in each of the management bodies responsible for deep-sea fisheries (CCAMLR, GFCM, NAFO, NEAFC, NPFC, SIOFA, SEAFO and SPRFMO), as well as the extent to which it is being implemented by members;
- using these results and the FAO–EAF guidelines, the EAF Toolbox and associated materials, while working with the FAO Fisheries Resource Branch (FIAF) and the Secretariats of the above organizations to develop a review procedure; and
- describing the extent of EAF implementation using the above method and making recommendations on activities to strengthen EAF among deep-sea fisheries management bodies and/or their members.

## CAVEATS

This study was designed as an initial, desk-top assessment of the level of implementation of the EAF approach by each of the RFMO management bodies; it therefore has a number of caveats:

- The EAF review could only examine the degree to which EAF processes and key EAF components were being considered and addressed, not the outcomes.
- This was a review of the level of adoption of the EAF approach within each RFMO; it was not an assessment of the degree to which the relevant management body was meeting the requirements set out in its convention/agreement.
- It is recognized that many of the RFMO Conventions do not specifically refer to all EAF components (e.g. social and economic outcomes).
- While EAF was agreed by Member Countries of COFI (and may be mentioned in some conventions), it is not a legal obligation for regional fisheries management bodies.
- A more complete assessment of EAF adoption and especially the outcomes would require direct involvement of the various stakeholders, including all relevant management, compliance and scientific bodies, contracting parties (CP), non-contracting parties (NCP), vessel owners, crews, non-governmental organizations (NGOs), etc.

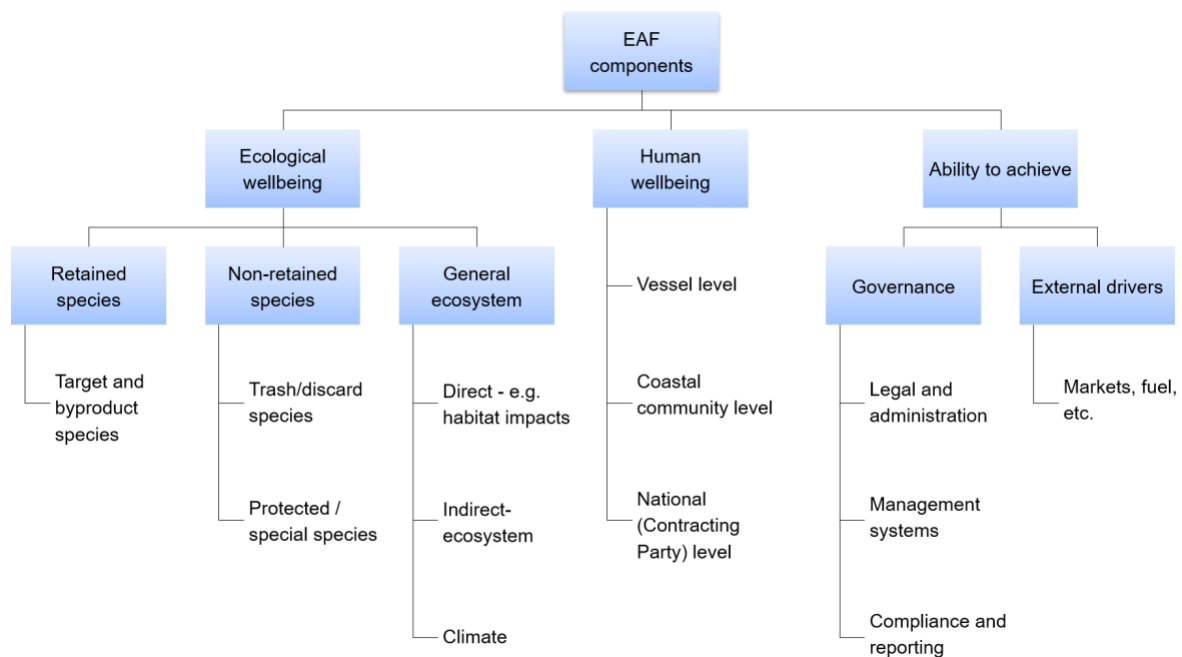


## METHODS

EAF audit criteria and assessments- The EAF component approach, as outlined in the EAF Toolbox,<sup>2</sup> was used as the basis for the assessment. This involves the issues associated with ‘a fishery’ being separated into the three EAF component groups:

1. **Ecosystem wellbeing:** All ecological ‘assets’, including all affected fish stocks (e.g. target, bycatch, discards etc), habitats, ecosystems relevant to the fishery and the issues/impacts generated by the fishery that may be affecting these assets.
2. **Human wellbeing:** The social and/or economic ‘outcomes’ currently generated by the fishery both the good – those outcomes the community wants to generate (e.g. food security, economic development) – and the bad, those it wants to avoid (e.g. conflicts, injuries).
3. **Ability to Achieve:** The management and institutional ‘systems’ in place or proposed to deliver the desired outcomes (e.g. access and tenure systems, compliance, democratic processes, conflict resolution), along with the external ‘drivers’ (factors not controlled by the fishery) which may be affecting performance.

Based on experiences applying the EAF approach in multiple situations, a set of 13 key EAF components have been identified that apply to most fisheries and jurisdictions:



**Figure E1:** The thirteen key EAF components<sup>3</sup>

To ensure the review assessment process was applied in a consistent manner across the RFMOs, suitable criteria were developed for assessing the level of consideration required for each of the 13 EAF components. This was achieved by developing a number of standard questions that focused on the degree to which there has been formal consideration of each of the components.

<sup>2</sup> <http://www.fao.org/fishery/eaf-net/toolbox/planning/step-2/en>

<sup>3</sup> See also [http://www.fao.org/fishery/eaf-net/eaftool/eaf\\_tool\\_1](http://www.fao.org/fishery/eaf-net/eaftool/eaf_tool_1) for more information

The high seas are the area where most of the RFMO fisheries operate. The only RFMO fishing activities that occur directly within the coastal areas were in the Mediterranean and Black Sea RFMO (GFCM). Consequently, the “coastal community level” EAF component was not included in the EAF review. Each of the other twelve EAF components was considered to be at least potentially relevant to every RFMO and the review was therefore based on this set of criteria.

## DATA COLLATION

To standardize the EAF reviews using material obtained from web-based materials and sources, an EAF background report was generated for each RFMO and its associated management body that was structured using the EAF report headings as outlined in EAF Activity 1.3 of the EAF Toolbox.<sup>4</sup> A tailored set of component trees for each of the RFMOs was also generated as per EAF Activity 2.1.<sup>5</sup>

The prime sources of information used for the review were the materials and publications available on (and linked to) the websites for each of the RFMOs, in addition to a number of highly relevant FAO publications (e.g. FAO, 2016).

### *Individual RFMO audits*

Based on the information collated within each of the EAF background reports and the tailored set of EAF components relevant to each RFMO, a gap analysis was undertaken to determine the degree to which the overall systems of management were consistent with EAF. These analyses therefore assessed the degree to which each of the EAF components was:

- being directly and fully addressed;
- previously identified and already addressed; and
- evidence that they had been formally considered and determined as not being of sufficient risk to warrant direct management intervention.

The audit scoring system used was semi-qualitative: nil (0), partly (1), mostly (2), mostly/fully (2.5) and fully addressed (3).

Importantly, as outlined above, this scoring related only to the level that EAF issues were being considered and addressed within the RFMO, not the outcome.

### *Assessment of broader RFMO trends*

In addition to the individual assessments for each RFMO, scores were also collated across the organizations to provide an overview of the levels of EAF implementation for each component. This identified whether there were any consistent gaps or issues across all/most RFMOs which could indicate where future programmes could be developed to address gaps in EAF implementation that would cover multiple regions/bodies.

### *Consultation*

To assist with the accuracy of these desktop assessments, following initial drafting of each background report and associated EAF assessment, both documents were sent to the respective RFMO secretariats in the first half of 2018. Any comments and/or suggestions provided by the secretariats were addressed, with revised versions of the background reports and review assessments generated. Based on these revised reports, the comparative analyses were undertaken and a full report was drafted based on the data that was available for each of the RFMOs, as of August 2018.

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<sup>4</sup> <http://www.fao.org/fishery/eaf-net/topic/166251>

<sup>5</sup> <http://www.fao.org/fishery/eaf-net/topic/166253>

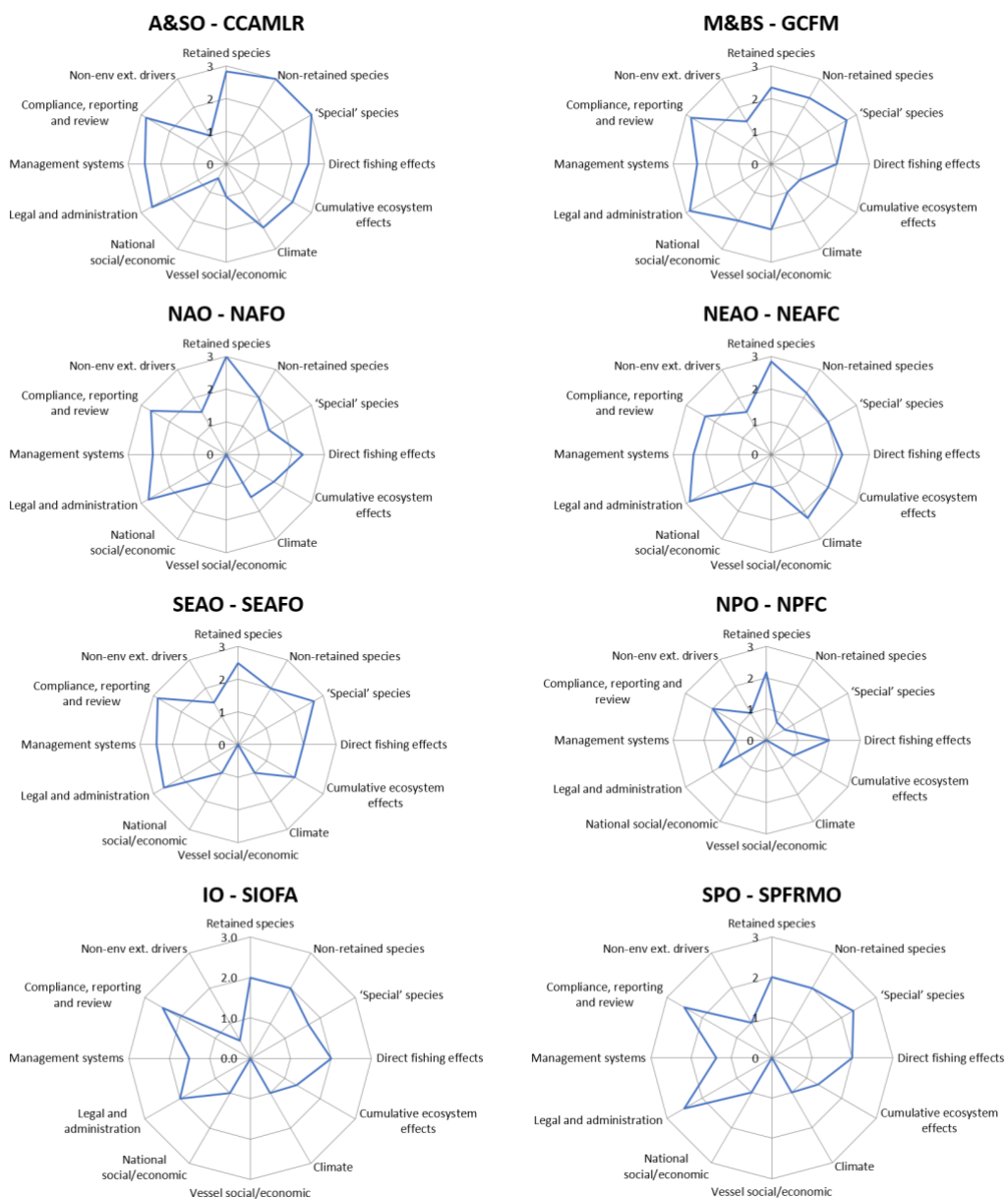
Following feedback from FAO on the full draft, a further round of consultation was undertaken in March 2019. Each RFMO secretariat was supplied with a copy of the full draft report that included the results for all RFMOs and the overall comparisons.

The finalization of the document included consideration of comments received on the full draft from the secretariats. In addition, it has incorporated feedback and comments received during the ABNJ Deep Sea Meeting 2019, including those that followed a presentation on this study (FAO, 2020).

## RESULTS

### Individual RFMOs

The overall level of implementation by the management bodies for each of the twelve EAF components within their RFMOs are outlined in Figure E2.



**Figure E2:** Summaries of the average level of EAF implementation within each of the RFMOs. *Note: climate refers to all environmental external drivers. The scores for each EAF component are: nil (0), partly (1), mostly (2), mostly/fully (2.5), or fully addressed (3)*

### **Antarctic and Southern Ocean - Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR)**

There has been direct consideration for most (9 out of 12) of the EAF components by CCAMLR with each of the 9 considered to be either mostly implemented (Direct Impacts; Cumulative Impacts; Climate; Management Systems) or close to fully implemented (Retained, Non-Retained and Special Species; Compliance and Reporting; Legal and Administration). Of the few gaps identified within these components, some are already under active consideration (ecosystem impacts of finfish fishing, climate impacts on recruitment).

The main gaps were active consideration of the social and economic components plus non-environmental external drivers.

**Key points:** Some form of risk assessment is still required for non-benthic direct impacts, vessel- and national-level (CP) social and economic issues. These assessments will enable the development of an overall EAF plan that may identify additional areas requiring direct management response or other activities.

### **Mediterranean and Black Seas - General Fisheries Commission for the Mediterranean (GFCM)**

There was some direct level of consideration across all 12 EAF components by the GFCM with the majority (75 percent) of these being considered to be mostly implemented (Retained Species, Non-Retained Species, Direct Fishing Impacts; Vessel- and National-level economic and social; Management Systems) or close to fully implemented (Legal and Administration; Compliance and Reporting; Special species). Some of the gaps that remain (increased stock management and additional assessments) were identified in the recent GFCM mid-term strategy.

**Key points:** This was the only RFMO that had specific social and economic objectives, as well as relevant data, probably a reflection of its operating in one of the world's more populated marine areas. However, this fact also affects its ability to develop widely agreed management systems.

Further work is also required to: manage benthic impacts; assess the cumulative effects of fishing; assist with the national strategies for the sustainable development of small-scale fisheries; and complete an overall EAF plan.

### **North Atlantic Ocean – North Atlantic Fisheries Organization (NAFO)**

There was direct consideration for 9 of the 12 EAF components by NAFO, with 6 of these considered to be either mostly implemented (Climate; Direct Impacts and Cumulative Impacts) or close to fully implemented (Legal and Administration; Compliance and Reporting, and Retained Species). A number of the gaps identified are already the subject of additional activities (e.g. action plans for bycatch reduction, assessment of ecosystem impacts, improvements to management strategies).

The main gaps were the active consideration of social and economic components and consideration of non-environmental external drivers.

**Key points:** Some form of risk assessment is still required for all captured species, non-benthic direct impacts, vessel- and national-level (CP) social and economic issues and external drivers.

### **North East Atlantic Ocean – North East Atlantic Fisheries Commission (NEAFC)**

There has been direct consideration for 9 of the 12 EAF components by NEAFC. Seven of these are considered to be mostly implemented (Non-Retained; Cumulative Impacts, Direct Impacts, Special Species, Climate; Compliance and Reporting; Management System) with two fully

implemented (Legal and Administration; Retained Species). The main gaps were direct consideration of social, economic components and non-environmental external drivers.

**Key points:** Some form of risk assessment is still required for non-benthic direct impacts; special species; and a consideration of vessel- and national-level (CP) social and economic issues.

#### **North Pacific Ocean - North Pacific Fisheries Commission (NPFC)**

Currently the NPFC has formal consideration for four of the EAF components, with these considered to be mostly implemented (Retained Species; Direct Fishing Impacts; Compliance; Legal and Administration) and none fully implemented. A number of gaps remain but there are plans already in place to deal with many of these.

**Key points:** The current scores reflect the very short duration that this management body has been operational. In addition to the planned activities, NPFC still needs to undertake some form of risk assessment for non-benthic direct impacts, vessel- and national-level social and economic issues and external drivers.

#### **South East Atlantic – South East Atlantic Fisheries Organisation (SEAFO)**

The SEAFO has direct consideration for most (9 of 12) EAF components which are either mostly implemented (Non-Retained Species; Cumulative Impacts; Climate; Management Systems) or close to being fully implemented (Retained and Special Species; Compliance and Reporting; Legal and Administration). Formal risk assessments of retained and non-retained species are under way, as are improvements to management, while cumulative impacts are under active consideration.

**Key points:** Some form of risk assessment is still required for non-benthic direct impacts, special species, vessel- and national-level (CP) social and economic issues and external drivers.

#### **Indian Ocean - Southern Indian Ocean Fisheries Agreement (SIOFA)**

Consistent with SIOFA having been operational for a short period of time, it currently has formal consideration for 7 of the 12 EAF components with these considered to be only mostly implemented (Retained, Non-Retained and Special Species; Direct and Cumulative Impacts; Legal and Administration; Compliance and Reporting and Reporting). While a number of gaps remain, many of these are already set to be addressed, including: risk assessments for captured species, cumulative impacts, climate and fishing footprint.

**Key points:** In addition to the above, some form of risk assessment is also required for non-benthic direct impacts, vessel- and national-level social and economic issues and external drivers.

#### **South Pacific Ocean - South Pacific Regional Fisheries Management Organisation (SPRFMO)**

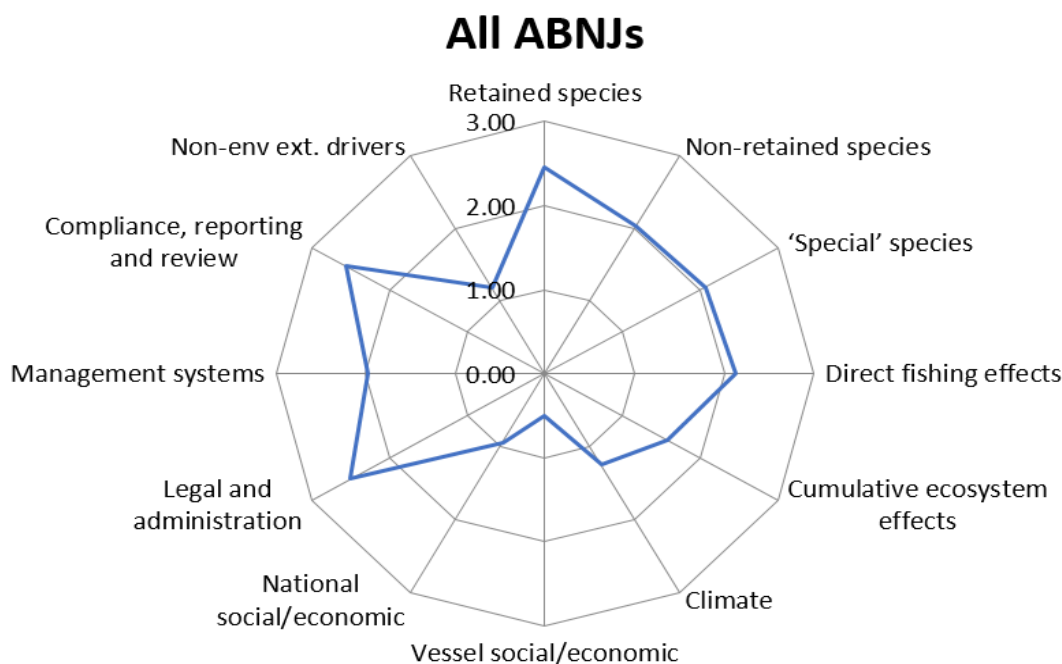
While it has only been operational for a relatively short time, the SPRFMO has considered 6 of the 12 EAF components, with these considered to be currently either mostly implemented (Retained, Non-Retained and Special Species; Cumulative Impacts) or close to fully implemented (Legal and Administration; Compliance and Reporting). A number of gaps for these components remain, but many are being actioned including assessments for retained, non-retained and special species, direct and cumulative impacts and possibly climate effects.

**Key points:** In addition to the above, some form of risk assessment is also required for vessel- and national-level (CP) social and economic issues.

## All RFMOs

### Overview

The level of EAF implementation varied both between the different RFMOs and between the different components of EAF. Many of the differences between RFMOs were associated with the different time durations since the formation of their management body, and to a lesser degree the relative value of catches. In addition to these time/value-related differences, a number of common themes were identified across the RFMOs (Figure E3).



**Figure E3:** Average level of implementation for each EAF component across the eight RFMOs. *Note: climate refers to all environmental external drivers. The scores for each EAF component are: nil (0), partly (1), mostly (2), mostly/fully (2.5), or fully addressed (3)*

Each of the RFMOs' respective 'commissions' and relevant management bodies have been very thorough in developing strong legal and administrative structures, and creating effective compliance systems. Each of the eight RFMOs have legal and administrative structures to address the ecological components of EAF that are mostly, or close to fully, consistent with those required. This includes the two most recently formed management bodies, SIOFA and NPFC.

Similarly, the development of compliance systems was one of the most complete areas of implementation. Except for SIOFA, which is essentially only just becoming established, the other seven RFMOs have fully implemented the key elements needed for this EAF component.

Depending upon the time since their formation, the RFMOs have addressed – or are in the process of addressing, to relatively high levels – the ecological impacts of fishing as these relate to target species, benthic habitats (generally referred to as Vulnerable Marine Ecosystems VMEs) and bycatch issues. Furthermore, for the RFMOs that had gaps in addressing direct ecological impacts, these have generally been identified, and plans are already in place to address these, notably through the completion of additional stock/risk assessments.

Similarly, the assessment and management of cumulative impacts of fishing, and the impacts of environmental external drivers (e.g. climate) had generally only been addressed to a moderate level. In

most cases, however, these gaps had already been identified, and actions are now in place to undertake appropriate risk assessments.

Given the logistical difficulties inherent in undertaking scientific studies to assess the status of fish resources and the potential fishing impacts on other ecological resources within these remote high seas regions – combined with the difficulties in developing multi-jurisdictional management systems – the generally strong EAF scores for ecological and governance components should be acknowledged. These outcomes reflect the strong emphasis placed on these areas by each of the management bodies to address the concerns raised by various stakeholders and forums over the past two decades, notably concerning the need for good management to deal with the potential ecological impacts of high seas fishing. These results should be received extremely positively by the broader community and be celebrated.

The largest EAF gaps identified through this desktop process were the formal consideration of social and economic issues at both the vessel and the national (contracting party) level, in addition to the impact of non-environmental external drivers (e.g. markets, fuel costs). With no objectives for these EAF components within most RFMO conventions/agreements, there are generally no formal processes for their consideration in decision-making. This situation led to a request from some stakeholders that these EAF aspects not be included in the analysis.

However, the active consideration of all relevant EAF social and economic issues is essential to meeting Sustainable Development and CCRF principles; it is also fundamental to developing effective long-term fisheries management because fishing activities only exist to generate social or economic benefits to one or more communities.

Nonetheless, it must be acknowledged that there is generally limited formal consideration of social and economic issues within most fishery jurisdictions and management systems. Consequently, the results obtained for the review of management systems within RFMOs largely reflect broader patterns, and they should not therefore be seen as unusual.

A further point to note is that a holistic consideration of all social and economic risks will be more difficult within RFMOs because of the multi-country nature of the RFMO membership. The consultative processes to understand all potential issues would require the direct involvement of representatives covering all contracting parties, vessel operators and other relevant stakeholders. There are, however, a number of social and economic issues that would generally apply to all RFMOs. These include:

- Social attitudes (social licence): regional and global community opinions about these fisheries and their perceived impacts on the environment may drive other agendas that can have longer term effects on their operations (e.g. marine parks, Biodiversity Beyond National Jurisdiction (BBNJ)).
- Social (welfare): the welfare of crew that work on vessels operating within the RFMO is an issue that is relevant to every RFMO. The management system could potentially include the requirement for all vessels operating within the RFMO to meet basic welfare rights.
- External drivers: the costs of operations in high seas areas is already relatively high, consequently changes in costs such as fuel, and the market values of the species, all have an exaggerated impact on the viability of these fisheries.
- Vessel economics: having some knowledge of these issues is important to understand changes to fishing vessels operations that may be occurring; this in turn helps interpret catch and effort data. Moreover, the economic status of individual vessels can drive the incentive to comply with rules (or not).

While the lack of formal consideration of social and economic risks, and their associated issues, is common within the fishery management systems of most jurisdictions, their explicit consideration can be as simple as being listed as standard agenda items at annual meetings to ensure that there is a forum for their discussion.

The decision-making process for new or revised management measures can also explicitly seek to have the lowest possible impact on social and economic objectives while still adequately meeting environmental objectives. In this context, some understanding of the preferred social and economic outcomes for each contracting party is helpful. For example, when developing the reference levels for target species harvest strategies will differ significantly depending on whether the objective is to deliver maximum sustainable yield (MSY) (maximum catch), maximum economic yield (MEY) (maximum economic returns), MVP (maximum overall value of production) or MJ (maximum jobs/employment) from their capture.

Importantly, a consideration of these social and economic objectives and risks does not override the need to meet any underlying ecological/stock sustainability requirements. Their consideration should only refine which actions are taken, not if actions should be taken. The decision-making process for new or revised management measures can, nonetheless, explicitly seek to have the lowest possible impact on these objectives while still adequately meeting environmental concerns. Importantly, if these issues are not being considered explicitly this is likely to undermine potential consensus on taking action.

It is possible that within the broader suite of consultation associated with the operations of each RFMO's particular management body, contracting parties (CPs) could already be offering their considered opinions on relevant economic and social considerations, although there may be no formal requirement to do so. This could be included within the decision-making process of their respective 'commission' meetings, and by having the CPs deal appropriately with any vessel-level issues. The number and level of actual EAF gaps may therefore not be as great from a practical perspective as has been identified through the desktop methods applied in this study.

## CONCLUSIONS

The similar patterns identified in the differential consideration of EAF components within each of the RFMOs could be a reflection of their focus on tackling ecological and compliance issues as a priority. Furthermore, it appeared that the various management systems and arrangements put in place by each of the RFMOs did not appear to have been developed using comprehensive and integrated processes such as those outlined in the various FAO–EAF guidelines and EAF Toolbox.<sup>6</sup>

One of the critical steps required for developing a 'compliant' EAF management plan and overall system of governance is to outline all of the potential EAF-related issues first (i.e. not just ecological), and assess the risks and opportunities systematically, based on current information. Thus, no comprehensive EAF assessments or documentation was found from the RFMO public information that was equivalent to an overarching EAF background document. Such documentation provides the best basis to determine relative priorities for action and also what level (if any) of management action is required – which may include monitoring, assessment, regulations, compliance and review – for each issue.

From the relevant EAF information identified for each RFMO it appears that there is still a misunderstanding of the approach. Most RFMOs have delegated dealing with EAF to a science-based working group, yet implementing the EAF approach is not the role of science; it is a management question. Dealing with some or even all ecosystem impacts, or obtaining an understanding of the scientific aspects, does not constitute EAF. As outlined above, EAF is an overarching risk-based

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<sup>6</sup> <http://www.fao.org/fishery/eaf-net/toolbox/planning/step-3/en>



governance process that is designed to build a comprehensive, holistic and robust management system that will address all of the ecological, economic, social and governance risks of (and to) a fishery appropriately.

However, the significant efforts that each of the RFMOs have already made can easily be integrated into a fully EAF-compliant system. Indeed, it is highly likely that if an assessment or formal consideration was undertaken across all EAF components and subcomponents for each of the RFMOs it would not materially add to the total level of management or other actions required. Moreover, it may in some cases even identify areas where the current level of management or other activities could be reduced.

If undertaken in a suitably pragmatic manner, these EAF-based assessments can be conducted in a short period of time, providing the right combination of assessment processes now available for ecological, social and economic issues is used (e.g. Fletcher, 2015). Even more important is having the right people present to undertake the assessments – in other words, not only scientists are required – and the right attitudes are adopted to deal with inevitable uncertainties in data/information.

Adopting the EAF approach as an overarching strategy for managing within each RFMO, should result in the generation of clear, holistic assessments that would facilitate the development of clearly articulated and integrated management plans, based on having considered all potential risks and opportunities objectively. These would provide clear justification for whether each of the EAF issues associated with the fishing activities in the ABNJ area either do, or do not, require direct management responses, as well as the level and type of actions that are required.

The risk-based approach is therefore extremely valuable as the basis for ensuring the correct priorities are being addressed, at the appropriate level. It also has the added benefit of not only assisting with the overall governance efficiency for each of the management bodies but of providing suitably robust justifications to external parties regarding the appropriateness of the current management arrangements. As outlined in the introduction, implementing EAF is essentially just a suitably tailored version of the risk management principles and processes that are outlined within the ISO 31000 guidelines (ISO, 2018). Such an approach (whether they are ‘tagged’ as being EAF or not) can and should be applied for the effective management of all-natural resources.



## 1. PURPOSE

The Sustainable Fisheries Management and Biodiversity Conservation of Deep-sea Living Marine Resources and Ecosystems in the areas beyond national jurisdiction project (an ABNJ Deep Sea Project) is a five-year GEF-funded initiative implemented jointly by FAO and UN Environment. A key objective of the ABNJ Deep Sea Project is to improve the planning and adaptive management for deep-sea fisheries. Consistent with this objective, in 2017, the Project Steering Committee (PSC) agreed to undertake a regional overview and document the various approaches taken in the different regions in relation to the FAO Ecosystem Approach to Fisheries (EAF) management framework. This was designed to identify where the project could best provide assistance to address gaps and capacity development at the regional and national levels.

## 2. BACKGROUND

### 2.1 What is ecosystem approach to fisheries?

The FAO Ecosystem Approach to Fisheries (EAF), and other related concepts (e.g. Ecosystem Based Management, EBM), have developed over the past 20 or more years in response to the need to implement the principles of sustainable development (WCED, 1987), the Convention on Biological Diversity (CBD, 2000) and the Code of Conduct for Responsible Fisheries (CCRF- FAO, 1995) in a practical manner.

The principles underlying EAF do not differ from the original concept of formally adopting an Ecosystem Approach to Fisheries (EAF) initially proposed at the 2001 FAO Reykjavik Conference. Subsequently, the Twenty-Fifth Session of COFI in 2003 considered EAF the appropriate approach to implementing the CCRF,<sup>7</sup> and supported the role of FAO in facilitating the adoption of the ecosystem approach as the most practical means of implementing these agreed principles for the management of fisheries.

The FAO definition of EAF states that its main purpose is to:

*“...plan, develop and manage fisheries in a manner that addresses multiple needs and desires of societies, without jeopardising the options of future generations to benefit from the full range of goods and services provided by aquatic ecosystems. [...] [I]t strives to balance diverse societal objectives, by taking account of the knowledge and uncertainties of biotic, abiotic and human components of ecosystems and their interactions and applying an integrated approach” (FAO, 2003).*

EAF is a participatory, risk-based planning process that seeks to develop holistic fishery management systems. Importantly, as outlined in the EAF Toolbox:<sup>8</sup>

- EAF not only deals with all the ecological consequences of fishing, but it also explicitly deals with the social and economic implications (good and bad) generated by the management and institutional arrangements related to fisheries.
- It seeks to improve all fishery management processes by adopting risk management principles that recognises complete knowledge is never available and is not essential to start the process.

<sup>7</sup> Most of the contracting parties are Member Countries of the FAO Committee on Fisheries (COFI).

<sup>8</sup> <http://www.fao.org/fishery/eaf-net/about/what-is-eaf/en>

It works by the identification and assessment of all relevant issues and the establishment of participatory processes to help address high priorities effectively and efficiently.

- It assists make the best decisions with the information available by using a precautionary (to reflect the risk) and an adaptive approach (to improve knowledge and adjust decisions). Implementing EAF helps to develop comprehensive fishery management systems that seek the sustainable and equitable use of the whole system (ecological and human) to best meet the community's needs and values.

In simple terms, EAF is a method for how you manage, not only what you manage. Moreover, when applied in an explicit and coordinated manner, it is designed to assist understanding of how each of these components interacts and can potentially affect the other.

To assist Member Countries with the broader adoption of EAF, FAO integrated elements from a number of relevant approaches (e.g. Chesson et al., 1999; Charles, 2001, Fletcher et al., 2002) to define a set of operational principles and guidelines for EAF (FAO, 2003, 2005; Garcia and Cochrane, 2005; De Young et al., 2008). A decade later, while the application of this approach was growing, many fishery managers continued to see EAF as too difficult to implement without access to expert guidance (see Bianchi and Skjoldal, 2008; Link, 2010). Crucially, many managers incorrectly perceived EAF as largely an academic or scientific exercise, similar to ecosystem modelling (Fletcher 2008, FAO, 2009). This perception was not helped by scientists who often equated EAF with a means for improving their understanding of all ecological aspects associated with fishing.

It was considered that if fishery managers had a better understanding of the EAF process and simpler access to relevant tools, the implementation of EAF would increase (FAO, 2009). This prompted FAO to undertake a number of initiatives to improve uptake, including the development of the EAF toolbox (FAO, 2012; Fletcher and Bianchi, 2014).

## **2.2 Essential elements of ecosystem approach to fisheries**

Implementing EAF essentially involves asking four questions about how a fishery is contributing to sustainable development:

- What impacts are the fishing activities having on target and associated species, as well as the broader ecosystem?
- What impacts are these fishing activities having on the resources or human activities managed by other sectors?
- What are the economic/social benefits and costs of fishing and its related activities to the sector and society as a whole?
- What other activities and drivers beyond the control of fishery management are affecting the fishery's capacity to reach its management objectives?

With the main purpose of applying EAF being to plan, develop and manage fisheries more effectively, one of the principal outputs of EAF implementation is generally a comprehensive fishery management system that seeks to ensure the sustainable use of all ecological, social and economic systems related to the fishery, not just the targeted species.

According to FAO guidelines, these management plans can be:

*“...a formal or informal arrangement between a fishery management authority and interested parties which identifies the partners in the fishery and their respective roles, details the agreed objectives of the fishery, and specifies the management rules and regulations which apply to it and provides other details about the fishery which are relevant to the task of the management authority” (FAO, 1997).*

The types and levels of management actions need to be appropriate to the issue in question. A critical aspect of the EAF process is that it helps determine what (if any) management actions are appropriate for each issue based on the current level of risk, available knowledge and management system in place.

Given that the review of RFMOs is being conducted over a decade after the 2008 Bergen Conference, and half a decade after the development of the EAF Toolbox, it will be instructive to determine the level of improvement there has been in the implementation of EAF.

### **2.3 Outline of ecosystem approach to fisheries processes**

EAF seeks to improve all fishery management processes by adopting risk management principles; the process is designed to help determine what level of management action – or non-action plus future research – is appropriate given the level of risk, opportunities and the current level of knowledge available (Figure 1).

Based upon international standard risk management principles (currently: ISO 31000, 2018) and using the system originally developed in Australia (Chesson et al., 1999; Fletcher et al., 2002, 2005), EAF is divided into four main steps (see Figure 1). These steps, and their associated key activities and outputs, are the same irrespective of whether the fishery is small- or large- scale, industrial or artisanal, data-poor or data-rich. Depending upon the fishery and the capacity of those involved, the complexity of the methods and tools chosen to complete each of the steps will vary significantly (Fletcher and Bianchi, 2014).

The four main steps in the EAF planning process for fisheries are:

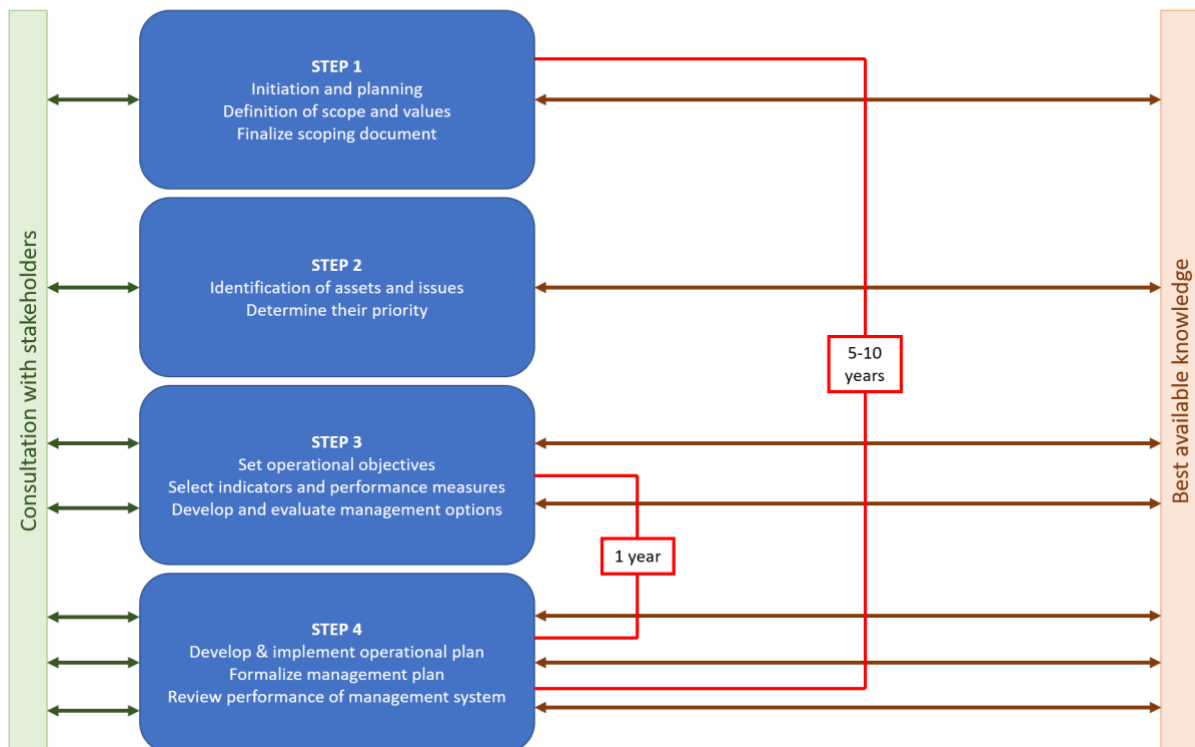
**Step 1-** Initiation and scope: Generate an agreed and clear definition of the fishery (scale and type) based on government and stakeholder input, in addition to a shared understanding of the social, economic and ecological objectives to be achieved.

**Step 2 -** Identification of assets, issues and priorities: Identify all relevant resource ‘assets’, community outcomes and the issues affecting their management (generated either by the fishery or external factors) and determine priorities for direct action to best achieve objectives.

**Step 3 -** Development of management system: Develop a management system to cost-effectively and holistically deal with all high priority issues that includes clear operational objectives and the ability to monitor and assess performance.

**Step 4 -** Implementation, monitoring and performance review.: Document the actions to implement the management system, monitor their completion, and evaluate and report on their performance in delivering acceptable community outcomes.

## EAF Planning Framework



**Figure 1:** EAF Management planning and implementation framework, adapted from the FAO EAF toolbox<sup>9</sup>

## 2.4 Ecosystem approach to fisheries myths

As outlined above, because the title does not explicitly mention its human components, EAF is often misinterpreted as only relating to the ecological aspects of the ecosystem. But, in addition to dealing with the ecological consequences of fishing, EAF implementation requires explicit consideration of the social and economic implications (positive and negative) of the management and institutional arrangements that relate to fishing operations. The reality is that the management and governance components are the most important aspects of EAF, as they have almost always been the areas where the highest risks have been encountered when comprehensive risk analyses are conducted (Fletcher, 2008; 2015). Furthermore, it is generally the lack of good governance that is the underlying cause of high risks and poor outcomes in other EAF components, rather than a lack of data.

A further myth to dispel is that EAF requires considerable information and a thorough understanding of all ecosystem processes. EAF is not a synonym or an automatic justification for undertaking the study of ecosystems, nor does implementing EAF require the building of complex ecosystem models. It is important to remember that EAF is (or at least should be) a management-based process that is informed by science: it should not be a research-led activity.

A related myth is that implementing EAF requires absolute certainty about all the possible ecological, economic and social interactions and issues associated with a fishery before you begin. No fishery has, or ever will have such certainty about all of its issues. Every fishery therefore has to operate with a level of uncertainty (Fletcher, 2015), with EAF designed to ensure all of these areas have at least been

<sup>9</sup> [www.fao.org/fishery/eaf-net](http://www.fao.org/fishery/eaf-net)

considered explicitly, thus facilitating the process of identifying which areas of uncertainty need to be addressed and which do not. Each of these concepts is worthy of consideration when assessing the level of implementation of EAF.

### 3. METHODS

#### 3.1 Scope and initial consultation

In 2017, the ABNJ Deep Seas Project Steering Committee (PSC) agreed to undertake a regional overview and document the management approaches employed in the different regions when adopting processes consistent with the Ecosystem Approach to Fisheries (EAF) framework. This was designed to help identify where the project could best provide assistance to address EAF-related gaps – and therefore capacity development – at the regional and national levels.

The agreed project activities included:

- Using mainly web-sourced information, reviewing how the ecosystem approach is being applied in each of the management bodies responsible for deep-sea fisheries (CCAMLR, GFCM, NAFO, NEAFC, NPFC, SIOFA, SEAFO and SPRFMO), and the extent to which it is being implemented by members.
- Using these results and the FAO–EAF guidelines, EAF Toolbox, and associated materials, working with FIAF and the secretariats of the above organizations to develop a review procedure.
- Describe the extent of EAF implementation using the above method, and make recommendations on activities to strengthen EAF among deep-sea fisheries management bodies and/or their members.

A paper outlining the proposed scope and methods for undertaking this review was circulated to the PSC, FAO and the relevant RFMO secretariats in November 2017.

#### 3.2 Study caveats

This study was designed as a first stage, desktop assessment of how far the EAF approach has been implemented by each of the RFMOs; it therefore includes a number of caveats:

- The EAF review could only examine the degree to which EAF processes and key EAF components were being considered and addressed, not their outcomes.
- This review identified the level of adoption of the EAF approach within each RFMO, it was not an assessment of the degree to which the relevant management body was meeting the requirements set out in its convention/agreement.
- It is recognized that many RFMO conventions do not specifically refer to all EAF components (e.g. social and economic outcomes).
- While EAF was agreed by Member Countries of COFI (and may be mentioned in some conventions), it is not a legal obligation for RFMOs.

- A more complete assessment of EAF adoption and especially the outcomes would require direct involvement of the various stakeholders including all relevant management, compliance and scientific bodies, contracting parties (CP), non-contracting parties (NCP), vessel owners, crews and NGOs, etc.

### 3.3 Ecosystem approach to fisheries components

As agreed by the ABNJ PSC, this review was designed to cover all key elements of EAF by asking a series of questions that mirrored the implementation guidelines for EAF as presented in the FAO–EAF toolbox.

#### Key EAF components

The EAF component approach, as outlined in the EAF Toolbox,<sup>10</sup> was used as the basis for assessment (Figure 2). The issues associated with ‘a fishery’ are separated into the three EAF component groups:

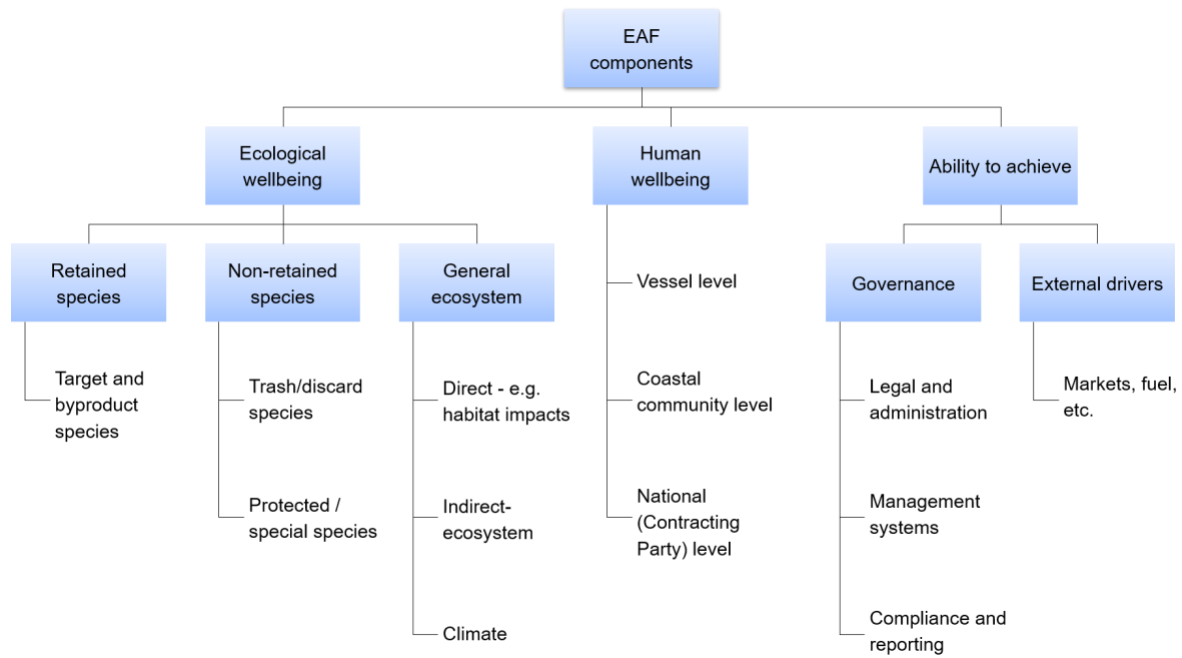
- **Ecosystem wellbeing:** All ecological ‘assets’, including all affected fish stocks (e.g. target, bycatch, discards etc), habitats, ecosystems relevant to the fishery and the issues/impacts generated by the fishery that may be affecting these assets.
- **Human wellbeing:** The social and/or economic ‘outcomes’ currently generated by the fishery both the good – those outcomes the community wants to generate (e.g. food security, economic development) – and the bad, those it wants to avoid (e.g. conflicts, injuries).
- **Ability to Achieve:** The management and institutional ‘systems’ in place or proposed to deliver the desired outcomes (e.g. access and tenure systems, compliance, democratic processes, conflict resolution), along with the external ‘drivers’ (factors not controlled by the fishery) which may be affecting performance.

Based on experiences applying the EAF approach in multiple situations, a set of 13 key EAF components have been identified that apply to most fisheries and jurisdictions.

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<sup>10</sup> <http://www.fao.org/fishery/eaf-net/toolbox/planning/step-2/en>





**Figure 2:** The thirteen key EAF Components<sup>11</sup>

To ensure the review assessment process was applied in a consistent manner across the RFMOs, suitable criteria were developed for assessing the level of consideration required for each of the 13 EAF components. This was achieved by developing a number of standard questions that focused on the degree to which there has been formal consideration of each of the components. The high seas are the area where most of the RFMO fisheries operate. The only RFMO fishing activities that occur directly within the coastal areas were in the Mediterranean and Black Sea (GFCM). Consequently, the “coastal community level” EAF component was not included in the EAF review. Each of the other 12 EAF components was considered to be at least potentially relevant to every RFMO and the review was therefore based on this set of criteria.

### Data collation and EAF background reports

In order to standardize the EAF reviews using material obtained from web-based materials and sources, an EAF background report was generated for each RFMO and its associated management body that was structured using the EAF report headings as outlined in EAF Activity 1.3 of the EAF Toolbox.<sup>12</sup> A tailored set of component trees for each of the regional fisheries management bodies was also generated, as per EAF Activity 2.1.<sup>13</sup>

The prime sources of information used for the review were the materials and publications available on (and linked to) the websites for each of the regional fisheries management bodies, in addition to a number of highly relevant FAO publications. Specifically, the compilation of information for the background report for each RFMO was significantly assisted by the information already contained within FAO Technical Report 595 (FAO, 2016). This report included a chapter on each of the RFMO regions and their associated management bodies. While this report focused on the extent to which these bodies were dealing with benthic impacts and vulnerable marine ecosystems, it did include some broader information on these fisheries that covered many aspects required for this review.

<sup>11</sup> See [http://www.fao.org/fishery/eaf-net/eaf-tool/eaf\\_tool\\_1](http://www.fao.org/fishery/eaf-net/eaf-tool/eaf_tool_1) for more information

<sup>12</sup> <http://www.fao.org/fishery/eaf-net/topic/166251>

<sup>13</sup> <http://www.fao.org/fishery/eaf-net/topic/166253>

A considerable level of additional information for each background report was also obtained from the webpages, documents, reports and other materials available for download from each of the RFMO websites. Another valuable document for checking management actions was a Comparative Measures Scan (FAO, unpublished). This draft document provided a list of the conservation measures applied within each RFMO across a variety of areas, which covered some of the EAF components and was a useful check on the information gained through the web-based material search.

It must be highlighted that in order to facilitate the process of completing the EAF background reports in a timely fashion, these reports often included large sections of text taken directly from the source documents themselves. While each of the sources is clearly acknowledged at the beginning of the EAF background reports and within the references section, given the high frequency that these sources were used as a basis for information, specific citations were not made each time within the text, except for figures and tables. Consequently, these background reports should be seen as collations of material from these sources, not as separately authored documents.

### **3.4 Ecosystem approach to fisheries assessment criteria**

Based on the information collated within each of the EAF background reports and the tailored set of EAF components relevant to each RFMO, a gap analysis was undertaken to determine the degree to which the overall systems of management were consistent with EAF. These analyses therefore assessed the degree to which each of the EAF components was:

- being directly and fully addressed;
- previously identified and already addressed; and
- evidence that they had been formally considered and determined as not being of sufficient risk to warrant direct management intervention.

Importantly, (as outlined above) this assessment related only to the level that EAF issues were being considered and addressed within the RFMO by the management systems, not specifically the outcomes. To assist in determining the EAF audit process, the set of questions developed as part of the FAO–EAF Toolbox project, to determine how well a fishery was implementing EAF, were used as a starting point. These questions had been designed to be answered by the fishery manager(s) explicitly undertaking an EAF planning process. They were, therefore, divided into four components, largely based on what step the fishery had reached in the EAF planning and implementation process. The underlying concept was that it is not until a fishery can demonstrate that it has undertaken the actions for each level of implementation – and can report how it is either achieving acceptable performance against each of its EAF-based management objectives, or is taking appropriate action to achieve acceptable levels – that it can say that EAF has been fully implemented.

As the assessments undertaken for this review were only based on a desktop review of what was publicly available information, the audit process could only focus on the degree to which there has been consideration of the EAF components and principles by each of the RFMOs. For example, the robustness of the individual science assessment methodologies applied, or the success of the research programmes, could not realistically be critiqued, as would be the case in an MSC audit. This level of review would need to be conducted in conjunction with – and with direct assistance from – the relevant managers, scientific, compliance and administrative staff from the RFMOs.

The criteria employed here were therefore suitably adapted for use in this EAF audit process in order to enable the reviews for each RFMO to be undertaken in a consistent and objective manner (Table 3.4). The set of questions developed covers each of the key components of EAF: ecological wellbeing, human wellbeing and ability to achieve.

**Table 3.4:** RFMO EAF assessment components

<b>ECOLOGICAL WELLBEING</b>
<b>Captured species – retained species</b>
Have ‘all’ retained species/stocks been identified and an assessment of their risks completed?
Are the management systems to deal with the set of risks in place (including operational objectives and performance measures and suitable restrictions/arrangements)?
Is a suitable monitoring programme in place (including regular re-assessment)?
<b>Captured species – non-retained species</b>
Has there been identification of ‘all’ non-retained species/groups and an assessment of their risks?
Are there management systems (if needed) appropriate to risk levels in place?
Is there a suitable monitoring programme (if needed) appropriate to risks in place?
<b>Captured species – special species</b>
Are special species (e.g. ‘protected species’) being identified and is an assessment of their risks being undertaken?
Is there a management system (if needed) appropriate to risk levels in place?
Is there a suitable monitoring programme (if needed) appropriate to risks in place?
<b>Broader ecosystem – direct effects</b>
Are potential direct effects (e.g. benthic impacts) being identified and assessment of their risks undertaken?
If needed, are the management arrangements appropriate to risk levels are in place?
Is there a suitable monitoring programme (if needed) appropriate to risks in place?
<b>Broader ecosystem – cumulative impacts</b>
Are potential indirect effects (e.g. cumulative impacts on community structure) being identified and assessment of their risks undertaken?
If needed, additional management arrangements to those designed for captured species and direct effects appropriate to the risk levels are in place
A suitable monitoring programme, appropriate to the risks, is in place.
<b>Broader ecosystem – external drivers/climate</b>
Identification of external environmental impacts (e.g. climate) and assessment of their risks
Appropriate consideration of these risks is made within management strategies and policies.

<b>HUMAN WELLBEING</b>	
<b>Vessel/industry level</b>	
Identification of relevant social and economic components at the vessel/industry level and assessment of the risks (e.g. crew safety, separation) and opportunities (e.g. income)	
Appropriate consideration of these risks/opportunities is made within management strategies and policies.	
<b>Community level (<i>n.b. this was not relevant to most RFMOs</i>)</b>	
Identification of relevant social and economic components at the Dependent Community Level and assessment of the risks and opportunities (e.g. income)	
Appropriate consideration of these risks/opportunities is made within management strategies and policies.	
<b>National level</b>	
Identification of relevant social and economic components and assessment of the risks (e.g. conflicts) and opportunities (e.g. licence fees, processing, food security) relevant at the various national levels including flag states, adjoining coastal states, etc	
Appropriate consideration of these risks is made within management strategies and policies.	
<b>ABILITY TO ACHIEVE</b>	
<b>Governance – legal and administration</b>	
There is a clear articulation of the fishery including: geographic boundaries; participants; fishing methods; high-level ecological, social and economic objectives to be achieved, etc	
Suitably binding and effective legal instruments and associated policies are in place, which enable effective management systems to be developed, implemented and enforced	
The consultation and administrative structures enable efficient decision-making processes, including an appropriate level of stakeholder consultation/participation	
Appropriate compliance and consideration of relevant international agreements and other fishery bodies.	
<b>Governance –management systems</b>	
There has been a comprehensive identification and assessments of risks for all EAF components against the set of high-level objectives	
There is a clear management ‘plan’ that specifies the set of management arrangements designed to achieve the operational objectives appropriate to their current levels of risk	
There is a clear process (such as harvest strategies/control rules) to determine when and what management amendments are needed.	
<b>Governance – compliance, reporting and review</b>	
There are effective monitoring, compliance and enforcement programmes	
There are regular assessments of the status/risk levels to determine whether the management settings are achieving the operational objectives	
There is regular public reporting on fishery status and risk levels	

There are periodic, independent reviews of risk levels and management processes.
<b>Non-environmental external drivers</b>
Potential external impacts from markets/exchange rates/fuel costs, etc; other relevant fisheries, RFMOs, jurisdictions etc, and their relative risks to the fishery are identified
There is an Appropriate consideration of external risks within management strategies, policies and processes.

### 3.5 Ecosystem approach to fisheries review assessment and scoring

For the 12 relevant EAF components (the community level wellbeing criteria was not relevant to most RFMOs) and their specific questions, the current implementation status was assessed using a semi-qualitative methodology, as presented in Table 3.5.

During the study an additional category of mostly/fully was added for the final scoring to better accommodate the current status of some of the EAF issues, whereby many of the RFMOs were already in the process of dealing with a few remaining gaps.

**Table 3.5:** Scoring methodology for the EAF Review

Scoring	Components	Description
n/a	n/a	Component/issue not applicable to this fishery
0	Nil	No evidence that this EAF component has been formally considered
1	Partly or developing	Only some aspects of this EAF component are currently covered or are just beginning to be considered
2	Mostly or partly in progress	While many aspects are already being covered, there are clear gaps
2.5	Mostly (in progress) mostly/fully	Each of the main gaps is actively being addressed
3	Fully	All aspects of this component are currently covered by the management system

The EAF review assessments were based on the materials that were collated for each of the RFMOs up to the middle of 2018. These are available in their EAF background reports, included as Appendix 2.

It must be noted that the review tables presented for each RFMO in the main body of the report only include a summary of the material used to justify the score. In order to get a full picture of what was used in the analysis (especially the references) each of the review tables should be read in conjunction with the relevant EAF background report. Importantly, as well as the score, the review tables outline where any specific gaps in EAF implementation were identified, in addition to any other comments.

### **3.6 Overall assessment of ecosystem approach to fisheries implementation by regional fisheries management organizations**

In addition to the EAF audit scores for each of the eight RFMOs being assessed, the scores for each of the EAF components were compared across all RFMOs to provide an overview of the level of EAF implementation by management bodies. This was undertaken to assess whether there were consistent trends for completion or omission by management bodies, and therefore whether issues were specific to the region/body or if a wider programme might be developed to address gaps in EAF implementation that would cover multiple fisheries/bodies.

### **3.7 Consultation**

Once the EAF background reports and assessment reviews for each RFMO had been drafted, they were forwarded to the relevant RFMO Secretariats for their comments. This was especially important where errors or omissions would affect the assessment of the level of EAF implementation. Where additional material or comments were provided by the management bodies, these were included in subsequent drafts or revisions. It is recognized that the EAF background documents compiled for this study are not exhaustive reviews of all information related to these fisheries or RFMO areas. They would, however, provide a good starting resource for the completion of more formal EAF background summaries.

After addressing each of the comments provided by the RFMO secretariats, updated background reports and audit reviews were redrafted. From these a consolidated report covering all RFMOs based on data available to August 2018 was developed and submitted to FAO for consideration. After incorporating comments from FAO, a further round of consultation was undertaken in March 2019. Each RFMO secretariat was supplied with a full draft of the report that now included the results for all RFMOs and the overall EAF gap analyses. The finalization of this report took into account comments received from the RFMO secretariats on the full draft, and incorporated feedback received during the ABNJ Deep Sea Meeting 2019 (held on 7–9 May 2019) (FAO, 2020) including those that followed a presentation on this study.

## **4. INDIVIDUAL REGIONAL FISHERIES MANAGEMENT ORGANIZATION REVIEWS**

### **4.1 Antarctic and Southern Oceans**

The Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) was established by international convention in 1982 with the objective of conserving Antarctic marine life within the high seas and national waters of the Antarctic and Southern Ocean (ASO). The CAMLR Convention also forms an integral part of the Antarctic Treaty System. The Convention covers the Antarctic marine living resources of the area south of 60° South latitude. CCAMLR has a mandate to conserve populations or ecosystems that are not only directly related to harvested marine resources, but also conserve dependent on and related to these populations (Table 4.1). The CCAMLR comprises: a

Commission, which is the decision-making body; a Scientific Committee, which has established subsidiary bodies; a Standing Committee on Implementation and Compliance; a Standing Committee on Administration and Finance; and finally a Secretariat, which provides administrative support to the Commission and the various committees.

The fisheries in the convention area currently target Patagonian toothfish, Antarctic toothfish, mackerel icefish and Antarctic krill. Krill are caught using pelagic trawls, with recent annual catches in the vicinity of 250 000 tonnes. Toothfish are mostly caught using bottom set longlines, catching approximately 20 000 tonnes across both species. Some trawling occurs for icefish in specific regions. CCAMLR practises an ecosystem-based management approach which requires harvesting to be carried out in a sustainable manner that takes into account the effects of fishing on other components of the ecosystem.

CCAMLR currently has 25 Members: Argentina, Australia, Belgium, Brazil, Chile, China, European Union, France, Germany, India, Italy, Japan, Namibia, New Zealand, Norway, Poland, the Republic of Korea, the Russian Federation, South Africa, Spain, Sweden, Ukraine, United Kingdom of Great Britain and Northern Ireland (the), the United States of America, Uruguay.

**Table 4.1:** EAF implementation audit – ASO/CCAMLR (July 2018)

*Note: The summaries outlined in this table should be read in conjunction with the information presented in the EAF Background Report for CCAMLR, including all key references.*

EAF component	EAF status	ASO/CCAMLR justification and comments	Source material
<b>Retained species</b>			
Identification and risk assessments	Fully	<p>There is a good understanding of the levels and composition of the catch for each of the retained species in the various fisheries that operate in the convention area (krill, toothfish and icefish).</p> <p>There is also some level of assessment of risk for each of the retained groups.</p>	<p>CCAMLR Website (<a href="http://www.ccamlr.org">www.ccamlr.org</a>)</p> <p>Annual fishery reports</p> <p>Statistical bulletin</p>
Management systems appropriate to risks	Fully / Mostly	<p>There are specific sets of conservation measures in place to manage each of the three target species/groups: seven CMs for Krill, eleven for toothfish and two for icefish.</p> <p>Where relevant, these are specific to the different fisheries or fishing areas.</p> <p>In all cases there are annual catch limits which are updated annually based on assessments and recommendations from the Scientific Committee, in turn based on the reports of the relevant working group.</p> <p>There are gear controls in place.</p> <p>There are also CMs designed to minimize the targeting of non-target species.</p> <p><i>Gap: There are clear decision rules for some but not all fisheries.</i></p>	<p>Website</p> <p>Annual fishery reports</p> <p>Scientific Committee reports</p> <p>Schedule of conservation measures 2017/18</p>



EAF component	EAF status	ASO/CCAMLR justification and comments	Source material
Suitable monitoring and ongoing assessment programme appropriate to risks	Fully	<p>There is comprehensive catch and effort monitoring with commercial fishing data submitted to the Secretariat using CCAMLR data forms.</p> <p>The Commission requires all toothfish- and icefish-fishing vessels in CCAMLR fisheries to carry at least one scientific observer.</p> <p>Krill fishing vessels are required to carry at least one scientific observer for 75 percent of their fishing operations.</p> <p>Observers record information on the gear configuration, fishing operations, catch composition, biological measurements of target and bycatch species, and details of tagging and tag-recaptures.</p> <p>Stock assessments are available for all target species and most by-product species specific to the individual regions where the fisheries operate.</p> <p>The annual fishery report for each fishery outlines the current stock status.</p>	<p>Website</p> <p>SISO</p> <p>Annual fishery reports</p>
<b>Non-retained species</b>			
Identification and risk assessments	Fully	<p>There is good information on the composition of discarded bycatch; the annual catch levels are also well-known for most of these bycatch species (at least for those caught in significant quantities).</p> <p>Some form of quantitative assessment has been undertaken to determine whether catch limits are required.</p>	<p>Website</p> <p>Annual fishery reports</p>
Management systems appropriate to risk levels are in place	Fully	<p>CM 33-01 and CM 33-02 limit the level of bycatch species that may be taken for specific fisheries, while CM 33-03 specifies bycatch limits for new and exploratory fisheries.</p> <p>Individual conservation measures may contain more specified bycatch limits by fishery, in addition to move-on rules if the limits for any one haul are exceeded.</p>	<p>Schedule of conservation measures 2017/18</p>
Monitoring programme appropriate to risks	Fully	<p>The catch and effort requirements and the SISO system together also provide a good monitoring system for non-retained species.</p>	<p>Statistical bulletin</p> <p>SISO</p>

EAF component	EAF status	ASO/CCAMLR justification and comments	Source material
<b>Special species</b>			
Identification and risk assessment	Fully	<p>There is a good understanding of the level of interactions with dependent species, particularly seabirds and mammals (fur seals).</p> <p>Incidental mortalities were high in the 1980/1990s and significant actions have been taken since to address the risks.</p> <p>Sharks have also been addressed.</p>	<p>Website</p> <p>Annual fishery reports</p>
Management appropriate to risk levels for each component of this group are in place	Fully	<p>There have been a number of initiatives and associated conservation measures introduced to minimize the incidental mortality and capture levels of seabirds CM 24-02, CM 25-02 and, where relevant, marine mammals CM 25-03.</p> <p>These have been effective in reducing the mortality to acceptable levels.</p> <p>There is a CM32-18 for shark conservation.</p>	<p>Website</p> <p>Annual fishery reports</p> <p>Schedule of conservation measures 2017/18</p>
Monitoring programme appropriate to risks	Fully	<p>The catch and effort and ISO observer programme cover this issue with observers recording information on the gear configuration, including measures to reduce the incidental mortality of seabirds and marine mammals.</p> <p>The annual numbers for bird and seal mortality in each fishery are presented in the relevant annual fishery reports.</p>	<p>SISO</p> <p>Annual fishery reports</p> <p>Statistical bulletin</p>
<b>Broader ecosystem - direct fishing effects</b>			
Identification of potential direct effects, including footprint mapping and risk assessments of all potential impacts	Mostly	<p>In line with the requirements of UNGA Resolution 61/105, preliminary assessments of bottom fishing activities (impact assessment) in exploratory fisheries in the high seas areas of the convention area have been undertaken.</p> <p><i>Gap: Not clear that there is a risk assessment of non-benthic components.</i></p>	<p>Website</p> <p>FAO Report 595</p>
Management arrangements (gear, area etc) appropriate to risk levels, including:	Mostly (in progress)	<p>There are a number of CMs in place to deal with these issues.</p> <p>Established and exploratory bottom fishing activities for toothfish are currently only undertaken within relatively small areas of the convention area.</p>	<p>Website</p> <p>Schedule of conservation measures 2017/18</p>

EAF component	EAF status	ASO/CCAMLR justification and comments	Source material
<ul style="list-style-type: none"> <li>• VME thresholds</li> <li>• Encounters and move on rules</li> <li>• VME closures, spatial measures</li> <li>• Gear restrictions</li> <li>• Lost gear</li> </ul>		<p>CCAMLR has banned the use of gillnets in the convention area (CM 22-04).</p> <p>There are further restrictions on the use of bottom trawling gears in high seas areas of the convention area (CM 22-05).</p> <p>CCAMLR established the world's first high seas MPA – the South Orkney Islands – with further MPAs envisaged as part of the General MPA framework (CM 91-04).</p> <p>A total of 46 registered VMEs have been identified: 42 of these are in areas where bottom fishing is currently prohibited (CM 32-02).</p> <p>Fishing vessels using bottom fishing gears are required to take certain actions when they encounter evidence of a VME (CM 22-07).</p> <p>To carry out exploratory bottom fishing, fisheries must submit details of their intentions for review, prior to fishing, together with any mitigation measures they plan to take to avoid significant adverse impacts on VMEs.</p> <p>CM 26-01 prohibits the use of plastic bait bands and restricts other plastic, as well as the dumping of waste, garbage and sewage.</p> <p>Resolution XXVI also covers ballast water discharge.</p>	FAO Report 595
Suitable monitoring programme appropriate to risks is in place	Fully	SISO	SISO
<b>Broader ecosystem - cumulative fishery effects</b>			
Identification of cumulative impacts on community structure and assessment of their risks	Mostly	<p>Krill harvesting has been managed in a precautionary manner in recognition of the critical role of krill in the Antarctic ecosystem (a keystone species).</p> <p><i>Gap: The performance review identified that there needs to be a better understanding of the interactions among fisheries within the Antarctic.</i></p>	<p>Website</p> <p>Convention</p> <p>Annual fishery report</p> <p>Second performance review</p>

EAF component	EAF status	ASO/CCAMLR justification and comments	Source material
Management arrangements for captured species and direct effects deal with any cumulative impacts	Mostly	<p>Recognition of the central role of krill in the ecosystem is at the core of the approach taken by CCAMLR in the management of the krill fishery; this is covered in CM 51-01, 51-02, 51-03.</p> <p>Ecosystem implications are also generally mentioned explicitly in the management settings and fishery reports for some toothfish fisheries, and to a lesser extent icefish fisheries.</p> <p><i>Gaps: there needs to be a better understanding of the interactions between fisheries within the Antarctic. This, together with individual conservation measures, would contribute to the successful achievement of the conservation objective by using a regional approach.</i></p> <p><i>The relationship between krill and whales may need greater attention.</i></p> <p><i>Ecosystem interactions for finfish fisheries, notably toothfish, also need more consideration.</i></p>	<p>Website</p> <p>Schedule of conservation measures 2017/18</p> <p>Second performance review</p>
Suitable monitoring and review appropriate to the risks	Fully	The CCAMLR Ecosystem Monitoring Programme (CEMP) is designed to detect and record significant changes in critical components of the ecosystem, to serve as a basis for the conservation of Antarctic marine living resources.	<p>Website</p> <p>CEMP</p>
<b>Broader ecosystem - environmental external drivers (climate)</b>			
Identification and assessment of risk from external environmental impacts (e.g. Climate)	Mostly (in progress)	<p>There is recognition of the potential impacts of climate on stock levels.</p> <p><i>Gap: Given the potential impact of climate change on recruitment variability, the Stock Assessment Working Group agreed that both the recruitment variability and the specification of the current decision rule relating to the maintenance of stable recruitment should be investigated further.</i></p>	<p>Website</p> <p>Annual fishery reports</p>
Explicit consideration of any risks made in management strategies	Mostly	As above	<p>Website</p> <p>Annual fishery reports</p>
<b>Social and economic wellbeing – vessel/industry level</b>			
Identification and assessment of social and economic components at	Partly	<p>The issue of vessel and crew safety has been identified.</p> <p><i>Gap: No other vessel-level or industry-level, economic or social EAF components were found to have been considered or had their risks assessed.</i></p>	<p>Convention</p> <p>Schedule of conservation measures</p>

EAF component	EAF status	ASO/CCAMLR justification and comments	Source material
this level (e.g. crew safety).			Website
Appropriate consideration of risks opportunities within management	Partly	The Convention includes a number of resolutions related to safety on board vessels. <i>Gap: No other social or economic measures are in place or appear to be explicitly considered.</i>	Schedule of conservation measures Website
<b>Social and economic wellbeing – community level</b>			
Identification and assessment of social and economic components at this level (e.g. regional benefits)	N/A	Not relevant (no coastal operations).	
Appropriate consideration of risks opportunities within management	N/A	As above.	
<b>Social and economic wellbeing – national level</b>			
Identification and assessment of social and economic components at this level (e.g. income, employment)	Nil	<i>Gap: No information found.</i>	Website Convention Annual reports
Appropriate consideration of risks opportunities within management	Partly	Contracting parties may provide their views on economic and social considerations based on implicit objectives during the decision-making process within the Commission meetings. <i>Gap: no formal mechanisms to deal with these EAF components were identified.</i>	Rules of procedures Convention

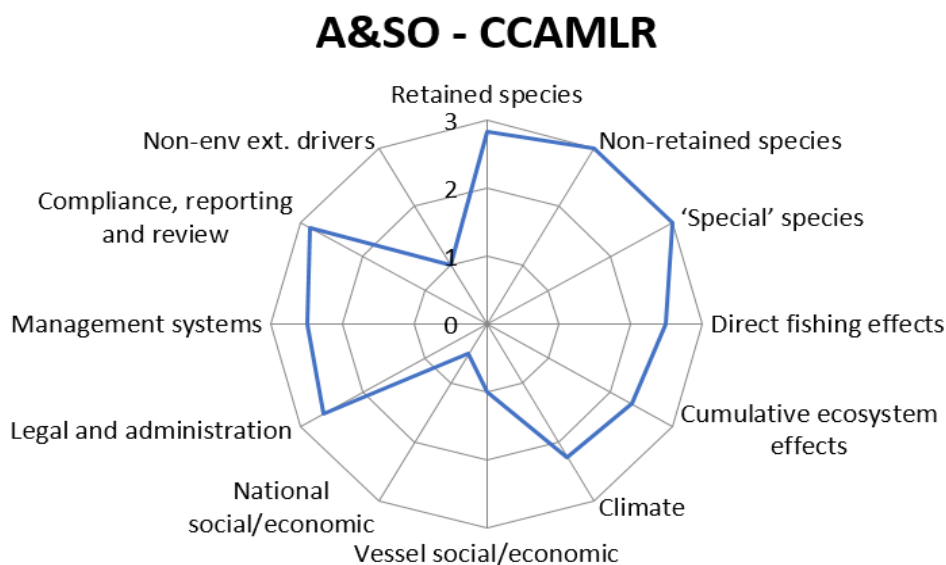
EAF component	EAF status	ASO/CCAMLR justification and comments	Source material
<b>Ability to achieve – governance – legal and administration</b>			
Clear scope and high-level EAF: ecological, social and economic objectives are identified	Mostly	<p>The combined set of information available on the CCAMLR website, the Second Performance Review documents, the various annual fishery reports and the FAO technical report cover most of the environmental elements of EAF.</p> <p><i>Gaps: The social and economic elements are not mentioned in the convention except for the term 'conservation', which included 'rational use'.</i></p>	Convention Website FAO report Second performance review
Suitably binding and effective legal instruments to enable effective management	Fully	<p>The Convention and the relevant compliance systems are comprehensive and binding for all contracting parties and, as far as possible, other relevant parties.</p>	Convention Website FAO report
Suitable consultation and administrative structures are in place and enable efficient decisions	Fully	<p>Each of the various governance and consultative structures is in place and operational.</p>	Website Convention FAO Report 595 Second performance review Various committee reports
Consideration of international agreements and other bodies	Mostly (in progress)	<p>CCAMLR is an integral component of the Antarctic treaty and regularly collaborates with nearby fisheries including the other deep-sea RFMOs and tuna RFMOs, as well as other Antarctic organizations such as COMNAP and IAATO, to develop fisheries and ecological research.</p> <p><i>Gaps: The Performance Review identified that agreements with adjacent regional fisheries bodies should be further developed and operationalized.</i></p> <p><i>More proactive communication should be undertaken to engage with other international organizations, regional bodies and international processes.</i></p>	Website Convention FAO Report 595 Second performance review

EAF component	EAF status	ASO/CCAMLR justification and comments	Source material
<b>Ability to achieve – governance – management systems</b>			
Comprehensive identification and assessments of risks for all EAF components	Mostly	<p>Identification and assessments of the most likely environmental risks – target species, bottom impacts, special bycatch species – have been conducted, in addition to general environmental risks and cumulative risks.</p> <p><i>Gaps: No formal assessment of most of the social and economic risks.</i></p>	<p>Website</p> <p>FAO Report 595</p> <p>Annual fishery reports</p>
A clear management ‘plan’ and arrangements appropriate to current levels of risk	Mostly	<p>Each of the governance elements required for the management of the various ecological risks is in place.</p> <p><i>Gap: There is no easily available documentation that clearly and holistically outlines how and why each of these risk areas is being managed in a manner consistent with the EAF guidelines.</i></p>	<p>Website</p> <p>Annual fishery reports</p> <p>Schedule of conservation measures</p> <p>Second Performance Review</p>
A clear process or harvest strategy to amend management as needed	Mostly / Fully	<p>There is a combination of explicit and implicit harvest strategies in operation for each of the target species/areas, which vary depending upon the level of maturity of the management systems.</p> <p><i>Gap: No set of easily found harvest strategies.</i></p>	<p>Annual fishery reports</p>
Suitable scientific monitoring and assessment process in place	Fully	<p>There is a very comprehensive system of monitoring in place covering:</p> <ul style="list-style-type: none"> <li>• Catch and effort Monitoring</li> <li>• International Scientific Observation scheme</li> <li>• CEMP</li> <li>• Annual assessments are also completed for each fishery.</li> </ul>	<p>Website</p> <p>Annual fishery reports</p> <p>SISO</p> <p>CEMP</p> <p>Statistical bulletin</p>

EAF component	EAF status	ASO/CCAMLR justification and comments	Source material
<b>Ability to achieve – governance – compliance, reporting and review</b>			
Effective monitoring, compliance and enforcement programmes: <ul style="list-style-type: none"> <li>• Vessel list and notification</li> <li>• VMS</li> <li>• IUU</li> <li>• Observers</li> <li>• Port</li> </ul>	Fully	CCAMLR conservation measures support a suite of monitoring and compliance systems and tools; these include: <ul style="list-style-type: none"> <li>• Vessel licensing (Conservation Measure 10-02)</li> <li>• Monitoring of vessel movements (Conservation Measure 10-04)</li> <li>• Monitoring of vessel transhipments (Conservation Measure 10-09)</li> <li>• System of Inspection</li> <li>• Vessel Monitoring System (Conservation Measure 10-04)</li> <li>• Catch Documentation Scheme (Conservation Measure 10-05)</li> <li>• Establishment of the Non-contracting party IUU Vessel List (Conservation Measure 10-07) and the contracting party IUU Vessel List (Conservation Measure 10-06), and</li> <li>• Obligations in respect of the control of nationals from CCAMLR Member Countries (Conservation Measure 10-08).</li> </ul>	Website Schedule of conservation measures Second performance review Statistical bulletin
Regular reporting on fishery risk status for all EAF components	Mostly / Fully	The annual fishery status reports cover the status of target stocks, bycatch, special species interactions and in many cases ecosystem impacts.  <i>Gap: No reporting on social or economic components.</i>	Annual fishery reports Statistical bulletin
Periodic, independent reviews	Fully	There have been two independent reviews of CCAMLR performance; the most recent was completed in 2016.  This has provided some recommendations that are consistent with ongoing EAF implementation.	Second performance review Website
<b>Non-environmental external drivers</b>			
External impacts and risks to the fishery identified and assessed	Partly	It is not clear that this is undertaken in a formal manner.	
Appropriate consideration of external risks within management strategies, policies and processes	Partly	As above	



### 4.1.1 Summary gap analysis



**Figure 3:** Summary of EAF implementation for CCAMLR (where 1= Partly; 2=Mostly and 3= Fully)

As per Figure 3, there has been direct consideration of most (9 of 12) of the EAF components by CCAMLR with each of the 9 considered to be either mostly implemented (Direct Impacts; Cumulative Impacts; Climate; Management Systems) or close to fully implemented (Retained, Non-Retained and Special Species; Compliance and Reporting; Legal and Administration). Regarding the few gaps within these components, some are already under active consideration. The main gaps were active consideration of the social and economic components as well as non-environmental external drivers.

*Retained, Non-Retained and Special Species:* A few minor gaps for retained species with clear decision rules only in place for some, but not all fisheries. No effective gaps for other components.

*Direct Fishing Effects:* Comprehensive management of benthic impacts. It is not clear that a risk assessment of all components within this category has been conducted.

*Cumulative Impacts:* While recognized for krill, the performance review identified that a better understanding of the interactions of fisheries within the Antarctic, and ecosystem interactions for finfish fisheries – notably tooth fish – also need consideration.

*Social/Economic:* Apart from crew safety, no other vessel- or industry-level, economic or social EAF components were found to have been considered or had their risks assessed or included in the management systems.

*Climate & Non-Environmental External Drivers:* Work to understand the impact of climate on recruitment variability, as well as decision rules relating to the maintenance of stable recruitment has been identified as requiring further investigation. No other external drivers (e.g. markets) appear to have been considered.

*Management:* There is no documentation that clearly and holistically outlines how and why each of the risk areas is being managed in a manner consistent with the EAF guidelines.

*Legal, Administration plus Compliance, Reporting and Review:* A key gap is the lack of explicit consideration and reporting on social or economic components.

**Key points:** Some form of risk assessment is still required for non-benthic direct impacts; vessel- and national-level (CP) social and economic issues, in addition to an overall EAF plan.

## 4.2 Mediterranean and Black Seas

The General Fisheries Commission for the Mediterranean (GFCM) was established in 1949 to monitor and manage fisheries in the Mediterranean Black Seas (MBS), on the basis of an agreement adopted under Article XIV of the FAO Constitution. The functions and responsibilities of the GFCM are to ensure the conservation and sustainable use of living marine resources at the biological, social, economic and environmental levels, as well as the sustainable development of aquaculture in the Mediterranean and Black Sea areas of application. The GFCM mandate uses the ecosystem approach to fisheries to consider negative impacts on marine ecosystems.

The GFCM operates through a secretariat based at its headquarters at FAO. The Commission operates by means of its committees: the Scientific Advisory Committee on Fisheries, the Scientific Advisory Committee on Aquaculture, the Compliance Committee (CC) and other subsidiary bodies.

The activities and policies of the GFCM are designed to promote the sustainable use and conservation of living marine resources in an economically, socially and environmentally responsible manner in the Mediterranean and the Black Sea, in line with FAO efforts towards food security, taking into account the principles enshrined in the FAO Code of Conduct for Responsible Fisheries and the FAO Blue Growth Initiative (BGI).

The latest GFCM strategy (GFCM, 2017) states that fishing has a tremendous cultural, social and economic importance in the Mediterranean and the Black Sea, providing an important source of food and livelihoods for riparian countries, as well as sustaining the traditions and way of life of many coastal communities (Table 4.2). The strategy also notes that the Mediterranean and Black Sea fisheries are currently facing serious challenges, with roughly 90 percent of the scientifically assessed stocks considered to be fished in excess of safe biological limits, with decreasing catches and shrinking fleets at the regional scale.

The Mediterranean and Black Sea fisheries feature a great variety of target species, vessels and fishing gears. There are 13 main species which account for most of landings, with pelagic species such as anchovy and sardine being the dominant species, collectively totalling over 1 million tonnes. The GFCM is currently composed of 23 Member Countries, in addition to the European Union, with a reported fishing fleet comprised some 92 700 vessels.

**Table 4.2:** EAF Implementation audit – MBS/GFCM (July 2018)

*Note: The summaries outlined in this table should be read in conjunction with the information presented in the EAF Background Report for GFCM including all the relevant references*

EAF component	EAF status	MBS – GFCM Justification and comments	Source material
<b>Retained species</b>			
Identification and risk assessments	Mostly (in progress)	<p>There is a comprehensive understanding of the species that are captured by the fisheries in the GFCM. There are assessments of many of the main targeted species which are summarized in the 2016 Status Report.</p> <p>The mid-term strategy states that only 40 percent of the landings in the GFCM area of application come from stocks for which scientific advice is provided to the Commission.</p> <p><i>Gap: The proportion of stocks assessed has increased. There are regional differences in the knowledge of stock status, with fewer stock units assessed in the Ionian Sea and eastern Mediterranean, compared with the western Mediterranean, the Adriatic Sea and the Black Sea.</i></p>	<p>2016 Status Report</p> <p>Mid-term strategy</p>

<p>Management systems appropriate to risks</p>	<p>Partly (in progress)</p>	<p>Prior to 2012 there were a few management measures for target stocks. RES-GFCM/33/2009/1 required a reduction of a minimum of 10 percent of bottom trawling fishing effort be applied in all GFCM areas.</p> <p>GFCM/37/2013/2 included guidelines on the management of fishing capacity in the GFCM area of application.</p> <p>There are many species identified as being overfished.</p> <p>Since 2012 multiannual management plans that contain each of the required elements have been under development for:</p> <ul style="list-style-type: none"> <li>• Adriatic Sea: fisheries for small pelagic resources;</li> <li>• Western Mediterranean: fisheries for small pelagic resources in the Alboran Sea;</li> <li>• Ionian Sea: fisheries for deepwater rose shrimp and associated species in the Strait of Sicily;</li> <li>• Eastern central Mediterranean: fisheries for deepwater blue and red shrimp and giant red shrimp in the eastern central Mediterranean basin;</li> <li>• Black Sea: fisheries for turbot, fisheries for small pelagic species.</li> </ul> <p><i>Gap: These multiannual management plans have not yet been implemented and similar plans for the other resources are yet to begin development.</i></p> <p>Goal: By 2020, actions are planned to increase the existing scientific and socio-economic knowledge in support of fisheries management, and to adopt necessary decisions to reverse the current rate of over-exploitation, reducing the percentage of stocks exceeding biologically safe limits.</p>	<p>Compendium of Measures 2017</p> <p>2016 Status Report</p> <p>Mid-term strategy</p>
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EAF component	EAF status	MBS – GFCM Justification and comments	Source material
Suitable monitoring and ongoing assessment programme appropriate to risks	Mostly (in progress)	<p>Recommendation GFCM/41/2017/6 outlines the submission of data on fishing activities in the GFCM area of application.</p> <p>It stipulates that the collection of fisheries data in the GFCM area should be organized within the Data Collection Reference Framework (DCRF).</p> <p>This tool is used by the SAC to collect the required information for the provision of advice.</p> <p>GFCM/36/2012/1 has guidelines on a general management framework and presentation of scientific information for multiannual management plans.</p> <p>Assessments of stock status have been presented to the SAC annually since 1997.</p> <p><i>Gaps: The DCRF has only been in place for a short period.</i></p> <p><i>Stock assessments of all GFCM resources are not yet routine.</i></p>	<p>Compendium of Measures 2017</p> <p>GFCM–DCRF (2016)</p> <p>2016 Status Report</p>
<b>Non-retained species</b>			
Identification and risk assessment	Mostly (in progress)	<p>A comprehensive assessment of bycatch levels by region and gear type has been completed, based on available data.</p> <p><i>Gap: updated monitoring and reporting through the DCRF would improve understanding of the different levels.</i></p>	<p>2016 Status Report</p> <p>GFCM–DCRF (2016)</p> <p>Mid-term strategy</p>
Management systems appropriate to risk levels are in place	Partly (in progress)	<p>There are some conservation recommendations that relate to reducing bycatch levels. GFCM/33/2009/2 cod end design.</p> <p>Mid-term goal: to reduce bycatch rates in Mediterranean and Black Sea fisheries.</p>	<p>Compendium of Measures 2017</p> <p>Mid-term strategy</p>
Suitable monitoring programme appropriate to risks	Mostly/Fully	The new DCRF should cover all requirements except for a lack of observers.	DCRF

EAF component	EAF status	MBS – GFCM Justification and comments	Source material
<b>Special species</b>			
Identification and risk assessment	Fully	There is a comprehensive assessment of the level of interaction with each of the vulnerable species in the GFCM.	2016 Status Report
Management appropriate to risk levels for each component of this group are in place	Mostly (in progress)	<p>There are conservation recommendations relating to each of the vulnerable species, including:</p> <ul style="list-style-type: none"> <li>• Recommendation GFCM/35/2011/3 on reducing incidental bycatch of seabirds; Recommendation GFCM/35/2011/7 on reducing incidental bycatch of seabirds in longline fisheries;</li> <li>• Recommendation GFCM/35/2011/4 on the incidental bycatch of sea turtles;</li> <li>• REC.ICCAT-GFCM/34/2010/4 recommendation by ICCAT on the conservation of thresher sharks; Recommendation GFCM/36/2012/3 on fisheries management measures for conservation of sharks and rays;</li> <li>• RES-GFCM/31/2007/4 conservation of marine mammals;</li> <li>• Recommendation GFCM/35/2011/5 on fisheries measures for the conservation of the Mediterranean monk seal; and</li> <li>• Recommendation GFCM/36/2012/2 on mitigation of incidental catches of cetaceans in the GFCM area.</li> </ul>	<p>Compendium of Measures 2017</p> <p>Mid-term strategy</p> <p>2016 Status Report</p> <p>Website</p>
Suitable monitoring programme appropriate to risks	Mostly (in progress)	<p>Specific reporting of incidental catch of seabirds, sea turtles, seals, cetaceans, sharks and rays species is required: GFCM/35/2011/3, GFCM/35/2011/4, GFCM/35/2011/5, GFCM/36/2012/2 and GFCM/36/2012/3.</p> <p><i>Gaps: There were some gaps in the data collection especially for Cetaceans.</i></p> <p><i>The new DCRF should cover most of requirements but without an observer programme it will not be complete.</i></p>	<p>Compendium of Measures</p> <p>2016 Status Report</p> <p>GFCM–DCRF (2016)</p>
<b>Broader ecosystem</b>			
<b>Direct fishing effects</b>			
Identification of potential direct effects, including footprint mapping and risk	Partly (in progress)	<i>Gap: There has not been a full analysis of the levels of benthic impacts in the GFCM.</i>	<p>Compendium of Measures</p> <p>2016 Status Report</p>

EAF component	EAF status	MBS – GFCM Justification and comments	Source material
assessments of all potential impacts		<i>Recommendation GFCM/41/2017/5 asks the SAC to identify possible knowledge gaps and provide advice on measures to overcome these, including through predictive modelling and mapping of habitat suitability, showing the likelihood of their presence.</i>	FAO Report
Management arrangements (gear, area etc) appropriate to risk levels including: <ul style="list-style-type: none"> <li>• VME thresholds</li> <li>• Encounters and move on rules</li> <li>• VME closures, spatial measures</li> <li>• Gear restrictions</li> <li>• Lost gear</li> </ul>	Partly (in progress)	<p>There is a ban on all bottom-trawl activities below 1 000 m in the Mediterranean (REC.CM-GFCM/29/2005/1).</p> <p>While there are no VMEs, there are four Fisheries Restricted Areas (FRAs) used to restrict fishing activities in order to protect deep-sea sensitive habitats, such as VMEs, and essential fish habitats.</p> <p>In addition, REC GFCM/41/2017/5 will establish a network of essential fish habitats in the GFCM.</p> <p>REC GFCM/41/2017/4 created a permanent working group on vulnerable marine ecosystems to advise on new proposals for closures and the enforcement of existing measures (efficiency of existing FRAs addressing VME protection).</p> <p><i>Gaps: GFCM has not identified “existing” and “new” bottom fishing areas and no exploratory fishing protocols for new or developing fisheries are in place or encounter protocols for VMEs.</i></p> <p><i>There are minimal restrictions on other gear and none associated with lost gear.</i></p>	Compendium of Measures 2016 Status Report FAO Report 565
Suitable monitoring programme appropriate to risks is in place	Partly (in progress)	The new DCRF and outcomes of the Essential Fish Habitat and VME working groups should cover most requirements.	DCRF
<b>Cumulative fishery effects</b>			
Identification of cumulative impacts on community structure and assessment of their risks	Partly	<p>There is minimal discussion of ecosystem-level impacts.</p> <p>The DCRF does not include measures apart from those related to individual species.</p>	2016 Status Report

EAF component	EAF status	MBS – GFCM Justification and comments	Source material
Management arrangements for captured species and direct effects deal with any cumulative impacts	Partly	No direct references but current measures will indirectly assist in an assessment of cumulative impacts.	Compendium of Measures
Suitable monitoring and review appropriate to the risks	Partly	No direct mention of this in the DCRF but this information is likely to assist in an assessment of cumulative impacts.	DCRF
<b>Environmental external drivers</b>			
Identification and assessment of risks from external environmental impacts (climate)	Partly	There is some discussion of external impacts in the status reports.	2016 Status Report
Explicit consideration of any risks undertaken in management strategies	Partly	This may be part of the new multiannual management plans.	2016 Status Report
Social and economic wellbeing			
<b>Vessel/industry level</b>			
Identification and assessment of social and economic components at this level (e.g. crew safety).	Partly (in progress)	There is some discussion of the crew safety in the 2016 Status Report.	2016 Status Report Mid-term strategy
Appropriate consideration of risks/opportunities within management	Partly (in progress)	This may be part of the new multiannual management plans.	Website



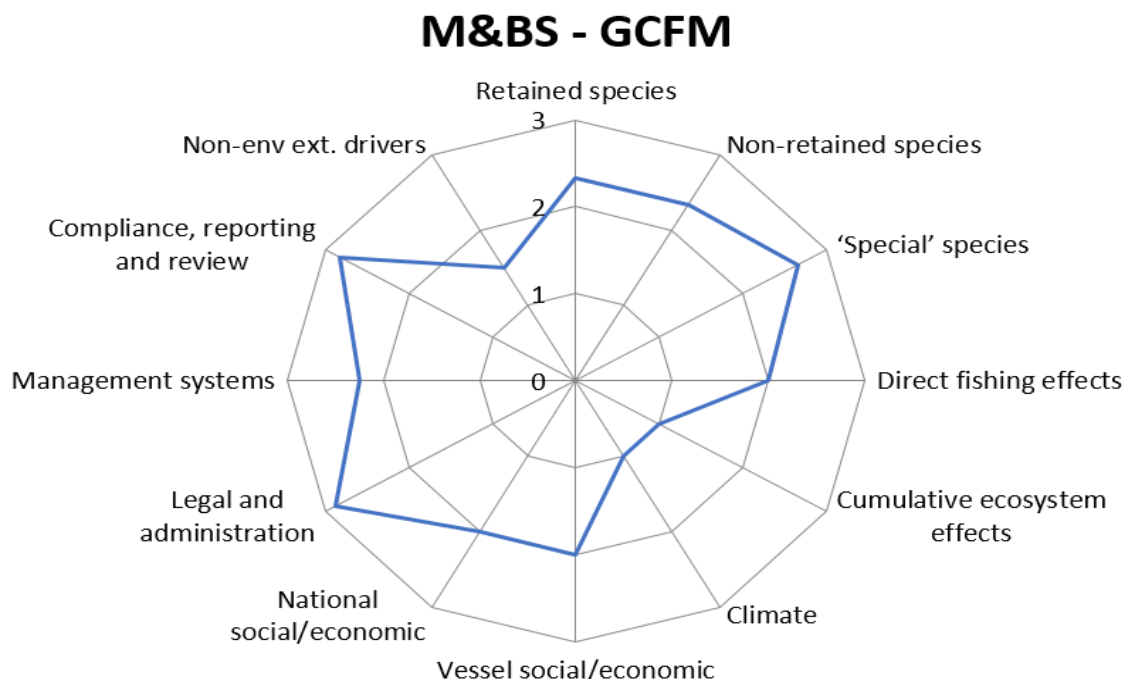
EAF component	EAF status	MBS – GFCM Justification and comments	Source material
<b>Community level</b>			
Identification and assessment of social and economic components at this level (e.g. regional benefits).	Mostly (in progress)	<p>The 2016 Status Report provides comprehensive data at the regional level.</p> <p>The mid-term strategy identifies support livelihoods for coastal communities: small-scale fisheries play an important role in providing income and ensuring food security, particularly within economically vulnerable coastal communities.</p>	<p>2016 Status report</p> <p>Mid-term strategy</p>
Appropriate consideration of risks opportunities within management	Partly (in progress)	<p>RES-GFCM40/2016/3 on sustainable small-scale fisheries in the GFCM area of application acknowledges the importance of the work by the Regional Conference on building a future for sustainable small-scale fisheries in the Mediterranean and the Black Sea.</p> <p><i>Gap: The mid-term strategy states concerted action should be taken to support this sector.</i></p> <p><i>It is recognized that the data available to measure the extent and impact of small-scale fishing activity are limited and can vary widely from country to country.</i></p>	<p>Compendium of Measures</p> <p>2016 Status Report</p> <p>FAO 565</p> <p>GFCM website</p> <p>Mid-term strategy</p>
<b>National level</b>			
Identification and assessment of social and economic components at this level (e.g. income, employment)	Mostly	<p>The 2016 Status Report provides comprehensive data at the national level.</p> <p><i>Gap: It does not report on relative risk levels.</i></p>	2016 Status Report
Appropriate consideration of risks opportunities by management	Partly (in progress)	<p>This may be part of the new multiannual management plans. This will also be discussed at the Commission and committee meetings.</p> <p><i>Gap: The GFCM should facilitate the elaboration of national strategies for the sustainable development of the small-scale fisheries sector, in line with the SSF Guidelines.</i></p>	<p>Mid-term strategy</p> <p>Status Report</p> <p>SSF guidelines</p>

EAF component	EAF status	MBS – GFCM Justification and comments	Source material
<b>Ability to achieve</b>			
<b>Governance</b>			
<b>Legal and administration</b>			
Clear scope and high-level EAF - ecological, social and economic objectives are identified	Fully	<p>The GFCM agreement and related documents outline the objectives, boundaries and participants.</p> <p>Importantly the main objective of the GFCM is to ensure the conservation and the sustainable use, at the biological, social, economic and environmental level, of living marine resources. This is completely consistent with EAF.</p>	<p>Agreement</p> <p>Website</p> <p>Basic texts</p>
Suitably binding and effective legal instruments to enable effective management	Mostly/Fully	<p>The agreement binds contracting parties to implement recommendations and resolutions made by the Commission; all non-contracting parties are also expected to comply with these.</p>	<p>Agreement</p> <p>Basic texts</p>
Suitable consultation and administrative structures are in place to enable efficient decisions	Fully	<p>There is a comprehensive and long-standing set of governance arrangements.</p> <p>There are annual meetings of the Commission and each of the committees covering science, compliance and administration is managed through a commission and secretariat.</p> <p>The process for determining decisions is appropriate and determined by consensus or by a two-thirds majority.</p> <p>RES-GFCM/40/2016/1 outlines the guidelines for drafting GFCM decisions.</p>	<p>Agreement</p> <p>Compendium of Measures</p> <p>FAO 565</p> <p>Basic texts</p>
Consideration of international agreements and other bodies	Fully	<p>The Agreement states that the Commission shall cooperate with other international organizations and institutions in matters of mutual interest, and shall seek to make suitable arrangements for consultation, cooperation and collaboration with other relevant organizations and institutions, including entering into memoranda of understanding and partnership agreements.</p>	<p>Agreement</p>

EAF component	EAF status	MBS – GFCM Justification and comments	Source material
<b>Management systems</b>			
Comprehensive identification and assessments of risks for all EAF components	Mostly/Fully	There has been a reasonably comprehensive assessment of each of the EAF components. Importantly, the social and economic elements have been examined specifically and their importance to the region recognized.	Status Report Mid-term strategy
A clear management ‘plan’ and arrangements appropriate to current levels of risk	Partly (in progress)	Multiannual management plans (MAMP) are beginning to be developed for different resources in the GFCM.  This is a key strategy that is now being adopted by the GFCM.	Compendium of Measures 2016 Status Report Mid-term strategy
A clear process or harvest strategy to amend management as needed	Partly (in progress)	These will be included in the MAMP.	Compendium of Measures 2016 Status Report Mid-term strategy
Suitable scientific monitoring and assessment process in place	Mostly (in progress)	Recommendation GFCM/41/2017/6 outlines the submission of data on fishing activities in the GFCM area of application.  Recommendation GFCM/40/2016/2 on the progressive implementation of data submission in line with the GFCM Data Collection Reference Framework.	Compendium of Measures 2016 Status Report Mid-term strategy
<b>Compliance, reporting and review</b>			
Effective monitoring, compliance and enforcement programmes: <ul style="list-style-type: none"> <li>• Vessel list and notification</li> </ul>	Mostly/fully	There are recommendations covering most of these programmes including: <ul style="list-style-type: none"> <li>• Vessel list: REC.MCS-GFCM/33/2009/6</li> <li>• Regional Fleet register GFCM/33/2009/5</li> <li>• IUU: GFCM/33/2009/8 and GFCM/41/2017/7</li> <li>• VMS: GFCM/33/2009/7 and GFCM/38/2014/1</li> <li>• Port Measures: GFCM/40/2016/1</li> </ul>	Compendium of Measures 2016 Status Report Mid-term strategy

EAF component	EAF status	MBS – GFCM Justification and comments	Source material
<ul style="list-style-type: none"> <li>• VMS</li> <li>• IUU</li> <li>• Observers</li> <li>• Port</li> </ul>		<i>Gap: there is currently no observer programme.</i>	
Regular reporting on fishery risk status for all EAF components	Fully	<p>The Commission and each of the subcommittees generate annual reports which are on the GFCM website.</p> <p>The 2016 Status Report also covered the majority of EAF issues.</p>	<p>GFCM website</p> <p>2016 Status Report</p>
Periodic, independent reviews	Fully	The GFCM established a mid-term strategy (2017–2020) towards the sustainability of Mediterranean and Black Sea fisheries (the strategy) aimed at supporting the GFCM to better fulfil its mandate.	Mid-term strategy
<b>Non-environmental external drivers</b>			
External impacts and risks to the fishery identified and assessed	Mostly	The information presented in the social and economic section of the 2016 Status Report included many of these elements.	2016 Status Report
Appropriate consideration of external risks within management strategies, policies and processes	Partly	There was minimal discussion as to how these issues are included in management settings apart from direct input at Commission and Committee meetings.	All materials

#### 4.2.1 Summary gap analysis



**Figure 4:** Summary of EAF implementation of GFCM (where 1=Partly; 2=Mostly and 3=Fully)

For the GFCM there was some direct level of consideration across all 12 EAF components, with the majority (75 percent) considered to be mostly implemented (Retained Species, Non-Retained Species, Direct Fishing Impacts; Vessel- and National-level economic and social; Management Systems) or close to fully implemented (Legal and Administration; Compliance, Reporting and Review; Special Species). Some of the gaps were identified in the GFCM mid-term strategy, including:

*Retained, Non-Retained and Special Species:* There are identified gaps in the stock assessment and management of target stocks, with only a few multiyear plans in place. Actions are under way to increase the existing scientific and socio-economic knowledge in support of fisheries management. There were gaps in the data collection for some non-retained species and there is no observer programme.

*Direct Fishing Effects:* There has not been a full risk analysis of the levels of benthic impacts and the GFCM has not identified “existing” and “new” bottom fishing areas. There are no exploratory fishing protocols for new or developing fisheries, in place or encounter rules. There are minimal other gear restrictions and none associated with lost gear.

*Cumulative Impacts:* No risk analysis of ecosystem-level impacts and no monitoring programme.

*Social/Economic:* The GFCM was the only RFMO with specific economic and social objectives and relevant information on these, no doubt reflecting the fact that it operates in one of the most populated marine areas; however, these have not yet been incorporated into the management system. GFCM must assist with national strategies that support the sustainable development of the small-scale fisheries sector.

*Climate & Non-Environmental External Drivers:* Minimal discussion of these issues in management settings.

*Management:* There are gaps in the management of target species, benthic, and cumulative impacts. The GFCM has already agreed to adopt necessary decisions to reverse the current over-exploitation rates; a working group is currently considering salutations for appropriate benthic protection. No overall EAF plan.

*Legal, Administration; Compliance/ Reporting/Review:* Few gaps. Importantly, the objective is to ensure conservation and sustainable use at the biological, social, economic and environmental levels.

**Key points:** GFCM was the only RFMO that had specific social and economic objectives as well as the relevant data – probably a reflection of its operation in one of the world’s more populated marine areas. However, this also affects its ability to develop broadly consensus on management systems.

### 4.3 The Northwest Atlantic Ocean

The Northwest Atlantic Fisheries Organization (NAFO) is an intergovernmental fisheries science and management body that includes the ABNJ area of the Northwest Atlantic Ocean (NAO). It was among the first regional fisheries management bodies to be established in the world and operated from 1949, with NAFO founded in 1979 as a successor to International Commission for the Northwest Atlantic Fisheries (ICNAF). The constituent bodies of NAFO are its Commission, Scientific Council and Secretariat.

The objective of the NAFO Convention is to ensure the long-term conservation and sustainable use of the fishery resources in the convention area and, in so doing, to safeguard the marine ecosystems in which these resources are found (Table 4.3). The NAFO area includes the western part of the Atlantic Ocean, extending up the east coast of the United States of America and into the region between Canada and Greenland. The NAFO Regulatory Area (NRA) takes into account the regions within this area that are outside of the 200 nautical mile Exclusive Economic Zones (EEZs).

NAFO has 12 contracting parties: Canada, Cuba, Denmark (in respect of the Faroe Islands and Greenland); France (on behalf of St Pierre et Miquelon), European Union, France, Iceland, Japan, the Republic of Korea, Norway, the Russian Federation, Ukraine, United States of America.

The three main fisheries regulated in the NAFO Regulatory Area are groundfish (including non-pelagic redfish), shrimp and pelagic redfish. In 2017 the catch amounted to approximately 56 000 tonnes of quota species caught in the NRA, with non-pelagic redfish as the predominant species, followed by cod and Greenland halibut.

**Table 4.3:** EAF Implementation audit – – NAO – NAFO (July 2018)

*Note: The summaries outlined in this table should be read in conjunction with the information presented in the EAF Background Report for NAFO, including all relevant references*

EAF component	EAF status	NAO - NAFO – Justification and comments	Source material
<b>Retained species</b>			
Identification and risk assessments	Fully	<p>There is a comprehensive list of species that have been captured in the convention area.</p> <p>Assessments of stock-level sustainability risks have been completed for all 18 stocks, covering 11 species that are retained or potentially retained by this fishery, either through directed or non-directed fishing activities.</p> <p>The Scientific Committee (SC) conducts full stock assessments of “unmanaged” stocks (those that do not appear in the NAFO quota table - Annex 1), either at the request of the Commission (e.g. alfonosinos) or of the SC’s own accord (e.g. grenadiers).</p> <p>This is the first step in how a species or stock becomes a “managed” stock.</p>	<p>NAFO Website <a href="https://www.nafo.int/Science/Species">https://www.nafo.int/Science/Species</a></p> <p>NAFO Conservation and Enforcement Measures (CEM) - Annex 1.C List of Species <a href="https://www.nafo.int/Fisheries/Conservation">https://www.nafo.int/Fisheries/Conservation</a></p>
Management systems appropriate to risks	Fully	<p>Risk-based management strategies are applied to each of the main stocks with performance levels based on achieving suitable F levels.</p> <p>F levels are controlled by setting suitable annual quotas and for some stock effort levels.</p> <p>There are a number of specific management strategies developed for the recovery of some of the stocks.</p> <p>There are also gear controls including minimum mesh sizes and minimum fish sizes.</p>	<p>Annual Assessments, Harvest Strategies and quota setting protocols (Articles 5–14 of CEM CEM - Annex 1.A, Annual Quota Table</p> <p>CEM - Annex 1.B Effort Limitation</p> <p>CEM Article 13 include gear requirements</p> <p>CEM Article 14 – Minimum fish size requirements</p> <p>Annex I- Management strategies Annex 1.A Annual Quota Table Annex 1.B Effort limitation</p> <p>Risk-based management strategy</p>

EAF component	EAF status	NAO - NAFO – Justification and comments	Source material
			<a href="https://www.nafo.int/Science/Frameworks/RBMS">https://www.nafo.int/Science/Frameworks/RBMS</a>
Suitable monitoring and ongoing assessment programme appropriate to risks	Fully	A stock monitoring, assessment and advice schedule is in place covering the main stocks.  This is supplemented by the ability to have species requests from the Commission.	<a href="https://www.nafo.int/Science/Stocks-Advice">https://www.nafo.int/Science/Stocks-Advice</a>  Article 28 Monitoring and Reporting  Annual reports  SCS Summary documents
<b>Non-retained species</b>			
Identification and risk assessment	Partly (in progress)	<i>Gap: No reference could be found on assessments of non-quota bycatch species that may be captured but never retained.</i>	Articles 5 and 6 of the NCEM (NAFO/COM Doc 18-01)  Action Plan in the Management and Minimization of Bycatch and Discards (NAFO/COM Doc 17-26).
Management systems appropriate to risk levels are in place	Partly (in progress)	An action plan has been developed to minimize bycatch and discarding of unwanted species and at-risk species by improving selectivity.  The priority areas are moratoria species, plus species and areas with the highest levels of discarding.	Action Plan in the Management and Minimization of Bycatch and Discards (NAFO/COM Doc 17-26)
Suitable monitoring programme appropriate to risks	Partly (in progress)	Monitoring of all catches, including discards is a requirement of all parties.  Annex II outlines these requirements.  These are also recorded as part of the mandatory observer programmes.	Articles 28 and 30 of the NCEM (NAFO/COM Doc 18-01)  Action Plan in the Management and Minimization of Bycatch and Discards (NAFO/COM Doc 17-26).  CEM Annex II



EAF component	EAF status	NAO - NAFO – Justification and comments	Source material
<b>Special species</b>			
Identification and risk assessment	Partly	<p><i>Gap: Apart from sharks, which are considered targeted species in this fishery, no specific 'special' species have been identified as at risk for this fishery; this may mean that they are not at risk but there is currently no explicit assessment to confirm this.</i></p> <p><i>An analysis of the current observer data or a change to the data that are collected could address this gap.</i></p>	
Management appropriate to risk levels for each component of this group are in place	Partly	<p>Sharks are specifically covered in the management arrangements.</p> <p>There is a resolution for sea turtles.</p> <p><i>Gap: Apart from the Convention mentioning that it does not cover these species there appear to be no other management measures in place.</i></p>	Article 12 – Conservation and Management of Shark Resolution to protect sea turtles (NAFO FC Doc 06-07)
Suitable monitoring programme appropriate to risks	Mostly / Fully	The observer reports would include the collection of these data if risks suggested this was necessary.	<p>Articles 28 and 30 of the NCEM (NAFO/COM Doc 18-01)</p> <p>Action Plan in the Management and Minimization of Bycatch and Discards (NAFO/COM Doc 17-26).</p>
<b>Broader ecosystem</b>			
<b>Direct fishing effects</b>			

EAF component	EAF status	NAO - NAFO – Justification and comments	Source material
<p>Identification of potential direct effects including footprint mapping and risk assessments of all potential impacts</p>	<p>Mostly</p>	<p>Extensive assessment of historic fishing areas and the potential benthic impacts, especially within what are termed vulnerable marine ecosystems.</p> <p>Preliminary assessments are required for proposed exploratory bottom fisheries: they include the assessment of known or anticipated impacts of the bottom fishing activity on VMEs, as well as accounting for any SAIs.</p> <p><i>Gap: It is not clear whether assessments of other potential impacts such as provisioning, ghost fishing etc have been conducted.</i></p>	<p>Report of SC June 2018</p> <p>Article 16 covers the fishing footprint</p> <p>FAO Report 595</p> <p>Meeting Reports of the WG-Ecosystem Approach Framework on Fisheries Management</p>

<p>Management arrangements (gear, area etc) appropriate to risk levels including:</p> <ul style="list-style-type: none"> <li>• VME thresholds</li> <li>• Encounters and move-on rules</li> <li>• VME closures, spatial measures</li> <li>• Gear restrictions</li> <li>• Lost gear</li> </ul>	<p>Mostly / Fully</p>	<p>A comprehensive set of benthic-related area closures has been introduced and there are monitoring and reporting mechanisms in place to identify additional areas where new VMEs may be identified.</p> <p>VME indicator species are listed in part VI of Annex I.E.</p> <p>Threshold levels are in place for sponges, live coral, and sea pens (Article 22, para 1).</p> <p>There are provisions in case of encounters with VMEs (Article 22).</p> <p>The encounter protocols include a move-on rule (Article 22, para a.ii).</p> <p>Closures are in place for certain seamounts and areas with high sponge and coral concentrations (Article 17).</p> <p>Measures in place for exploratory bottom fishing activities (Article 18), as well as the management and evaluation of those fisheries.</p> <p><i>Gaps: No clearly identified performance levels associated with relative trawl activity to be met within each of the VMEs could be found.</i></p> <p><i>An assessment of other factors (e.g. lost gear) has also not been completed; as outlined above, it is not clear whether all the necessary management is being done.</i></p> <p><i>Without risk assessment on the other potential components it is not certain what else is necessary.</i></p>	<p>CEM Chapter II – including Articles 17–23</p> <p>Article 13 Lost or abandoned fishing gears</p>
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EAF component	EAF status	NAO - NAFO – Justification and comments	Source material
Suitable monitoring programme appropriate to risks is in place	Mostly/ Fully	<p>The monitoring programme includes detailed fishing activity and reporting both in current areas and also in exploratory areas. These are: monitoring by VMS, logbooks, and observers.</p> <p>Level of lost gear are recorded.</p> <p>Levels of discards are recorded.</p> <p><i>Gap: not clear how the level of acceptability of performance for these is determined each year.</i></p>	<p>Articles 28 to 30 cover recording of areas of activity discards</p> <p>Article 13 covers lost gear</p>
<b>Cumulative fishery effects</b>			
Identification of cumulative impacts on community structure and assessment of their risks	Partly (in progress)	The WG-ESA is to develop research and summarize new findings on the status, functioning, and productivity of ecosystems (including modelling multi-species interactions) in the NAFO Convention Area.	<p>Report of Working Group on Ecosystem Science and Assessment (WG-ESA)</p> <p>NAFO SCS Doc. 16/21</p>
Management arrangements for captured species and direct effects deal with any cumulative impacts	Partly	There is some specific consideration of the level of cod captured.	<p>NAFO Website</p> <p>SC Report Sept 2017</p>
Suitable monitoring and review appropriate to the risks	Partly (in progress)	The WG have proposed to develop research and summarize new findings on the long-term monitoring of status and functioning of ecosystem units (including ecosystem summary sheets) and the application of ecosystem knowledge for the assessment of impacts and management of human activities in the NAFO Convention Area.	<p>Reports of SC 2017 <a href="https://www.nafo.int/Portals/0/PDFs/sc/2017/scs17-22.pdf">https://www.nafo.int/Portals/0/PDFs/sc/2017/scs17-22.pdf</a></p> <p>Report of Working Group on Ecosystem Science and Assessment (WG-ESA)</p>

EAF component	EAF status	NAO - NAFO – Justification and comments	Source material
<b>Environmental External Drivers</b>			
Identification and assessment of risk from external environmental impacts (e.g. climate)	Mostly	There is explicit monitoring of climate factors that may affect the fishery; all species assessments in annual SC reports include a qualitative assessment of the impacts on the environment from that component of the fishery.	<a href="https://www.nafo.int/Science/Ecosystem/Ocean-Climate">https://www.nafo.int/Science/Ecosystem/Ocean-Climate</a> <a href="https://www.nafo.int/Science/Species">https://www.nafo.int/Science/Species</a>
Explicit consideration of any risks made in management strategies	Partly	While these potential modifying factors are mentioned in the assessment reports, it is not clear whether they are explicitly included in management settings and harvest strategies.	Various SC Reports <a href="https://www.nafo.int/Library/Publications/SC-Reports">https://www.nafo.int/Library/Publications/SC-Reports</a>
<b>Social and economic wellbeing</b>			
<b>Vessel/industry level</b>			
Identification and assessment of social and economic components at this level (e.g. crew safety)	No	<i>Gap: No apparent examination and assessment of the potential vessel-level, social or economic issues.</i>	
Appropriate consideration of risks opportunities within management	No	<i>Gap: No apparent consideration of these vessel issues in management. Obligations of Masters only relates to meeting fishery-related reporting requirements, not other issues.</i>	
<b>Community levels</b>			
Identification and assessment of social and economic components at this level (e.g. regional benefits)	N/A	There are no relevant 'local' communities for this fishery.	
Appropriate consideration of	N/A	As above.	

EAF component	EAF status	NAO - NAFO – Justification and comments	Source material
risks/opportunities within management			
<b>National level</b>			
Identification and assessment of social and economic components at this level (e.g. income, employment)	Partly	<p>The fishery generates national benefit to each of the Member Countries and non-contracting parties. The relative levels of catch and value may provide some level of understanding of this importance.</p> <p>Delegations of contracting parties include stakeholders, e.g. fishing industry, and NGOs may have considered their economic and social objectives and views from their perspective.</p> <p><i>Gap: No formal assessment of these elements has been undertaken. No identification of the risks and therefore the drivers that these countries may bring to the decision-making table.</i></p>	Country reports
Appropriate consideration of risks/opportunities by management	Partly	<p><i>Gaps: There are no social or economic objectives considered in the making of management decisions.</i></p> <p><i>However, the delegations of contracting parties may provide their views on economic and social considerations during the decision-making process, based on implicit objectives.</i></p> <p><i>There are no requirements on flag states to deal with such issues.</i></p>	Country reports
<b>Ability to achieve</b>			
<b>Governance</b>			
<b>Legal and administration</b>			
Clear scope and high-level EAF - ecological, social and economic objectives are identified	Mostly	<p>There is a comprehensive set of information available for most of the expected EAF elements, which are presented in the Convention, CEMs and the NAFO website.</p> <p>These document the boundaries, the participants, fishing methods etc, and includes the NAFO objectives that cover the ecological/environmental objectives of EAF but not the social or economic.</p> <p><i>Gaps: No explicit articulation of any social and economic objectives.</i></p>	<p>NAFO Convention</p> <p>CEM – 2018</p> <p>Article 3 - Duties of contracting parties</p>

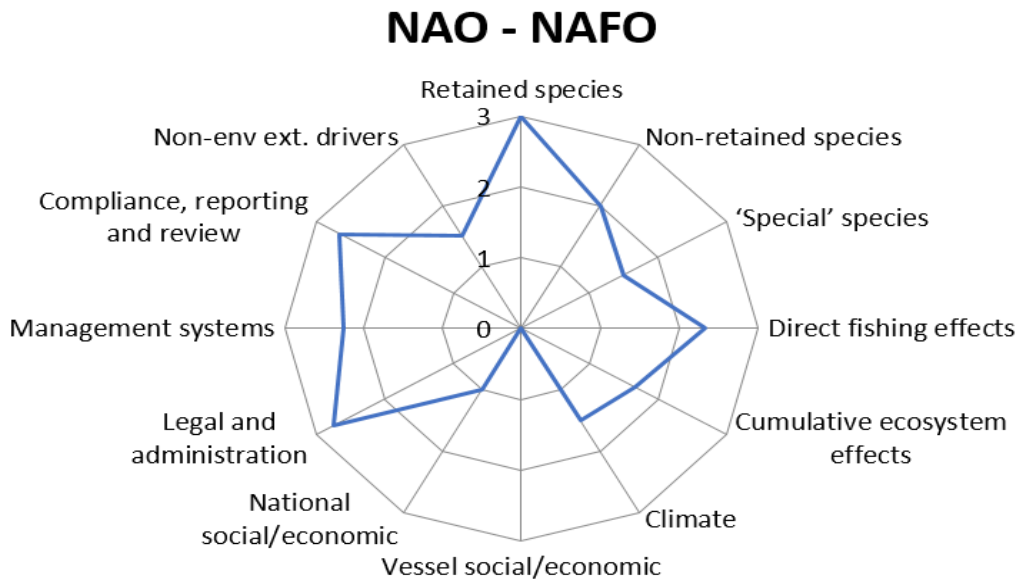
EAF component	EAF status	NAO - NAFO – Justification and comments	Source material
		<i>There is no single document that includes all information consistent with a full EAF background report document.</i>	Articles 48-55 that deal with non-contracting parties  www.nafo.int  FAO 595
Suitably binding and effective legal instruments to enable effective management	Fully	The Convention and associated policies are comprehensive however there is still the inherent level of uncertainty associated with having non contracting parties etc.	NAFO Convention  FAO 595
Suitable consultation and administrative structures are in place and enable efficient decisions	Fully	The system of committees is extensive and all contracting parties have representation.  Each of the three components involved in the governance and decision-making process (Secretariat, Commission and Scientific Committee and their associated working groups have been in operation for some time now.	NAFO Convention  FAO 595
Consideration of international agreements and other bodies	Fully	There is a specific Article (17) in the Convention that requires NAFO to works collaboratively with other organizations.	NAFO Convention  FAO 595
<b>Management systems</b>			
Comprehensive identification and assessments of risks for all EAF components	Mostly	There has been an assessment of many of the EAF components.  <i>Gap: Some tidying up work to ensure that the stocks not directly assessed are at appropriate risk levels.</i>  The process to examine cumulative impacts is under way.  There are no identified plans to assess the social and economic components.	See above
A clear management 'plan' and	Mostly	The annually updated CEM document outlines the full set of conservation and enforcement measures currently in force for the fishery. This is updated annually.	CEM 2018

EAF component	EAF status	NAO - NAFO – Justification and comments	Source material
arrangements appropriate to current levels of risk		<p>While comprehensive, it is a category-based document that outlines each of the types of management and conservation measures currently being applied.</p> <p>There is a clear articulation of how the suite of management actions directly links to the management of each individual objective/risk species/stocks that have specific recovery sections.</p>	
A clear process or harvest strategy to amend management as needed	Mostly (in progress)	<p>There are formal harvest control rules and recovery plans in place for a number of cod stocks, American plaice, Greenland halibut, shrimp and redfish.</p> <p>There are currently no identifiable harvest strategies related to adjusting the management to deal with non-retained species, habitat/VMEs or ecosystem effects.</p> <p>A number of these are in progress.</p>	CEM 2018 Articles 7-11 of the CEM
Suitable scientific monitoring and assessment process in place	Mostly (in progress)	<p>Monitoring and assessments of main stocks and habitats is well covered with long term schedules planned. This includes logbooks, VMS and observers, and scientific programmes.</p> <p>There are also plans to now determine how to undertake monitoring of cumulative ecosystem level impacts.</p>	CEM 2018 - Articles 22, 23, 28, 29, 30
<b>Compliance, reporting and review</b>			
<p>Effective monitoring, compliance and enforcement programmes:</p> <ul style="list-style-type: none"> <li>• Vessel list and notification</li> <li>• VMS</li> <li>• IUU</li> <li>• Observers</li> <li>• Port</li> </ul>	Fully	<p>Extensive and multiple systems in place to monitor vessels and catch levels; the CEMS articles include:</p> <ul style="list-style-type: none"> <li>• Article 25 &amp; 26 Vessel Requirements and Chartering</li> <li>• Article 28–30 Catch Reporting, VMS and Observers</li> <li>• Article 31–41 At Sea Inspections and Surveillance</li> <li>• Article 42–47 Port Duties</li> <li>• Articles 48–55 Non-Contracting and IUU</li> </ul>	CEM 2018 - Articles 31-55



EAF component	EAF status	NAO - NAFO – Justification and comments	Source material
Regular reporting on fishery risk status for all EAF components	Partly (in progress)	<p>Reporting at stock status is fine and the annual report has total catch and effort for the year.</p> <p><i>Gaps: hard to get overall long-term trends in catch levels.</i></p> <p><i>No reporting on other EAF components.</i></p>	<p>Website</p> <p>Annual report  <a href="https://www.nafo.int/Publications">https://www.nafo.int/Publications</a>  <a href="https://www.nafo.int/Library/Science/SC-Documents">https://www.nafo.int/Library/Science/SC-Documents</a></p>
Periodic, independent reviews	Fully	<p>The various committee structures of the Commission have regular review cycles to examine the elements that are under active management.</p> <p>Many of the studies are published in peer-reviewed literature.</p> <p>A second review of the NAFO is under way</p>	2017 Annual Report
<b>Non-environmental external drivers</b>			
External impacts and risks to the fishery identified and assessed	Mostly	Impacts from coastal fisheries are directly assessed but it is not clear whether other factors are.	
Appropriate consideration of external risks within management strategies, policies and processes	Partly	This may occur in an informal manner through input from the contracting parties.	

### 4.3.1 Summary gap analysis



**Figure 5:** Summary of EAF implementation for NAFO (where 1= Partly; 2=Mostly and 3= Fully)

There was direct consideration of 9 of the 12 EAF components by NAFO, with 6 of these considered to be either mostly implemented (Climate; Direct Impacts and Cumulative Impacts) or close to fully implemented (Legal and Administration; Compliance and Retained Species; see Figure 5). A number of these gaps are already the subject of additional actions. The main gaps were the active consideration of social and economic components, and the consideration of non-environmental external drivers.

*Retained, Non-Retained and Special Species:* No gaps for retained species. Some form of risk assessment for non-retained species and special species is required. An action plan has been developed to minimize bycatch and the discarding of unwanted species and at-risk species.

*Direct Fishing Effects:* Comprehensive management of benthic impacts. It is not clear that any risk assessments have been conducted for non-benthic direct impacts such as provisioning, ghost fishing, etc.

*Cumulative Impacts:* Work to meet the gap for this category is in progress with the Working Group on Ecosystem Science and Assessment to develop research and summarize new findings on the status, functioning, and productivity of ecosystems, as well as the application of ecosystem knowledge for the assessment of impacts and management of human activities.

*Social/Economic:* No apparent examination and risk assessment of the potential vessel- or national-level social or economic issues, and there are no formal social or economic objectives considered when making management decisions.

*Climate and Non-Environmental External Drivers:* Impacts from coastal fisheries are directly assessed but it is not clear whether other factors are identified and assessed.

*Management:* There are currently no identifiable harvest strategies related to adjusting management arrangements in order to deal with non-retained species, habitat/VMEs or ecosystem effects. A number of these are in progress. No overall EAF plan.

*Legal, Administration and Compliance/ Reporting/Review:* There is no explicit articulation of any social and economic objectives. There is no single document that includes all information consistent with a full EAF background report document, plus no comprehensive report on stock status and no reporting on other EAF components.

**Key points:** Some form of risk assessment is still required for all captured species; non-benthic direct impacts; vessel- and national-level (CP) social and economic issues, as well as external drivers.

#### 4.4 North East Atlantic Ocean

The North East Atlantic Fisheries Commission covers the high seas and national waters of the North East Atlantic Ocean (NEAO), with most of the convention area forming parts of the EEZs of the coastal states in this region. There are essentially three regulatory areas in which the Convention operates, with five contracting parties and five non-contracting parties. While a management body for this area has been in place since 1959, it was formally converted into a commission in 2004. The Commission is assisted by three permanent internal committees, a number of working groups, and a secretariat. The International Council for the Exploration of the Sea (ICES), provides science-based advice to NEAFC. The objective of NEAFC's is, "to ensure the long-term conservation and optimum utilisation of the fishery resources in the Convention Area, providing sustainable economic, environmental and social benefits".<sup>14</sup>

There are two main types of fishing managed in these areas - a pelagic fishery that captures herring, redfish, mackerel using pelagic gear and fisheries that target haddock and other "deep-sea species" using demersal fishing gears (Table 4.4). The majority of the captures within the convention area, especially for the deep-sea fisheries, occur in the Non Regulatory Areas – i.e. within parts of the EEZs of the main contracting parties.

There are currently five contracting parties: Denmark, European Union, Iceland, Norway, and the Russian Federation, together with seven cooperating, non-contracting parties: Bahamas, Curaçao Canada, Liberia, New Zealand, and Panama and Saint Kitts and Nevis).

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<sup>14</sup> <https://www.neafc.org/about>

**Table 4.4:** EAF Implementation audit – NEAO – NEAFC (August 2018)

*Note: The summaries outlined in this table should be read in conjunction with the information presented in the EAF Background Report for NEAFC (Appendix 2.4) where the references are located*

EAF component	EAF status	NEAO - NEAFC - Justification and comments	Source material
<b>Retained species</b>			
Identification and risk assessments	Fully	<p>There is a full list of species captured by the fishery in Annex V of Scheme of Control and Enforcement.</p> <p>The MOU between NEAFC and ICES covers all main species and stocks for which the Commission has specific responsibility.</p> <p>Regular stock (risk) assessments of the main target species are completed by ICES working group; advice from these is generated in conjunction with the NEAFC science working group.</p>	<p>NEAFC website</p> <p>ICES WGDEEP report</p> <p>ICES MOU</p>
Management systems appropriate to risks	Mostly/Fully	<p>Effort controls have been set for the fishery for deep-sea species (Rec 6: 2017) to maintain them at &lt; 65% maximum historic level.</p> <p>Catch and/or effort limits have been set for main pelagic species (Recs. 3, 4, 5, 7).</p> <p>Mesh size for capelin (Rec 1: 1984).</p> <p>Mesh size for blue whiting (Rec 2: 1986)</p> <p>Gap: Most key species appear to have full management systems but it is unclear whether all retained species are covered appropriately to their risk levels</p>	<p>Set of current controls and regulations: website, advice set out on ICES website.</p>
Suitable monitoring and ongoing assessment programme appropriate to risks	Fully	<p>The Scheme of Control and Enforcement (Article 5) includes requirements for the recording and reporting of catch and effort.</p> <p>ICES conduct scientific cruises and undertake numerous regular repeat surveys in the northeast Atlantic.</p> <p>This provides information used to assess deepwater resources for these fisheries.</p> <p>This is undertaken by ICES through an MOU.</p>	<p>ICES MOU</p> <p>Scheme of Control and Enforcement</p>

EAF component	EAF status	NEAO - NEAFC - Justification and comments	Source material
<b>Non-retained species</b>			
Identification and risk assessment	Mostly/Fully	The MOU with ICES covers most bycatch species, including 40 species of demersal fish, sharks, rays etc.	ICES MOU
Management systems appropriate to risk levels are in place	Mostly	Rec 11/2015 - Sorting grids for shrimp fishing. Rec 16/2010 prohibits discarding species listed in Annex I A.	Current measures
Monitoring programme appropriate to risks	Mostly	The Scheme of Control and Enforcement requires that the mandatory catch reporting include the amount of fish discarded. <i>Gap: There is no general observer programme.</i>	Scheme of Control and Enforcement
<b>Special species</b>			
Identification and risk assessment	Mostly	The ICES MOU stipulates the provision of any new information regarding the impact of fisheries on other components of the ecosystem, including: small cetaceans and other marine mammals, sea birds and sensitive habitats. <i>Gap: With no observer requirements this may make it harder to complete such an assessment, but the ICES surveys may be sufficient.</i>	ICES MOU
Management appropriate to risk levels for each component of this group are in place	Mostly	Management recommendations Rec 10, 11, 12, 13 07 and 08 prohibit landing of this set of shark-like species. While there are no direct measures for seabirds, mammals etc, there is also a ban on gillnets at depths greater than 200 m; the ICES advice states that fishing should have minimal interactions with mammals and birds.	Current management measures
Monitoring programme appropriate to risks	Mostly	The logbook programme should identify most of the issues, especially as it includes discards. Some level of observer coverage would be required to validate this.	Scheme of Control and Enforcement

EAF component	EAF status	NEAO - NEAFC - Justification and comments	Source material
<b>Broader ecosystem</b>			
<b>Direct fishing effects</b>			
Identification of potential direct effects including footprint mapping and risk assessments of all potential impacts	Mostly	The Secretariat has compiled maps of bottom fishing areas, the first of which was adopted in 2009, and subsequently improved and modified in 2010 and 2014.  <i>Gap: No assessment of impacts from provisioning due to discards and waste disposal.</i>	FAO Report 595
Management arrangements (gear, area etc) appropriate to risk levels including: <ul style="list-style-type: none"> <li>• VME thresholds</li> <li>• Encounters and move-on rules</li> <li>• VME closures, spatial measures</li> <li>• Gear restrictions</li> <li>• Lost gear</li> </ul>	Mostly/Fully	A number of area closures have been implemented to protect VMEs (Article 5 and Rec 19/04).  An exploratory fishing protocol manages potential fishing in “new bottom fishing areas” (Article 6 and 7).  Gillnets, entangling nets and trammel nets are prohibited at depths greater than 200 m (Recommendation 3/2006).  There are indicators and threshold levels for VMEs (Article 8, Article 9).  There is an obligation for vessels fishing with fixed gear to have equipment to retrieve lost gear on board, and to attempt to retrieve lost gear as soon as possible (Rec 16/2010).	Convention text  Current management measures  Scheme of Control and Enforcement
Suitable monitoring programme appropriate to risks is in place	Mostly	The logbook programme covers most aspects; observers are required in exploratory areas.  ICES conducts scientific cruises and undertake numerous regular repeat surveys in the northeast Atlantic, some of which provides information for assessing VMEs in the NEAFC Regulatory Area.  <i>Gap: broader observer programme.</i>	Scheme of Control and Enforcement  ICES MOU
<b>Cumulative fishery effects</b>			
Identification of cumulative impacts on community structure and assessment of their risks	Partly (in progress)	The ICES MOU includes a requirement for advice to be provided on marine ecosystems within the geographical scope of this agreement.	ICES MOU

EAF component	EAF status	NEAO - NEAFC - Justification and comments	Source material
		<p>The recurring advice shall include information on the state of marine ecosystems and human impacts, including historical developments in the main parameters and information on the present state and recent development of stocks.</p> <p><i>Gap: no specific advice found on website.</i></p>	
Management arrangements for captured species and direct effects deal with any cumulative impacts	Partly (in progress)	<p>The Convention states that the Commission must duly take into account the impact of fisheries on other species and marine ecosystems and in doing so adopt, where necessary, conservation and management measures that address the need to minimize harmful impacts on living marine resources and marine ecosystems.</p> <p><i>Gap: no clear example of how this is undertaken.</i></p>	Convention
Suitable monitoring and review appropriate to the risks	Mostly	<p>The logbook programme would cover most aspects.</p> <p>The ICES scientific cruises and numerous regular repeat surveys in the northeast Atlantic could also provide relevant data.</p>	Scheme of Control and Enforcement ICES MOU
<b>Environmental external drivers</b>			
Identification and assessment of risk from external environmental impacts (e.g. climate).	Mostly	<p>When providing its advice regarding fisheries, ICES shall take into account all available information and the context of fisheries management, including: information from the fishing industry, ecosystem considerations, environment and hydrographical conditions, regulations in force that affect fisheries, factors affecting fishing operations and information about the fisheries, development of fisheries technology and relevant performance changes, together with other relevant factors that affect fishing or fish stocks.</p>	WGDEEP Report ICES MOU
Explicit consideration of any risks made in management strategies	Mostly/Fully	<p>Based on the convention, these aspects should be included in management decisions.</p> <p>ICES integrate this information into the scientific advice (i.e. on catch limits) based on all the various pressures and in light of the long-term management plan for the relevant stock if agreed.</p>	Convention ICES-MOU

EAF component	EAF status	NEAO - NEAFC - Justification and comments	Source material
<b>Social and economic wellbeing</b>			
<b>Vessel/industry level</b>			
Identification and assessment of social and economic components at this level (e.g. crew safety, welfare)	Partly	Some aspects related to choices regarding data recorded in logbooks and observer programmes, etc.  <i>Gap: No apparent examination and assessment of the potential vessel-level issues.</i>	
Appropriate consideration of risks/opportunities within management	Partly	There are a number of resolutions that relate to vessel safety.  <i>Gap: No systematic consideration of the potential vessel-level issues in management settings.</i>	
<b>Community levels</b>			
Identification and assessment of social and economic components at this level (e.g. regional benefits)	N/A	There are no specific 'local' communities directly dependent upon the operations of this fishery: this occurs at the country level for contracting parties.	
Appropriate consideration of risks/opportunities within management	N/A	As above.	
<b>National level</b>			
Identification and assessment of social and economic components at this level (e.g. income, employment)	Partly	The fishery will be generating national benefit for each of the Member Countries and non-contracting parties.  The relative levels of catch and value may provide some level of understanding of this importance but it appears to be relatively low compared to the total for the region.  The delegations of contracting parties will include such input from their fishing industry and NGOs, which may then consider the economic and social objectives and views from their perspective.  <i>Gap: No formal assessment of these elements has been undertaken.</i>	Convention



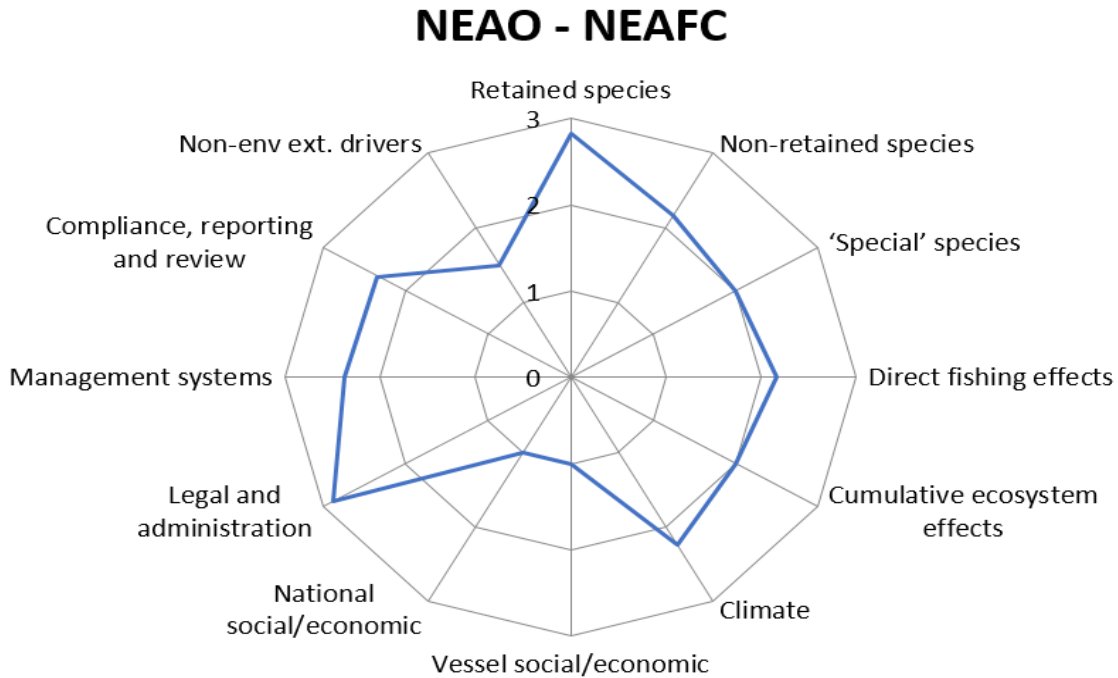
EAF component	EAF status	NEAO - NEAFC - Justification and comments	Source material
		<i>No identification of the risks and therefore the drivers that these countries may bring to the decision-making table.</i>	
Appropriate consideration of risks opportunities by management	Partly	<p><i>Gap: There are no social or economic objectives considered in the making of management decisions.</i></p> <p><i>However, as the delegations of contracting parties may provide their views on economic and social considerations based on implicit objectives during the decision-making process.</i></p>	
<b>Ability to achieve</b>			
<b>Governance</b>			
<b>Legal and administration</b>			
Clear scope and high-level EAF - ecological, social and economic objectives are identified	Mostly	<p>There is reasonable amount of information available for some of the expected EAF elements which are presented in the Convention and the NEAFC website.</p> <p>These document articulate the boundaries, the participants, fishing methods etc.</p> <p>The objective is to ensure the long-term conservation and optimum utilization of fishery resources in the convention area, including their sustainable economic, environmental and social benefits.</p> <p><i>Gaps: No explicit articulation of any social and economic objectives.</i></p> <p><i>The information on this fishery is hard to find. There is no single document that includes all information consistent with a full EAF background report document.</i></p>	<p>Convention</p> <p>NEAFC Website</p> <p>Scheme of Control and Enforcement</p>
Suitably binding and effective legal instruments to enable effective management	Mostly (Fully)	Article 15 of the Convention and associated policies are comprehensive and binding on all contracting parties and to the degree possible on non-contracting parties.	<p>Convention</p> <p>Scheme of control and enforcement</p> <p>Basic texts</p>

EAF component	EAF status	NEAO - NEAFC - Justification and comments	Source material
			FAO report
Suitable consultation and administrative structures are in place and enable efficient decisions	Fully	<p>There are an appropriate set of committees and working groups and all contracting parties have representation.</p> <p>Each of the three components involved in the governance and decision-making process (Secretariat, Commission and the various scientific, compliance and administrative committees, and their associated working groups, have been in operation for some time).</p>	<p>Convention Basic texts FAO Report 595</p>
Consideration of international agreements and other bodies	Fully	The Convention outlines that the Commission shall seek to ensure consistency between its recommendations to stocks or group of stocks and those occurring under the jurisdiction of the contracting parties.	Convention
<b>Management systems</b>			
Comprehensive identification and assessments of risks for all EAF components	Mostly/Fully	<p>There has been explicit assessment of the standard set of ecological components of EAF components. OSPAR has started a thorough cumulative impacts assessment process.</p> <p><i>Gaps: There are no identified plans to assess the social and economic components.</i></p>	<p>Stock Assessment reports VME assessments FAO Report 595 ICES MOU</p>
A clear management 'plan' and arrangements appropriate to current levels of risk	Mostly	<p>There are a set of management measures and relevant Convention articles that have begun to manage the resources.</p> <p><i>Gap: not all areas have clear management arrangements.</i></p> <p><i>There is also no clear articulation of how the suite of management actions for each of the measures link directly to the management of each individual objective/risk.</i></p>	<p>Current Measures Scheme of Control and Enforcement Basic texts</p>
A clear process or harvest strategy to amend management as needed	Mostly	ICES proposes reference points as guidance for management purposes in an ecosystem context.	ICES MOU

EAF component	EAF status	NEAO - NEAFC - Justification and comments	Source material
		In addition, ICES will provide warnings of any serious threats from fishing activities alone or in conjunction with any other relevant activity to local ecosystems or species.	
Suitable scientific monitoring and assessment process in place	Fully	Based on ICES surveys and fishery reporting, the monitoring and assessments of main stocks and habitats are well covered.  Additional areas may be needed once all EAF assessments are completed.	Scheme of Control and Enforcement
<b>Compliance, reporting and review</b>			
Effective monitoring, compliance and enforcement programmes: <ul style="list-style-type: none"> <li>• Vessel list and notification</li> <li>• VMS</li> <li>• IUU</li> <li>• Observers</li> <li>• Port</li> </ul>	Fully	Each of the key areas apart from observer requirements are covered by convention articles or the Scheme of Control and Enforcement: <ul style="list-style-type: none"> <li>• Authorisations to fish Article 4</li> <li>• Notifications Article 5</li> <li>• Vessel Requirements Article 6</li> <li>• Labelling of fish Article 8</li> <li>• Marking and Lost Gear Article 7</li> <li>• Inspections at Sea Articles 15–19</li> <li>• Port State Controls Articles 20–27</li> <li>• Infringements Articles 28–33</li> </ul>	Scheme of Control and Enforcement
Regular reporting on fishery risk status for all EAF components	Mostly	The Commission posts an Annual Report, as well as the reports of the various working groups. The resource assessments are located on the ICES website – separately for deep-sea and pelagics.  <i>Gap: The fragmentation of material makes it hard to develop a full understanding of the current status of risks in an efficient manner.</i>	Website  ICES website
Periodic, independent reviews	Mostly	The resource assessments are reviewed regularly by ICES.  These are not easily locatable.	Website
<b>Non-environmental external drivers</b>			
External impacts and risks to the fishery identified and assessed	Partly (work in progress)	Impacts from coastal fisheries are directly assessed.	Convention

EAF component	EAF status	NEAO - NEAFC - Justification and comments	Source material
		<p>OSPAR has both the science and the management measures for all non-fishing human activities in the NEA marine environment, and there is active collaboration on measures.</p> <p><i>Gap: No evidence that social and economic factors (e.g. markets, fuel costs etc) are explicitly identified and assessed, but this may be done as part of Commission discussions.</i></p>	
Appropriate consideration of external risks within management strategies, policies and processes	Partly	As above.	

#### 4.4.1 Summary gap analysis



**Figure 6:** Summary of EAF implementation for NEAFC (where 1= Partly; 2=Mostly and 3= Fully)

As per Figure 6, there has been direct consideration for nine of the 12 EAF components by NEAFC. Seven of these are considered to be mostly implemented (non-retained; cumulative impacts, direct impacts, special species, climate; compliance; management system) with two fully implemented (legal and administration; retained species). The main gaps were consideration of social, economic components and non-environmental external drivers. The remaining gaps include:

*Retained and non-retained species:* A few minor gaps for non-retained species assessments and no observer programme.

*Direct fishing effects:* Most potential benthic impacts managed. No risk assessments of potential non-benthic impacts such as from provisioning, discards, waste disposal.

*Cumulative impacts:* While the ICES Memorandum of Understanding (MOU) states that advice regarding marine ecosystems will be provided, this was not found.

*Social/economic:* Minimal explicit assessment of these elements at the vessel level and national level have been undertaken, in addition to some vessel safety resolutions.

*Climate & external drivers:* Climate factors covered, but non-climate drivers are not explicitly considered in management systems.

*Management:* not all areas have clear management arrangements. There is also no clear articulation of how the suite of management actions for each of the measures links directly to the management of each individual objective/risk: i.e. no overall EAF plan.

*Legal, administration plus compliance/reporting/review:* No explicit articulation of any social and economic objectives. Information is distributed among sites and there is no single document available that includes all information consistent with a full EAF background report and no single status report.

**Key points:** Some form of risk assessment is still required for non-benthic direct impacts; special species; and consideration of vessel and national-level (CP) social and economic issues.

#### 4.5 North Pacific Ocean

The North Pacific Fisheries Commission (NPFC) is an intergovernmental organization established by the Convention on the Conservation and Management of High Seas Fisheries Resources in the North Pacific Ocean (NPO), which only came into effect in 2015. It covers a large proportion of the North Pacific up to the United States of America and the Russian Federation, excluding the Hawaiian Islands and Northern Mariana Islands.

The objective of the Convention is to ensure the long-term conservation and sustainable use of fisheries resources in the convention area, while protecting the marine ecosystems of the North Pacific Ocean areas in which these resources occur (Table 4.5). The Commission is supported by three subsidiary bodies: the Scientific Committee; the Technical and Compliance Committee and the Finance and Administration Committee, as well as a Secretariat.

The Commission manages the fisheries for both the pelagic fish stocks and bottom fish stocks in the convention area. The primary target species of the bottom trawl fisheries have been North Pacific armourhead (*Pentaceros wheeleri*) and splendid alfonsino (*Beryx splendens*); the primary target species of the bottom gillnet fisheries have been splendid alfonsino, oreo (*Allocyttus verrucosus*) and mirror dory (*Zenopsis nebulosa*). The pelagic stocks include Pacific saury, chub mackerel (*Scomber japonicus*), spotted mackerel (*Scomber australasicus*), Japanese sardine (*Sardinops melanostictus*), neon flying squid (*Ommastrephes bartramii*), and Japanese flying squid (*Todarodes pacificus*). Catches of each of these species are large (e.g. mackerel), with some exceeding a million tonnes per annum in some years.

Current Member Countries include: Canada, China, Japan, the Republic of Korea, the Russian Federation, Taiwan Province of China, the United States of America and Vanuatu. Given this Commission has only just been formed, it is to be expected that progress towards implementing many EAF components will have only just begun.

**Table 4.5:** EAF Implementation audit – NPO – NPFC (August 2018)

*Note: The summaries outlined in this table should be read in conjunction with the information presented in the EAF background report for NPFC, including the full set of references (Appendix 2.5)*

EAF component	EAF status	NPO - NPFC- Justification and comments	Source material
<b>Retained species</b>			
Identification and risk assessments	Partly (in progress)	<p>Stock assessment has only been carried out for some target species, including Pacific saury. Chub mackerel stock assessment activities have started.</p> <p><i>Gaps: most target species and all by-product species require assessment.</i></p> <p><i>The SC Research Plan includes expanding stock assessments.</i></p>	<p>SCC PS02 report</p> <p>SC 02 (2017)</p> <p>TWG CMSA Report (2017)</p>
Management systems appropriate to risks	Partly (in Progress)	<p>There are CMMs in place for chub mackerel (CMM 2017-07) and Pacific saury (CMM 2017-08), both limiting effort on these stocks and requiring assessments to be completed in the near future.</p> <p>The bottom fishing CMMs (CMM 2017-05 and CMM 2017-06) also restrict the levels of effort that can be applied to these stocks.</p> <p>Gaps: There are no clear decision rules in place at this time.</p> <p>Management of the other target species and byproducts may be required.</p> <p>The Commission's ability to control compliance with the CMMs is limited.</p>	CMMs
Suitable monitoring and ongoing assessment programme appropriate to risks	Mostly (Developing)	<p>The Convention requires all vessels to record detailed catch and effort. There is also now a requirement for observers for all bottom fishing vessels.</p> <p>Some survey data available from Member Countries.</p> <p>Annual reports on fishing footprint by Member Countries are generated.</p> <p><i>Gap: The programme has only just begun but the SC has developed a research plan that includes the collection of data for stock assessments as a priority.</i></p>	<p>Convention</p> <p>SC 02 (2017)</p> <p>CMM 2017-05; 2017-06</p> <p>SC Research Plan</p>

EAF component	EAF status	NPO - NPFC- Justification and comments	Source material
<b>Non-retained species</b>			
Identification and risk assessment	Partly	Bottom fisheries observers are required to: <ul style="list-style-type: none"> <li>• Estimate the amount (weight or volume) of all living marine resources discarded, split by species; and</li> <li>• Record the numbers by species of all marine mammals, seabirds or reptiles caught (including those discarded and dropped-off).</li> </ul> <i>Gap: Assessments of discarded species not yet begun.</i>	CMMs 2017-05 and 2017-06
Management systems appropriate to risk levels are in place	No	Gap: None found.	
Suitable monitoring programme appropriate to risks	Developing	<i>Gap: The monitoring programme that is under development should address this gap.</i>	SC Research Plan 2017-2021
<b>Special species</b>			
Identification and risk assessment	Partly	<i>Gap: Bottom fisheries observers are required to collect information on protected species or species of concern.</i>	CMMs 2017-05 and 2017-06
Management appropriate to risk levels for each component of this group are in place	No	<i>Gap: None found.</i>	
Suitable monitoring programme appropriate to risks	Developing	The data plan and observer programme may be effective for these components.	
<b>Broader ecosystem</b>			
<b>Direct fishing effects</b>			
Identification of potential direct effects including footprint mapping and risk assessments of all potential impacts	Mostly	Fishing footprints of all parties has been mapped; some VME surveys have been conducted.  Most countries have completed individual assessments of bottom impacts by their own fisheries and none reported to be having significant adverse impacts on VMEs.	NPFC 2015 and reference list



EAF component	EAF status	NPO - NPFC- Justification and comments	Source material
		<i>Gap: no formal assessment of potential benthic and non-benthic impacts.</i>	
Management arrangements (gear, area etc) appropriate to risk levels, including: <ul style="list-style-type: none"> <li>• VME thresholds</li> <li>• Encounters and move on rules</li> <li>• VME closures, Spatial measures</li> <li>• Gear restrictions</li> <li>• Lost gear</li> </ul>	Mostly	<p>There are CMMS in place to deal with the impacts of bottom fishing on the benthos (VMEs) CMM 2017-05; 06.</p> <p>There are closed areas for potential VME conservation (CMM 2017-05, para H.).</p> <p>The Convention prohibits directed fishing on a suite of coral species and any indicators of VMEs.</p> <p>Threshold limit for VME indicator species (CMM 2017-05).</p> <p>Provisions on what to do with a VME encounter (CMM 2017-05).</p> <p>Vessels to move away after a VME encounter (CMM 2017-05).</p> <p>Non expansion of bottom fishing area (CMM 2017-05).</p> <p><i>Gap: The Convention identifies minimizing pollution and waste originating from fishing vessels, discards, catch by lost or abandoned gear, and impacts on other species and marine ecosystems through measures including, to the extent practicable, the development and use of selective, environmentally safe, and cost-effective fishing gear and techniques. However, there are no CMMS yet.</i></p>	Convention CMM Compendium
Suitable monitoring programme appropriate to risks is in place	Partly (in progress)	This is under development.	SC Research Plan 2017–2021
<b>Cumulative fishery effects</b>			
Identification of cumulative impacts on community structure and assessment of their risks	In progress	This has been identified as a gap by the SC and is now in the Research Plan.	SC Research Plan 2017–2021
Management arrangements for captured species and direct	In progress	N/A	

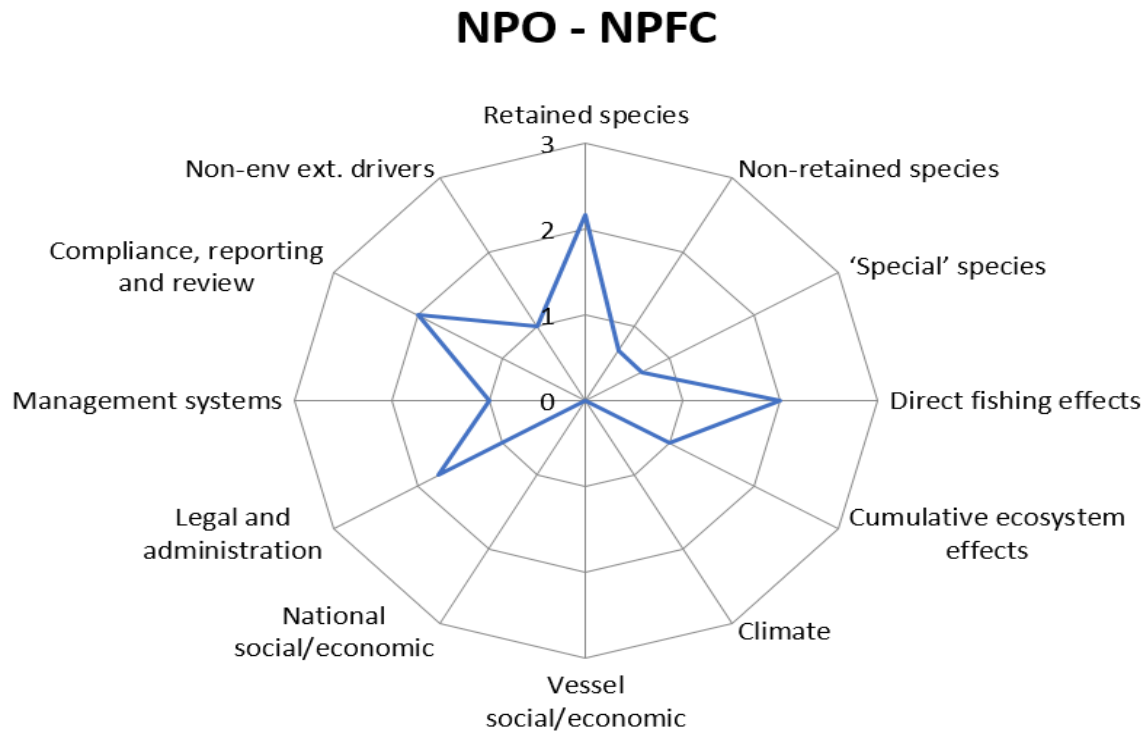
EAF component	EAF status	NPO - NPFC- Justification and comments	Source material
effects deal with any cumulative impacts			
Suitable monitoring and review appropriate to the risks	In progress	As above.	
<b>Environmental external drivers</b>			
Identification and assessment of risk from external environmental impacts (e.g. climate)	No	No information found.	
Explicit consideration of any risks made in management strategies	No	No information found.	
Social and economic wellbeing			
<b>Vessel/industry level</b>			
Identification and assessment of social and economic components at this level (e.g. crew safety).	No	No information found.	
Appropriate consideration of risks/opportunities within management	No	No information found.	
<b>Community levels</b>			
Identification and assessment of social and economic components at this level	N/A		
Appropriate consideration of risks/opportunities within management	N/A		

EAF component	EAF status	NPO - NPFC- Justification and comments	Source material
<b>National level</b>			
Identification and assessment of social and economic components at this level (e.g. income, employment).	No	No information found.	
Appropriate consideration of risks opportunities by management	No	No information found.	
<b>Ability to achieve</b>			
<b>Governance</b>			
<b>Legal and administration</b>			
Clear scope and high-level EAF - ecological, social and economic objectives are identified	Mostly	The Convention articulates most of these components but is effectively silent on most social and economic components of EAF.	Convention
Suitably binding and effective legal instruments to enable effective management	Mostly	The Convention is binding on all contracting parties: it has a series of articles that encourage the major powers to develop and enforce management controls for all environmental elements of EAF. However, no mention of social and ecological components.	Convention
Suitable consultation and administrative structures are in place and enable efficient decisions	Mostly	Most of the administrative structures, committees and decision-making forums have now been formed. They have all developed TORs and have met on at least one occasion. Smaller working groups are now being formed, and 'strategic' and operational plans being developed.	See meeting reports on website
Consideration of international agreements and other bodies	Partly	This is covered in the Convention and the Commission attends meetings of other relevant fishery bodies.	Convention

EAF component	EAF status	NPO - NPFC- Justification and comments	Source material
		No formal assessment was possible as to whether the Commission is compliant with relevant international agreements/treaties.	
<b>Management systems</b>			
Comprehensive identification and assessments of risks for all EAF components	Partly	Only some EAF components have been identified and assessed.	
A clear management ‘plan’ and arrangements appropriate to current levels of risk	Partly	The current CMMs only cover some of the EAF components. There is no clear management plan as yet – only some aspects having been developed so far.	CMM Compendium
A clear process or harvest strategy to amend management as needed	No	No harvest control rules for any components at this time.	
Suitable scientific monitoring and assessment process in place	Partly (in progress)	The SC Research plan is only just beginning to be implemented.	SC Research Plan 2017-2021
<b>Compliance, reporting and review</b>			
Effective monitoring, compliance and enforcement programmes: <ul style="list-style-type: none"> <li>• Vessel list and notification</li> <li>• VMS</li> <li>• IUU</li> <li>• Observers</li> <li>• Port</li> </ul>	Mostly	The Convention outlines that the major powers adopt each of the key compliance tools.  The Technical and Compliance Committee are beginning to develop their respective strategic plans: <ul style="list-style-type: none"> <li>• CMM 2016-01 On information requirements for vessel registration</li> <li>• CMM 2016-02 To establish a list of vessels presumed to have carried out IUU activities in the NPFC Convention Area</li> <li>• CMM 2016-03 On the interim transshipment procedures for the NPFC</li> <li>• CMM 2016-04 On vessels without nationality</li> <li>• CMM 2017-09 High Seas Boarding and Inspection Procedures for the NPFC</li> </ul>	Convention  Compliance reports  CMM Compendium
Regular reporting on fishery risk status for all EAF components	Mostly	The Commission produces an annual yearbook which includes most of the key documents and reports in the one location.	NPFC Yearbook 2015-2016 NPFC 2017

EAF component	EAF status	NPO - NPFC- Justification and comments	Source material
Independent review	N/A	Too early to begin a review phase for this Commission.	
<b>Non-environmental external drivers</b>			
External impacts and risks to the fishery identified and assessed	Partly	The catches in coastal states are recognized. The Commission attends other relevant fishery body meetings.	
Appropriate consideration of external risks	N/A	None generated as yet.	

#### 4.5.1 Summary gap analysis



**Figure 7:** Summary of EAF implementation by NPFC (where 1= Partly; 2=Mostly and 3= Fully)

Given its recent formation, the NPFC only has formal consideration for four of the EAF components, with these considered to be mostly implemented (retained species; direct fishing impacts; compliance; legal and administration) and none fully implemented (Figure 7). There are already plans in place to deal with the gaps for these components as well as beginning to address some of the other EAF areas.

*Retained, non retained and special species:* Most target species and all the by-product species require some form of assessment but the research plan includes expanding stock assessments. Management is in place but there are no clear decision rules at this time and no management for discards or special species. Assessment and monitoring of discarded species and special species are planned.

*Direct fishing effects:* No risk assessment or Conservation Management Measures (CMMs) in place for minimizing pollution and waste originating from fishing vessels, discards, catch by lost or abandoned gear.

*Cumulative impacts:* This gap has been identified by the Scientific Committee (SC) and it is now in the research plan.

*Social/economic:* No social or economic risk assessments completed at either the vessel or industry level.

*Climate and external drivers:* No information on the climate impacts found.

*Management:* Only some EAF components have been identified and assessed. Management and monitoring systems are just starting to be developed. No overall EAF plan.

*Legal, administration plus compliance/reporting/review:* No information on most social and economic components of EAF. International relationships are not yet clearly defined. Many compliance areas still being developed through a strategic plan.

**Key points:** Current scores reflect the very short lifetime of this management body. In addition to the planned activities, there also needs to be some form of risk assessment for non-benthic direct impacts, vessel- and national-level social and economic issues, and external drivers.

#### **4.6 South East Atlantic Ocean**

The South East Atlantic Fisheries Organisation (SEAFO) is a regional fisheries management organization in South East Atlantic Ocean (SEAO). It was established in 2001. The convention area is off the southwest coast of Africa outside of EEZs. The objective of its Convention is to ensure the long-term conservation and sustainable use of the fishery resources in the convention area (Table 4.6). The organizational structure of SEAFO is defined in the Convention, and consists of a Commission with three main subsidiary bodies: the Scientific Committee (SC), the Compliance Committee (CC) and the Standing Committee on Administration and Finance (SCAF), together with the Secretariat.

The economically important SEAFO fish species in the convention area have included sedentary deepwater finfish species such as alfonsino, orange roughy and crustacean species such as red crab. The catches in the convention area have always been relatively small (< 1 000 tonnes annually) and have decreased in recent years with only approximately 150 tonnes (mostly red crabs) taken in 2017.

The contracting parties are: Angola, European Union, Japan, the Republic of Korea, Namibia, Norway and South Africa.

**Table 4.6:** EAF Implementation audit – SEAFO (August 2018)

*Note: The summaries outlined in this table should be read in conjunction with the information presented in the EAF background report for SEAFO, including the full set of references (Appendix 2.6). Furthermore, the scoring of EAF status for this fishery took into consideration the relatively small levels of fishing activity that have occurred in this convention area over the past decade*

EAF component	EAF status	SEAFO-SEAFO - Justification and comments	Source material
<b>Retained species</b>			
Identification and risk assessments	Mostly (in progress)	<p>The list of retained species in Annex 1 of SOICE 2017.</p> <p>The status reports for each of the target species is updated annually.</p> <p><i>Gap: There is no formal risk assessment of the other retained species, but this has been identified.</i></p>	<p>SEAFO SOICE 2017</p> <p>SC Report 2017</p>
Management systems appropriate to risks	Mostly/Fully	<p>SEAFO has been able to implement TACs for the main target species. CM 32/16 is valid for 2017 and includes TACs for target species Patagonian toothfish, Deep-sea red crab, Alfonsino, Orange roughy and Pelagic Armourhead.</p> <p>There are rudimentary harvest control rules based on CPUE: these are used to provide recommendations on whether changes to the TACs are required to enable review of annual TACs. The stock status report ends up with a discussion of current management measures and management advice to the Commission.</p> <p><i>Gap: refinement of control rules and clarification that the non-target species do not need specific management may be required.</i></p>	<p>SC Report 2017</p> <p>CM 32/16</p>
Suitable monitoring and ongoing assessment programme appropriate to risks	Mostly (in progress)	<p>There are requirements to record catch and effort.</p> <p>Observers on all vessels is now a requirement; these observers collect data on target species including biological (age) data.</p> <p><i>Gap: There is minimal direct biological information on stocks in this area.</i></p> <p><i>But the SC discussed the issue and agreed to explore potential risk assessment approaches, applicable to new or re-emerging stock.</i></p>	<p>Article 10 of SOICE 2017</p> <p>Article 18 SOICE 2017</p> <p>SC Report 2017</p>



EAF component	EAF status	SEAO-SEAFO - Justification and comments	Source material
<b>Non-retained species</b>			
Identification and risk assessment	Partly (in progress)	The species list in Annex 1 may not be the complete set of all captured species and there is no formal risk assessment of these at the moment.  Given the low levels of effort it is still possible to assess the current risks by the SC as proposed.	Annex 1 SOICE  SC Report 2017
Management systems appropriate to risk levels are in place	Mostly	There is a recommended ban on the use of gillnets in the convention area.  The current TACs and levels of fishing effort are so low that this indirectly reduces risks to most non-retained species and obviates the need for specific controls on general discard species.	
Suitable monitoring programme appropriate to risks	Mostly	Discards are to be recorded at the species level if they are > 10 kg.  Given the current level of effort this is probably appropriate.	Article 10 of SOICE 2017
<b>Special species</b>			
Identification and risk assessment	Fully	Seabirds, turtles and sharks have all been identified as species requiring special attention.  While no mention of mammals is made, it is unlikely this is an issue given the location and methods.	SOICE 2017  Second Performance Review report
Management appropriate to risk levels for each component of this group are in place	Mostly/Fully	Management measures have been put in place to reduce incidental bycatch of seabirds and to improve reporting of sea turtles bycatch, with the intention of reducing mortality from fishing operations.  There are also specific CMs in place to reduce the capture of deepwater sharks.	CM 25/12 on reducing incidental bycatch of seabirds in the SEAFO  CM 14/09 calls to reduce sea turtle mortality  CM 04/06 for sharks caught in SEAFO

EAF component	EAF status	SEAO-SEAFO - Justification and comments	Source material
			fisheries, and Rec 1: 2008
Suitable monitoring programme appropriate to risks	Mostly/Fully	<p>Bycatch interactions with these species are monitored by the scientific observers and provided through their reports to the Secretariat.</p> <p>This information is considered by the SC and recommendations made to the Commission for consideration and, if necessary, strengthening of the measures.</p>	Article 18 SOICE 2017
<b>Broader ecosystem</b>			
<b>Direct fishing effects</b>			
Identification of potential direct effects including footprint mapping and risk assessments of all potential impacts	Partly	<p>There has been an identification of the specific areas where bottom trawling and/or longlining have taken place.</p> <p>The extent of VMEs is only poorly known however.</p> <p>There is minimal survey information to undertake formal assessments.</p> <p>No assessments of potential impacts from gear loss, waste etc.</p>	<p>FAO Report</p> <p>Second Performance Review Report</p>
<p>Management arrangements (gear, area etc) appropriate to risk levels including:</p> <ul style="list-style-type: none"> <li>• VME thresholds</li> <li>• Encounters and move on rules</li> <li>• VME closures, spatial measures</li> <li>• Gear restrictions</li> <li>• Lost gear</li> </ul>	Mostly/Fully	<p>Habitat-related measures have been adopted in relation to bottom fishing and VMEs (CM 30/15).</p> <p>As a precautionary measure, fairly large areas have been closed to all fishing, as well as areas which are closed to all fishing activities.</p> <p>CM 30/15 includes:</p> <ul style="list-style-type: none"> <li>• What VME indicators are (Annex 6) and in 2009 an identification guide for corals and sponges was published;</li> <li>• It also has the VME threshold levels (Annex 6);</li> <li>• How to deal with encounters with possible VMEs (Article 8);</li> <li>• Measures for move-on rules (Article 8);</li> </ul>	<p>CM 30/15</p> <p>Articles 4,5,6</p> <p>Convention Article 7 SOICE 2017 Article 8 SOICE 2017</p>

EAF component	EAF status	SEAO-SEAFO - Justification and comments	Source material
		<ul style="list-style-type: none"> <li>Measures for area closures for the protection of VMEs (Article 5).</li> </ul> <p>The 2017 SEAFO system requires the marking of gear (Article 7) and the retrieval of lost or abandoned fishing gear (Article 8).</p> <p>Recommendation 1/2009 calls for the banning of gillnets.</p>	
Suitable monitoring programme appropriate to risks is in place	Mostly/Fully	<p>A reporting system regarding biota associated with VMEs. Observers on fishing vessels are required to report bycatches of sponges and corals.</p> <p>An identification guide has been developed to support the observers in this task.</p>	Article 18 of SOICE 2017
<b>Cumulative fishery effects</b>			
Identification of cumulative impacts on community structure and assessment of their risks	Partly (in progress)	<p>Stock status reports include information of the potential ecosystem impacts of each of the fisheries.</p> <p><i>Gap: Second Performance Review identified the need to identify criteria for maximum acceptable ecosystem impacts of fisheries. The report acknowledges that a lack of data may hamper such assessments; this is now on the SC's list of recommendations for future work.</i></p> <p><i>The review also identified that the SC should develop ecosystem status reports regarding the interactions between fisheries and the marine ecosystem within the convention area.</i></p>	Second Performance Review Report SC Report 2017
Management arrangements for captured species and direct effects deal with any cumulative impacts	Partly (in progress)	Currently under consideration.	SC Report
Suitable monitoring and review appropriate to the risks	Partly (in progress)	This is likely to require dedicated science surveys to provide the information to generate ecosystem 'models' – unless the assessment indicates that this is a low risk.	Second Review report

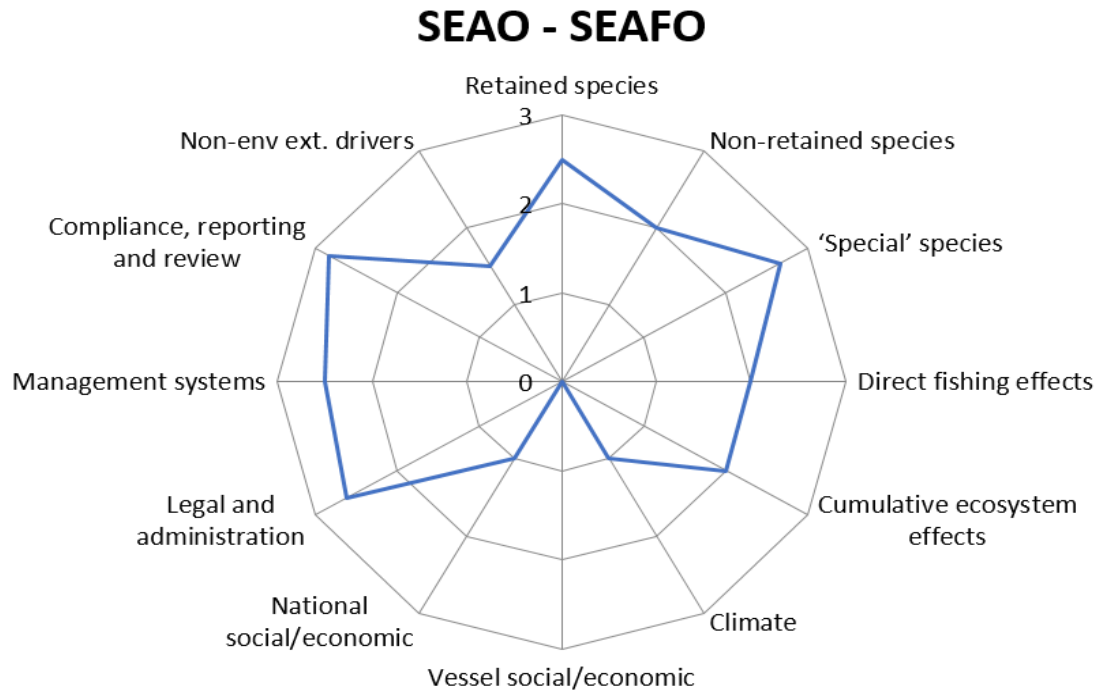
EAF component	EAF status	SEAO-SEAFO - Justification and comments	Source material
<b>Environmental external drivers</b>			
Identification and assessment of risk from external environmental impacts (e.g. climate)	Partly (in progress)	Such issues are only starting to be included in the assessment programme.	
Explicit consideration of any risks made in management strategies	In progress	This is yet to be formally integrated into the management settings.	
<b>Social and economic wellbeing</b>			
<b>Vessel/industry level</b>			
Identification and assessment of social and economic components at this level (e.g. crew safety).	No	<i>Gap: No apparent examination and assessment of potential vessel-level issues.</i>	
Appropriate consideration of risks/opportunities within management	No	<i>Gap: No apparent consideration of the potential vessel-level issues in management settings.</i>	
<b>Community levels</b>			
Identification and assessment of social and economic components at this level (e.g. regional benefits).	N/A	Not relevant.	
Appropriate consideration of risks/opportunities within management	N/A	Not relevant.	
<b>National level</b>			
Identification and assessment of social and economic	Partly	Contracting parties participate in discussions and may bring issues to the Commission.	

EAF component	EAF status	SEAO-SEAFO - Justification and comments	Source material
components at this level (e.g. income, employment)		<p><i>Gap: No formal assessment of these elements has been undertaken.</i></p> <p><i>No identification of the risks and therefore the drivers that these countries may bring to the decision-making table.</i></p>	
Appropriate consideration of risks opportunities by management	Partly	<p>Contracting parties may provide their views on economic and social considerations based on implicit objectives during the decision-making process.</p> <p><i>Gap: no formal mechanism to deal with these objectives.</i></p>	
<b>Ability to achieve</b>			
<b>Governance</b>			
<b>Legal and administration</b>			
Clear scope and high-level EAF - ecological, social and economic objectives are identified	Mostly	<p>The combined set of information available on the website and in the Performance Review documents, the SC reports and the FAO technical report cover most of the environmental elements of EAF.</p> <p>As outlined above there is minimal coverage of the social and economic components of EAF.</p>	<p>FAO Report</p> <p>Second Performance Review Report</p> <p>SC Report 2017</p> <p>Website</p>
Suitably binding and effective legal instruments to enable effective management	Fully	<p>The Convention and the Compliance System (SOICE) are comprehensive and binding on all contracting parties and, to the degree possible, non-contracting parties.</p> <p>However, there is still the inherent level of uncertainty associated with having non-contracting parties.</p>	<p>Convention SOICE 2017</p>
Suitable consultation and administrative structures are in place and enable efficient decisions	Fully	<p>There are suitable consultative and administrative structures and committees in place.</p> <p>Convention Article 8 outlines the meeting structure and Article 17 outlines the decision-making processes; reports from these are stored on the website.</p>	<p>Convention website</p>

EAF component	EAF status	SEAO-SEAFO - Justification and comments	Source material
Consideration of international agreements and other bodies	Mostly/Fully	The SPR identified that SEAFO was compliant with most relevant international agreements and considers other relevant fishery bodies.	Second Performance Review Report
<b>Management systems</b>			
Comprehensive identification and assessments of risks for all EAF components	Mostly/Fully	Identification and assessments of the most likely environmental risks have been conducted i.e. target species and bottom impacts and special bycatch species.  No formal assessment of the social and economic risks.	
A clear management ‘plan’ and arrangements appropriate to current levels of risk.	Mostly/Fully	There are a series of Conservation Measures that deal with the most likely set of environmental risks covering: target species, VMEs/closed areas, move on, encounters, bottom impacts seabirds, sharks, turtles (see above for details).	See CMs on website
A clear process or harvest strategy to amend management as needed	Mostly/Fully	The annual status reports for target species include harvest control rules which are used to determine if the TACs should be adjusted.	SC 2017 Report
Suitable scientific monitoring and assessment process in place	Mostly (in progress)	The level of monitoring for most risks is appropriate given the low levels of effort.  Consideration of expanding this to other broader ecosystem issues is under way.	Second Performance Review  SC 2017 Report
<b>Compliance, reporting and review</b>			
Effective monitoring, compliance and enforcement programmes: <ul style="list-style-type: none"> <li>• Vessel list and notification</li> <li>• VMS</li> <li>• IUU</li> <li>• Observers</li> <li>• Port</li> </ul>	Fully	The SEAFO System of Observation, Inspection, Compliance and Enforcement is comprehensive and covers each of these areas, including: <ul style="list-style-type: none"> <li>• Article 4 vessel list</li> <li>• Article 13 pertains to VMS.</li> <li>• Article 14 is transshipments</li> <li>• Article 17 At-sea inspections</li> <li>• Article 18 covers the scientific observer programme</li> <li>• Articles 19–26 Port states</li> <li>• Article 28 Listed IUU vessels</li> </ul>	SOICE 2017
Regular reporting on fishery risk status for all EAF components	Mostly (in progress)	The SC reports annually on status of target species; the possibility of producing ecosystem system status reports is also being considered.	SC 2017 report

EAF component	EAF status	SEAO-SEAFO - Justification and comments	Source material
			Second Performance Review
Periodic, independent reviews	Fully	<p>There have been two independent performance reviews of the SEAFO, the most recent completed in 2016.</p> <p>This has provided a series of recommendations that are consistent with progressing implementation of EAF.</p>	Second Performance Review
<b>Non-environmental external drivers</b>			
External impacts and risks to the fishery identified and assessed.	Partly	Other fisheries that capture the target species are recognized in the assessments. Minimal discussion of other potential drivers	SC Report 2017
Appropriate consideration of external risks within management strategies, policies and processes	Partly/ Mostly	<p>Some considerations are given to captures within other fisheries when developing management measures.</p> <p>However, as per Convention Article 19, this demands compatible measures.</p>	<p>SC Report 2017</p> <p>Article 19</p> <p>Convention</p>

#### 4.6.1 Summary gap analysis



**Figure 8:** Summary of EAF implementation by SEAFO (where 1= Partly; 2=Mostly and 3= Fully)

The SEAFO has direct consideration for most (nine of 12) EAF components which are either mostly implemented (non-retained species; cumulative impacts; climate; management systems) or close to being fully implemented (retained and special species; compliance; legal and administration; see Figure 8). Formal risk assessments of retained and non-retained species are under way; cumulative impacts are under active consideration and improvements to management are also under way.

*Retained, non-retained and special species:* SEAFO has implemented total allowable catches (TACs) for the main target species and rudimentary harvest control rules. There is no formal risk assessment of many retained and non-retained species but has already been identified and will be addressed.

*Direct fishing effects:* The extent of VMEs is only poorly known. There is minimal survey information to undertake formal assessments. No assessments of potential impacts from non-benthic elements such as provisioning, gear loss, waste, etc.

*Cumulative impacts:* These issues are active being considered by the Scientific Committee.

*Social/economic:* No apparent examination and assessment of potential vessel-level issues. No formal assessment of national-level elements.

*Climate and external drivers:* Climate is only starting to be recognized, with some consideration of external factors such as the impacts of catches by other fisheries.

*Management:* Minor improvements in a number of management areas are under way. There is no overall EAF plan.



*Legal, administration plus compliance/reporting/review:* There is a lack of social and economic objectives. No reports on all EAF components, but the possibility of producing ecosystem system status reports is being considered.

**Key points:** In addition to planned activities, some form of risk assessment is still required for non-benthic direct impacts; special species; vessel- and national-level (CP) social and economic issues, and external drivers.

## 4.7 Indian Ocean

The Southern Indian Ocean Fisheries Agreement (SIOFA) was signed in Rome on 7 July 2006 and came into force in June 2012. The objectives of the Agreement are to ensure the long-term conservation and sustainable use of fishery resources and to promote the sustainable development of fisheries in high seas area of the Indian Ocean (IO) (Table 4.7). This includes taking account of the needs of parties, particularly the least developed and small island states. The SIOFA area of application covers the southern two-thirds of the Indian Ocean between Africa and Australia. The Agreement operates by way of an Annual Meeting of Parties that is serviced by a Secretariat, scientific and compliance committees plus working groups.

The SIOFA is largely a bottom trawl fishery that began in the 1960s to 1970s, with the total number of vessels fishing in the area from 2011 to 2017 between seven and 65. These vessels fished for toothfish with bottom longlines, orange roughy with bottom trawls, and alfonsino and other species with deep midwater (semi-pelagic) trawls. The catch levels have been approximately 4 000–6 000 tonnes of Alfonsino, 1 500–2 500 tonnes of Orange Roughy, 1 500 tonnes of sharks, small amounts of toothfish plus 5 000–9 000 tonnes of lizardfish and scads. Recent total annual catches for all species are around the 5 000 t level. They appear to be stable and target mainly alfonsino, with lesser components of orange roughy and Patagonian toothfish.

The agreement was signed in 2006 but only came into effect in 2012 with the first meeting of parties held in 2013. SIOFA has nine contracting parties: Australia, the Cook Islands, European Union, France (on behalf of its Indian Ocean Territories), Japan, the Republic of Korea, Mauritius, Seychelles and Thailand.

**Table 4.7:** EAF Implementation audit – IO - SIOFA (July 2018)

*Note: The summaries outlined in this table should be read in conjunction with the information presented in the EAF background report for SIOFA, including the full set of references (Appendix 2.7). It should also be noted that SIOFA has only been operational since 2013*

EAF component	EAF status	IO - SIOFA - Justification and comments	Source material
<b>Retained species</b>			
Identification and risk assessments	Partly- (in progress)	<p>The set of retained species has been identified using catch records now obtained from all member parties (SC 2016).</p> <p>The SC has identified three principal target species: Orange roughy, Alfonsino and Patagonian toothfish. Advice and recommendations will be made to the Meeting of the Parties on the stock status of these deep-sea resources by the end of SC 2019.</p> <p>The SC 2017 noted that a risk-based approach could be applied to other target species, bycatch and species caught incidentally.</p>	<p>1st Meeting Scientific Committee (SC) 2016 Annex 1</p> <p>2nd SC meeting report (2017) Pages 11–13</p> <p>Compendium of CMMs 2017</p> <p>SC report 2018</p>
Management systems appropriate to risks	Partly (in progress)	<p>Until formal stock assessments are completed each contracting party must establish and apply specific measures to limit effort and or catch levels (CMM 2016/01; CMM 2017/01).</p> <p>The use of large pelagic drift nets is prohibited (CMM 2016/05).</p> <p>While no decision rules are in place see SIOFA Rules of Procedure for decision-making <a href="http://www.apsoi.org/about-siofa/basic-documents/RoP">http://www.apsoi.org/about-siofa/basic-documents/RoP</a>.</p>	<p>Compendium CMM 2017</p> <p>RFMO Measures Report</p> <p>SC report 2018</p>
Suitable monitoring and ongoing assessment appropriate to risks	Mostly	<p>All contracting parties, CNCPs and PFEs shall ensure that data on fishing activities – including target, non-target and associated and dependent species such as marine mammals, marine reptiles, seabirds or ‘other species of concern’ – are collected from vessels flying their flag (CMM 2016/02; Annex A and Annex B; 2017/02).</p> <p>Logbook data to be submitted within 30 days CMM 2017/10.</p> <p>The completion of stock assessments may identify that additional data may be needed.</p>	<p>CMM 2016/02 (annexes A&amp;B)</p> <p>CMM 2017/10</p>

EAF component	EAF status	IO - SIOFA - Justification and comments	Source material
<b>Non-retained species</b>			
Identification and risk assessment	Partly (in progress)	An assessment of risks to deepwater sharks has been conducted; no other explicit assessments of non-retained species but planned through the ERA process (SC Strategic Plan) ERAWG.	SC report 2018
Management systems appropriate to risk levels are in place	In progress	It was noted that the ERA has prioritized species for which better information is needed, and those for which explicit management actions may be required.	SC report 2018
Suitable monitoring programme appropriate to risks	Mostly	Likely to be covered by observer programmes CMM 2017/02 (Annex B) and the newly agreed monitoring requirements (CMM 2017/10).	Compendium CMM 2017
<b>Special species</b>			
Identification and risk assessment	Partly (in progress)	While no specific special species have been identified for this fishery (and some of the specific species are unlikely to be affected) there is currently no explicit assessment to confirm this. The limit on an increase in effort will also assist in this indirectly.  <i>Gap: The proposed ERAs of the current observer data could address this gap.</i>	SC report 2018  Compendium CMM 2017
Management appropriate to risk levels for each component of this group are in place	Partly	Use of large pelagic drift nets is prohibited (CMM 2016/05a).  A Memorandum of Understanding between SIOFA and the Agreement on the Conservation of Albatrosses and Petrels (ACAP) was adopted in 2018 ( <a href="http://www.apsoi.org/about-siofa/international-cooperation/ACAP">www.apsoi.org/about-siofa/international-cooperation/ACAP</a> ).  There are limits on expanding effort.  Until a full assessment has been completed it is not clear whether other measures are needed to reduce risks.	Compendium CMM 2017  RFMO Measures Report  SC report 2018
Suitable monitoring programme appropriate to risks	Mostly	Likely to be covered by observer programmes (CMM 2016/02; Annex B).	

EAF component	EAF status	IO - SIOFA - Justification and comments	Source material
<b>Broader ecosystem</b>			
<b>Direct fishing effects</b>			
Identification of potential direct effects including footprint mapping and risk assessments of all potential impacts	Partly (in progress)	<p>By 2019, determine criteria for what constitutes evidence of an encounter with a VME, in particular threshold levels and indicator species (CMM 2016/01; CMM 2017/01).</p> <p>By 2020 determine an appropriate SIOFA bottom fishing footprint (CMM 2016/01; CMM 2017/01).</p> <p>By 2020 determine a SIOFA Bottom Fishing Impact Assessment shall take into account the activities of all contracting fishing vessels (CMM 2016/01; CMM 2017/01).</p> <p>There are rules on list gear (CMM 2017/09).</p> <p><i>Gap: No assessment of non-benthic impacts.</i></p>	Williams et al., 2011 Compendium CMM 2017
Management arrangements (gear, area etc) appropriate to risk levels including: <ul style="list-style-type: none"> <li>• VME thresholds</li> <li>• Encounters and move on rules</li> <li>• VME closures, spatial measures</li> <li>• Gear restrictions</li> <li>• Lost gear</li> </ul>	Partly (in progress)	<p>By 2019 determine the most appropriate response to a VME encounter, including closing particular areas to a particular gear type or types (CMM 2017/01).</p> <p>Until assessments are completed each contracting party must establish and apply specific measures to limit the level and spatial extent of the bottom fishing of vessels flying their flag, so that they do not expand the area of trawl operations and VMEs are not affected.</p> <p>Must cease bottom fishing if VME is encountered (CMM 2016/01, CMM 2017/01).</p> <p>Measures are in place regarding the use of large-scale pelagic driftnets and deepwater gillnets (CMM 2016/05).</p> <p>Vessels must retrieve or report all lost fishing gear (CMM 2017/09).</p>	Compendium CMM 2017
Suitable monitoring programme appropriate to risks is in place	Mostly	<p>Observer programme in place for trawling with 100 percent scientific observer coverage; other programmes have 20 percent observer coverage (CMM 2016/01; CMM 2017/01).</p> <p>Guidelines for reporting VME encounters are in place.</p>	Compendium CMM 2017

EAF component	EAF status	IO - SIOFA - Justification and comments	Source material
		Until assessment is completed it is not possible to determine whether all required monitoring is in place.	
<b>Cumulative fishery effects</b>			
Identification of cumulative impacts on community structure and assessment of their risks	In progress	This is now being planned by the SC.	SC report 2018
Management arrangements for captured species and direct effects deal with any cumulative impacts	Partly (in progress)	CMM 2017/01 is designed to protect the marine ecosystem including, inter alia, the prevention of significant adverse impacts on vulnerable marine ecosystems.	Compendium CMM 2017
Suitable monitoring and review appropriate to the risks	Mostly	The observer programme and other monitoring is likely to cover most data requirements (CMM 2017/01; CMM 2017/10).	Compendium CMM 2017
<b>Environmental external drivers</b>			
Identification and assessment of risk from external impacts	In progress	Starting to be considered.	SC report 2018
Explicit consideration of any risks made in management strategies	Partly	The agreement outlines that relevant oceanographic and other environmental conditions need to be considered, together with the management of straddling stocks.	Agreement
Social and economic wellbeing			
<b>Vessel/industry level</b>			
Identification and assessment of social and economic components at this level (e.g. crew safety)	No	No information. <i>Gap: no assessment of vessel-level social or economic issues.</i>	
Appropriate consideration of risks/opportunities within management	No	No information.	

EAF component	EAF status	IO - SIOFA - Justification and comments	Source material
<b>Community levels</b>			
Identification and assessment of social and economic components at this level (e.g. regional benefits).	N/A	Not relevant (no coastal operations).	
Appropriate consideration of risks/opportunities within management	N/A	As above.	
<b>National level</b>			
Identification and assessment of social and economic components at this level (e.g. income, employment)	Partly	Country-level annual reports enable national-level issues to be raised.	SC report 2018
Appropriate consideration of risks/opportunities by management	Partly	The agreement outlines that the Meeting of Parties can consider the impacts of fishing on relevant human activities.	Agreement
<b>Ability to achieve</b>			
<b>Governance</b>			
<b>Legal and administration</b>			
Clear scope and high-level EAF - ecological, social and economic objectives are identified	Mostly	<p>The Southern Indian Ocean Fisheries Agreement (SIOFA) outlines the ecological objectives, boundaries participants and fishing methods.</p> <p>The website has additional information but there is no single document that includes all information consistent with a full EAF background report.</p> <p><i>Gap: no social or economic objectives.</i></p>	<p>SIOFA Agreement</p> <p>SIOFA website</p>

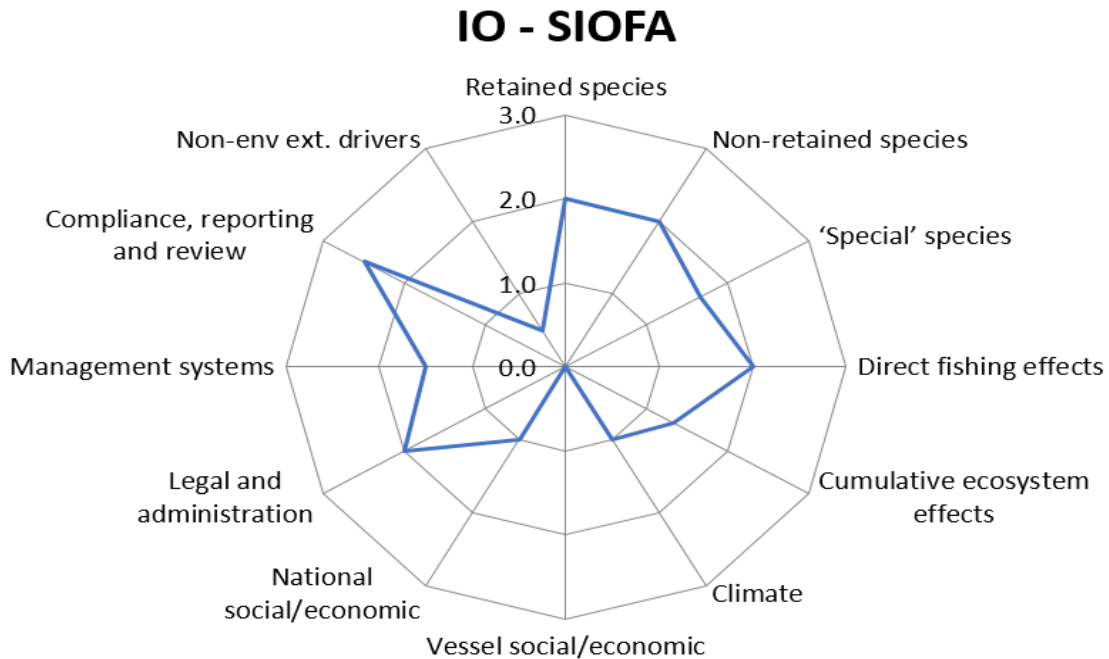
EAF component	EAF status	IO - SIOFA - Justification and comments	Source material
Suitably binding and effective legal instruments to enable effective management	Mostly	<p>The Southern Indian Ocean Fisheries Agreement (SIOFA) binds all contracting members to the all CMMs identified.</p> <p>There is one cooperating non-contracting party (CNCPS) Comoros and currently no participating fishing entities (PFEs).</p> <p>There is a confidentiality agreement for data and access to data (CMM 2016/03).</p> <p>All flag states must strengthen their legal, operational and institutional capacity to take action against flagged vessels that have engaged in IUU fishing or fishing-related activities (CMM 2016/04).</p>	Compendium CMM 2017 RFMO Measures report
Suitable consultation and administrative structures are in place and enable efficient decisions.	Mostly	<p>The overall governance framework is comprehensive and most parts are now functioning.</p> <p>There is a functioning secretariat.</p> <p>The Annual Meeting of Parties is operational.</p> <p>The Compliance Committee is operational.</p> <p>The Scientific Committee is operational.</p> <p>The Finance Committee is not yet operational but TORs have been determined.</p>	Compendium CMM 2017 Procedures RFMO measures report SC report 2018
Consideration of international agreements and other bodies	Mostly	The Agreement specifically requires contracting parties to cooperate with related organizations that have mutual interests, and particularly with SWIOFC and other adjacent organizations managing fisheries in the high seas (SIOFA, 2006).	Agreement
<b>Management systems</b>			
Comprehensive identification and assessments of risks for all EAF components	Partly (in progress)	<p>The identification of risks for many of the ecological elements is progressing in line with the SC strategic plan.</p> <p>There is no clear plan covering the identification and assessment of social and economic elements.</p>	SC report 2018

EAF component	EAF status	IO - SIOFA - Justification and comments	Source material
A clear management plan and arrangements appropriate to current levels of risk	Partly (in progress)	<p>There are a number of Conservation Management Measures (CMM) developed so far for this fishery. They are not comprehensive, with many of the underlying, necessary analyses not yet completed.</p> <p>The compendium of CMMs is updated annually, following the Meeting of the Parties forum.</p> <p>There are plans to increase the level of management.</p>	Compendium of CMMs
A clear process or harvest strategy to amend management as needed	Nil	Given that the first series of assessments has not yet been completed, this process has not yet begun.	
Suitable scientific monitoring and assessment process in place	Mostly	The monitoring programme is in place for the issues identified. Once all elements have been assessed the current programme needs to be reviewed.	Compendium of CMMs
<b>Compliance, reporting and review</b>			
<p>Effective monitoring, compliance and enforcement programmes:</p> <ul style="list-style-type: none"> <li>• Vessel list and notification</li> <li>• VMS</li> <li>• IUU</li> <li>• Observers</li> <li>• Port</li> </ul>	Fully	<p>All IUU activity must be reported (CMM 2016/06).</p> <p>All vessels must notify and be authorized if they are to fish (CMM 2016/07).</p> <p>All transshipments and at-sea transfers to be recorded accurately (CMM 2017/10).</p> <p>All frozen products must be appropriately labelled (CMM 2017/09).</p> <p>A port inspection scheme is in place (CMM 2017/08).</p>	<p>Compendium CMM 2017</p> <p>RFMO Measures Report</p> <p>SC report 2018</p>
Regular reporting on fishery risk status for all EAF components	Partly (in progress)	Some level of fishery status reporting occurs, through the annual Meeting of Parties and committee reporting processes, which are published on the website – but it does not cover all EAF elements. The level of reporting is increasing.	SC report 2018
Periodic, independent reviews	N/A	As this fishery has only just begun to be managed and the first set of assessments and management actions have not been generated, this is not relevant as yet.	



EAF component	EAF status	IO - SIOFA - Justification and comments	Source material
<b>Non-environmental external drivers</b>			
External impacts and risks to the fishery identified and assessed	Partly	The potential impact of non-member fishing activities has been identified.	
Appropriate consideration of external risks within management strategies, policies and processes	No	Not yet possible.	

#### 4.7.1 Summary gap analysis



**Figure 9:** Summary of EAF implementation by SIOFA (where 1= Partly; 2 = Mostly and 3 = Fully)

Consistent with SIOFA having been operational for a short period, it currently has formal consideration for seven of the 12 EAF components (see Figure 9). These are considered to be only mostly implemented (retained, non-retained and special species; direct and cumulative impacts; legal and administration; compliance and reporting). While a number of gaps remain, many are set to be addressed, including: risk assessments for captured species; cumulative impacts climate; fishing footprint.

*Retained, non-retained and special species:* Many target species require stock assessments to be completed and no formal arrangements or decision rules are in place. No explicit risk assessments of non-retained or special species, but these are now planned.

*Direct fishing effects:* SIOFA bottom fishing footprint to be developed by 2020. There is no assessment of non-benthic direct impacts.

*Cumulative impacts:* This gap is now planned to be addressed.

*Social/economic:* No assessment of social or economic issues at either the vessel or industry level.

*Climate and external drivers:* These gaps are starting to be considered.

*Management:* These systems are not yet developed or comprehensive, with many of the underlying, necessary analyses not yet completed. There are plans to increase the level of management.

*Legal, administration plus compliance/reporting/review:* There are no social or economic objectives and no single report or document that provides a status update of all EAF areas.

**Key points:** In addition to the above, some form of risk assessment is also required for non-benthic direct impacts; vessel- and national-level (CP) social and economic issues, and external drivers.

## 4.8 South Pacific Ocean

The South Pacific Regional Fisheries Management Organisation (SPRFMO) is an intergovernmental organization committed to the long-term conservation and sustainable use of the fishery resources of the high seas area in the South Pacific Ocean (SPO), as well as the safeguard of marine ecosystems. The SPRFMO Convention applies to the high seas (outside EEZs) of the South Pacific, covering about a fourth of the Earth's high seas areas. This management process was initiated in 2006, with the convention agreed in principle in 2009 and officially signed in 2012.

The objective of this convention is to ensure the long-term conservation and sustainable use of fishery resources through the application of the precautionary approach, and an ecosystem approach to fisheries management; in so doing, it aims to safeguard the marine ecosystems in which these resources occur (Table 4.8). The SPRFMO consists of a commission and a number of subsidiary bodies including a secretariat, scientific, compliance and management committees plus working groups.

Information on commercial fishing in the South Pacific Ocean high seas is limited. Exploratory and targeted commercial fishing is thought to have taken place in the area since at least the 1970s. Currently, the main commercial resources fished in SPRFMO are jack mackerel and jumbo flying squid in southeast Pacific and, to a lesser degree, the deep-sea species associated with seamounts in the southwest Pacific. Fishing methods currently used include purse seining, pelagic trawling, bottom trawling, pelagic longlining, bottom longlining and potting. Catches of trawl species such as Orange roughy are now small (< 1 500 tonnes), but some pelagic species such as jack mackerel can exceed 100 000 tonnes. Catches of many of these species are much greater within the EEZ regions.

The Commission currently has 15 Members from Asia, Europe, the Americas, and Oceania: Australia, Chile, China, Cook Islands, Cuba, Ecuador, European Union, Denmark (in respect of the Faroe Islands, the Republic of Korea, New Zealand, Peru, the Russian Federation, Taiwan Province of China, the United States of America, Vanuatu.

**Table 4.8:** EAF Implementation audit – SPO SPRFMO (July 2018)

*Note: The summaries outlined in this table should be read in conjunction with the information presented in the EAF background report for SPRFMO, including the full set of references (Appendix 2.8)*

EAF component	EAF status	SPO – SPRFMO – Justification and comments	Source material
<b>Retained species</b>			
Identification and risk assessments	Partly (in progress)	<p>There is a list of the main species captured and their catch levels in the data section of the website.</p> <p><i>Gap: No formal assessment of target species and no risk assessment for the other retained species The SC is charged with completing these assessments.</i></p>	<p><a href="https://www.sprfmo.int/data/catch-information/">https://www.sprfmo.int/data/catch-information/</a></p> <p>CMM 03-2018 SC Science Plan (2018)</p>
Management systems appropriate to risks	Partly (in progress)	<p>There is specific management of effort, total catch and specific allocations to members for jack mackerel. This is reviewed each year.</p> <p>Until the assessments are completed there is a requirement to limit bottom fishing to historic levels and areas.</p> <p>Fishery requirements are being developed.</p> <p><i>Gaps: Most target stocks still require the development of suitable management systems, including harvest strategies.</i></p>	<p>CMM 01-2018 CMM 03-2018 CMM 13 CMM 14</p>
Suitable monitoring and ongoing assessment appropriate to risks	Mostly	<p>Many of the data requirements include recording of catch and effort information are in progress.</p> <p>The sixth workshop of the Scientific Committee met in May 2018 to assess the Jack mackerel stock.</p> <p><i>Gap: Most of the stock assessments for target and bycatch stocks are not done – this requires collation of historical information which is underway. No evidence of biological sampling.</i></p>	<p>CMM 02- 2017</p> <p><a href="https://www.sprfmo.int/meetings/schw6/">https://www.sprfmo.int/meetings/schw6/</a></p>

EAF component	EAF status	SPO – SPRFMO – Justification and comments	Source material
<b>Non-retained species</b>			
Identification and risk assessment	Partly (in progress)	Data is being recorded on discards but there is no evidence it has been assessed: this is one of the initiatives in the science plan.	CMM 02-2018 Science Plan 2018
Management systems appropriate to risk levels are in place	Partly (in progress)	There is a restriction on the use of gillnets. <i>Gap: No management explicit for other taxa – it may not be required if found to be low risk when the planned risk assessment is completed.</i>	CMM 08-2013 Science Plan 2018
Suitable monitoring programme appropriate to risks	Mostly	Data collection requirements include the recording of discards; observers should be able to provide information on this issue. <i>Gap: Final determination of this programme will occur following the completion of the risk assessment to determine what level of monitoring is needed.</i>	CMM 02-2018
<b>Special species</b>			
Identification and risk assessment	Partly (in progress)	Seabirds have been identified as a group of species of interest. The science plan now includes evaluating available observer data on seabird interaction rates and determining where estimates can be improved. It will also analyse observer-collected seabird interaction data to inform risk assessment(s). <i>Gap: Risks to other groups are scheduled to be undertaken.</i>	CMM 09-2017 Science Plan 2018
Management appropriate to risk levels for each component of this group are in place	Mostly	Management measures have been put in place to reduce incidental bycatch of seabirds. These measures include a requirement to review arrangements if the rates of capture or death by a vessel exceed specified limits. There is a general reference to these species in bottom fishing measures but no specific actions.	CMM 09-2017 CMM 03-2018

EAF component	EAF status	SPO – SPRFMO – Justification and comments	Source material
		<i>Gap: No management systems for the other taxa – may or may not be needed based on risk(s).</i>	
Monitoring programme appropriate to risks	Fully	Observers and data recording by vessel should be sufficient for this.	CMM 02-2017
<b>Broader ecosystem</b>			
<b>Direct fishing effects</b>			
Identification of potential direct effects including footprint mapping and risk assessments of all potential impacts	Partly (in progress)	<p>In 2011, the SPRFMO Secretariat produced a joint bottom-trawl fishing footprint map, but this is known to have gaps.</p> <p>There is a programme to get all members to provide their pre-2007 fishing histories.</p> <p><i>Gaps: A formal risk assessment of other issues, including waste management, provisioning etc.</i></p> <p><i>The science plan now includes the Spatially Explicit Fisheries Risk Assessment framework (SEFRA)</i></p>	<p>SPRFMO, 2011</p> <p>Science Plan 2018</p>
<p>Management arrangements (gear, area etc) appropriate to risk levels including:</p> <ul style="list-style-type: none"> <li>• VME thresholds</li> <li>• Encounters</li> <li>• VME closures</li> <li>• Gear restrictions</li> <li>• Lost gear</li> </ul>	Partly (in progress)	<p>Some of the measures to deal with VMEs have been outlined, but not yet completed.</p> <p>Protocols for new or exploratory fishing outside the footprint or above the 2002–2006 catch levels are in place.</p> <p>There is a restriction on the use of gillnets.</p> <p><i>Gaps: No closures formally defined as yet.</i></p> <p><i>There is no uniform threshold for encounters with VMEs: each party has their own criteria.</i></p> <p><i>The SC will be providing advice on these shortly. There is no mention of lost gear.</i></p>	<p>CMM 03-2018</p> <p>CMM 13-2016</p> <p>CMM 08-2013</p> <p>Science Plan 2018</p>

EAF component	EAF status	SPO – SPRFMO – Justification and comments	Source material
Suitable monitoring programme appropriate to risks is in place	Mostly	The observer programme and data recording by vessels should be sufficient for this.	CMM 02-2017 CMM 03-2017 CMM 16-2018
<b>Cumulative fishery effects</b>			
Identification of cumulative impacts on community structure and assessment of their risks	In progress	This is one of the initiatives in the science plan.	Science Plan
Management arrangements for captured species and direct effects deal with any cumulative impacts	Partly (in progress)	The Convention outlines that fishing shall be commensurate with the sustainable use of resources, taking into account the impacts on non-target and/or associated or dependent species, as well as the general obligation to protect and preserve the marine environment.	Convention
Suitable monitoring and review appropriate to the risks	In progress	Covered in the science plan.	Science Plan 2018
<b>Environmental external drivers</b>			
Identification and assessment of risk from external impacts	Partly	Climate impact is one of the considerations.	COMM 5 Info 3
Explicit consideration of any risks made in management strategies	Partly	<i>Gap: As no assessments have been made this is not possible to evaluate – likely to be included in future assessments.</i>	

EAF component	EAF status	SPO – SPRFMO – Justification and comments	Source material
<b>Social and economic wellbeing</b>			
<b>Vessel/industry level</b>			
Identification and assessment of social and economic components at this level (e.g. crew safety).	No	<i>Gap: No apparent examination and assessment of the potential vessel-level issues.</i>	
Appropriate consideration of risks/opportunities within management	No	<i>Gap: No apparent consideration of potential vessel-level issues in management settings.</i>	
<b>Community levels</b>			
Identification and assessment of social and economic components at this level (e.g. regional benefits).	N/A		
Appropriate consideration of risks/opportunities within management	N/A		
<b>National level</b>			
Identification and assessment of social and economic components at this level (e.g. income employment)	Partly	Contracting members participate in discussions and may bring issues to the Commission.  <i>Gap: No formal assessment of these elements has been undertaken.</i>  <i>No identification of the risks and therefore the drivers that these countries may bring to the decision-making table.</i>	
Appropriate consideration of risks opportunities by management	Partly	Contracting Members may provide their views on economic and social considerations based on implicit objectives during the decision-making process.	

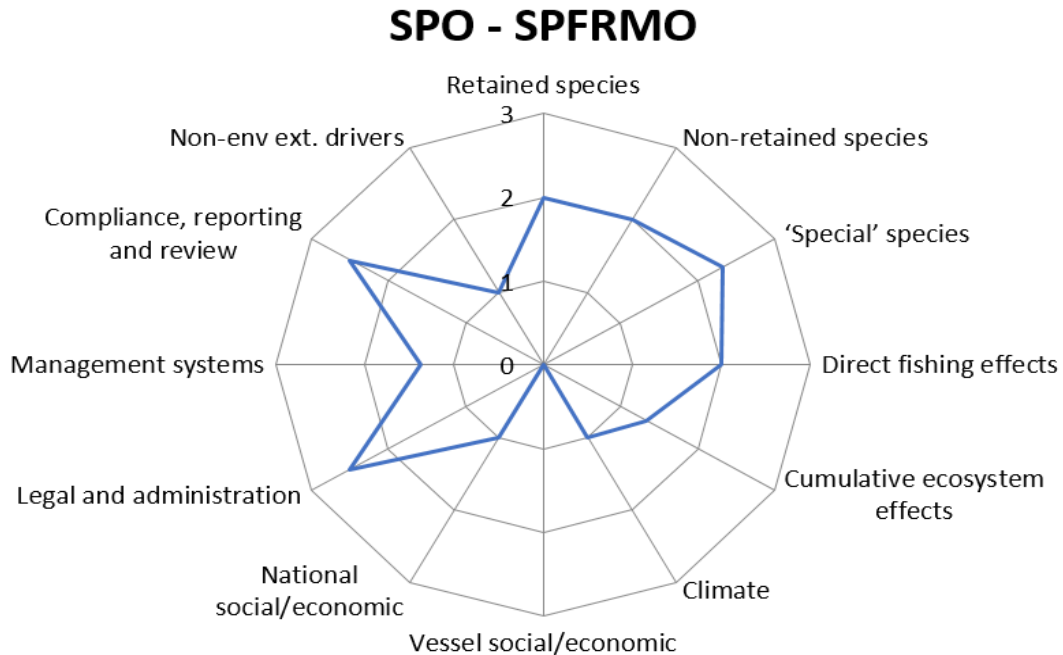


EAF component	EAF status	SPO – SPRFMO – Justification and comments	Source material
		<i>Gap: No formal mechanism to deal with these objectives.</i>	
<b>Ability to achieve</b>			
<b>Governance</b>			
<b>Legal and administration</b>			
Clear scope and high-level EAF - ecological, social and economic objectives are identified	Partly (in progress)	<p>There are short descriptions of the fishery on the website in the basic document sections, as well as some analysis of fishing methods and history of the fishery.</p> <p>The FAO report outlines some further information but only on bottom fishing.</p> <p><i>Gap: There are many areas of EAF that are not covered in the information available through the website.</i></p>	<p><a href="http://www.sprfmo.int/about/docs/">www.sprfmo.int/about/docs/</a> FAO report</p>
Suitably binding and effective legal instruments to enable effective management	Mostly/Partly	<p>The Convention is binding on all contracting parties and, to the degree possible, non-contracting parties.</p> <p>However, there is still an inherent level of uncertainty associated with having non-contracting parties, etc.</p> <p><i>Gap: There are still a large number of management systems that need to be formalized for this fishery.</i></p>	<p>Convention</p> <p><a href="https://www.sprfmo.int/assets/Basic-Documents/Convention-web-12-Feb-2018.pdf">https://www.sprfmo.int/assets/Basic-Documents/Convention-web-12-Feb-2018.pdf</a></p>
Suitable consultation and administrative structures are in place and enable efficient decisions	Mostly	<p>There are suitable consultative and administrative structures and committees in place: each of the various committees is now operational and they generate their own annual reports.</p> <p>The outlines the annual commission meeting structure and the decision-making processes.</p>	Convention
Consideration of international agreements and other bodies	Mostly/Fully	Article 31 of the Convention also states that the Commission shall cooperate, as appropriate, with other regional fisheries management organizations, FAO etc.	Convention

EAF component	EAF status	SPO – SPRFMO – Justification and comments	Source material
<b>Management systems</b>			
Comprehensive identification and assessments of risks for all EAF components	Partly	There has only been identification and assessments of some of the likely environmental risks – only a few of the target species and bottom impacts and seabirds have been addressed so far. <i>Gap: No formal assessment of the social and economic risks.</i>	
A clear management plan and arrangements appropriate to current levels of risk	Partly	A number of CMMs only cover some of the potential risks.	
A clear process or harvest strategy to amend management as needed	Partly	The CMMs only include some elements consistent with a harvest strategy approach.	
Suitable scientific monitoring and assessment process in place	Mostly (in progress)	The current programme of data collection appears to be comprehensive. <i>Gap: In the absence of clear assessments it is not possible to determine whether the current monitoring and science programme is sufficient, though it is in progress.</i>	CMM 02-2018
<b>Compliance, reporting and review</b>			
Effective monitoring, compliance and enforcement programmes: <ul style="list-style-type: none"> <li>• Vessel list and notification</li> <li>• VMS</li> <li>• IUU</li> <li>• Observers</li> <li>• Port</li> </ul>	Fully	Each of these elements is covered by CMMs and/or the Convention.	CMM 05-2016 CMM 06-2017 CMM 07-2017 CMM 11-2015 CMM 12-2018

EAF component	EAF status	SPO – SPRFMO – Justification and comments	Source material
Regular reporting on fishery risk status for all EAF components	Partly (in progress)	<p>The Commission's annual report includes changes to the CMMs.</p> <p>All current CMMS are now included in a compendium.</p> <p>Annual catch information is presented in a report.</p> <p><i>Gap: No reporting of annual status updates; no reporting on economic or social aspects.</i></p>	<p><a href="https://www.sprfmo.int/assets/01-Commission-2017/ANNEXES/COMM5-Report-ANNEX-10-Annual-Report-of-the-Commission-p85-86.pdf">https://www.sprfmo.int/assets/01-Commission-2017/ANNEXES/COMM5-Report-ANNEX-10-Annual-Report-of-the-Commission-p85-86.pdf</a></p> <p>CMM compendium 2018</p> <p><a href="https://www.sprfmo.int/assets/2018-COMM6/COMM6-INF03-Data-Submitted-to-the-Secretariat.pdf">https://www.sprfmo.int/assets/2018-COMM6/COMM6-INF03-Data-Submitted-to-the-Secretariat.pdf</a></p>
Periodic, independent reviews	NA	No evidence of this – may be too early in the Commission's history.	
<b>External drivers</b>			
External impacts and risks to the fishery identified and assessed	Partly progress	Other fisheries that capture the targeted species are recognised in the reporting and presumably this is considered within the assessments.	COMM 5 Info3
Appropriate consideration of external risks within management strategies, policies and processes	In progress	As above.	

#### 4.8.1 Summary gap analysis



**Figure 10:** Summary of EAF implementation by SPRFMO (where 1= Partly; 2 = Mostly and 3 = Fully)

While it has only been operational for a relatively short time, the SPRFMO has considered six of the 12 EAF components (see Figure 10). These are considered to be currently either mostly implemented (retained, non-retained and special species; cumulative impacts) or close to fully implemented (legal and administration; compliance). A number of gaps for these components remain, but many are being actioned.

*Retained, non-retained and special species:* There is no formal assessment of target species and no risk assessment for the other retained, non-retained and many special species. The SC is charged with completing these assessments. Most target stocks still require development of suitable management systems, including harvest strategies.

*Direct fishing effects:* No spatial closures have been formally defined as yet. There are no uniform thresholds for encounters with VMEs. Formal risk assessments of other non-benthic impacts such as waste management and provisioning may be done as part of the southern hemisphere quantitative risk assessment. There is no mention of lost gear.

*Cumulative impacts:* This is one of the initiatives in the science plan.

*Social/economic:* No formal assessment of these elements have been undertaken at the vessel or industry levels.

*Climate and external drivers:* No evidence except from impacts of catches by other fisheries, but it may be found during risk assessment processes.

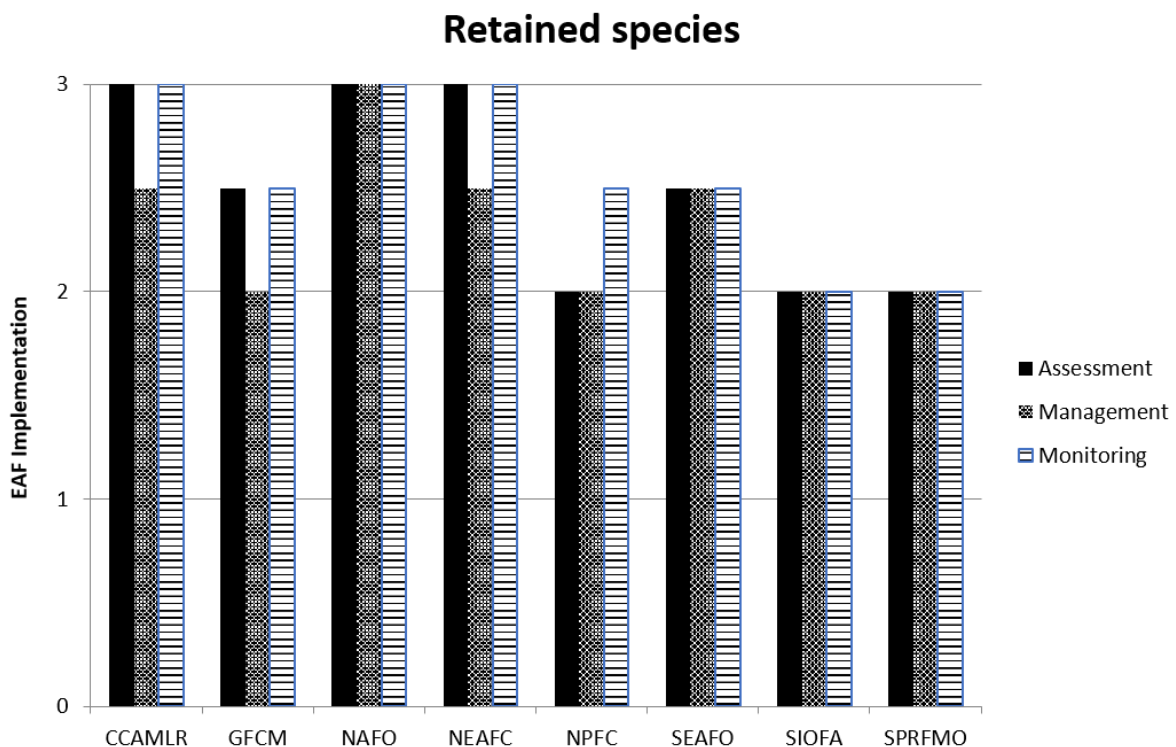
*Management:* Only a few of the target species, bottom impacts and seabirds have been addressed so far; a large number of management systems need to be formalized for the fishery. No overall EAF plan.

*Legal, administration plus compliance/reporting/review:* Many areas of EAF not covered in the objectives and policies. No reporting of annual status updates and no reporting on economic or social aspects.

**Key points:** In addition to the actions outlined above, some form of risk assessment is also required for vessel- and national-level (CP) social and economic issues.

## 5. REGIONAL FISHERIES MANAGEMENT ORGANIZATION – ECOSYSTEM APPROACH TO FISHERIES COMPONENT-LEVEL REVIEWS

### 5.1 Retained species



**Figure 11:** Summary of EAF implementation for retained species (where 1= Partly; 2 = Mostly and 3 = Fully)

The degree to which fully implemented EAF systems for retained species are in place generally correlates with the length of time the and/or administrative structures have been in place. As such, NAFO, CCAMLR and NEAFC have all now fully or mostly/fully implemented all EAF-related aspects for retained species within their RFMO areas; this includes ongoing monitoring systems, regular stock assessments and management arrangements with some control rules.

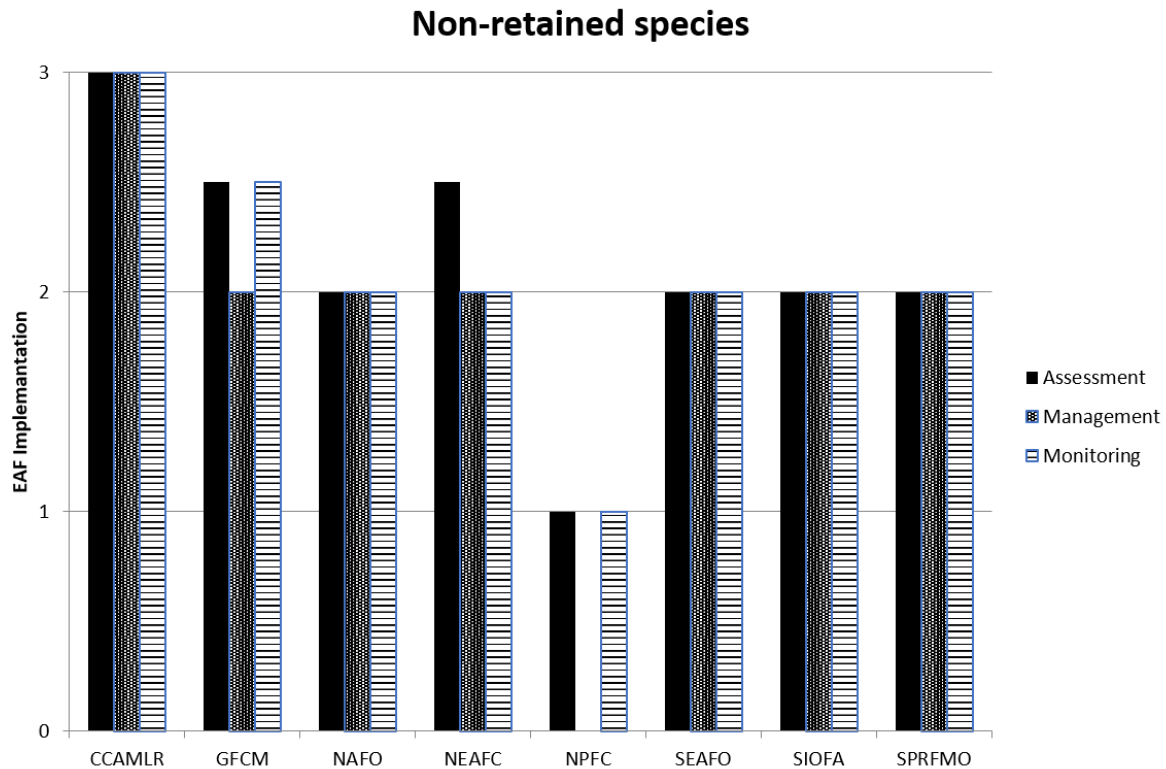
Both the GFCM and SEAFO have systems in place that cover many of the aspects required for the management of the principal retained species within their RFMO areas, while the identified gaps in assessment and management systems are currently being addressed.

The relatively new RFMOs – NPFC, SIOFA and SPRFMO – are still in the process of developing the management systems needed for the retained species. In each of these cases, programmes have already been identified to deal with the main gaps in monitoring and assessment. While the current levels of

management arrangement in place are relatively low, such programmes are either in progress or scheduled to be undertaken upon completion of the planned assessments.

*Conclusion:* The overall management of retained species is clearly a priority for the management bodies in all the RFMOs; and given the plans already in place, it is expected that the gaps in assessment and management arrangements for the newer bodies will improve significantly over the next five years.

## 5.2 Non-retained species



**Figure 12:** Summary of EAF implementation for non-retained species (where 1= Partly; 2 = Mostly and 3 = Fully)

*Note:* “Non-retained” refers to species that are captured but never retained, though does not include discards of target species, which should be included in the assessments

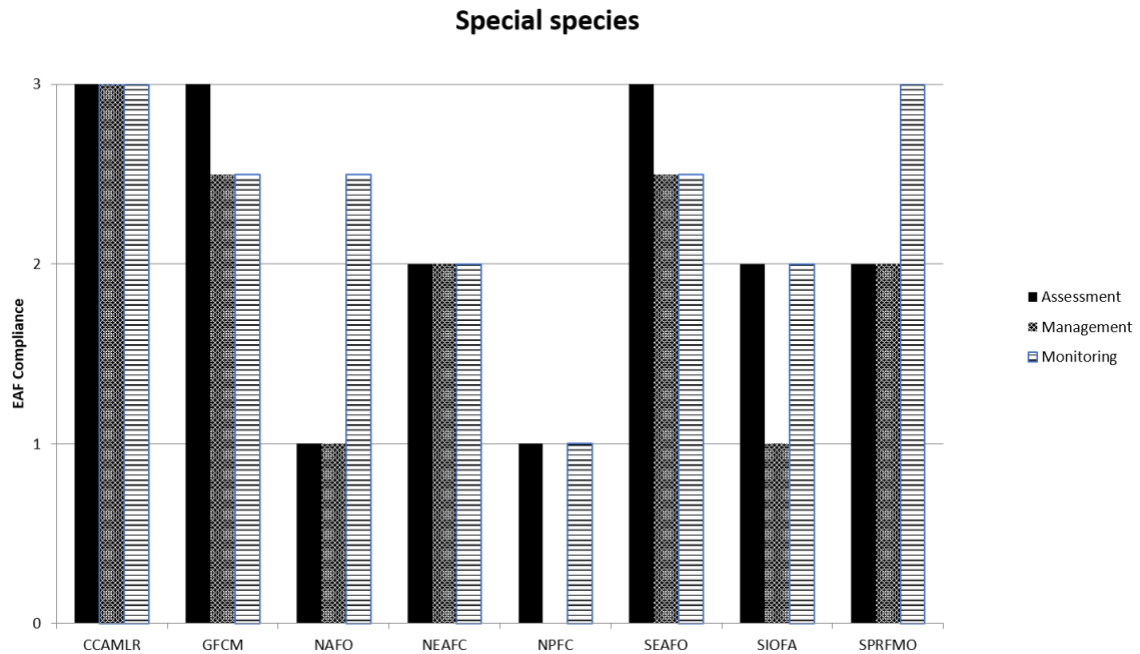
The implementation of EAF requirements for non-retained species was less strictly related to the duration of the RFMO. All bodies except NPFC were found to have at least some level of assessment, management and monitoring in place for this EAF category. No gaps were found in the comprehensive bycatch systems documented for CCAMLR.

In the case of some RFMOs (GFCM, NAFO, NEAFC) it was not clear from the documentation available the extent to which a comprehensive risk assessment of this category had been undertaken. The other RFMOs (NPFC, SEAFO, SPRFMO, SIOFA) had already identified this as a gap and have scheduled some form of risk assessment into their science plans for this category of species.

*Conclusion:* If a dedicated risk assessment of all non-retained species potentially impacted by the fishing operations has not been undertaken by an RFMO, this should be completed (assessments normally completed at either the category or group level).

Without a clear understanding of the risk status of each of the non-retained species/group it is not possible to determine with any certainty whether any specific management is, or is not, required. These assessments also help determine the levels of monitoring and ongoing assessment necessary for these species.

### 5.3 Special species



**Figure 13:** Summary of EAF implementation for special ('Protected') species (where 1= Partly; 2 = Mostly and 3 = Fully)

There was a broad level of EAF implementation for this category (which may include whales, dolphins, threatened species including some sharks, etc) which was unrelated to the level of RFMO duration. While the levels of addressing this category of species was high for CCAMLR and GFCM (which are both well established), the next highest levels of implementation were for SPRFMO and SEAFO, both of which are relatively new bodies.

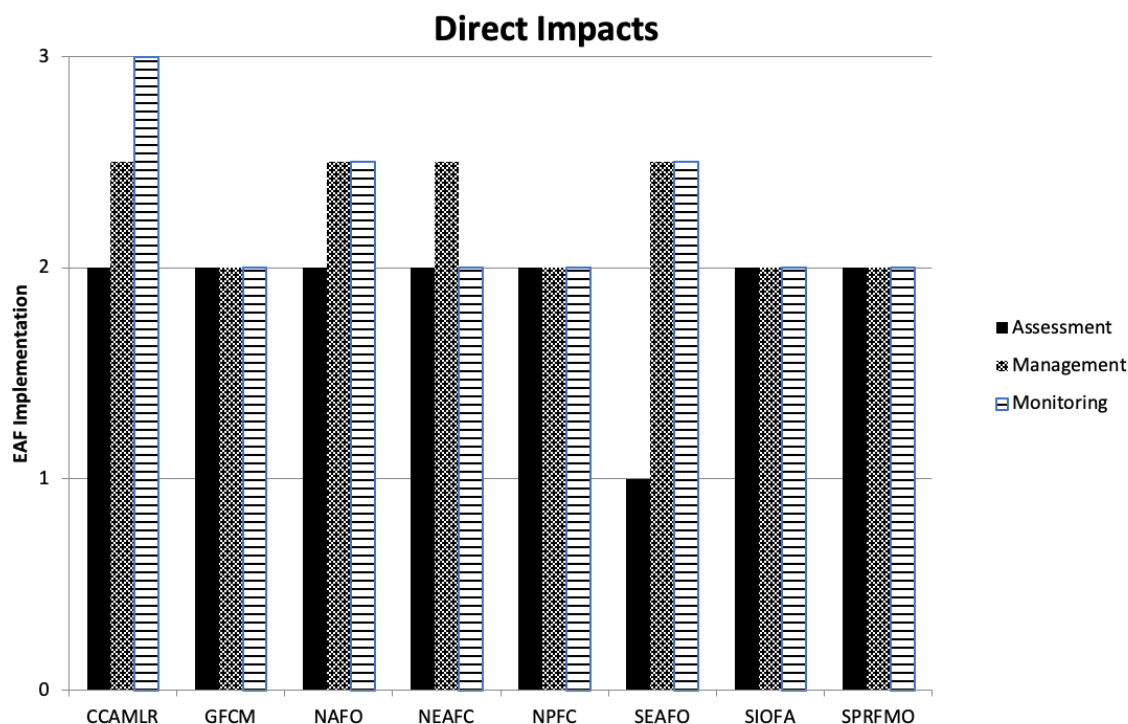
The relatively low levels of implementation identified for NAFO and NEAFC – in spite of their histories – notably the lack of observer programmes and specific management measures for seabirds and mammals has been described as a reflection of the risk levels, but formal justification for these is needed.

For the NPFC and SIOFA, the assessments of special species is planned, as are monitoring programmes for these species.

*Conclusion:* As with the non-retained species, if not already available a formal risk assessment of the potential impacts on 'special' species should be undertaken and documented. This will then guide the level of management, monitoring and ongoing review (if any) required for this group by the RFMO.

This is especially important given the often-high level of public scrutiny that is directed at impacts on this group of species. The objectives that need to be met are more often related to what is socially acceptable rather than what is ecologically sustainable.

## 5.4 Direct ecosystem impacts



**Figure 14:** Summary of EAF implementation for direct ecosystem impacts (where 1= Partly; 2 = Mostly and 3 = Fully)

There has been a strong focus in the activities of all RFMOs to deal with direct benthic impacts – generally referred to as vulnerable marine ecosystems (VMEs) – and many of the bodies achieved a full EAF implementation score for dealing with these. Potential benthic impacts are therefore suitably covered by the systems in place for NAFO, CCAMLR, NEAFC, NPFC and SEAFO. Further developments are under way for GFCM, SIOFA and SPRFMO.

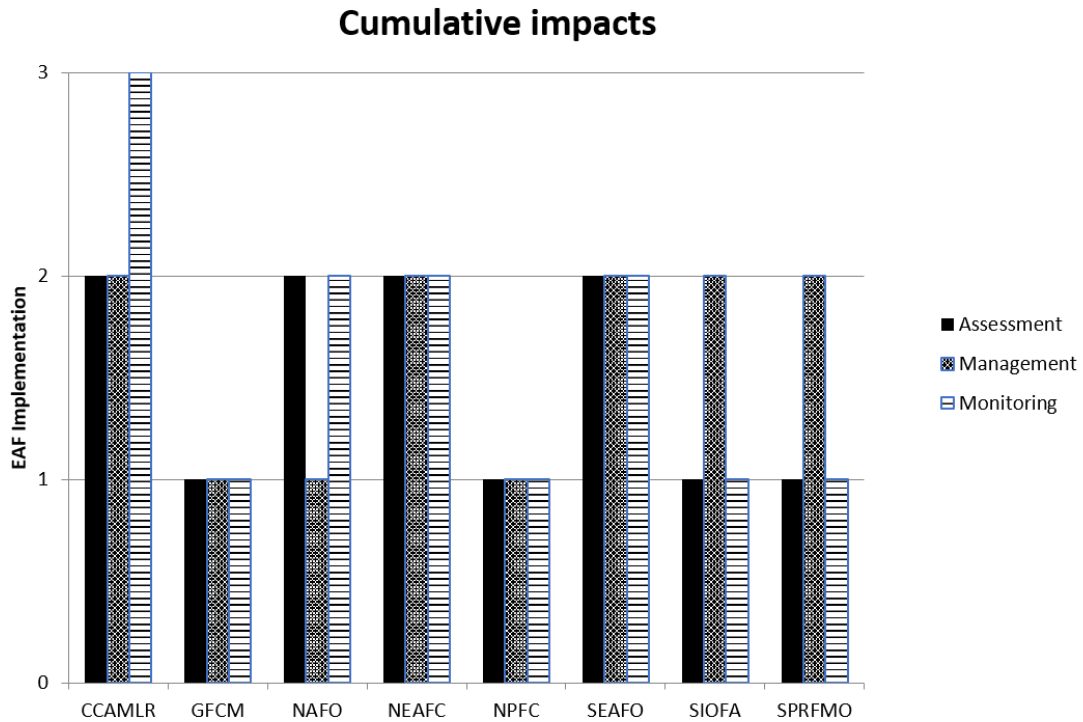
However, this EAF category also includes managing the potential effects from pollution and waste originating from fishing vessels, the indirect impacts of discards (provisioning), and the potential effects of lost/abandoned fishing gear, among other aspects. While some of the RFMOs have management and monitoring that deals directly with some of these aspects (SPRFMO, CCAMLR, GFCM, NAFO), none appear to have completed a formal risk assessment of all them.

*Conclusion:* The strong focus on potential benthic impacts has already generated comprehensive management systems by most of the RFMOs. The gaps are generally well-known and the plans in place to address them are documented.

Assessments of potential impacts from non-benthic, direct impacts are generally missing. All RFMOs appear to need to undertake some formal risk assessment of these components. Where appropriate, they should also assess the different types of fishing operations separately: this will then guide the level of management, monitoring and ongoing review (if any) required for this group by each of the bodies.



## 5.5 Cumulative ecosystem impacts



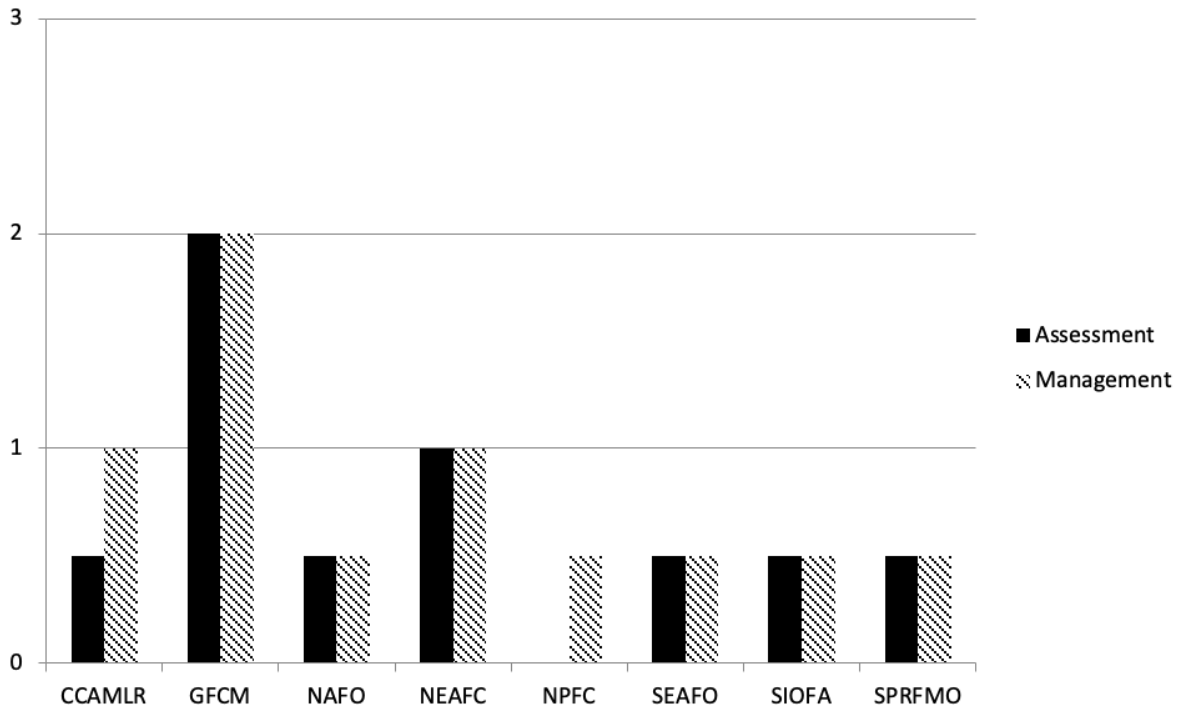
**Figure 15:** Summary of EAF implementation for cumulative ecosystem impacts (where 1= Partly; 2 = Mostly and 3 = Fully)

None of the RFMOs had considered this EAF component in full. There is a prevailing misconception that by assessing and managing vulnerable marine ecosystems (VMEs), this deals with ‘ecosystems’ in the broadest sense. VMEs, however, only deal with benthic biota impacts; the cumulative impacts of all fishing activities – including potential trophic effects within the RFMO areas – should also consider the potential effects on the entire ecosystem. CCAMLR does this with respect to managing the potential effects on other taxa (e.g. whales) from the capture of krill.

For NEAFC, such advice comes from ICES. For NAFO, NPFC, SEAFO, SIOFA and SPRFMO, the lack of a risk assessment for the potential cumulative ecosystem effects of their fisheries has been identified and included in their respective plans. A review of CCAMLR identified that a better understanding of the interactions of fisheries within the Antarctic and the related ecosystem need consideration.

*Conclusion:* There appears to be a need within all RFMO areas for a formal risk assessment of potential cumulative ecosystem impacts to be undertaken – these should be conducted at the suitable spatial scales and, where appropriate, divided among different types of fishing operations. This will then direct the appropriate level of management, monitoring and ongoing review (if any) within each of the RFMOs required for this EAF component.

## 5.6 Social and economic (vessel and national)



**Figure 16:** Summary of EAF implementation for social and economic issues (where 1= Partly; 2 = Mostly and 3 = Fully)

Of all EAF components these were the least implemented. Most RFMO conventions generally include no objectives for these EAF components, and therefore no formal process for their consideration in the decision-making associated with the management planning process at either the vessel or national/contracting party level.

This outcome generated a degree of concern among some of the RFMOs, with the suggestion that such EAF aspects should not be included in the analysis as a result. Active consideration of both social and economic issues is, however, fundamental to EAF because this is critical to meeting the CCFRF and to long-term, effective fisheries management.

The GFCM was one of the few RFMOs that had specific economic and social objectives, as well as some relevant information. These have not yet been formally incorporated into the management system, but it was identified they must assist with national strategies for the sustainable development of the small-scale fisheries sector in the Mediterranean.

From a broad perspective, the safety and welfare of the crew and others involved in fishing operations should be explicitly considered when developing management arrangements in all RFMOs. Despite crew safety being a critical aspect of every fishing operation, only CCAMLR had any direct mention of this in their management systems.

Moreover, as the fishing activities within each RFMO are only undertaken to generate social and/or economic outcomes generating the appropriate, RFMO-level management settings is needed, offering some understanding of the objective for each contracting party. For example, developing harvest strategies, reference levels and other management settings will differ depending on whether the objectives are to deliver MSY (catch) versus MEY (economic returns) versus MVP (maximum overall value of production) or MCY (maximum jobs) for the same stock. An understanding of the current

economic and social risks facing each of the contracting parties is also helpful to determine the likelihood of non-compliance.

It is possible that while there may be no formal requirement within the relevant convention/processes, contracting parties could still be providing their considered views on relevant economic and social considerations within the broader suite of governance systems that are associated with many of the RFMOs, and/or during the decision-making process of their respective commission meetings. The extent of the gap may therefore not be as great from a practical perspective as this analysis identified.

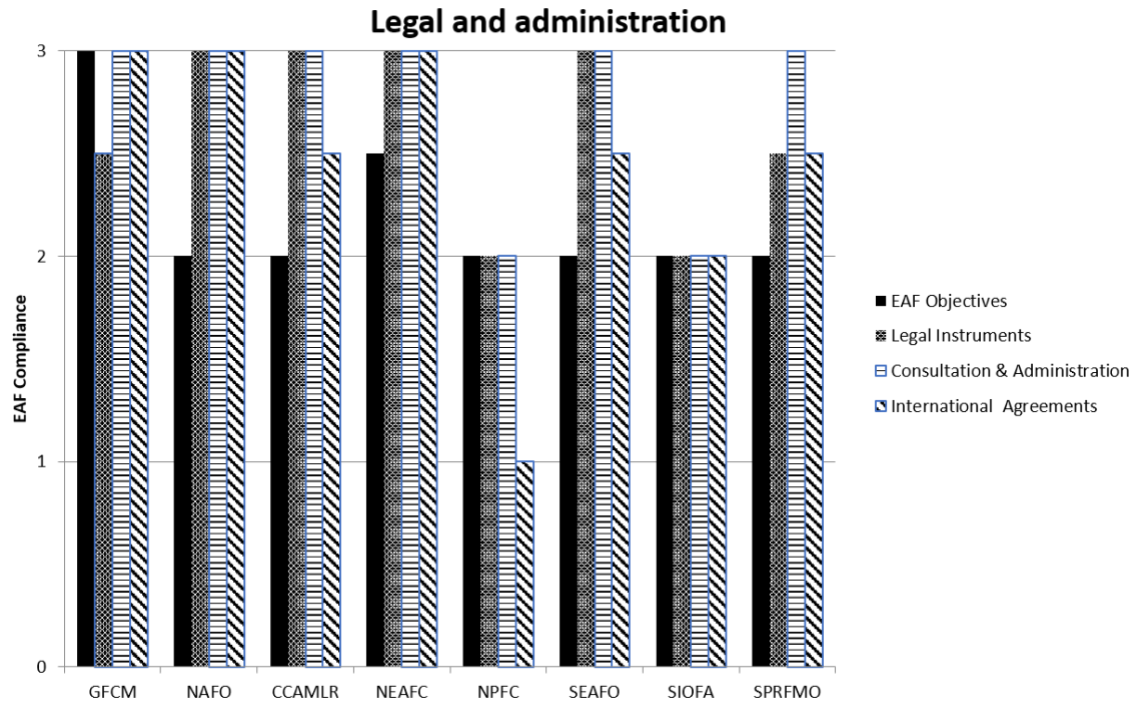
*Conclusion:* The lack of any formal risk assessment of social and economic elements at either the vessel or the national level is a critical gap. Crew safety and general welfare are issues that cannot be ignored by management bodies setting rules for regions. The national-level issues are also important; even if they do not feature in a convention they must be understood, as these elements are often the drivers of fisher behaviour and can therefore directly affect the success (or otherwise) of the overarching management system.

As alluded to in the feedback, the formulation and management of these elements does not have to be undertaken by the RFMO management bodies. In many circumstances they can (and should) be dealt with effectively by contracting parties. In such circumstances all that is required is for there to be some level of documentation that such elements are being effectively dealt with.

There needs to be a formal risk assessment of potential social and economic issues at both the vessel level and national level (as outlined in the component trees in each of the EAF background reports) for each of the RFMOs that includes the contracting parties – not just the management body. These should also be completed, where appropriate, among different types of fishing operations.

These risks will then guide how best to develop fisheries management systems and also identify whether non-fisheries management actions (e.g. crew safety) may be required, in addition to any monitoring and ongoing review required within each of the RFMOs – either by the relevant management body, or where appropriate, by the relevant contracting parties.

## 5.7 Legal and administration



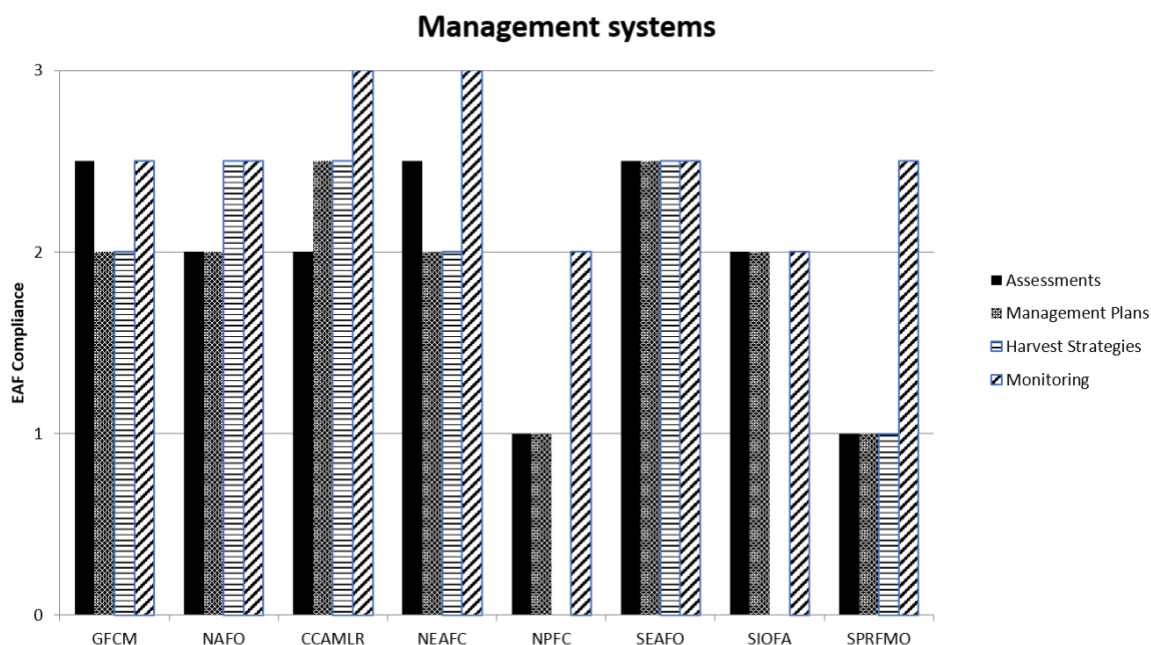
**Figure 17:** Summary of EAF implementation for legal and administration (where 1= Partly; 2 = Mostly and 3 = Fully)

A clear priority for all RFMOs has been to generate strong legal instruments for management and compliance, as well as good administrative structures to give effect to these instruments. These are always the first elements to have been completed.

The only areas where these are not meeting EAF requirements are: the general lack of any social and economic objectives, and the considerable lack of any formal mechanism(s) for their consideration within decision-making.

*Conclusion:* All RFMOs (apart from GFCM) need to at least consider the identification of appropriate social and economic objectives for either formal inclusion in their relevant charter/conventions, or within a suitable high-level policy document. At the very least these must cover the wellbeing of those involved in the fishing operations within their RFMO. However, as the reasons for going fishing are social and economic, it would be appropriate for there to be some formal discussion of these objectives in planning processes; furthermore, mechanisms for the formal consideration of these elements in decision-making processes must be included in all RFMO policies and procedures.

## 5.8 Ecosystem approach to fisheries management systems



**Figure 18:** Summary of EAF implementation for management systems (where 1= Partly; 2 = Mostly and 3 = Fully)

The level of implementation of EAF-compliant management systems was highly variable across each of the RFMOs. These variations generally reflected the different amounts of time the respective RFMOs have been in existence.

Critically, no RFMO has completed a full set of EAF assessments – in other words by specifically examining the risk level of each of the relevant EAF components presented in their respective EAF background reports. This should, however, be one of the first steps to be undertaken in the development and implementation of an EAF-compliant management system, as it can be completed in a short time (less than a week) with whatever data is available. There is therefore no reason why it has not been completed by all bodies.

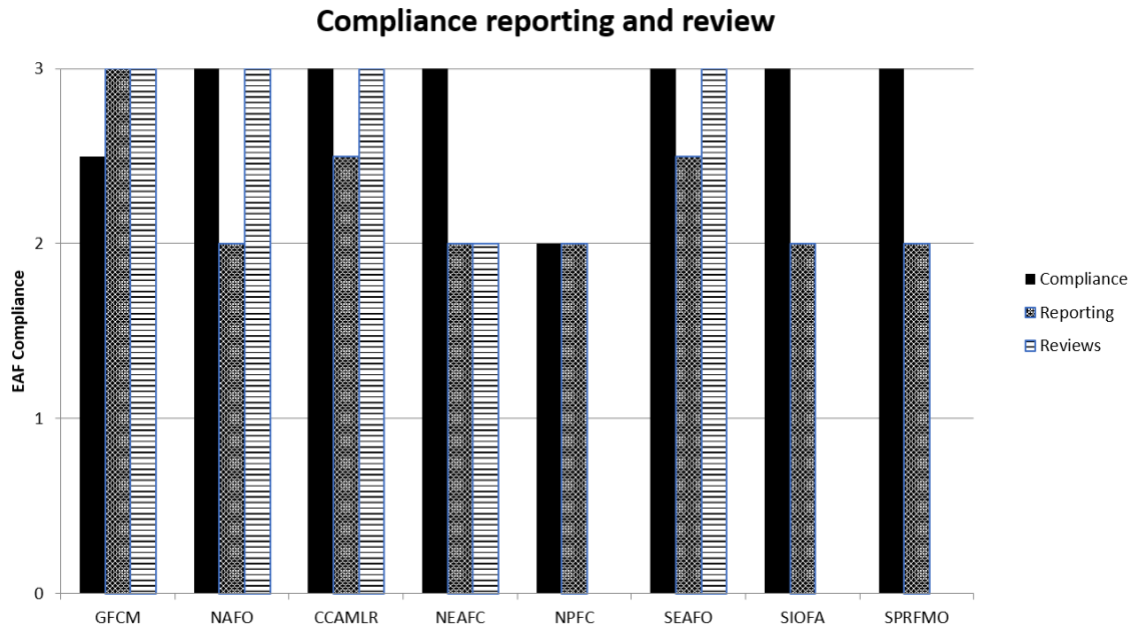
Similarly, no RFMO had an EAF-based management plan that dealt with all components comprehensively and collectively, and justifying why a particular level of direct management was appropriate (or not).

The levels of monitoring were generally good, although as there was no EAF plan clear conclusions cannot be drawn as to whether of this was necessary or if there were outstanding gaps.

*Conclusion:* It does not appear that development of the management arrangements by the various bodies in any of the RFMOs has been undertaken using the EAF steps as they are outlined by FAO.

Indeed, it appears that the different issues are often dealt with in relative isolation by separate committees. What is more, most of the RFMOs appear to still believe that EAF is an issue of concern/relevance only to their science group, and in some cases their specialized ecosystem group.

## 5.9 Compliance, reporting and review



**Figure 19:** Summary of EAF implementation for compliance, reporting and review (where 1= Partly; 2 = Mostly and 3 = Fully)

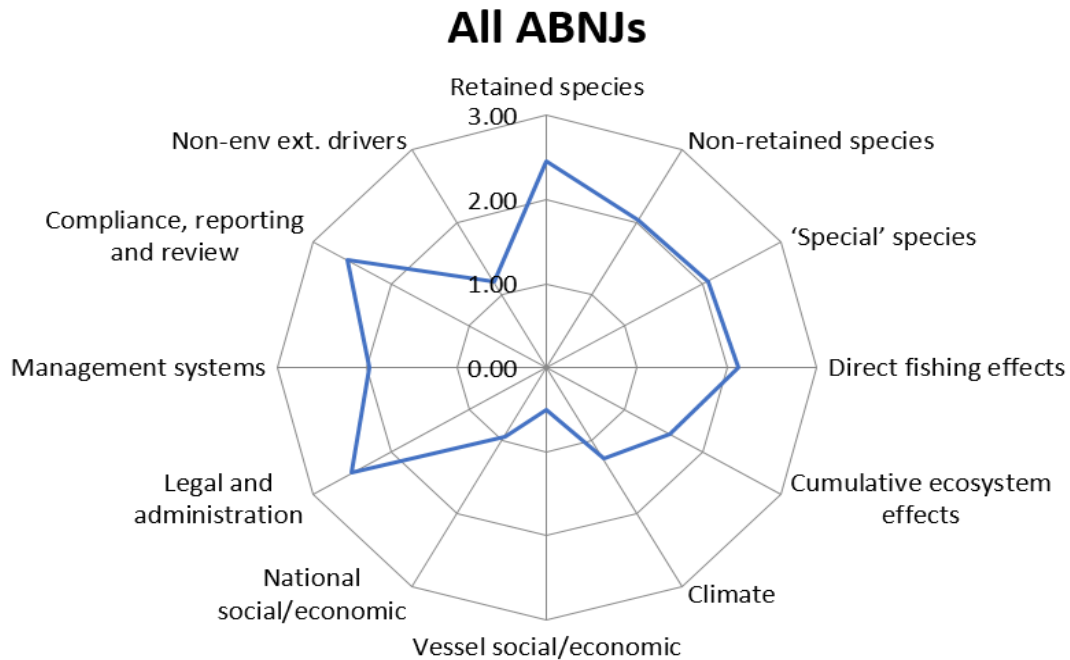
The compliance area was one of the most complete areas of implementation. Except for SIOFA, which is only just becoming established, the other RFMOs have largely and fully implemented all of the elements needed for this category.

The level of reporting varied between the different RFMOs. For some, the documentation available was both comprehensive and accessible; for others it was hard to find relevant information on even the catch history of target species. Only the GFCM included reports on the social and economic components for the Mediterranean Black Seas.

The levels of formal review also generally reflected the lifespan of the respective RFMOs.

*Conclusion:* Each of the RFMOs should generate a clear status report – preferably on an annual basis, or at most every three years. These should report on the current risk status in each of the EAF components and, where relevant, summarize what new management or other activities are in progress.

## 6. GENERAL DISCUSSION



**Figure 20:** Average level of implementation of each of the EAF components across all RFMOs (where 1 = Partly; 2 = Mostly and 3 = Fully)

### 6.1 Overview

The level of EAF implementation varied between both the RFMOs themselves and the different EAF components. Many of the differences between RFMOs were associated with the different lifespans of the management body, and to a lesser degree the relative value of catches. In addition to these time/value-related differences, a number of common themes were identified across the RFMOs (see Figure 20).

Within each of the RFMOs, their commission and relevant management body has been very thorough in developing strong legal and administrative structures and creating effective compliance systems. Each of the eight regional fisheries management bodies has legal and administrative structures that are mostly or close to fully consistent with those required to address the ecological components of EAF. This even includes the two recently formed management bodies (SIOFA and NPFC).

Similarly, the development of compliance systems was one of the most complete areas of implementation. Except for SIOFA which is essentially only just becoming established, the other seven RFMOs have fully implemented the key elements needed for this EAF component.

Depending upon the amount of time since their formation, the RFMOs have addressed, or are in the process of addressing to relatively high levels, the ecological impacts of fishing related to target species, benthic habitats (generally referred to as vulnerable marine ecosystems, VMEs) and bycatch issues. For the RFMOs that had gaps in addressing direct ecological impacts, these have generally been identified with plans already in place to address these, notably through the completion of additional stock/risk assessments.

Similarly, the assessment and management of cumulative impacts of fishing and impacts of environmental external drivers (e.g. climate) had generally only been addressed to a moderate level. In

most cases, however, these gaps had already been identified with actions now in place to undertake appropriate risk assessments.

Given the inherent logistical difficulties in undertaking scientific studies to assess the status of fish resources and the potential fishing impacts on other ecological resources within these remote, high seas regions, combined with the difficulties in developing multi-jurisdictional management systems, the generally strong EAF scores for ecological and governance components should be acknowledged. These outcomes reflect the strong emphasis that has been placed by each of the management bodies on addressing the concerns raised by various stakeholders and forums over the past two decades, regarding the need for good management to deal with the potential ecological impacts of high seas fishing. These results should be received extremely positively by the broader community and should therefore be promoted.

The largest EAF gaps identified through this desktop process were the formal consideration of social and economic issues at both the vessel and national (contracting party) level, in addition to the impact of non-environmental external drivers (e.g. markets, fuel costs). With no objectives for these EAF components within most RFMO conventions there are also generally no formal processes for their consideration in decision-making. This situation generated requests from some stakeholders that these EAF aspects not be included in the analysis.

The active consideration of all relevant EAF social and economic issues is, however, essential to meeting Sustainable Development and CCRF principles. It is also fundamental for the development of effective, long-term fisheries management because fishing activities only exist to generate social or economic benefits to one or more communities.

However, it must be acknowledged that there is generally limited formal consideration of social and economic issues within most fishery jurisdictions and/or management systems. Consequently, the results obtained for the review of management systems within RFMOs largely reflect broader patterns and should therefore not be viewed as unusual.

A further point to note is that a full consideration of all social and economic risk issues is more difficult within RFMOs because of the multi-country participants. The consultative processes to understand all potential issues would require the direct involvement of representatives from all contracting parties, as well as vessel operators and other relevant stakeholders. There are, however, a number of social and economic issues that would be generally applicable to all RFMOs. These include:

- Social attitudes (social licence): regional and global community opinions about these fisheries and their perceived impacts on the environment may drive other agendas that can have longer-term effects on their operations (e.g. marine parks, BBNJ).
- Social (welfare): the welfare of crew that work on vessels operating within the RFMO is an issue that is relevant to every RFMO. The management system could potentially include the requirement for all vessels operating within the RFMO to meet basic welfare rights.
- External drivers: the cost associated with operations in the high seas areas are already relatively high; changes in costs such as fuel and the market values of the species therefore all have an exponential impact on the viability of these fisheries.
- Vessel economics: some knowledge of these issues is important to understand changes to the operations of fishing vessels that may be occurring, which will in turn help interpret catch and effort data. Moreover, the economic status of individual vessels can drive their incentive(s) to comply (or not comply) with rules.



Explicit consideration of most of these types of issues can be as simple as having these listed as standard agenda items at annual meetings, in order to ensure a forum for their discussion.

The decision-making process for new or revised management measures can also explicitly seek to have the least possible impact on social and economic objectives while still adequately meeting environmental objectives. In this context, some understanding of the preferred social and economic outcomes for each contracting party is helpful. For example, when developing the reference levels for target species, harvest strategies will differ significantly depending upon whether the objective is to deliver MSY (maximum catch), MEY (maximum economic returns), MVP (maximum overall value of production) or MJ (maximum jobs/employment) from their capture.

Importantly, consideration of these social and economic objectives and risks does not override the need to meet any underlying ecological/stock sustainability requirements. Their consideration should only refine what actions are taken, not if action(s) should be taken. Importantly, if these issues are not being explicitly considered this is likely to affect obtaining consensus for taking any action.

It is possible that while there may be no formal requirement to do so within the broader suite of consultation concerning the operations of the management bodies for each of the RFMOs, contracting parties could already be providing their considered views on relevant economic and social considerations. This could be included within the decision-making process within their respective commission meetings, and the CPs could be encouraged to deal appropriately with any of their vessel-level issues. As such, the number and level of actual EAF gaps may not be as great in practical terms as has been identified through the desktop methods applied in this study.

## 6.2 Conclusions

The similar patterns identified with regard to the differential consideration of EAF components by each of the RFMOs are possibly a reflection of their clear focus on tackling ecological and compliance issues as their main priorities. In addition, it was identified that the various management systems and arrangements developed by each of the RFMOs did not appear to be developed using comprehensive and integrated processes such as those outlined within the various FAO–EAF guidelines and EAF Toolbox.<sup>15</sup>

One of the critical steps required for developing an ‘EAF-compliant’ management plan and overall system of governance is to outline all the potential EAF related issues first (i.e. not just ecological) and assess the risks and opportunities based on current information systematically. Thus, no comprehensive EAF assessments or documentation were found that equated to an overarching EAF background document. These provide the best basis to determine relative priorities for action and also what level (if any) of management – which may include monitoring, assessment, regulations, compliance and review – or action for each issue exists.

From the EAF-related information identified for each RFMO it appears that there is still a misunderstanding of this approach among the RFMOs. Most have delegated dealing with EAF to a science-based working group. Implementing the EAF approach is not, however, a science role: it is a management approach. Just dealing with some or even all ecosystem impacts, or developing an understanding of the scientific aspects does not constitute EAF. As previously noted, EAF is an overarching risk-based governance process that is designed to build a comprehensive, holistic and robust management system that will address all of the ecological, economic, social and governance risks of (and to) a fishery appropriately.

However, the significant efforts that each of the ABNJ management bodies have already undertaken can easily be integrated into a fully EAF-compliant system. It is highly likely that if an assessment or

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<sup>15</sup> <http://www.fao.org/fishery/eaf-net/toolbox/planning/step-3/en>

formal consideration was undertaken across all EAF components and subcomponents for each of the RFMOs, this would not materially add to the total level of management or other actions required. Moreover, it may, in some cases, even identify areas where the current level of management or other activities could be reduced.

If undertaken in a suitably pragmatic manner, these EAF-based assessments can be done in a short period of time, providing the right mix of assessment processes now available for ecological, social and economic issues is used (e.g. Fletcher, 2015). Even more important is having the right people present to undertake the assessments (i.e. not only scientists are necessary) and the right attitudes are adopted to deal with inevitable uncertainties in data/information.

Adopting the EAF approach as an overarching strategy for management within each RFMO should result in the generation of clear, holistic assessments, which would in turn facilitate the development of clearly articulated and integrated management plans (based on having objectively considered all potential risks and opportunities). The latter would provide clear justifications for why each of the EAF issues associated with the fishing activities in the RFMO area either does, or does not, require direct management responses, as well as the level and type of actions required.

The risk-based approach is therefore extremely valuable as the basis for ensuring the correct priorities are being addressed, and at an appropriate level. This has the added benefit of not only assisting with the overall governance efficiency of each of the management bodies, but also of providing suitably robust justifications as to the appropriateness of the current management arrangements to external parties. As outlined in the introduction, implementing EAF is essentially just a tailored version of the risk management principles and processes that are outlined within the ISO 31000 guidelines (ISO, 2018). Such an approach (whether 'tagged' as being EAF or not) can, and should, be applied for the effective management of all-natural resources.

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## APPENDIX 1. SUMMARY ECOSYSTEM APPROACH TO FISHERIES SCORES

	ASO CCAMLR	M&BS GFCM	NAO NAFO	NEA NEAFC	NPO NPFC	SEAO SEAFO	IO SIOFA	SPO SPRFMO
<b>Captured species</b>								
<b>Retained species</b>	<b>2.8</b>	<b>2.3</b>	<b>3.0</b>	<b>2.8</b>	<b>2.2</b>	<b>2.5</b>	<b>2.0</b>	<b>2.0</b>
All retained species/stocks identified with risk assessments	3	2.5	3	3	2	2.5	2	2
Where needed, management systems are in place	2.5	2	3	2.5	2	2.5	2	2
A suitable monitoring and assessment programme is in place	3	2.5	3	3	2.5	2.5	2	2
<b>Non-retained species</b>	<b>3.0</b>	<b>2.3</b>	<b>2.0</b>	<b>2.2</b>	<b>0.7</b>	<b>2.0</b>	<b>2.0</b>	<b>2.0</b>
Identification of all non-retained species and assessment of their risks	3	2.5	2	2.5	1	2	2	2
Management systems appropriate to risk levels	3	2	2	2	0	2	2	2
Monitoring programme appropriate to risks	3	2.5	2	2	1	2	2	2
<b>Special species</b>								
<b>Special species</b>	<b>3.0</b>	<b>2.7</b>	<b>1.5</b>	<b>2.0</b>	<b>0.7</b>	<b>2.7</b>	<b>1.7</b>	<b>2.3</b>
Identification of special species (e.g. protected species) and assessment of their risks	3	3	1	2	1	3	2	2

	ASO CCAMLR	M&BS GFCM	NAO NAFO	NEA NEAFC	NPO NPFC	SEAO SEAFO	IO SIOFA	SPO SPRFMO
Management systems appropriate to risk	3	2.5	1	2	0	2.5	1	2
Suitable monitoring programme appropriate to risks	3	2.5	2.5	2	1	2.5	2	3
<b>Broader ecosystem</b>								
<b>Direct fishing effects</b>	<b>2.5</b>	<b>2.0</b>	<b>2.3</b>	<b>2.2</b>	<b>2.0</b>	<b>2.0</b>	<b>2.0</b>	<b>2.0</b>
Identification of potential direct effects (e.g. benthic impacts) and the risks	2	2	2	2	2	1	2	2
Operating arrangements appropriate to risk levels	2.5	2	2.5	2.5	2	3	2	2
Suitable monitoring programme appropriate to risks	3	2	2.5	2	2	3	2	2
<b>Cumulative ecosystem effects</b>	<b>2.3</b>	<b>1.0</b>	<b>1.7</b>	<b>2.0</b>	<b>1.0</b>	<b>2.0</b>	<b>1.3</b>	<b>1.3</b>
Assessment of cumulative impacts (e.g. community structure) and assessment of risks	2	1	2	2	1	2	1	1
If needed, additional management to reduce potential impacts	2	1	1	2	1	2	2	2
Monitoring and review appropriate to the risks	3	1	2	2	1	2	1	1
<b>Environmental external drivers</b>	<b>2.25</b>	<b>1</b>	<b>1.5</b>	<b>2.25</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>
Identification of risks from external environmental impacts (e.g. climate) on outcomes	2.5	1	2	2	0	1	1	1

	ASO CCAMLR	M&BS GFCM	NAO NAFO	NEA NEAFC	NPO NPFC	SEAO SEAFO	IO SIOFA	SPO SPRFMO
Explicit consideration of risks in management	2	1	1	2.5	0	1	1	1
<b>Social and economic wellbeing</b>								
<b>Vessel/industry level</b>	<b>1</b>	<b>2</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
Identification of relevant social and economic risks at the vessel/industry level	1	2	0	1	0	0	0	0
Appropriate consideration of these risks/opportunities	1	2	0	1	0	0	0	0
<b>Community levels</b>								
Identification of relevant social and economic risks at the community levels		2						
Consideration of risks within management strategies and policies		1						
<b>National level</b>	<b>0.5</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>
Identification of relevant social and economic risks and opportunities at the national level(s)	0	2	1	1	0	1	1	1
Consideration of these risks within management strategies and policies	1	2	1	1	0	1	1	1

	ASO CCAMLR	M&BS GFCM	NAO NAFO	NEA NEAFC	NPO NPFC	SEAO SEAFO	IO SIOFA	SPO SPRFMO
<b>Ability to achieve</b>								
<b>Governance</b>								
<b>Legal and administration</b>	<b>2.625</b>	<b>2.875</b>	<b>2.8</b>	<b>2.875</b>	<b>1.75</b>	<b>2.625</b>	<b>2</b>	<b>2.5</b>
Clear articulation of the fishery and the objectives to be achieved	2	3	2	2.5	2	2	2	2
Binding and effective legal instruments to enable management	3	2.5	3	3	2	3	2	2.5
Effective consultation and administrative structures	3	3	3	3	2	3	2	3
International agreements and other fishery bodies	2.5	3	3	3	1	2.5	2	2.5
<b>Management systems</b>	<b>2.5</b>	<b>2.25</b>	<b>2.25</b>	<b>2.375</b>	<b>1</b>	<b>2.5</b>	<b>1.5</b>	<b>1.375</b>
Assessments of all EAF components against high-level objectives	2	2.5	2	2.5	1	2.5	2	1
A clear management plan designed to achieve each operational objective and manage risk	2.5	2	2	2	1	2.5	2	1
Harvest strategies used for all EAF components	2.5	2	2.5	2	0	2.5	0	1
Scientific monitoring and assessment process	3	2.5	2.5	3	2	2.5	2	2.5
<b>Compliance, reporting and review</b>	<b>2.8</b>	<b>2.8</b>	<b>2.7</b>	<b>2.3</b>	<b>2.0</b>	<b>2.8</b>	<b>2.5</b>	<b>2.5</b>



	ASO CCAMLR	M&BS GFCM	NAO NAFO	NEA NEAFC	NPO NPFC	SEAO SEAFO	IO SIOFA	SPO SPRFMO
Effective vessel monitoring, compliance and enforcement programmes	3	2.5	3	3	2	3	3	3
Regular reporting on fishery status and risks for all EAF components	2.5	3	2	2	2	2.5	2	2
Periodic, independent reviews of all processes	3	3	3	2	NA	3	NA	NA
<b>Non-environmental external drivers</b>	<b>1</b>	<b>1.5</b>	<b>1.5</b>	<b>1.5</b>	<b>1</b>	<b>1.5</b>	<b>0.5</b>	<b>1</b>
Risks from external impacts to the fishery are assessed	1	2	2	2	1	1	1	1
Consideration of external risks within management strategies and processes	1	1	1	1	1	2	0	1

## APPENDIX 2. INDIVIDUAL ECOSYSTEM APPROACH TO FISHERIES BACKGROUND REPORTS

### *DISCLAIMER:*

*The compilation of information for the EAF background report for each RFMO was significantly assisted by the information contained within the FAO Technical Paper 595 (Thompson et al., 2016). This report included sections on each of the RFMO regions and their associated management bodies. While the focus of the 2016 report was on the extent to which these bodies were dealing with benthic impacts and vulnerable marine ecosystems, it also included some broader information on these fisheries that covered aspects required for this holistic review of EAF practice. A considerable amount of information for each background report was also obtained from documents, reports and other materials available for download from the RFMOs' respective websites. Another useful document that was valuable for checking management actions was the Comparative Measures Scan (FAO, 2018, unpublished), which provided a short list of the conservation measures applied in each RFMO across a series of components that overlapped with some of those in EAF. It must be highlighted that to facilitate the process of completing the EAF background reports in a timely fashion, these often included large sections of text directly taken from the source documents. While each of the sources is clearly acknowledged at the beginning of the report, and in the references section, given the high frequency that these sources were used as a basis for the information presented in the background reports, specific citations were not made each time within the text, except for figures and tables. Consequently, these background reports should be seen as collations of material from these sources, rather than as separately authored documents, and they are therefore only included as appendices. Finally, although these documents are not exhaustive reviews of all information related to these fisheries, they would provide a good starting resource for the completion of more formal EAF summaries.*

### **A2.1 Antarctic and Southern Oceans – Commission for the Conservation of Antarctic Marine Living Resources**

#### **EAF BACKGROUND REPORT**

##### *Acknowledgments*

The material presented in this background report was largely obtained from either FAO Technical Paper 595 (Jones et al., 2016), publicly available information located on the CCAMLR website (including the Second Performance Review, CCAMLR, 2017), plus by referencing the draft scan on RFMO Measures (FAO, 2018, unpublished). Given this, these sources are not referenced individually everywhere in the following text except for tables and figures. The information was last updated in August 2018.

##### *Overview*

The Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) was established by international convention in 1982, with the objective of conserving Antarctic marine life. This was in response to increasing commercial interest in Antarctic krill resources, a keystone component of the Antarctic ecosystem, as well as the history of over-exploitation of several other marine resources in the Southern Ocean.

The fisheries in the convention area currently target Patagonian toothfish (*Dissostichus eleginoides*), Antarctic toothfish (*Dissostichus mawsoni*), mackerel icefish (*Champscephalus gunnari*) and Antarctic krill (*Euphausia superba*). CCAMLR practises an ecosystem-based management approach which requires harvesting to be carried out in a sustainable manner that takes into account the effects

of fishing on other components of the ecosystem. Krill harvesting using pelagic trawls is therefore managed in a precautionary manner in recognition of the critical role it plays in the Antarctic ecosystem. Toothfish, which are sought after in restaurants and high-end markets worldwide, are mainly captured by fisheries using bottom-set longlines at depths of 1 200–1 800 m, but may also be caught by trawl and pot. The icefish fisheries currently operate in waters less than about 350 m deep and use semi-pelagic trawls around South Georgia and bottom trawls around Heard Island and McDonald Island.

## CONVENTION

### *CCAMLR Convention*

The Convention on the Conservation of Antarctic Marine Living Resources is an international treaty adopted at the Conference on the Conservation of Antarctic Marine Living Resources, which was held in Canberra, Australia, 7–20 May 1980.

The CAMLR Convention also forms an integral part of the Antarctic Treaty System. Provisions in the CAMLR Convention bind contracting parties to a range of obligations in the Antarctic Treaty.

*Convention definitions* include:

- The Antarctic marine living resources in the area south of 60° S latitude, and those between that latitude and the Antarctic Convergence, which form part of the Antarctic marine ecosystem.
- Under the Convention, “Antarctic marine living resources” refers to the populations of finfish, molluscs, crustaceans and all other species of living organisms – including birds found south of the Antarctic Convergence. The marine resources managed by CCAMLR specifically exclude whales and seals however, as these are the subject of separate conventions.
- The “Antarctic marine ecosystem” means the complex of relationships of Antarctic marine living resources with each other and with their physical environment.

### *Convention objectives*

The objectives of the Convention are the conservation of Antarctic marine living resources, where the term “conservation” includes rational use. Any harvesting and associated activities must be conducted in accordance with the following principles of conservation:

- Ensure any harvested population does not fall below levels that enable stable recruitment or the restoration of depleted populations to these levels;
- Maintenance of the ecological relationships between harvested, dependent and related populations of Antarctic marine living resources; and
- Prevention of changes or minimization of the risk of changes in the marine ecosystem which are not potentially reversible within reasonable time frames.

These resource-based objectives differ from many other RFMOs, which mostly focus on managing fisheries and any impacts they may have on the environment. Furthermore, CCAMLR has a mandate to conserve populations or ecosystems that are not only directly related to harvested marine resources, but also conserve dependent and related populations.

The Convention outlines various governance-related objectives and procedures (see below). There are, however, no specific references within the Convention – apart from the words “rational use” – related to the delivery or explicit consideration of economic or social objectives.

*Contracting parties to the Convention*

Membership of CCAMLR was initially open to states that participated in the Conference on the Conservation of Antarctic Marine Living Resources between 1978 and 1980, with new Members having joined since that time. CAMLR currently has 25 Members: Argentina, Australia, Belgium, Brazil, Chile, China, European Union, France, Germany, India, Italy, Japan, Republic of Korea, Namibia, New Zealand, Norway, Poland, the Russian Federation, South Africa, Spain, Sweden, Ukraine, United Kingdom of Great Britain and Northern Ireland, United States of America, Uruguay.

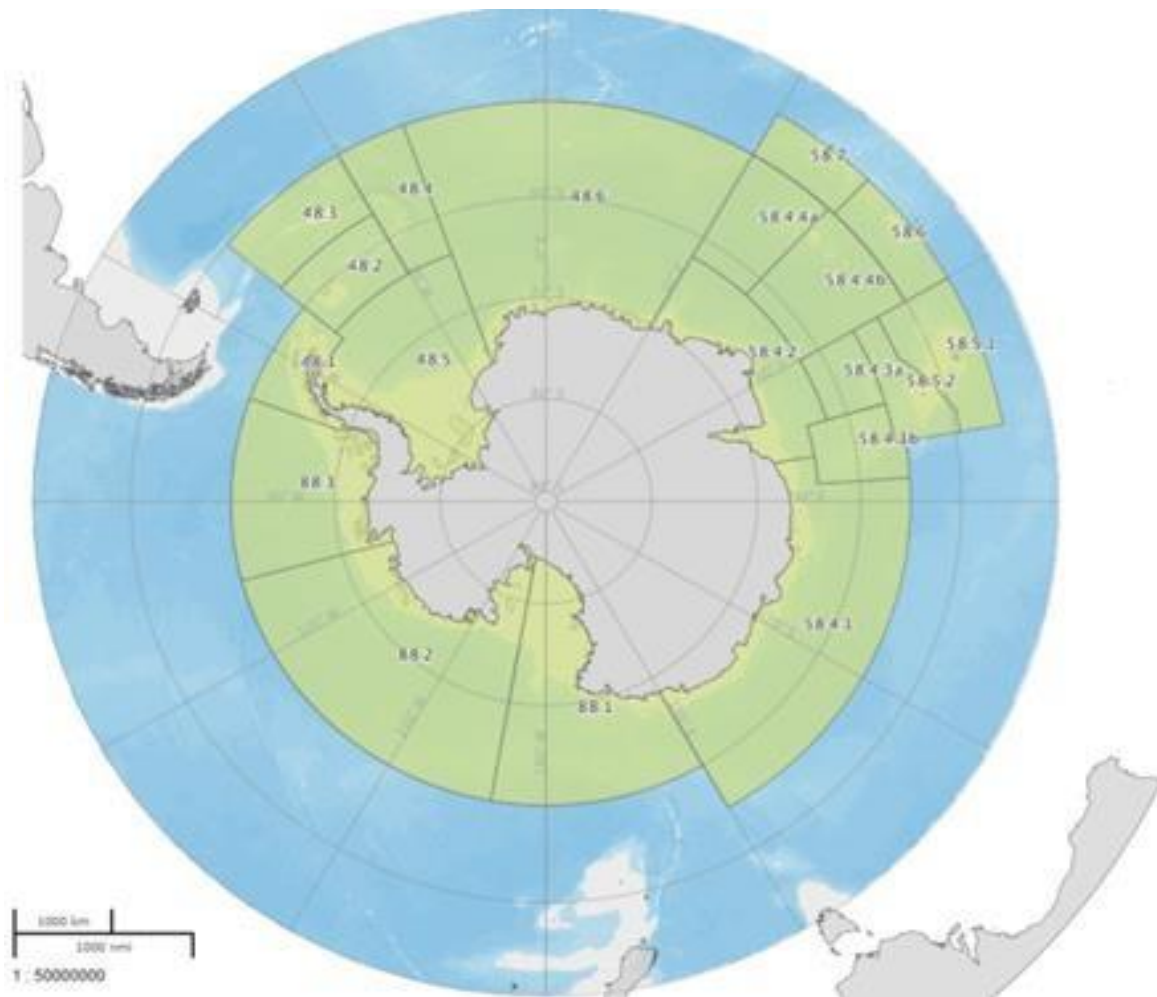
Each Member contributes to the Commission and Scientific Committee's work, including participation in annual meetings (held in Hobart, Australia). Only Members contribute to CCAMLR's annual budget and participate in decision-making.

There are also 11 Acceding States: Bulgaria, Canada, Cook Islands, Finland, Greece, Mauritius, Netherlands, Pakistan, Panama, Peru, Vanuatu. These Acceding States are legally bound by the terms of the Convention but do not contribute financially to the organization or participate in decision-making. Furthermore, Acceding States are not permitted to fish in the CAMLR Convention Area.

*Convention area*

The convention area is large, making up 10 percent of the world's oceans. It is circumpolar and divided into a number of management regions (Figure A2.1.1).

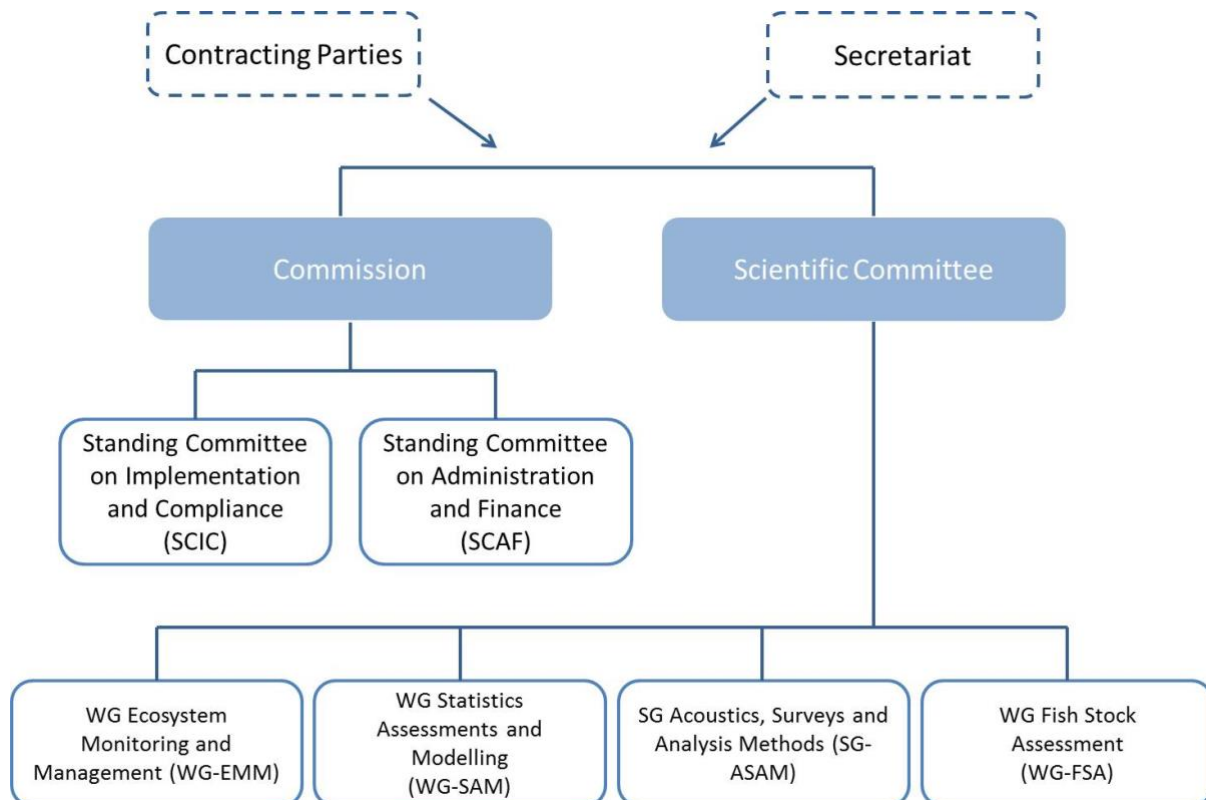
It is important to note that although some of these areas are part of the EEZ of some countries (e.g. Australia and France), the Convention is still relevant to them; this report will therefore include these areas even though they are not strictly an RFMO.



**Figure A2.1.1:** CCAMLR Convention Area (CCAMLR, 2020)

#### *CCAMLR governance structure*

The governance structure for CCAMLR is outlined in Figure A2.1.2. Consistent with most RFMOs, a commission is the primary decision-making body, a number of committees that undertake the activities and provide information for making decisions, and a secretariat that undertakes the administrative activities for the Commission to function.



**Figure A2.1.2:** CCAMLR Governance structure (Reproduced from Thompson et al., 2016)

## THE COMMISSION

The Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) was established in 1982 under Article VII of the CAMLR Convention and is designed to give effect to the Convention's objectives and principles. The Commission meets annually to adopt conservation measures, among other matters, and make decisions which apply to harvesting activities within the convention area. The Commission is also responsible for the financial affairs and administration of the organization.

Each contracting party (Member) is represented at both the Commission and the Scientific Committee by one individual, who may be accompanied by alternate representatives and advisors.

The Commission includes a scientific committee which was established by the CAMLR Convention. The Commission and the Scientific Committee can establish subsidiary bodies that are necessary for the performance of their functions. The Commission has established two subsidiary bodies: the Standing Committee on Implementation and Compliance and the Standing Committee on Administration and Finance.

The Commission has documented Rules of Procedures that describe how meetings are to be undertaken. The Commission's decisions establish the regulatory framework applied to the management of each fishery in the convention area. Such decisions may include, but are not limited to, catch limits and seasonal or area closures and measures aimed at minimizing any potential impact of fishing activities on non-target species and the ecosystem.

Second CCAMLR Performance Review: The Commission first undertook a performance review in 2008, which resulted in wide-ranging recommendations that were taken up by the Commission and Scientific Committee. In 2016 the Commission decided to undertake a second performance review; this

has now been completed, with the report published in 2017. Some of the key findings have been included in the relevant sections below.

***Key Second Performance Review findings relevant to the Commission***

Recommendation 4: Further steps be taken to ensure contracting parties to CCAMLR are made aware of and are supported to ensure, where relevant, compliance with obligations arising from the Antarctic Treaty, including relevant measures and regulations established or recommended by the ATCM.

Recommendation 25: A management–science forum across the Commission and the Scientific Committee should be established to facilitate open communication and dialogue between scientists and policymakers involved in CCAMLR on key topics and issues, as well as their respective expectations for science and policy.

## SCIENTIFIC COMMITTEE

Science is fundamental to CCAMLR, with the impetus to develop a convention originating in the scientific concerns derived from over-exploitation in the 1970s, whereby an increasing interest in the large-scale exploitation of Antarctic krill in the 1980s would have drastic ecosystem consequences. The main route for scientific advice in CCAMLR is through the Scientific Committee and its subsidiary groups.

The Scientific Committee was established under the Convention as an independent consultative body to the Commission. It is made up of suitably qualified scientific representatives of Members, who may be accompanied by other experts and advisors.

The Scientific Committee is tasked with providing the best available scientific information to the Commission on, among other things, harvesting levels and other management issues. In turn, the Commission is obligated by the Convention to take the recommendations and advice of the Scientific Committee into account when making its decisions.

The Scientific Committee draws on the outcomes of research from national programmes of CCAMLR Members. In addition, CCAMLR has established a number of programmes to collect the data required for the effective management of the Southern Ocean; these include:

- Fisheries monitoring
- Scientific observers on fishing vessels
- Ecosystem monitoring and marine debris programmes.

The Scientific Committee meets annually, immediately prior to the Commission meeting. In order to address the wide range of science areas that might impact on the decisions of the Commission, the Scientific Committee has established a number of working groups that meet during the year and assist in formulating scientific advice on key areas. There are currently four working groups and one specialist subgroup:

- The Working Group on Ecosystem Monitoring and Management (WG-EMM) was established in 1995 and meets annually. It is responsible for assessing populations of krill and populations of dependent and related species, to evaluate predator–prey fisheries interactions, coordinate research priorities, evaluate proposed VMEs, and develop associated management advice.
- The Working Group on Fish Stock Assessment (WG-FSA) undertakes finfish stock assessments and evaluates, inter alia, the potential adverse impact of bottom fishing on VMEs.

- The Working Group on Statistics, Assessments and Modelling (WG-SAM) and the Subgroup on Acoustics, Surveys and Analysis Methods (SG-ASAM), both of which provide specialized advice on analytical methods.
- Additional specialist groups may be established from time to time, often for a limited duration, to deal with specific focus topics. For instance, the Working Group on Incidental Mortality Associated with Fishing (WG-IMAF) no longer needs to meet at regular intervals in light of the decline in incidental captures of seabirds.

***Relevant Second Performance findings for Scientific Committee:***

Recommendation 19: The current practice of managing the business of the Scientific Committee through an informal executive group be institutionalized as a bureau, in order to formalize good practices and improve the efficiency and conduct of business of the Scientific Committee and its working groups.

Recommendation 20: A Commission bureau must be established involving the Scientific Committee Chair, the chairs of the standing committees and the Chair and Vice-Chair of the Commission, which, along with the newly established Scientific Committee bureau, can help coordinate the annual work plan for the Commission and the Scientific Committee, as well as facilitating the determination and, where needed, the delivery of priority requirements for the Secretariat. The current proposal is for the Commission bureau to meet on every morning of the two-week, annual Commission meeting.

Recommendation 21: The annual work programme of the Scientific Committee and its subsidiary bodies focus on delivering the requirements of Article XV.2 (provision of specific scientific advice to assist the Commission), whereas a strategy for meeting the requirements of Article XV.1 (general science on Antarctic marine living resources) should be primarily developed through mechanisms other than the annual work programme of the Scientific Committee.

## **COMPLIANCE COMMITTEE**

The key terms of reference for this committee are to:

- (i) review and assess contracting parties' implementation of, and compliance with, conservation and management measures adopted by the Commission;
- (ii) review and assess, as appropriate, the implementation of, and compliance with, conservation and management measures by non-contracting parties;
- (iii) provide technical advice and recommendations on means to promote the effective implementation of, and compliance with, conservation and management measures;
- (iv) review and analyse information pertaining to activities of contracting parties and non-contracting parties which undermine the objectives of the Convention, including in particular illegal, unregulated and unreported (IUU) fishing, and recommend actions to be taken by the Commission to prevent, deter and eliminate such activities;
- (v) review the operation of, and recommend priorities of and improvements to, the System of Inspection and, in association with the Scientific Committee, as appropriate, the Scheme of International Scientific Observation[.]



***Relevant Second Performance findings for Compliance Committee***

Recommendation 11: The CCAMLR Compliance Evaluation Procedure should be strengthened by requiring enhanced reporting on actions taken to address infringements – including whether a contracting party fails to report by the next subsequent meeting of SCIC on their follow-up investigations and rectification of non-compliance, and that such failures be identified in the annual compliance report as ‘serious, frequent or persistent non-compliance’.

Recommendation 12: To ensure chain of custody, all transshipments of catch from the convention area, whether occurring in the convention area or in port, be: (i) independently verified; (ii) permitted by contracting party vessels only to vessels which report to the C-VMS while operating in the convention area; (iii) permitted to NCP receiving vessels only when they are registered with CCAMLR; and (iv) for transshipments of catch from the convention area that occur outside of the convention area, detailed information should be reported to CCAMLR, including the names and IMO numbers of the vessels involved, quantities of catch or products by species transhipped and the date and time of transhipment.

Recommendation 13: CCAMLR should strengthen its IUU vessel listing procedures to provide for listing of stateless fishing vessels and for the possibility of listing vessels with the same owner as other IUU-listed vessels.

**SECRETARIAT**

The Secretariat supports the regular meetings and daily functions of the Commission and Scientific Committee as detailed in the convention text. These include:

- Facilitating communications with and between Members
- Producing and distributing publications
- Receiving and managing scientific CCAMLR data
- Managing the catch documentation scheme (CDS), and
- Monitoring compliance with conservation measures and other Commission decisions.

The Secretariat’s Strategic Plan outlines two overarching goals which underpin all services provided by the Secretariat to assist the work of the Commission and the Scientific Committee:

- To deliver best-practice administrative, technical, logistical and scientific support to the Commission and the Scientific Committee;
- To facilitate communication and collaboration among stakeholders through effective dissemination of information, education, outreach and capacity building.

***Relevant Second Performance Review Findings:***

Recommendation 28: The Secretariat should ensure that capacity building and associated outreach support is strengthened in the next review of the Secretariat’s strategic plan.

Recommendation 29: Further cost-reduction options should be considered, including through a review of Secretariat structures and priorities. In addition, revenue-generating opportunities should be encouraged, including through a review of cost-recovery, consideration of research administration fees, or other user pay initiatives.

**INTERACTIONS WITH OTHER FISHERIES AND BODIES**

Although its convention area extends beyond the area covered by the Antarctic Treaty System (ATS), CCAMLR is an integral component of that ATS and must collaborate regularly with the other components. CCAMLR undertakes periodic consultations and collaborates with nearby fisheries

including the other RFMO fisheries SEAFO, SIOFA, SPRFMO and relevant Tuna RFMOs (CCSBT, IATTC, ICCAT, WCPFC). It has contacts with other relevant conventions (CITES) and bodies such as FAO, IOC, IUCN, UNEP and IWC, in addition to other international non-governmental organizations such as the Association of Responsible Krill harvesting companies (ARK), the Antarctic and Southern Ocean Coalition (ASOC), and the Coalition of Legal Toothfish Operators (COLTO).

#### ***Relevant Second Performance Review findings***

Recommendation 14: Agreements with adjacent regional fisheries bodies be further developed and operationalised to ensure the useful exchange of meaningful information and relevant data necessary to establish effective conservation and management measures applicable in the CCAMLR area

Recommendation 15: More pro-active communication be undertaken by the Commission and its Members, particularly with respect to engaging with other international organizations, regional bodies and international processes, with a view to ensuring that CCAMLR is recognised as, and maintains its position as, the pre-eminent forum for the conservation of Antarctic marine living resources in the region.

### **CONSULTATION AND DECISION-MAKING PROCESSES**

The main process to initiate decisions by the Commission involves the submission of proposals to the Commission by the various committees. The Scientific Committee reviews the advice of its working groups and presents its recommendations to the Commission. The Convention obliges the Commission to take full account of the recommendations and advice of the Scientific Committee when making decisions. The Commission then discusses these recommendations, along with proposals made by contracting parties, and adopts, inter alia, the necessary revisions or additions to conservation measures and resolutions.

Based on the Rules of Procedure, the Chairman puts questions and proposals requiring decisions to all Members of the Commission. Decisions are taken in accordance with the following provisions:

- Commission decisions on matters of substance shall be taken by consensus; if there is a question of whether a matter is one of substance it shall be treated as a matter of substance.
- Decisions on matters other than those above are taken by a simple majority of Members of the Commission present and voting.
- When any item requires a decision, it shall be made clear whether a regional economic integration organization (and how its Member States) will participate in the taking of the decision.

### **OVERVIEW OF THE CCAMLR FISHERIES**

#### **Geographic scope and fisheries activities**

The fisheries in the convention area currently target Patagonian toothfish (*Dissostichus eleginoides*), Antarctic toothfish (*Dissostichus mawsoni*), mackerel icefish (*Champscephalus gunnari*) and Antarctic krill (*Euphausia superba*).

#### **Fishing fleet, target species and methods**

*Krill*: Krill (*Euphausia superba*) are small crustaceans of the order *Euphausiacea* and are found in all the world's oceans. They are short-lived and probably live for 3–4 years, spawning when they are 2–3 years old. They are important in the food chain because they feed on phytoplankton, and to a lesser

extent zooplankton, making nutrients available to other animals for which krill constitute the largest part of their diet. For this reason, krill are considered a keystone species in the Southern Ocean ecosystem. The size of the krill population varies significantly from year to year and the changes observed appear to be driven mostly by how many young krill enter the population. The krill fishery uses pelagic trawling as the main method of capture. Recent annual catches are in the vicinity of 250 000 tonnes.

*Toothfish:* Patagonian toothfish (*Dissostichus eleginoides*) and Antarctic toothfish (*Dissostichus mawsoni*) are targeted by licensed fisheries in the Southern Ocean, using mainly bottom-set longlines at depths of 1 200–1 800 m. These species may also be caught by trawl and pot. Both species of toothfish are sought after in restaurants and high-end markets worldwide. The highly prized fish, sometimes referred to as ‘white gold’, have also caught the attention of illegal, unreported and unregulated (IUU) fishing vessels.

There are 13 licensed fisheries targeting toothfish in Area 48, Area 58 and Area 88, including seven exploratory fisheries. These fisheries are separately managed: for example, the fishery in 58.5.2 is managed by the Australian Fisheries Management Authority (AFMA) in accordance with the conservation measures adopted by CCAMLR and Australian law. The Commission’s agreed limits for the current fishing season in each fishery are defined in the conservation measures (see below).

*Icefish:* Mackerel icefish (*Champsocephalus gunnari*) is targeted by licensed fisheries in the Southern Ocean using midwater trawls at South Georgia in Subarea 48.3 and using both bottom and midwater trawls at Heard and McDonald Islands in Division 58.5.2. The area where bottom trawling currently occurs is relatively small and impacts from the fishery are managed by gear measures and by the presence of the Heard Island and McDonald Island Marine Reserve, which is intended to protect sensitive benthic habitats.

Each of the established fisheries is reviewed annually by the CCAMLR Working Group on Fish Stock Assessment (WG-FSA) and the Scientific Committee (see annual fishery reports). The Commission’s agreed limits for the current fishing season are defined in the conservation measures.

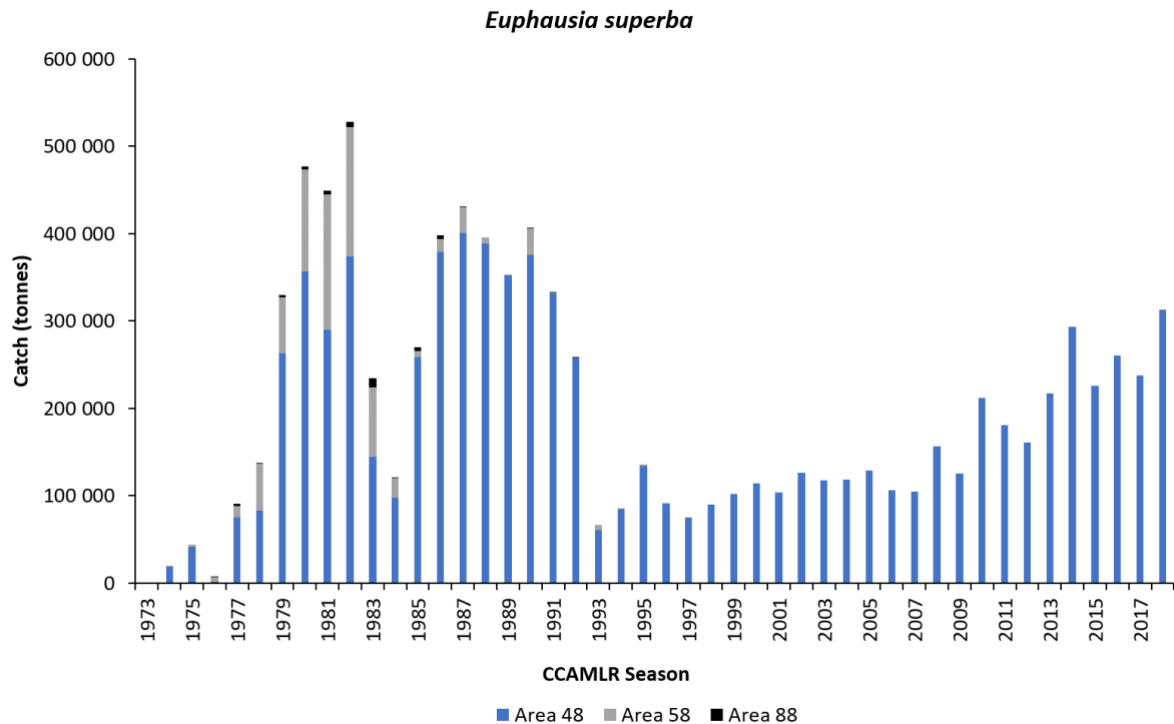
## **Catch and effort history**

### **Pelagic fishing**

*Krill:* Historically, catches of krill and finfish from the convention area (including rock cod, *Lepidonotothen squamifrons* and *Notothenia rossii*, and *C. gunnari*) were both high and erratic, with annual catches of between 20 000 and 200 000 tonnes, giving rise to concerns about overfishing in the 1970s and 1980s. CCAMLR was established in 1980 amid concerns that an expanding krill fishery could have a large impact on the ecosystem of the Southern Ocean. Since then krill harvesting has been managed in a precautionary manner, as a recognition of the critical role krill plays as a keystone species in the Antarctic ecosystem, and the uncertainties associated with environmental changes including climate change.

The history of catches in the krill fishery (Figure A2.1.3) shows a number of rises and declines associated with technical and geopolitical influences. As the fishery has developed, the location of fishing has moved from the Indian Ocean to the Atlantic Ocean sector; since the early 1990s it has focused almost entirely in the Atlantic sector.

In 2016, 12 vessels fished in Subareas 48.1, 48.2 and 48.3 and the total catch of krill reported was 259 979 tonnes. In 2017, 12 vessels fished with the total catch of krill exceeding 237 000 tonnes.



**Figure A2.1.3:** Total annual catches of krill (*Euphausia superba*) in the CAMLR Convention Area (CCAMLR, 2018)

### Bottom fishing

Toothfish: Bottom fisheries have operated within the CAMLR Convention Area since the 1970s, and the main fisheries currently target both species of toothfish: *Dissostichus eleginoides* and *D. mawsoni*. These species have circumpolar distributions and are found on the southern shelves and slopes of South America and around the subantarctic islands of the Southern Ocean. They are long-lived species (> 40 years), which initially grow rapidly on shallow shelf areas before undertaking an ontogenetic migration into deeper water. They are currently fished using bottom-set longlines at depths of 600–1 800 m.

Toothfish were first caught as bycatch (as juveniles) in shallow trawl fisheries but, following the development of deepwater longlining, a fishery rapidly developed throughout the Southern Ocean. Toothfish fisheries occur in specific locations in the convention area (FAO Statistical Areas 48, 58, and 88), and catches increased slowly, up to a relatively stable level of around 11 000 tonnes per annum since the late 1990s for *D. eleginoides*, and 4 000 tonnes per annum since the mid-2000s for *D. mawsoni* (CCAMLR, 2015a). *D. eleginoides* is caught mainly around subantarctic islands in Areas 48 and 58, whereas *D. mawsoni* is caught predominantly along the Antarctic coast in all three areas. Commercial bottom trawling (outside the area mentioned above) and gillnetting have not been allowed in the CAMLR Convention Area since 2006, and fishing for toothfish in waters shallower than 550 m in exploratory fisheries has been prohibited since 2009. Moreover, a number of areas are closed to bottom fishing, including those closed to protect known or possible VMEs. Details of the bottom fisheries targeting toothfish in the convention area can be found at CCAMLR (2015a).

Other bottom fisheries have operated in the Southern Ocean at various times since the 1960s. Some were large and intensive, and occurred prior to the establishment of CCAMLR. They no longer exist, either because they ceased operating prior to the entry into force of CCAMLR, or because they were closed by the Commission in the 1990s – mainly in Subareas 48.1, 48.2, and 48.3, as a result of insufficient information for the exploited stocks to be assessed and managed with confidence. In

addition, the Commission has closed a number of fisheries for toothfish due to concerns about the adverse impacts of IUU fishing.

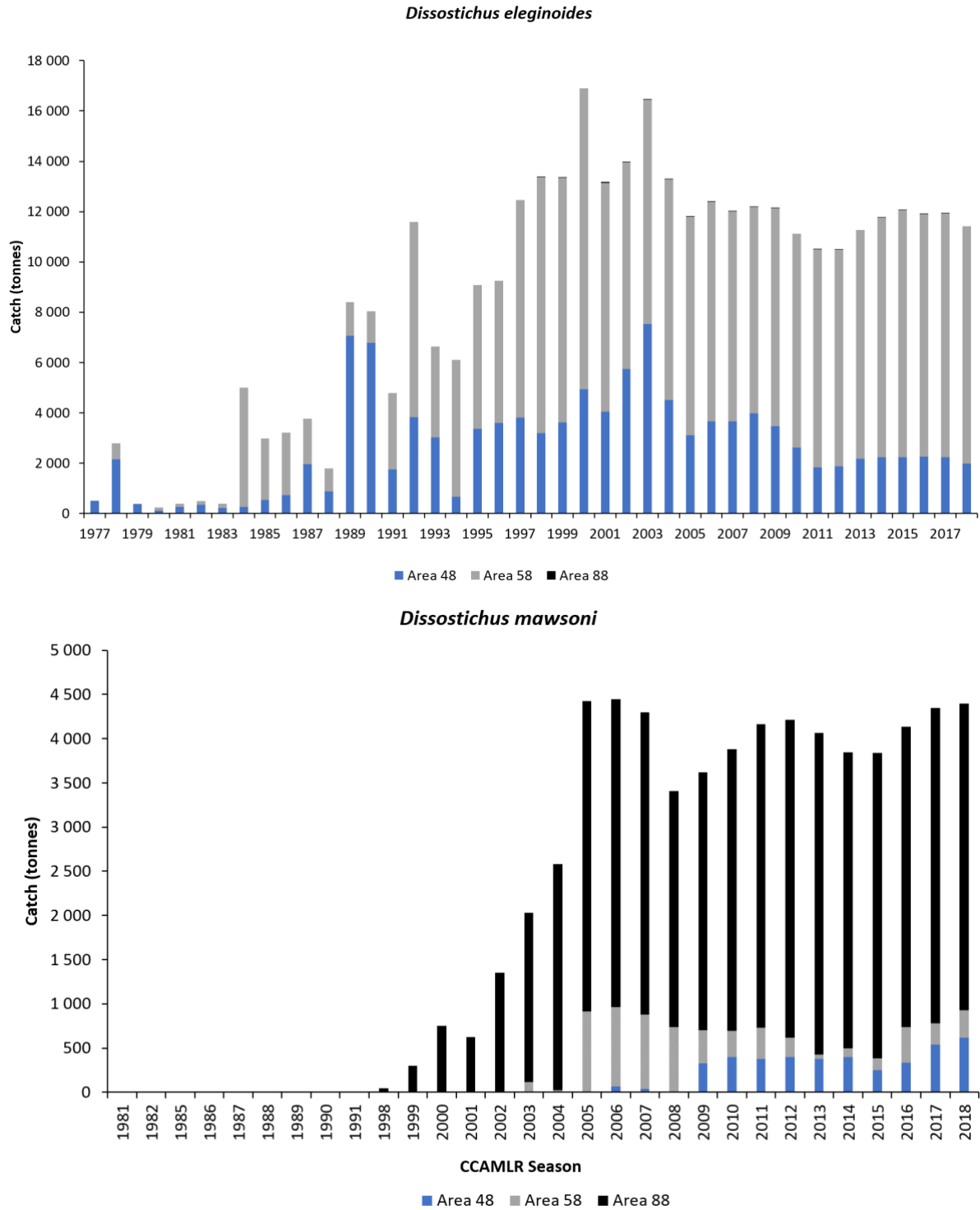


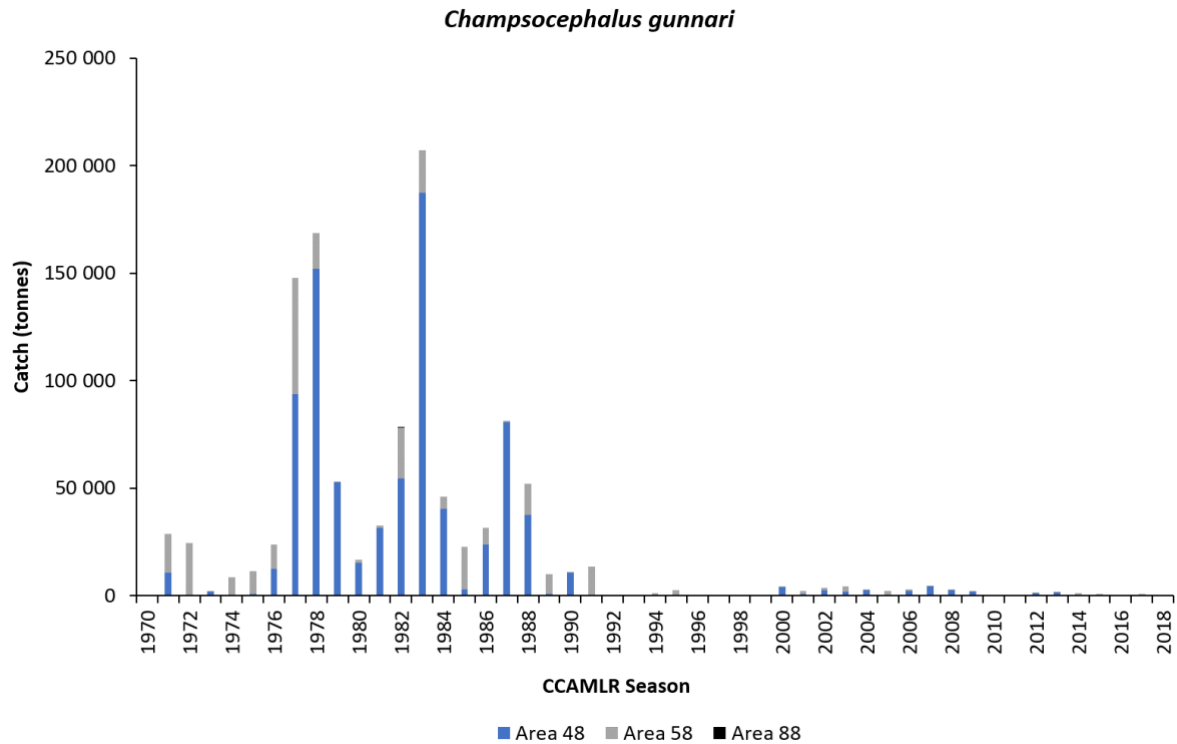
Figure A2.1.4: Catches of toothfish in the CAMLR Convention Areas (CCAMLR, 2019a)

**Icefish**

Mackerel icefish (*Champsocephalus gunnari*) grow rapidly to a maximum size of 55 cm, reaching a marketable size of 30 cm in three years. Icefish inhabit the shelf all around South Georgia and also at

Shag Rocks, forming large aggregations. They feed on krill and their abundance has been linked to interannual variations in krill abundance.

This species was heavily exploited in the 1970s and 1980s. Concern over the levels of exploitation in these fisheries, and the high annual variability in catches, led to the closure of the fisheries in the early 1990s. The fishery was later reopened, but with a highly conservative catch limit, and was restricted to pelagic trawling to avoid impacts on non-target species. Fisheries on mackerel icefish may now only occur within two years of a survey, if sufficient stock is assessed to be available.



**Figure A2.1.5:** Icefish catch history (CCAMLR, 2019b)

### Stock assessments of target species

Stock assessments are available for all of the target species and most also have assessments specific to the individual regions where fisheries currently operate. Annual fishery reports for each fishery outline the current stock status. The type of assessment methodology varies between fisheries, based on the level and type of data available.

### Bycatch species

There is a high level of information on bycatch within these fisheries, including good information on the composition of bycatch; annual catch levels are also well-known, and for most of the bycatch species (at least for those caught in material amounts), some form of quantitative assessment has been completed that has enabled the calculation of bycatch catch limits.

*Pelagic fishing:* Detailed information on the fish bycatch reported from the krill fishery was provided in WG-FSA-16/04. This indicated that painted rockcod (*Lepidonotothen larseni*) and spiny icefish (*Chaenodraco wilsoni*) were the most frequently reported. The estimated total annual mass of fish bycatch would be 370 tonnes, comprising 40 percent mackerel icefish (*Chamsocephalus gunnari*) and 30 percent *L. larseni*.

*Bottom fishing:* The catch of bycatch species in each of the toothfish fisheries are documented separately in the annual fishery reports. Many of these species have had some level of risk assessment and catch limits imposed, but only in some of the fisheries. The main bycatch species include the Caml grenadier (*Macrourus caml*), Whitson's grenadier (*M. whitsoni*), bigeye grenadier (*M. holotrachys*), ridge-scaled grenadier (*M. carinatus*) and skates (rajids). Catch limits for bycatch species groups have been defined for most fisheries.

*Icefish fisheries:* There are catch limits and catches for some of the most common bycatch species: humped rockcod (*Gobionotothen gibberifrons*), marbled rockcod (*Notothenia rossii*), grey rockcod (*Lepidonotothen squamifrons*), South Georgia icefish (*Pseudochaenichthys georgianus*) and blackfin icefish (*Chaenocephalus aceratus*). Bycatch is consistently low in this fishery – usually less than a few tonnes collectively. In other icefish fisheries, bycatch of unicorn icefish (*Channichthys rhinoceratus*) fluctuates considerably but reached a historical high in 2014.

### **Seabirds/mammal interactions**

There is a high level of information on the capture of seabirds and mammal interactions within these fisheries. This includes the satisfactory information on the annual levels of capture.

*Krill fishery:* In 2016, a total of nine seabird mortalities were reported from the krill fishery, one in Subarea 48.2 and eight in Subarea 48.1. There were also three reported mortalities of Antarctic fur seal (*Arctocephalus gazella*) in the fishery in Subarea 48.3. In 2017, two seabird mortalities were reported.

Initial monitoring of the levels of seal captures in the early 2000s indicated a need for mitigation measures. Following extensive development of the latter, there were no seal mortalities reported between 2008 and 2014. There were three mortalities of Antarctic fur seals in 2015 and 2016, but none in 2017.

*Bottom fishing:* The annual numbers for bird mortality by toothfish fisheries are presented in each of the fishery reports. The three most common species injured or killed in these fisheries are the Cape petrel (*Daption capense*), the black-browed albatross (*Thalassarche melanophrys*), the white-chinned petrel (*Procellaria aequinoctialis*) and northern giant petrel (*Macronectes halli*).

There is no mention of any level of seal interactions with these toothfish fisheries.

For icefish, conservation measures – including requirements to clean nets and ensure that they sink quickly – also reduced incidental the mortality of birds. Bycatch and incidental mortality are now low.

### **Bottom impacts/VMEs and impact assessments**

Established and exploratory bottom fishing activities for toothfish are currently only undertaken within relatively small areas of the convention area, where such fishing is permitted.

In line with the requirements of United Nations General Assembly (UNGA) Resolution 61/105, CCAMLR has undertaken preliminary assessments of bottom fishing activities (“impact assessments”) in exploratory fisheries in the high seas areas of the convention area. This is achieved by requiring all Members intending to carry out exploratory bottom fisheries to submit details of their intentions prior to fishing, together with any mitigation measures they plan to adopt to avoid significant adverse impacts on VMEs. This information is reviewed by the Scientific Committee to assess potential short- and long-term impacts.

The impact assessments include: descriptions of the fishing gear, fishing activity, and the estimated fishing footprint per unit effort for a typical fishing gear deployment event; a description of non-standard gear deployment scenarios; an estimation of associated frequencies and fishing footprints per unit of effort; a characterization of fragility for VME taxa within each spatial footprint; a calculation of

footprint index, and impact index for the fishing method; a spatial summary of historical fishing effort; and a calculation of spatially resolved cumulative footprint and impact.

Bycatch of benthos has also been monitored by observers since the early stages of the fishery's development and the rate of benthos bycatch is generally lower in areas that have subsequently become the main fishing grounds, as opposed to locations sampled in the RSTS.

*Icefish:* The current pelagic trawl fishery assessed in Subarea 48.3 has minimal impact on the benthic ecosystem.

### **Ecosystem impact assessments**

*Krill fishery:* Krill are important in the food chain because they feed on phytoplankton, and to a lesser extent zooplankton, making nutrients available to other animals of whose diet krill constitute the largest part. Hence why krill are considered a keystone species in the Southern Ocean ecosystem.

Recognition of the central role of krill in the ecosystem is at the core of the approach taken by CCAMLR in the management of the krill fishery. One element of this, the CCAMLR Ecosystem Monitoring Program (CEMP), was established in 1985 to detect changes in the krill-based ecosystem in order to provide a basis for regulating harvesting of Antarctic marine living resources in accordance with the ecosystem approach.

*Toothfish:* Each of the fishery reports for the toothfish fisheries outline their assessment of ecosystem impacts. The level of these varies from "no formal evaluation" in Area 48.3 to some discussion of benthic impacts.

*Icefish:* Icefish play an important role in the ecosystem of the South Georgia shelf as predators of krill (*Euphausia superba*), other *euphausiids* and the *hyperiid* amphipod (*Themisto gaudichaudii*) and as the prey species of fur seals and gentoo penguins. *Champscephalus gunnari* may also be consumed by juvenile toothfish in years of high *C. gunnari* abundance at Shag Rocks. Estimates of *C. gunnari* standing stock have been shown to vary in relation to krill abundance at South Georgia, and in years of poor krill availability, the conditions for *C. gunnari* are poorer and larger quantities are likely to be consumed by both fur seals and gentoo penguins, which are normally krill-dependent predators.

*Other:* The Second Performance Review noted that there are currently no consolidated assessments in CCAMLR of:

- the status of depleted species and their likely trajectories;
- the potential for current fisheries to impede the recovery of depleted species directly or indirectly; and
- changes to the ecosystem that may arise as a result of the recovery of depleted species.

### **Social and economic status/impacts**

No information identified.



## MANAGEMENT

### Conservation/management measures

CAMLR implements a comprehensive set of measures in order to support the conservation of Antarctic marine living resources and the management of fisheries in the Southern Ocean. These conservation measures are reviewed and developed at each annual meeting of the Commission, before being implemented by Members during the ensuing intersessional period and fishing season. Conservation measures are published in the annual, Schedule of Conservation Measures in Force.

There are approximately 60 conservation measures listed under general components, with each measure uniquely identified by a numeric code. The components used and total numbers of the measures are:

Compliance (10–20)	10 CMs
General fishery matters (21–30)	26 CMs
Fishery regulations (31–90)	27 CMs
Protected areas (91–100)	5 CMs

A compendium of these conservation measures (CMs) is available as a PDF which includes a useful summary.<sup>16</sup>

### Management of target species

*Krill:* A summary of the seven CMs for Krill are listed in Table A2.1.1. The sustainability of the krill fishery is ensured by setting limits on the fishery such that the catches taken will leave enough krill to ensure a healthy breeding population, with enough available for predators (such as penguins and whales).

Sustainability of the krill fishery is dependent on the size of the catch relative to the population. In essence, the CCAMLR approach to managing the krill fishery is to minimize the impact on the ecosystem rather than trying to maximize the size of the fishery.

Scientists use computer models that simulate the krill population (controlled by a set of equations for the number of births, the rate of growth and the rate of death) and then use this data to predict what might happen with different levels of fishing. Thousands of simulations are carried out in order to determine a catch level that is sustainable. CCAMLR sets precautionary catch limits for krill using a set of decision rules to determine what proportion of the stock can be fished while still achieving the objective set out in the Convention.

To do this, the population of krill is projected forward in time using a population model to allow the effects of different catch levels to be simulated based on key parameters (such as recruitment, growth and mortality) drawn at random from plausible ranges to account for natural variability and uncertainty. Simulations take into account what is known and what is not known about the ecosystem.

When setting the 5.6 million-tonne catch limit over such a large area CCAMLR recognizes that the fishery has the potential to be spatially restricted and has the potential for localized, potentially negative, ecosystem impacts. In recognition of this risk, CCAMLR introduced a trigger level of 620 000 tonnes above which the fishery cannot proceed until there is an agreed mechanism to distribute catches in such a manner as to avoid localized impacts. This “trigger” level represents approximately 1 percent of the estimated 60 million tonnes of the unexploited biomass, or virgin size, of the krill population in this region. The actual annual catch is around 0.3 percent of the unexploited biomass of krill.

<sup>16</sup> [www.ccamlr.org/en/document/publications/schedule-conservation-measures-force-2017/18](http://www.ccamlr.org/en/document/publications/schedule-conservation-measures-force-2017/18)

The trigger level represents the combined maximum historic catches reported from each subarea, a figure which is subdivided so that catches in any one season may not exceed 25 percent of the trigger level (155 000 tonnes) in Subarea 48.1 and 45 percent (279 000 tonnes) in Subarea 48.2 and Subarea 48.3 (CM 51-07).

**Table A2.1.1:** A summary of CCAMLR limits in force and related conservation measures for the krill fishery in Subareas 48.1, 48.2, 48.3 and 48.4 in 2018

Element	Limits in force
Target species	The target species is <i>Euphausia superba</i> ; any species other than <i>Euphausia superba</i> is bycatch
Access (gear)	Trawling only
Notification	All Members intending to fish for krill must notify the Commission in accordance with CM 21-03
Catch limit	155 000 tonnes in Subarea 48.1, 279 000 tonnes in Subareas 48.2 and 48.3, and 93 000 tonnes in Subarea 48.4 (CM 51-07)
Move-on rule	No move-on rules apply
Season	1 December to 30 November of the following year
Bycatch	Bycatch rates as in CM 33-01 apply in Subarea 48.3
Bird and mammal mitigation	Specific advice/requirements in accordance with CM 25-03 and CM 51-01
Observers	Scientific observers should be deployed on vessels in accordance with CM 51-06
Data	Monthly and/or five-day catch and effort reporting
Haul-by-haul catch and effort data	
Data reported by the CCAMLR scientific observer	
Research	No specific requirement
Environmental protection	Regulated by CM 26-01 during fishing operations

*Toothfish:* There are currently 11 toothfish-specific CMs. Table A2.1.2 outlines the current catch limits in each fishery. As there are 13 toothfish fisheries it is not practicable to list each of the specific management measures here, but Table A2.1.3 outlines an example of the full set of the other management measures that apply within each fishery.

**Table A2.1.2:** Thirteen Toothfish fisheries and current catch limits (Source: <https://www.ccamlr.org>)

Area	Type of fishery	Target species	Catch limit (tonnes) 2017/2018	Conservation measure
Subarea 48.3	Established	<i>Dissostichus eleginoides</i>	2600	CM 41-02
Subarea 48.4	Research fishing	<i>Dissostichus</i> spp.	63	CM 41-03
Subarea 48.6	Exploratory	<i>Dissostichus mawsoni</i>	557	CM 41-04
Division 58.4.1	Exploratory	<i>Dissostichus mawsoni</i>	545	CM 41-11
Division 58.4.2	Exploratory	<i>Dissostichus mawsoni</i>	42	CM 41-05
Division 58.4.3a	Exploratory	<i>Dissostichus eleginoides</i>	38	CM 41-06
Division 58.4.3b	Exploratory	<i>Dissostichus mawsoni</i>	0	CM 41-07
Division 58.5.1	Established	<i>Dissostichus eleginoides</i>	5 050	n/a
Division 58.5.2	Established	<i>Dissostichus eleginoides</i>	3 525	CM 41-08
Subarea 58.6	Established	<i>Dissostichus eleginoides</i>	1 300	n/a
Subarea 58.7	Established	<i>Dissostichus eleginoides</i>	575	n/a
Subarea 88.1	Exploratory	<i>Dissostichus mawsoni</i>	3 157	CM 41-09
Subarea 88.2	Exploratory	<i>Dissostichus mawsoni</i>	619	CM 41-10

**Table A2.1.3:** Example of management measures for a Toothfish fishery

Element	Limit in force
Bycatch	As set out in CM 33-02 fishing shall cease if the bycatch limit of any species is reached: <i>Channichthys rhinoceratus</i> : 1 663 tonnes <i>Lepidonotothen squamifrons</i> : 80 tonnes <i>Macrourus carinatus</i> and <i>M. holotrachys</i> : 360 tonnes <i>Macrourus caml</i> and <i>M. whitsoni</i> : 409 tonnes Skates and rays: 120 tonnes
Move-on-rule	As set out in CM 33-02, if the catch limits for any one haul are reached, the vessel must not fish using that method within 5 nautical miles of the location for at least 5 days: <i>Channichthys rhinoceratus</i> : 5 tonnes <i>Macrourus</i> spp. combined: 3 tonnes <i>Lepidonotothen squamifrons</i> : 2 tonnes <i>Somniosus</i> spp.: 2 tonnes Skates and rays: 2 tonnes Other bycatch species: 1 tonne
Mitigation	In accordance with CMs 24-02, 25-02 and 25-03, minimization of risk of the incidental mortality of birds and mammals
Observers	Each vessel to carry at least one scientific observer and may include one additional CCAMLR scientific observer

Data	Ten-day reporting system as in Annex 41-08/A Monthly fine-scale reporting system as in Annex 41-08/A on a haul-by-haul basis Fine-scale reporting system as in Annex 41-08/A. Reported in accordance with the CCAMLR Scheme of International Scientific Observation
Target species	For the purpose of Annex 41-08/A, the target species is <i>Dissostichus eleginoides</i> and the bycatch is any species other than <i>D. eleginoides</i>
Jellymeat	Number and weight of fish discarded, including those with jellymeat condition, to be reported. These catches count towards the catch limit.
Environmental protection	Regulated by CM 26-01

*Icefish*: There are currently only two specific CMs for icefish. These limit the catches for the fishery for *C. gunnari* in Subarea 48.3 for the forthcoming season (as per CM 42-01); catch limits in Division 58.5.3 are also listed in Table A2.1.4.

**Table A2.1.4:** Current catch limits for icefish (Source: <https://www.ccamlr.org>)

Area	Type of fishery	Target species	Catch limit (tonnes) 2017/2018	Conservation measure
Subarea 48.3	Established	<i>C. gunnari</i>	4 733	CM 42-01
Division 58.5.2	Established	<i>C. gunnari</i>	526	CM 42-02

### Climate change and harvest strategies

The second performance review noted that:

- Harvest strategies for krill and toothfish currently use decision rules that imply no change to the ecosystem other than that arising from natural variability. Strategies need to be developed that will achieve the Convention's objective and be robust to ecosystem changes arising from other causes, including: regional climate change, fishing and/or tourism, and the uncertainties that may arise as a result of the absence of data or knowledge.
- A concern about future ecosystem change is that it may not just be a change in productivity of Antarctic marine living resources but could also be a change in ecosystem structure and function, with the possibility of tipping points being crossed, i.e. movement of the system from one stable state – one based on krill, for instance – to another stable state, for instance one based on fish or salps. These different outcomes may require different kinds of rules for deciding management actions (such as catch limits, for example) than those being used at present.

### Management of bycatch

*General*: There are a large number of conservation measures related to the management of fisheries which ensure that impacts on the target and other species are minimized. CM 33-01 limits the level of bycatch species that may be taken. CM 33-02 specifies that there should be no directed fishing other than for the target species, the bycatch limits for incidentally caught species and the move-on rules if

the limits for any one haul are exceeded. There is a limit on bycatch in new and exploratory fisheries (CM 33-03). There is also CM for Shark bycatch (CM 32-18).

### **Management of seabirds and mammal interactions**

There have been a number of initiatives and associated conservation measures introduced to minimize the incidental mortality and the levels of capture of seabirds CM 24-02; 25-02 and, where relevant, marine mammals 25-03.

*Krill fishery:* Specific advice/requirements in accordance with CM 25-03.

*Toothfish fisheries:* CM 25-03 is in force to minimize the incidental mortality of birds and mammals during trawl fishing. Measures include developing gear configurations which minimize the chance of birds encountering the net, and the prohibition of discharge of offal and discards during the shooting and hauling of trawl gear.

Longline fishing is conducted in accordance with CM 24-02 and CM 25-02 for the protection of birds so that hook lines sink beyond the reach of birds as soon as possible once in the water. Between them, these measures specify the weight requirements for different longline configurations, as well as the use of streamer lines and a bird exclusion device to discourage birds from accessing the bait during setting and hauling. A core fishing season and season extensions are specified in CM 41-08. If three seabirds are caught during the season extension by a vessel, fishing during the season extension is to cease immediately for that vessel.

*Icefish fisheries:* CM 25-03 applies to these fisheries. It sets out technical measures to minimize bird bycatch and relates to: net monitoring cables, vessel lighting, discarding of offal, net cleaning, net sinking (nets are most likely to trap birds when they are on the surface of the water) and streamer lines (bird scarers). CM 42-01 has a further mitigation measure that, should any vessel catch a total of 20 birds, it shall cease fishing and shall be excluded from further participation in the fishery in that year.

### **General environmental impacts**

CM 26-01 covers general environmental protection during fishing. This includes a ban on:

- Using plastic bait bands and restricting other plastic; and
- Dumping waste, garbage and sewage.

Resolution XXVI also covers ballast water discharge.

### **Management of benthic impacts**

*Gear restrictions:* Since 2006 CCAMLR has banned the use of gillnets in the convention area (CM 22-04) and there are further restrictions on the use of bottom trawling gears in high seas areas of the convention area (CM 22-05).

*MPAs:* In 2009, CCAMLR established the world's first high seas MPA – the South Orkney Islands Southern Shelf Marine Protected Area – a region covering 94 000 km<sup>2</sup> in the southern Atlantic Ocean. This is the first step towards establishing a representative system of marine protected areas (MPAs) in the convention area: further MPAs are envisaged as part of the General Framework for the Establishment of CCAMLR Marine Protected Areas (Conservation Measure 91-04).

*VMEs:* The CCAMLR working definition of VMEs, as set out in CM 22-06, includes “seamounts, hydrothermal vents, cold water corals and sponge fields” (CM 22-06, Paragraph 3). The presence of

VME indicator organisms above a certain threshold level is also taken as evidence of a VME. VME indicators are organisms which, when observed or caught as bycatch, indicate that fishing may potentially be in an area where VMEs occur.

A total of 46 registered VMEs have been identified; 42 of these are in areas where bottom fishing is currently prohibited (CM 32-02), and no additional measures are required to protect the VMEs in these areas at this time. The remaining four VMEs are in Subarea 88.1 and Division 58.4.1, where toothfish fisheries are permitted, and they are afforded specific protection under CM 22-09.

*Encounter protocols and thresholds:* CCAMLR has threshold values, established by CM 22-07 in 2008, that apply to bottom-set longlines and lines of pots; these are defined in terms of the number of VME indicator units recovered per line segment. Fishing vessels using bottom fishing gears have been required to take certain actions when they encounter evidence of a VME (CM 22-07). An encounter is defined as catching VME indicator taxa above a certain threshold value (see next section), and the action depends upon whether a high or low threshold is exceeded. If the higher threshold is exceeded, the vessel must inform its flag state and the Secretariat of the position and the number of VME indicator units caught.

*Other spatial management measures:* Since 2009, CCAMLR has imposed a general prohibition on fishing for *Dissostichus* spp. in depths shallower than 550 m in exploratory fisheries, in order to protect benthic communities (CM 22-08).

### **Managing ecosystem implications and effects**

Recognition of the central role of krill in the ecosystem is at the core of the approach adopted by CCAMLR in its management of the krill fishery; this is covered in CM 51-01, 51-02, 51-03. Generally, ecosystem implications are also explicitly mentioned in the management settings and fishery reports for the toothfish and icefish fisheries.

Despite this, the second performance review noted that:

- At present, considerations of the spatial requirements for achieving the conservation of Antarctic marine living resources are separated into topics on krill fisheries, toothfish fisheries and spatial management. Spatial management is further divided into VMEs and MPAs. Better integration of these issues is needed in order to understand the interactions of fisheries with Antarctic marine living resources, and how the approaches being taken within individual conservation measures will contribute to the successful achievement of the Convention's conservation objective. A regional approach to conservation would help the integration.
- The spatial and temporal scales of MPAs established for these purposes will need to be consistent with the respective scales of the ecologies of Antarctic marine living resources and the temporal scale of processes required to achieve these purposes. CCAMLR has established a number of conservation measures to implement an ecosystem approach to fisheries derived from Article II of the Convention, including measuring bycatch in the finfish and krill fisheries.
- The relationship between krill and whales may need greater attention. Ecosystem interactions for finfish fisheries, notably toothfish, also need consideration.
- While its efforts to establish a network of MPAs have been commendable – and further work is ongoing, notably for the East Antarctic, Weddell Sea and Antarctic Peninsula regions – CCAMLR has come under some criticism for the rate at which it is able to complete work on MPA designations, and the extent to which the most recent MPA designation, for the Ross Sea region, is sufficiently enduring and conservation-focused.

- The Southern Ocean ecosystem may be experiencing long-term directional changes (compared to random variations) due to climate change, resulting in changes to both habitat suitability and species ecologies. A strategy for the collection of information on (but not limited to) prey–predator interactions, habitat variables and population biology is needed to improve ecosystem-based fishery management under changing conditions.
- Harvest strategies and accompanying advice for all fisheries need to indicate clearly how they are adopting an ecosystem approach in a precautionary manner so as to decide on catches and their spatial and seasonal distributions, including consideration of the potential direct and indirect effects of concentrated fishing.

### **Management of social and economic outcomes**

*Economic impacts:* There are no CMs that relate directly to economic outcomes.

One study examined the economic impacts of proposals to implement an MPA.

*Social impacts:* There are no CMs related to social impacts, but a number of resolutions relate to vessel safety.

*Resolution 23/XXIII:* ‘Safety on board vessels fishing in the Convention Area’ urges Members to take particular measures through appropriate survival training and the provision and maintenance of appropriate equipment and clothing, in order to promote the safety of all those on board vessels fishing in the convention area.

*Resolution 34/XXXI:* ‘Enhancing the safety of fishing vessels in the Convention Area by continuing the work on the mandatory code for ships operating in polar waters’. Consider ratifying the Cape Town Agreement as soon as practicable, and consider and implement appropriate measures to enhance the safety standards of fishing vessels that are licensed to operate in the convention area.

<h3><b>Relevant second review</b></h3>
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<p>Recommendation 10: Action is needed to address issues regarding the safety of ‘non-SOLAS vessels’ operating in polar waters.</p>
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### **Compliance**

CCAMLR implements ten specific compliance-related conservation measures to support the conservation and management of Antarctic living marine resources. CCAMLR seeks to achieve optimal levels of compliance with conservation measures and has been pioneering in its endeavours to achieve this. CCAMLR has recently adopted a conservation measure to support the implementation of a compliance evaluation procedure (Conservation Measure 10-10) for all Members.

CCAMLR conservation measures support a suite of monitoring and compliance systems and tools. Members implement compliance systems that include:

- Vessel licensing (Conservation Measure 10-02)
- Monitoring of vessel movements (Conservation Measure 10-04)
- Monitoring of vessel transshipments (Conservation Measure 10-09)
- System of inspection
- Vessel monitoring system (Conservation Measure 10-04)
- Catch documentation scheme (Conservation Measure 10-05)

Concerned that illegal, unreported and unregulated (IUU) fishing compromises the objectives of its convention, CCAMLR has adopted additional conservation measures to address the threat of IUU fishing specifically. These conservation measures include the establishment of the Non-Contracting Party IUU Vessel List (Conservation Measure 10-07) and the Contracting Party IUU Vessel List (Conservation Measure 10-06) and obligations in respect of the control of nationals from CCAMLR Member Countries (Conservation Measure 10-08).

The Standing Committee on Implementation and Compliance (SCIC) is a subsidiary body to the Commission and meets annually to review the operation of conservation measures and compliance systems, and to advise the Commission on their refinement and implementation.

### **Second review findings**

Recommendation 11: The CCAMLR compliance evaluation procedure should be strengthened by requiring enhanced reporting on the actions taken to address infringements, including whether a contracting party fails to report on their follow-up investigations and rectification of non-compliance by the next subsequent meeting of SCIC, and that such failures be identified in the annual Final CCAMLR Compliance Report as, 'serious, frequent or persistent noncompliance'.

Recommendation 12: To ensure chain of custody, all transshipments of catch from the Convention Area, whether occurring in the Convention Area or in port, should be: (i) independently verified; (ii) permitted from contracting party vessels only to vessels which report to the C-VMS while operating in the Convention Area; (iii) permitted to NCP receiving vessels only when they are registered with CCAMLR; and (iv) for transshipments of catch from the Convention Area that occur outside of the Convention Area, detailed information should be reported to CCAMLR, including the names and International Maritime Organization (IMO) numbers of the vessels involved, quantities of catch or products by species transhipped and the date and time of transhipment.

Recommendation 13: CCAMLR should strengthen its IUU vessel listing procedures to provide for the listing of stateless fishing vessels and for the possibility of listing vessels with the same owner as other IUU-listed vessels.

### **Monitoring and reporting**

There are extensive monitoring and reporting programmes in the CCAMLR. There are seven CMs related to data reporting. These include:

*Catch and effort monitoring:* Catch and effort data is used to monitor CCAMLR fisheries and to forecast fishery closures. Catch and effort data is submitted to the Secretariat by flag states or their vessels using the CCAMLR data forms. Catch and effort data is submitted at different reporting periods depending on the conservation measure (CM) that applies to a fishery and the status of the fishery in relation to its catch limit.

*Daily catch and effort data:* Daily catch and effort data is submitted in accordance with Conservation Measure 23-07 and is required for all exploratory toothfish fisheries.

*5-day catch and effort data:* 5-day catch and effort data is submitted in accordance with Conservation Measure 23-01 and is required for established toothfish and icefish fisheries (except Division 58.5.2), established krill fisheries when krill catches exceed 10–80 percent of their respective limits (see monthly catch and effort reporting) and during research fishing undertaken, in accordance with Conservation Measure 24-01.

*10-day catch and effort data:* 10-day catch and effort data is submitted in accordance with Conservation Measure 41-08 and Conservation Measure 42-02 for established fisheries in Division 58.5.2.



*Monthly catch and effort data:* Monthly catch and effort data is submitted in accordance with Conservation Measure 23-03 and Conservation Measure 23-06 for established krill fisheries in Subareas 48.1, 48.2, 48.3 and 48.4, and Divisions 58.4.1 and 58.4.2 when the total catch is less than 50–80 percent of the trigger level – or 10 percent of the trigger level in Subarea 48.1 (CCAMLR-XXXIII, paragraph 5.5).

*Haul-by-haul data:* Catch, effort and biological data reporting is also required on a haul-by-haul (fine-scale) basis. This data is used to: characterize fisheries; quantify catches of target and bycatch species, incidental catches and removal of vulnerable marine ecosystem (VME) indicator species; estimate fishery and biological parameters; and assess fish stocks. The reporting of catch and effort data on a haul-by-haul basis is required in all fisheries. The data must be submitted before the end of the month following the month when the data were collected, in accordance with Conservation Measure 23-04. Haul-by-haul (fine-scale) data is also required in special cases where the equivalent data is not collected and submitted by the CCAMLR Scheme of International Scientific Observation (SISO). In such cases, the data must be submitted before the end of the month followed the month when data were collected, in accordance with Conservation Measure 23-05.

*SISO:* The CCAMLR Scheme of International Scientific Observation (SISO) was adopted in 1992, under Article XXIV of the Convention. It is one of the most important sources of scientific information and is essential to assessing the impact of fishing on the ecosystem, including the status of target populations, as well as those of related and dependent species. The scheme also plays a crucial role in developing approaches to reducing the impact of fishing on the ecosystem by collecting data on the effectiveness of mitigation measures. All vessels fishing in CCAMLR fisheries are required to carry an observer for some or all of their fishing operations. In fisheries for icefish and toothfish there is a requirement for 100 percent coverage by an international observer (i.e. not from the same flag state as the vessel), while in the krill fishery there is a target coverage of 50 percent using either international or national observers. Observers record information on the gear configuration (including measures to reduce the incidental mortality of seabirds and marine mammals), fishing operations (including catch composition), biological measurements of target and bycatch species, details of fish tagging and tag-recaptures, vessel sightings and data on indicators of vulnerable marine ecosystems. All of these data are submitted by observers to the CCAMLR Secretariat on standardized logbook forms designed for longline, trawl (finfish and krill) and pot (crabs and finfish) fisheries.

*CEMP:* The CCAMLR Ecosystem Monitoring Program (CEMP) was established in 1985 to detect changes in the krill-based ecosystem to provide a basis for regulating the harvesting of Antarctic marine living resources in accordance with the ecosystem approach. The programme aims to: detect and record significant changes in critical components of the ecosystem, to serve as a basis for the conservation of Antarctic marine living resources; and distinguish between changes due to the harvesting of commercial species and changes due to environmental variability, both physical and biological.

*Debris:* The CCAMLR Marine Debris programme was established in 1989 to monitor debris levels in the convention area, with specific regard to fishing debris items. Members annually submit data using a standardized set of forms and instructions covering marine debris from beach surveys, debris associated with seabird colonies, entanglements of marine mammals, and hydrocarbon soiling of mammals and seabirds. The CCAMLR Marine Debris database contains data from 15 sites, predominantly in the Antarctic Peninsula and on subantarctic islands.

Fishery reports are published annually and present the status and management of the fisheries in the CAMLR Convention Area. The data is reviewed by the CCAMLR expert working groups using detailed data from the fisheries and fishery surveys, and the CCAMLR Scheme of International Scientific Observation.

*Statistical Bulletin:* The Statistical Bulletin is published annually and contains: catch and effort statistics for all fisheries in the CCAMLR Convention Area; catch histories for selected fishery target species;

Trade statistics (landings and exports) of toothfish (*Dissostichus eleginoides* and *D. mawsoni*); and Planimetric seabed areas by selected depth intervals in the convention area.

### Scientific studies

The Scientific Committee is developing a strategic five-year plan. This will include broad themes as follows:

- target stock: assessments to estimate sustainable yield in established/assessed fisheries;
- target stock: development of management advice consistent with Article II for data-limited fisheries;
- ecosystem-based management of Southern Ocean krill resources;
- minimization of risks of change to the ecosystem by CCAMLR fisheries – vertebrate bycatch and VME in CCAMLR fisheries;
- spatial management of impacts on the Antarctic ecosystem;
- data acquisition and management.

A range of tasks have been identified within each theme, along with science topics to be considered, in order to carry out the tasks. A timetable of work for each theme will then reveal the working group under which the tasks will fall.

The intention is for the final document to become a ‘living document’ that can be revised annually as the priorities of the SC develop and unforeseen issues, which may require action from the SC, arise. The intention is for the document to be publicly available in order to promote a greater public understanding of the priorities and work of the Scientific Committee.

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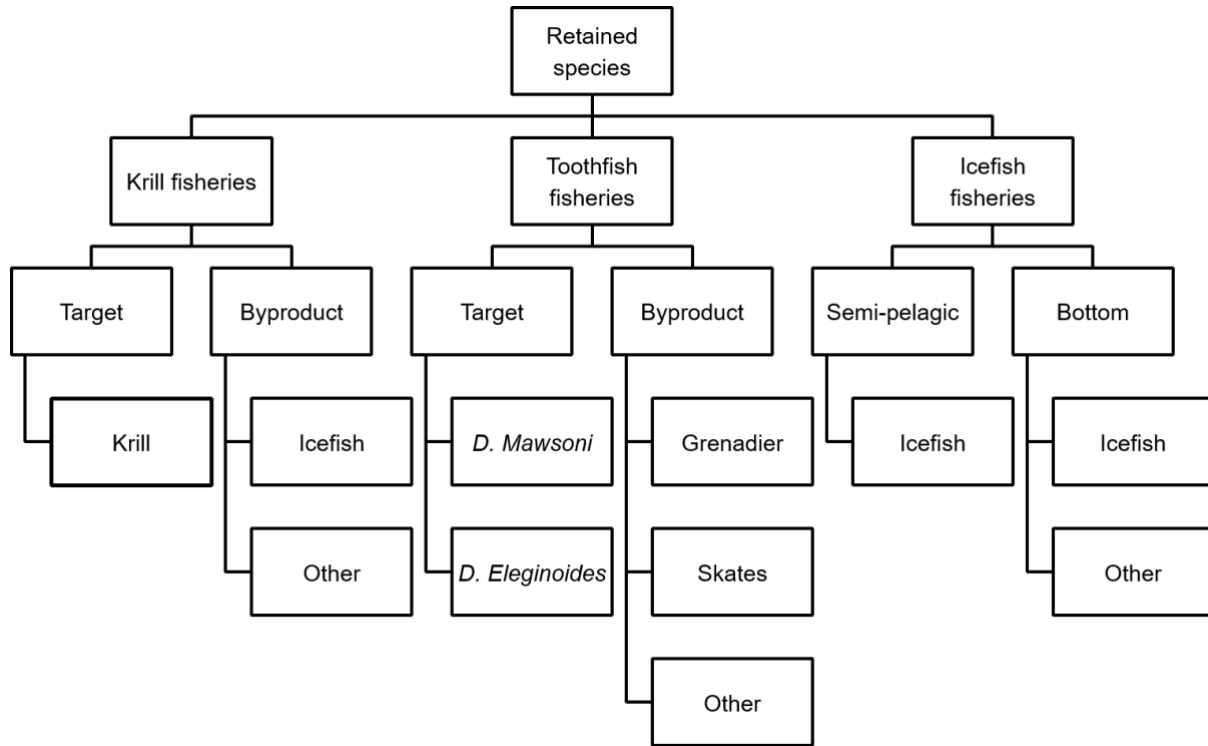
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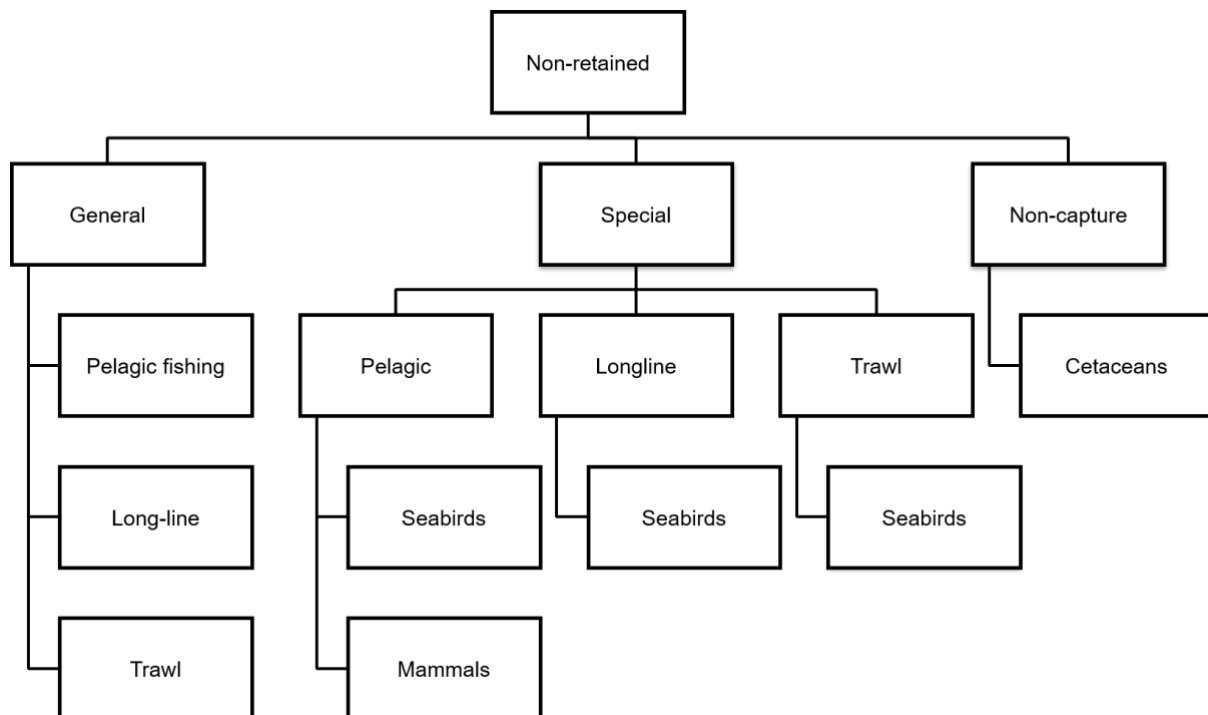
**EAF COMPONENTS CCAMLR**

*N.B. These identify potential issues – a risk analysis would be needed to determine their current risk levels and therefore whether direct management was needed.*

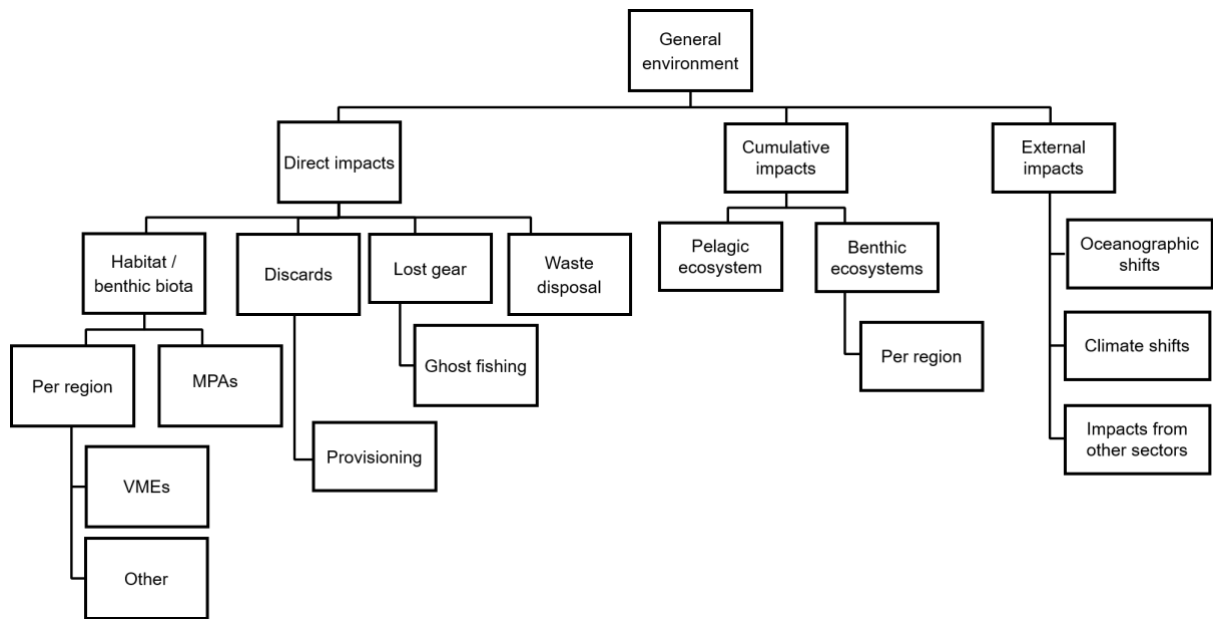
**Retained species CCAMLR**



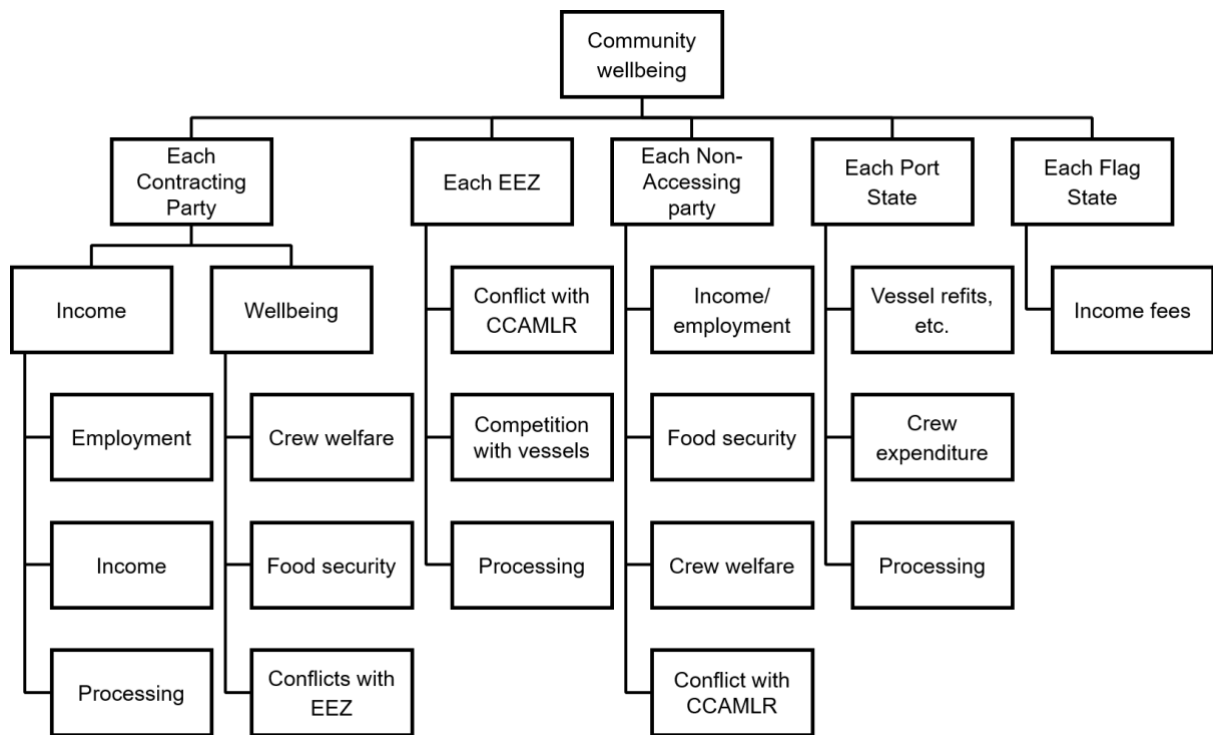
**Non-retained species CCAMLR**



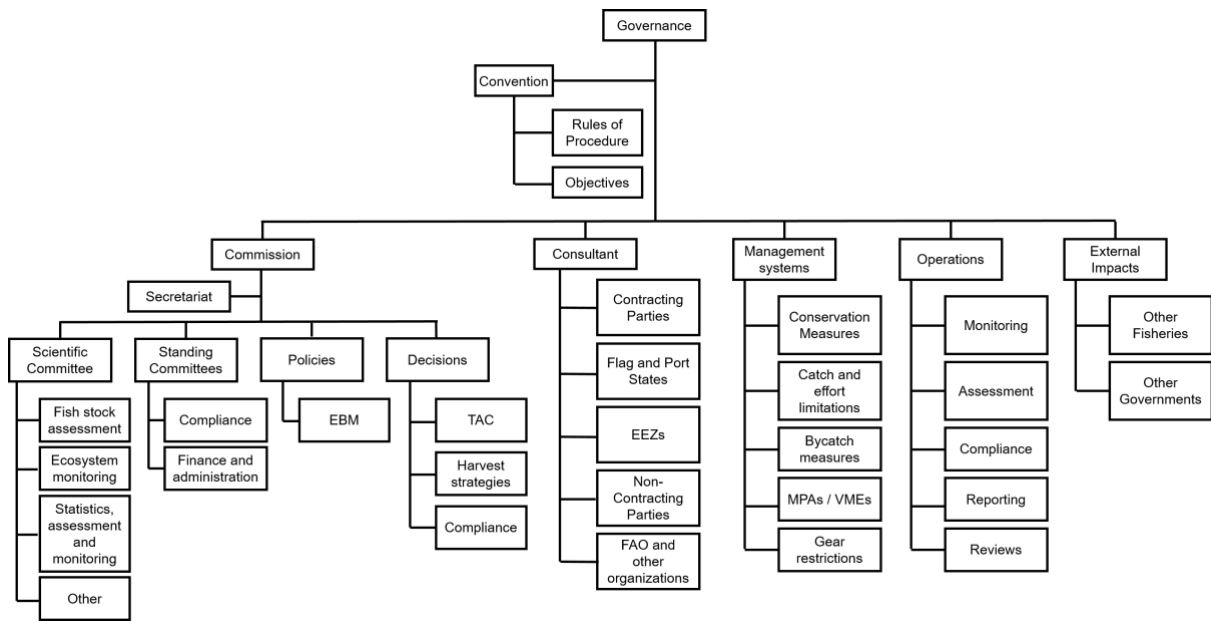
**General environment CCAMLR**



**Community wellbeing CCAMLR**



**Governance (ability to achieve) CCAMLR**



## **A2.2 Mediterranean and Black Seas – General Fisheries Commission for the Mediterranean**

This material was largely obtained from the relevant section in FAO Technical Paper 595 (Álvarez et al., 2016), the GFCM website (<http://www.fao.org/gfcm/en/>) and other documents lodged on this site (e.g. the 2016 Status Report), in addition to the 2017 Review on RFMO Measures (FAO, 2018, unpublished). Given their usage, except for Figures and Tables, no specific references are made to each of these sources within the following summary. The information was last updated in August 2018.

### **OVERVIEW**

The functions and responsibilities of the GFCM are to ensure the conservation and sustainable use of living marine resources at the biological, social, economic and environmental levels, as well as the sustainable development of aquaculture in its area of application. The GFCM mandate uses the ecosystem approach to fisheries and to consider negative impacts on marine ecosystems.

The activities and policies of the GFCM are designed to promote the sustainable use and conservation of living marine resources in an economically, socially and environmentally responsible manner in the Mediterranean and the Black Sea, in line with FAO efforts towards food security and adopting the principles enshrined in the FAO Code of Conduct for Responsible Fisheries and the FAO Blue Growth Initiative.

Although GFCM covers the management of aquaculture activities, as most of these occur in territorial waters this aspect will not be covered in this RFMO review.

The latest GFCM strategy (GFCM, 2017) states that fishing has a tremendous cultural, social and economic importance in the Mediterranean and the Black Sea, providing an important source of food and livelihood for riparian countries, as well as sustaining the traditions and the way of life of many coastal communities. It also notes that the Mediterranean and Black Sea fisheries are currently facing serious challenges, with roughly 90 percent of scientifically assessed stocks considered to be fished in excess of safe biological limits, together with decreasing catches and shrinking fleets at the regional level.

### **GFCM Agreement**

The Agreement for the establishment of the General Fisheries Commission for the Mediterranean (GFCM), under the provisions of Article XIV of the FAO Constitution, was approved at the fifth session of the FAO Conference in 1949. It entered into force on 20 February 1952.

The General Fisheries Commission for the Mediterranean (GFCM) was established in 1949 to monitor and manage fisheries in the Mediterranean and Black Seas on the basis of an agreement adopted under Article XIV of the FAO Constitution, which has been amended four times: in 1963, 1976, 1997, and 2014 (GFCM, 2014). The basic texts document now also includes the GFCM Rules of Procedures and the Financial Regulations.<sup>17</sup>

#### *Agreement objective*

The main objective of the GFCM is to ensure the conservation and the sustainable use, at the biological, social, economic and environmental level, of living marine resources as well as the sustainable development of aquaculture in the Mediterranean and in the Black Sea.

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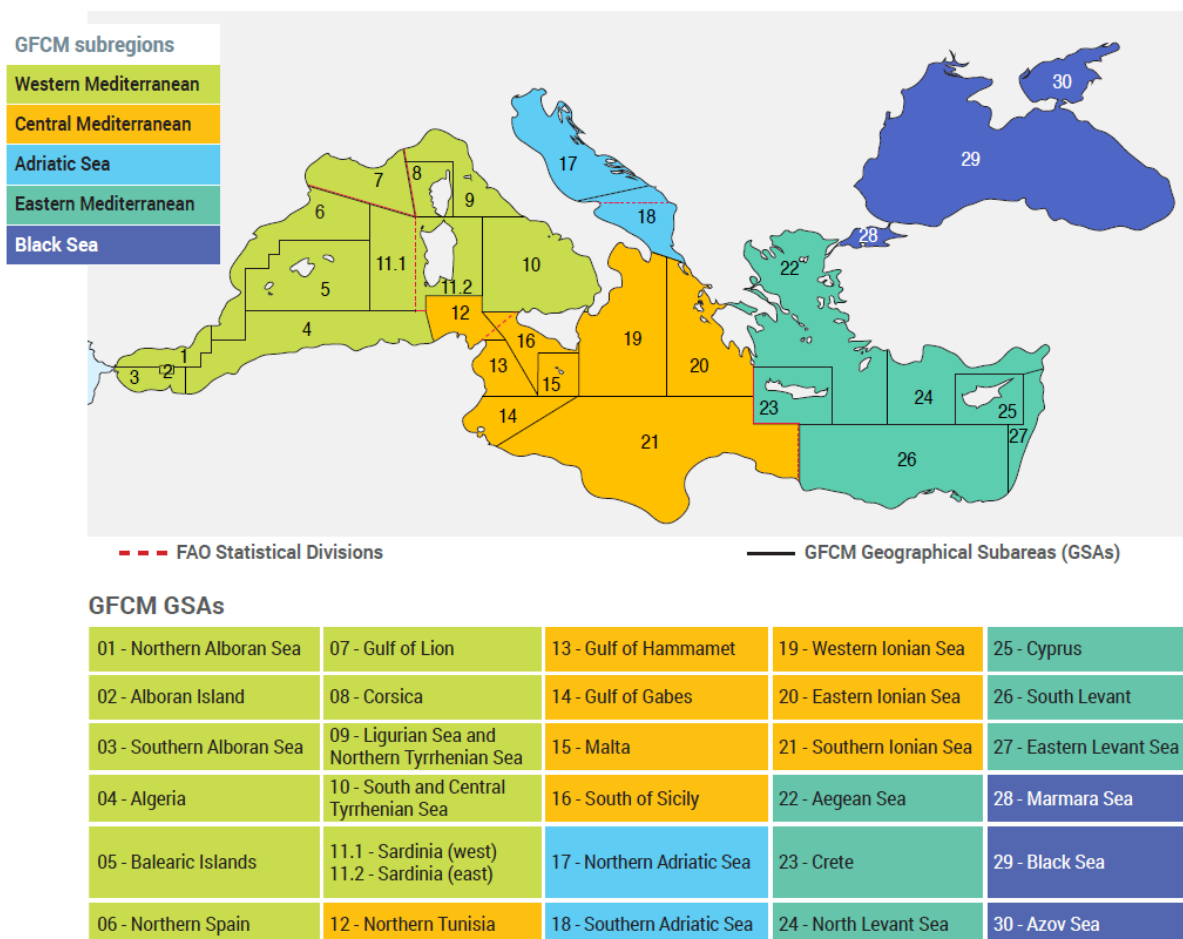
<sup>17</sup> <http://www.fao.org/gfcm/publications/brochures/gfcmbasictexts/en/>

Importantly, with respect to EAF, the agreement was designed to ensure the long-term conservation and sustainable use of living marine resources and marine ecosystems in the area of application. It also recognizes the economic, social and nutritional benefits derived from the sustainable use of living marine resources in the area of application.

Furthermore, in giving effect to the objective, the Commission shall adopt recommendations on conservation and management measures aimed at ensuring the long-term sustainability of fishing activities, in order to preserve the marine living resources, the economic and social viability of fisheries and aquaculture. By adopting such recommendations, the Commission shall give particular attention to measures to preventing overfishing and minimizing discards. The Commission shall also pay particular attention to the potential impacts on small-scale fisheries and local communities.

### GFCM mandate and scope

The GFCM area of application comprises the marine waters of the Mediterranean and Black Seas, and includes both national and international waters (Figure A2.2.1). It should be noted that national jurisdictions over marine areas are not consistently delineated. Much of the Mediterranean Sea is therefore still regarded as international waters. Consequently, the preservation of the marine ecosystems and the living marine resources found therein is ensured through cooperation with relevant regional organizations, including the GFCM.



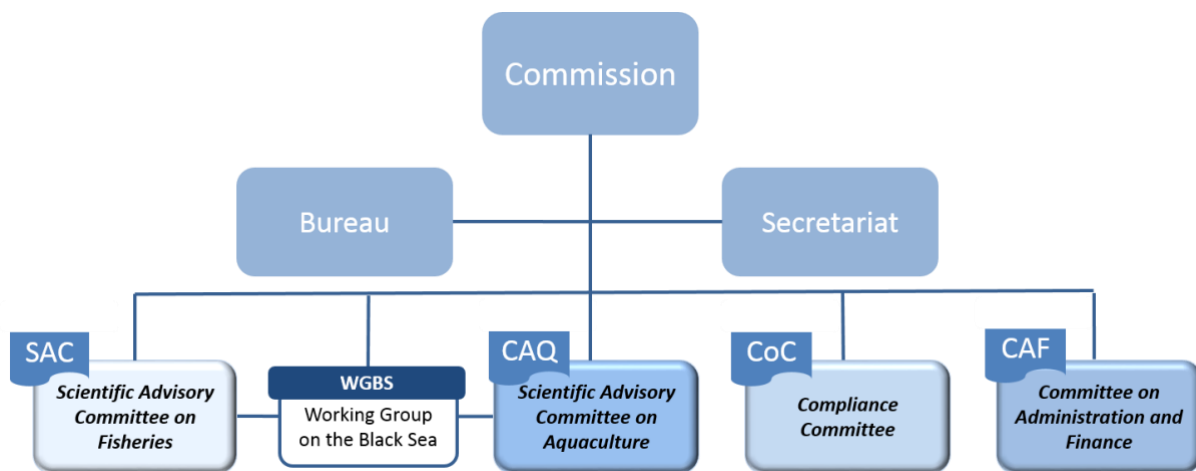
**Figure A2.2.1:** Area of Agreement for the GFCM (Source: <http://www.gfcm.org>)



## Contracting and non-contracting parties to Convention

The GFCM is currently composed of 23 Member Countries and the European Union, who contribute to its autonomous budget to finance its functioning, in addition to three cooperating, non contracting parties (Bosnia and Herzegovina, Georgia and Ukraine). In light of its increasing cooperation with the GFCM, the Commission granted cooperating non-contracting party status to the Republic of Moldova in 2017.

**The Commission:** The Commission is made up of one representative from each of the 24 contracting parties (22 Mediterranean and Black Sea states, Japan, and the European Union) and five cooperating non-contracting parties. The Commission is the central decision-making body of the GFCM, and its sessions are steered by the Commission bureau. The GFCM implements its activities through its Secretariat and operates by way of its subsidiary bodies (see Figure A2.2.2) during the intersession.



**Figure A2.2.2:** Structure of the GFCM (Reproduced from Thompson et al., 2016)

The GFCM operates through a Secretariat based at FAO headquarters in Rome, Italy. The Commission holds its regular sessions annually and operates through its committees during the intersession; these include: the Scientific Advisory Committee on Fisheries (SAC), the Scientific Advisory Committee on Aquaculture (CAQ), the Compliance Committee (CoC), the Committee of Administration and Finance (CAF) and their subsidiary bodies, including the Working Group for the Black Sea (WGBS). The GFCM Bureau steers strategic orientations to the Commission and the Secretariat.

**Scientific Advisory Committee of Fisheries (SAC):** Established in 1997, the SAC mandate is to provide independent advice on the technical and scientific basis for decisions related to the conservation and management of fisheries, including their social, biological and economic aspects; in particular:

- assessing the information provided by members and relevant fisheries organizations or programmes on catches and fishing effort, as well as other data relevant to the conservation and management of fisheries;
- formulating advice to the Commission on the conservation and management of fisheries;
- identifying cooperative research programmes and coordinating their implementation; and
- undertaking such other functions or responsibilities as may be conferred by the Commission.

Prior to 2014, the SAC had four thematic subcommittees – for Economic and Social Science, Marine Environment and Ecosystems, Stock Assessment, and Statistics and Information. After 2014, a subregional approach was adopted, with subregional committees (SRCs) established for the western, central and eastern Mediterranean, as well as the Adriatic Sea. This reorganization into subregional

committees introduced a more flexible framework, under which both thematic actions and subregional issues are discussed to provide suggestions for the advice of the SAC.

**Scientific Advisory Committee on Aquaculture (CAQ):** Established in 1995, the CAQ is responsible for providing technical advice related to the work of the Commission, and to promote the sustainable development and responsible management of marine, brackish and inland aquaculture in the area of application in a way that is consistent with an ecosystem approach to aquaculture, while taking into account specific regional, subregional and local characteristics.

**Compliance Committee (CoC):** Established in 2006, the CoC mandate includes:

- assessing compliance by contracting parties, cooperating non-contracting parties and relevant non-contracting parties, with recommendations adopted by the Commission;
- raising the attention of the Commission when parties do not comply with recommendations, or cases where activities undermine the effectiveness of such recommendations;
- providing additional information relating to the implementation and compliance with recommendations; and
- providing independent advice on an institutional and legal basis, and submitting reports to the Commission to facilitate the adoption of recommendations related to monitoring, control and surveillance, as well as technical assistance and capacity building activities to support these aspects.

**Secretariat:** The Secretariat is responsible for monitoring the implementation of the policies and activities of the Commission and reports on progress to the Commission.

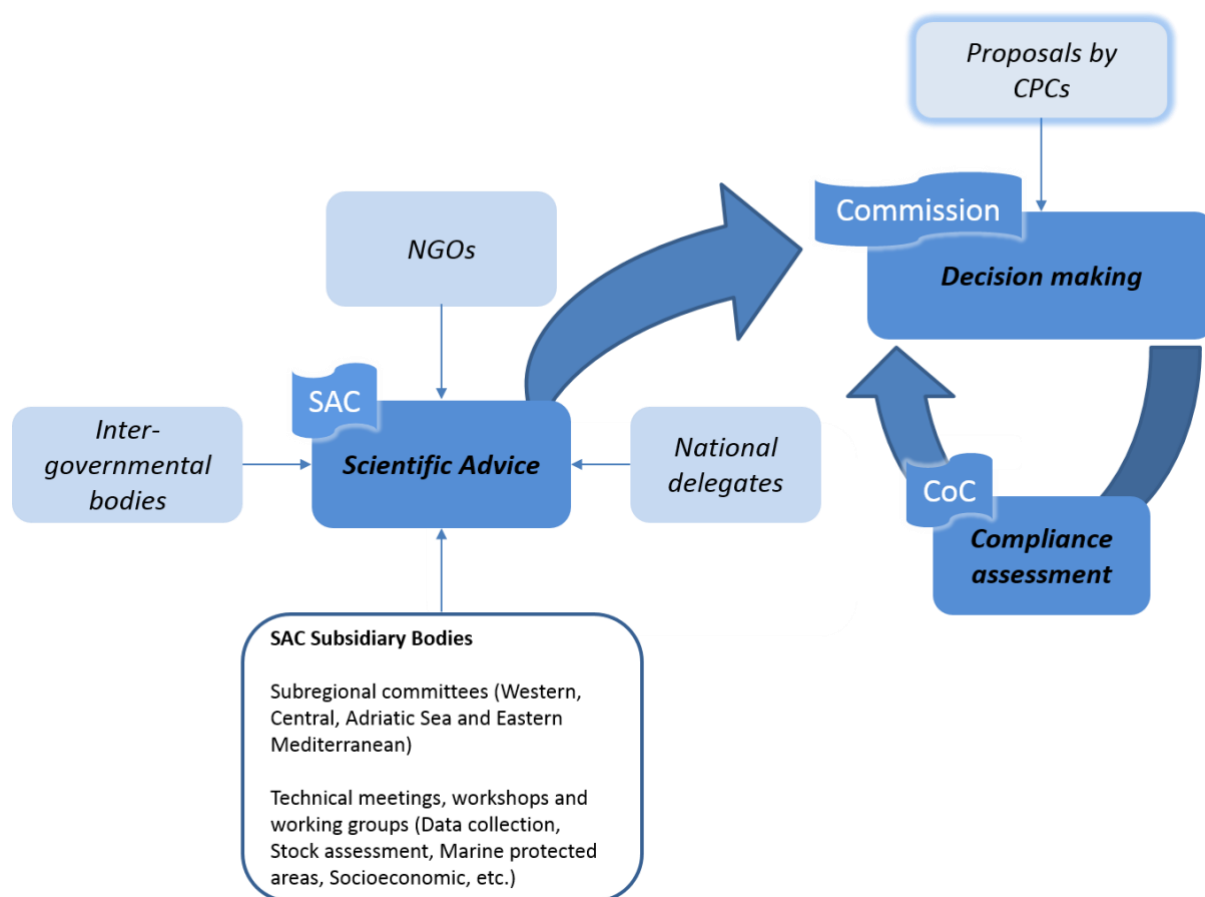
### **Interactions with other fisheries and bodies in the region**

To strengthen its cooperation with the other organizations operating in the region, the GFCM has signed a total of 11 MoUs with other related environmental groups and NGOs. In 2016 the GFCM, in collaboration with the Secretariats of ACCOBAMS, IUCNMed, UNEP/MAP through RAC/SPA, and MedPAN developed a Joint Cooperation Strategy on spatial protection and management measures for marine biodiversity. This is to ensure that the conservation and the sustainable use of the open sea in the Mediterranean is achieved with the best available knowledge and the application of the precautionary principle and the ecosystem approach, together with the aim of undertaking harmonized activities in relation to spatially based management and conservation in the open sea in the Mediterranean.

### **Consultation and decision-making processes**

The scientific analysis and assessments from the subregional committees (or thematic subcommittees, prior to 2014) – and other subsidiary expert groups such as technical meetings, working groups, or workshops – are reviewed at the SAC annual meeting. Based on these reviews, the SAC then provides integrated advice on the status of stocks, fisheries and ecosystems, and technical advice on priority corrective measures when required. These measures are submitted for consideration to the CPCs, who are invited to put forward recommendations and resolutions to be discussed at the Commission's annual meeting of. As per Article 8(b), resolutions are adopted by a two-thirds majority of the Commission's contracting parties that are present and voting.

The overall flow of information and the coordination of the work of the different bodies is assisted by the Secretariat, in coordination with the SAC and Commission bureaus. Once a recommendation enters into force, the Compliance Committee has the mandate to revise the compliance status of all existing recommendations (Figure A2.2.3).



**Figure A2.2.3:** Provision of advice and decision-making (Reproduced from Thompson et al., 2016)

Most recently RES-GFCM/40/2016/1 outlines the guidelines for drafting GFCM decisions.

## OVERVIEW OF GFCM FISHERIES

### Geographic scope and fisheries activities

#### *Fishing fleet and methods*

The Mediterranean and Black Sea fisheries feature a wide variety of target species, vessels and fishing gears. These play an extremely important socio-economic role in the whole region. The GFCM mandate is to ensure the sustainability of fishing activities through the adoption of adequate management measures.

The officially reported fishing fleet operating in the Mediterranean and the Black Sea in 2015 was made up of some 92 700 vessels, with the eastern Mediterranean accounting for 28 percent, followed by the Ionian Sea (27 percent), the western Mediterranean (19 percent), the Adriatic Sea (14 percent) and the Black Sea (12 percent). Turkey, Greece, Italy and Tunisia are, in decreasing order of importance, the countries with the largest fleets, accounting for more than 60 percent of the total number of vessels reported to the GFCM.

Small-scale vessels, identified as polyvalent small-scale vessels up to 12 m length overall (LOA), are the dominant fleet segments, accounting for 80 percent of the total number of vessels (see Table A2.2.1). Other fleet segments of regional relevance in terms of numbers are trawlers (12–24

m LOA; 6 percent), polyvalent vessels (> 12 m LOA; 4 percent), purse seiners (> 12 m LOA; 3.5 percent), and longlines (> 6 m LOA; 2 percent). Besides being the most numerous, the small-scale fleet segments employ the highest number of fishers in the region. In terms of total landings by weight, purse seiners are the most important fleet segments. In terms of landing value, trawlers are the leading segment.

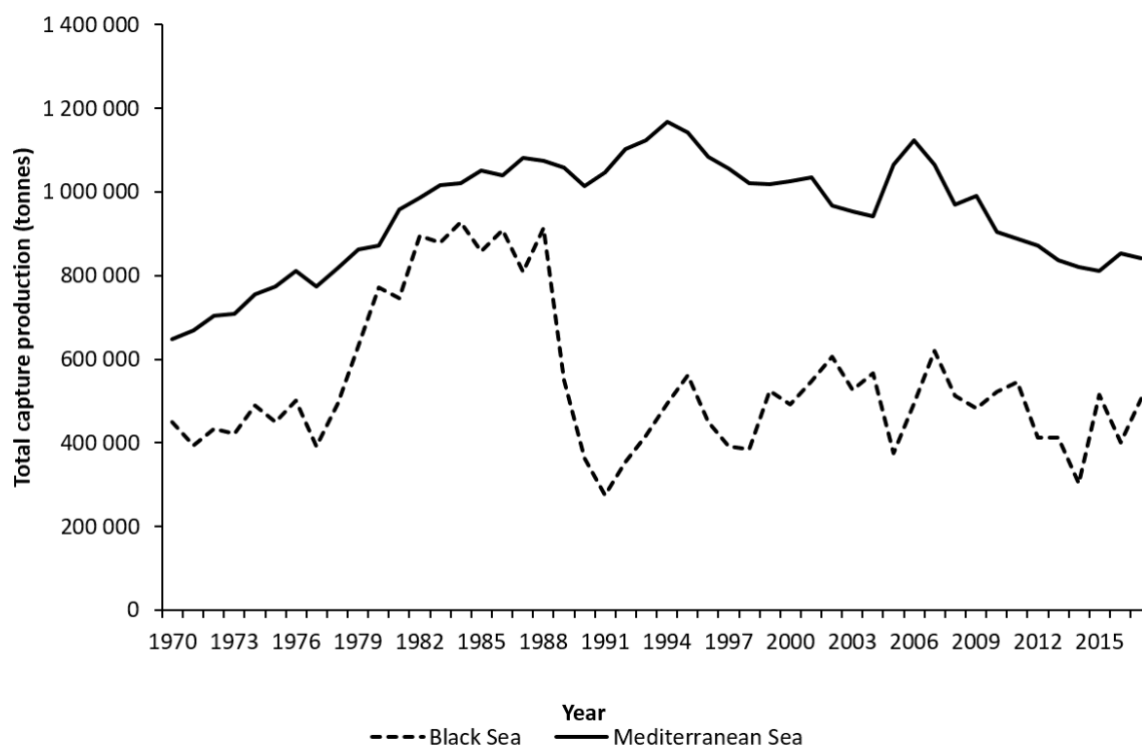
**Table A2.2.1:** Vessel components (Source: GFCM Strategy Document, GFCM, 2017)

Vessel groups			Length classes (LOA)			
			<6m	6–12m	12–24m	>23m
Polyvalent	P	Small-scale vessels without engine using passive gears	P-01	P-02	P-03	P-04
		<i>P-13</i>				
		Small-scale vessels with engine using passive gears	P-05	P-06	P-07	P-08
		Polyvalent vessels	P-09	P-10	P-11	P-12
				<i>P-14</i>		
Seiners	S	Purse seiners	S-01	S-02	S-03	S-04
		<i>S-09</i>				
		Tuna seiners	S-05	S-06	S-07	S-08
				<i>S-10</i>		
Dredgers	D	Dredgers	D-01	D-02	D-03	D-04
		<i>D-05</i>				
Trawlers	T	Beam trawlers	T-01	T-02	T-03	T-04
		Pelagic trawlers	T-05	T-06	T-07	T-08
		<i>T-13</i>				
		Trawlers	T-09	T-10	T-11	T-12
Longliners	L	Longliners	L-01	L-02	L-03	L-04
			<i>L-05</i>			

### Catch and effort history

Total landings in the Mediterranean and the Black Sea increased irregularly from about 1 million tonnes in 1970 to almost 2 million tonnes in 1982. They remained relatively stable during most of the 1980s before declining abruptly in 1989 and 1990, largely due to the collapse of pelagic fisheries in the Black Sea. In the Mediterranean, landings continued to increase until 1994, reaching 1 087 000 tonnes, and subsequently declined irregularly to 787 000 tonnes in 2013 (see Figure A2.2.4).

In the Black Sea, landings have varied considerably from one year to the next since 1990, albeit demonstrating a generally increasing trend. In 2013, the total reported landings in the Black Sea were 376 000 tonnes. Considered together, Algeria, Greece, Italy, Spain, Tunisia, Turkey and Ukraine are responsible for just over 80 percent of total landings in the Mediterranean and the Black Sea.



**Figure A2.2.4:** Reported landings in the GFCM area over the past 40 years (GFCM, 2020)

### Priority (target) species

A group of 13 main species accounts for some 65 percent of landings (Table A2.2.2), with pelagic species such as anchovy and sardine being the dominant species (Table A2.2.3).

**Table A2.2.2:** List of priority species (Source: GFCM <http://www.fao.org/gfcm>)

	Western Mediterranean	Central Mediterranean	Adriatic Sea	Eastern Mediterranean	Black Sea	
Pelagic species	<i>Engraulis encrasicolus</i>	<i>Engraulis encrasicolus</i>	<i>Engraulis encrasicolus</i>	<i>Engraulis encrasicolus</i>	<i>Engraulis encrasicolus</i>	<i>Trachurus mediterraneus</i>
	<i>Sardina pilchardus</i>	<i>Sardina pilchardus</i>	<i>Sardina pilchardus</i>	<i>Sardinella aurita</i>	<i>Sprattus sprattus</i>	<i>Sarda sarda</i>
Demersal species	<i>Parapenaeus longirostris</i>	<i>Parapenaeus longirostris</i>	<i>Mullus barbatus</i>	<i>Mullus barbatus</i>	<i>Merlangius merlangus</i>	<i>Psetta maxima</i>
	<i>Merluccius merluccius</i>	<i>Merluccius merluccius</i>	<i>Merluccius merluccius</i>	<i>Saurida lessepsianus</i>		<i>Mullus barbatus</i>
	<i>Pagellus bogaraveo</i>					
Species of conservation concern	<i>Anguilla anguilla</i>				<i>Squalus acanthias</i>	
	<i>Corallium rubrum</i>					
Invasive species	<i>Pierois miles</i>				<i>Rapana venosa</i>	
	<i>Lagocephalus sceleratus</i>					

**Table A2.2.3:** Average landings in the 2000–2013 period by species group contributing to at least 1 percent of total landings, presented in decreasing order (Source: FAO and GFCM, 2016b)

Group of species	Average landings	Percentage
<i>Herrings, sardines, anchovies</i>	710 200	51
<i>Miscellaneous coastal fish</i>	165 570	12
<i>Miscellaneous pelagic fish</i>	130 430	9
<i>Unidentified marine fish</i>	66 601	5
<i>Squids, cuttlefish, octopus</i>	58 000	4
<i>Clams, cockles, arkshells</i>	56 100	4
<i>Cod, hake, haddock</i>	51 470	3
<i>Shrimp, prawns</i>	36 710	3
<i>Shad</i>	21 380	2
<i>Mussels</i>	20 710	1
<i>Miscellaneous demersal fish</i>	20 450	1
<i>Miscellaneous marine molluscs</i>	15 180	1
<i>Other*</i>	48 930	4

*Bottom (demersal) fishing:* The narrowness of the continental shelves in the Mediterranean means that most fishing grounds are relatively close to the coast. Bottom fisheries typically operate on the continental shelf, and extend down on the shelf slope to a depth of around 700–1 000 m. In the Black Sea, bottom fisheries are restricted to shallow depths due to the anoxic conditions of the waters at depths greater than 150 m.

In the Mediterranean, the two main deepwater bottom fisheries that occur between 400 and 1 000 m are the directed bottom trawl fishery for various shrimp species, and the multispecies, multigear fishery for European hake (*Merluccius merluccius*). The multispecies hake fishery uses bottom trawls, gillnets and longlines, with trawlers operating mainly in the shallower waters of the continental shelf and slopes; the gillnetters and longlines, on the other hand, operate mainly off the shelf and below 400 m as deeper waters are not suitable for trawling.

In the Black Sea, the maximum depth reached by demersal trawling and bottom-set gillnets is around 100–120 m and most frequently closer to 80–100 m. Trawl fisheries mainly target whiting (*Merlangius merlangus*) and mullet (*Mullus barbatus*), while gillnets target turbot.

Annual catches of European hake increased from the 1950s to the 1990s, when they reached 50 000 tonnes; however, they declined rapidly at the end of the 1990s, and are currently at around half the historical maximum catches.

### Stock assessments

Assessments of stock status have been presented to the SAC since its establishment in 1997. Data for the assessment of stocks are collected through stock assessment forms (SAF), which also contain information on reference points and assessment outcomes (e.g. fishing mortality, exploitation rate, spawning stock biomass, recruitment, etc). The indicators used in the analysis are the terminal fishing mortality for small pelagic stocks (i.e. the estimated fishing mortality for the last year of the time series used for assessment) and the average fishing mortality over the last three years for demersal stocks.

According to the 2016 Status Report, about 85 percent of Mediterranean and Black Sea stocks assessed are fished at biologically unsustainable levels. Demersal stocks experience higher fishing mortality rates, while small pelagic stocks show average fishing mortality rates that are closer to the target. Hake stocks in the Mediterranean Sea show the highest fishing pressure, with a fishing mortality rate that is on average five times higher than the target – and in the case of some specific stocks, up to twelve times higher than the target. Conversely, small pelagic stocks show average fishing mortality rates that are close to the target, while for some specific stocks the fishing mortality rate is estimated as being below the target (Table A2.2.4).

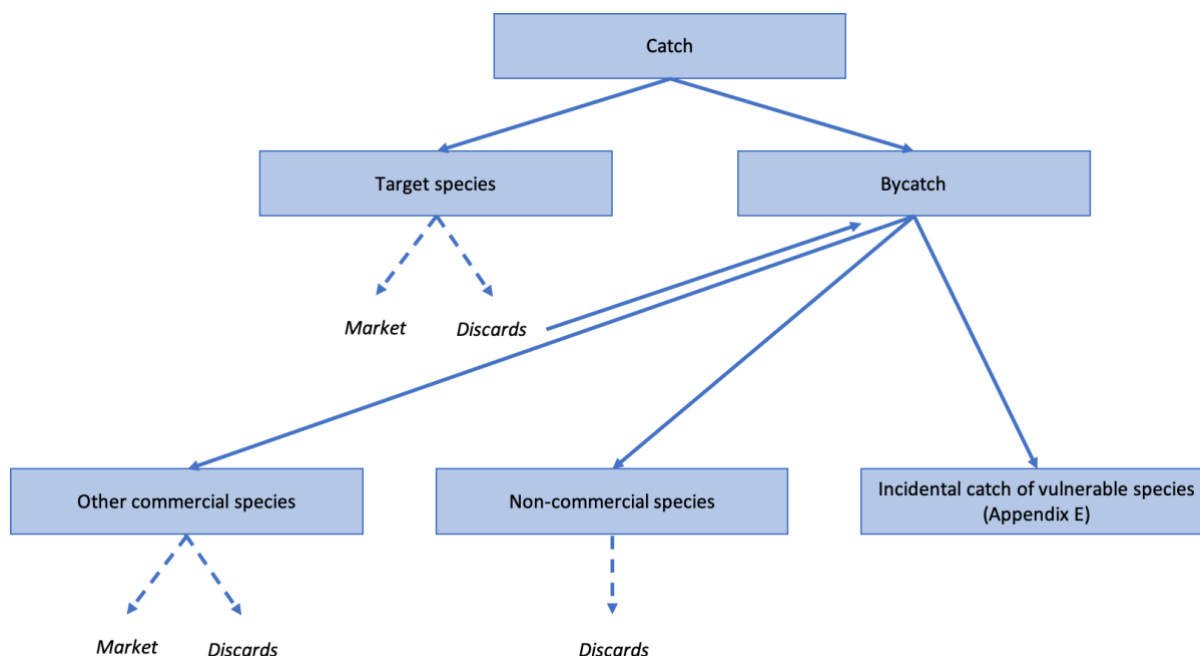
The percentage of landings assessed has nearly doubled in recent years, rising from about 20 percent in 2013 to around 45 percent in 2014 and 2015. Moreover, there are regional differences in the knowledge of stock status, with fewer stock units assessed in the Ionian Sea and eastern Mediterranean compared to the western Mediterranean, the Adriatic Sea and the Black Sea.

**Table A2.2.4:** Average over-exploitation index (ratio between current and target fishing mortality) for the main commercial species in the Mediterranean and the Black Sea) (Source: FAO and GFCM, 2016b)

Species	Exploitation index
<i>Merluccius merluccius</i>	5.2056
<i>Solea solea</i>	3.5571
<i>Psetta maxima</i>	3.3761
<i>Aristeus antennatus</i>	3.1801
<i>Galeus melastomus</i>	2.6923
<i>Mullus barbatus</i>	2.6042
<i>Aristaeomorpha foliacea</i>	2.2601
<i>Saurida undosquamis</i>	2.1600
<i>Parapenaeus longirostris</i>	2.1406
<i>Lophius budegassa</i>	2.0647
<i>Nephrops norvegicus</i>	2.0299
<i>Pagellus erythrinus</i>	1.9529
<i>Squilla mantis</i>	1.9400
<i>Boops boops</i>	1.9084
<i>Mullus surmuletus</i>	1.8698
<i>Pagellus bogaraveo</i>	1.6482
<i>Engraulis encrasicolus</i>	1.5821
<i>Sardina pilchardus</i>	1.3905
<i>Squalus acanthias</i>	1.1304
<i>Merlangius merlangus</i>	1.0857
<i>Sprattus sprattus</i>	0.7500
<i>Spicara smaris</i>	0.6429

## Bycatch

The 2016 Status Report includes a comprehensive section on bycatch. The definition of bycatch within the GFCM takes into account the multispecies/multigear fisheries characteristic of the GFCM area of application, where target species are not always clearly defined (Figure A2.2.5).



**Figure A2.2.5:** Outline of the different catch components as defined by the GFCM DCRF (Source: FAO and GFCM, 2016b)

The volume of fishery discards in the Mediterranean is in the region of 230 000 tonnes per year; in other words, about 18 percent of total catches. Bottom trawls are responsible for the bulk of discards (over 40 percent). Discard rates for pelagic fisheries – such as pelagic trawls and purse seiners – are generally lower than those of bottom trawls. For the pelagic trawl fishery, discard values range from 10 to 50 percent; for purse seines, values from 2 to 15 percent have been reported. Information on discards for small-scale fisheries is relatively scarce, but available data reported a discard ratio of under 10 percent for trammel and gillnets. In the Black Sea, discards are estimated at around 45 000 tonnes; or, approximately 10–15 percent of catch. The various discard rates, by fishery, are as follows: 25–45 percent for trawl fisheries; 15 percent for small-scale fisheries; approximately 5 percent for midwater trawlers targeting small pelagic species; 1–5 percent for purse seines; and about 11 percent for sea snail dredge fisheries. Most common discarded groups of species in fisheries are benthic invertebrates, elasmobranch species with no commercial value, but also non-commercial individuals of target fish, crustaceans and cephalopod species.

The 2016 Status Report also features a very detailed regional and gear-based assessments on bycatch levels and discards.

### Vulnerable species

The 2016 Status Report states that while there are data on the interactions and incidental catches of vulnerable species (e.g. whales, dolphins, seabirds, turtles etc) these are usually limited in times and space so that annual levels are not available. It reports on the information available, such as the relative importance of different types of fishing gear and the main species affected. Sharks, rays and skates, which occur in the shallow coastal shelves of the Mediterranean, are mainly affected by bottom trawlers targeting demersal fish and invertebrate species. Longlines (both pelagic and demersal) have a



significant impact on sharks, sea turtles and seabirds. Static nets also catch a conspicuous number of sea turtles incidentally. In the Black Sea, the turbot gillnet fishery is associated with high rates of incidental catches of demersal sharks (e.g. piked dogfish) and dolphins.

### Bottom impacts/VMEs and impact assessments

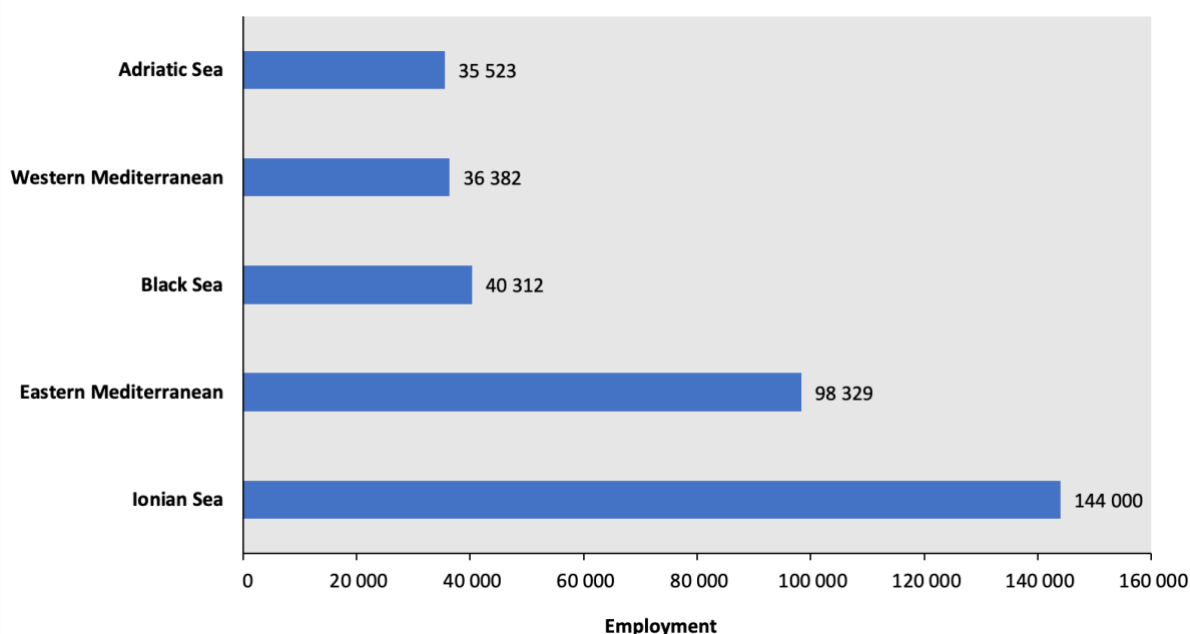
The spatial distribution of current fishing effort within the Mediterranean Sea is under investigation. In order to enhance the knowledge of the distribution of fishing effort in its area of application, at the moment of writing, GFCM is undertaking several actions to support and guide the implementation of monitoring, control and surveillance (MCS) practices through the integrated use of technologies in line with regional standards, including VMS and automatic identification system (AIS).

### Social and economic assessments

#### *Value*

The 2016 Status Report provides very detailed and regional assessments of the landed value of fisheries products in the GFCM. The total value of fish landings across the Mediterranean and the Black Sea is estimated to be a minimum of USD 3.09 billion. The subregion with the highest landing value is the western Mediterranean (USD 1.57 billion), followed by the Ionian Sea (USD 1.41 billion), the eastern Mediterranean (USD 1.07 billion), the Adriatic Sea (USD 979 million) and the Black Sea (USD 691 million). Similar average landing prices were observed in the western Mediterranean (USD 3 947 per tonne), the Ionian Sea (USD 3 902 per tonne) and the Adriatic Sea (USD 3 849 per tonne), and it is worth noting that the average landing price in these three subregions is at least double that of the eastern Mediterranean (USD 1 893 per tonne) and the Black Sea (USD 1 516 per tonne). In spite of such differences, fisheries present a more significant economic contribution to regional economies in the eastern Mediterranean, compared with other subregions.

Just under a quarter of a million people (221 797) are directly employed on fishing vessels in the GFCM area (see Figure A2.2.6). In addition, artisanal or small-scale fisheries in the Mediterranean and the Black Sea play a significant social and economic role, as they constitute more than 80 percent of the fishing fleet, employ at least 60 percent of those workers directly engaged in fishing activity, and account for approximately 20 percent of the total landing value from capture fisheries in the region.



**Figure A2.2.6:** Employment generated by fishing vessels in GFCM (Source: FAO and GFCM, 2016b)

## *Trade*

The 2016 Status Report includes detailed data on the trade implications of the fish caught within the GFCM area. The primary regional trade partners for fish products from the Mediterranean and the Black Sea riparian countries, and relevant non-state actors, both in terms of imports and exports, are European countries that are neither Mediterranean nor Black Sea riparian countries. In terms of total trade, Asia is the next largest overall trade partner, with the Americas trailing close behind.

## *Overview*

The 2016 Status Report provides an overview of the social benefits of the fisheries in the GFCM region. It concludes that they make an important contribution to food security and offer a flexible last resort for some of the region's most vulnerable populations, offering a way to supplement income or food supply in times of need. Evidence from value chain analyses and case studies indicates that the total economic value of fisheries in this region may be more than twice that which is indicated by landing values and employment rates alone.

Further studies are needed to estimate the value of the secondary processing sector, trade in fish services, recreational fisheries and other elements of the value chain. Similarly, further study and improved data collection is needed to identify the socio-economic impacts of this sector at a more detailed, subregional level.

## **Management**

*Policy:* Mid-term strategy 2017–2020 (GFCM 2016).

*Target 1:* Reverse declining trend of fish stocks and offer better scientific advice: With only 40 percent of the landings in the GFCM area of application originating from stocks for which scientific advice is provided to the Commission, and with an even smaller percentage of the landings originating from fisheries that are subject to comprehensive management plans, the coverage of advice on the status of stocks must be improved, and the percentage of landings coming from fisheries regulated by specific multiannual management plans must be increased.

Implement actions to increase the existing scientific and socio-economic knowledge in support of fisheries management by 2020, and adopt the necessary decisions to reverse the current over-exploitation rates, reducing the percentage of stocks fished in excess of biologically safe limits.

*Target 2:* Support livelihoods for coastal communities: small-scale fisheries play an important role in providing income and ensuring food security, particularly within economically vulnerable coastal communities. Concerted action should therefore be taken to support this sector, even though the data available to measure the extent and impact of small-scale fishing activity are limited and can vary widely from country to country. As a result of these data limitations, small-scale fisheries tend to be undervalued, potentially leading to their marginalization in the decision-making process.

*Target 3:* Curb IUU through a regional plan of action: Better management of fisheries in the Mediterranean and the Black Sea is undermined by IUU fishing activities and the disregard of common rules. Although the impacts of IUU fishing are currently not assessed and therefore under-represented in the current status of fisheries and trends information, they must be adequately considered in the development of scientific advice for management.

*Target 4:* Minimize and mitigate unwanted interactions between fisheries and marine ecosystems: reduce bycatch rates in Mediterranean and Black Sea fisheries;

- implement a bycatch monitoring programme;
- promote the identification and establishment of new FRAs;

- adopt a comprehensive regional management plan for red coral;
- create an adaptation strategy to cope with potential effects of invasive species and climate change on fisheries; and
- create an adaptation strategy to cope with potential effect of marine litter on fisheries.

*Target 5:* Improved capacity for the management of fisheries resources;

- improve national capacity;
- strengthen fisheries governance in the Black Sea; and
- increase cooperation with relevant actors.

### **Management measures and decisions**

GFCM fisheries are now managed using a suite of management measures that regulate the extent of fishing, and include requirements on fishing effort, VMS, minimum landing size, seasonal closures, mitigation of bycatch and incidental mortality of vulnerable species, data collection, etc. A compendium of management measures is available on the website; these are structured into components (see Appendix 1):

1.1 Recommendations on conservation and management (27)

1.2 Recommendations on monitoring, control and surveillance (9)

1.3 Recommendations on data and information reporting (4)

1.4 Resolutions (20)

1.5 Other decisions (5)

Among a suite of measures the plan also established permanent spatial closures through Fisheries Restricted Areas (FRAs). These are area-based measures that restrict fishing practices to a designated area for the conservation and management of fisheries resources, as well as for the protection of specific marine ecosystems. An FRA can potentially be established to protect any kind of marine resource and habitat (e.g. aggregations of vulnerable sponges, seamount areas, coralligenous formations, seagrass meadows, spawning grounds and reproduction sites for fish resources, etc). The GFCM has a compendium of decisions which includes all of those currently in force and adopted after 1976.<sup>18</sup> The decisions in this document are classified into the following components according to their scope: recommendations on conservation and management; monitoring, control and surveillance; data and information reporting; resolutions; other decisions.

A total of 27 management and conservation measures have been adopted by the GFCM to ensure the conservation and sustainable exploitation of living marine resources, while safeguarding habitats and vulnerable species from the impact of fishing activities. In general, these binding decisions include: 1) spatial management measures; 2) mitigation measures for the incidental catch of vulnerable species; and 3) other technical conservation measures.

Nine recommendations have been adopted for large, vulnerable marine vertebrates, in order to mitigate the incidental catch of marine mammals, seabirds, sea turtles and sharks, and to improve monitoring and data collection. Other measures, such as the establishment of minimum legal sizes, gear restrictions and fishery closed seasons have also been adopted to promote the sustainable use of resources in the GFCM area of application. In addition, the following fisheries are addressed by common regional

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<sup>18</sup> <http://www.fao.org/gfcm/publications/brochures/gfcmbasictexts/>

measures: dolphinfish fisheries using fish aggregating devices (FAD); demersal trawling fisheries and the harvesting of red coral (*Corallium rubrum*).

The Commission adopted an adaptive multiannual management plan for small pelagic species in the Adriatic Sea in 2013. Subsequently, three recommendations were adopted in 2015, setting the framework for, and requesting the development of, complete multiannual management plans for demersal fisheries in the Strait of Sicily, as well as turbot and piked dogfish in the Black Sea. The Commission has been actively working on the development and implementation of these plans in recent years, with two revisions of the management plan for the Adriatic Sea already completed (2014 and 2015) and the provision of advice to finalize management plans for the other fisheries listed above.

### Recent decisions

At their most recent meeting (2017) the GFCM Commission:

- adopted a multiannual management plan for turbot fisheries in the Black Sea;
- established a regional adaptive management plan for the exploitation of red coral in the Mediterranean;
- submitted data on fishing activities in the GFCM area of application; and
- devised a regional plan of action to combat illegal, unreported and unregulated fishing in the GFCM area of application, along with an international joint inspection and surveillance scheme outside the waters under national jurisdiction in the Strait of Sicily.

### Managing target stocks

- Recommendation GFCM/2002/1 was for the control of fishing effort and the improvement of the exploitation pattern of demersal fisheries; and
- Recommendation GFCM/2006/1 called for a management programme in relation to fishing effort control in demersal and small pelagic fisheries.
- RES-GFCM/33/2009/1 outlined the management of demersal fisheries in the GFCM area which controls bottom trawl fishing effort; a reduction of a minimum of 10 percent of bottom trawling fishing effort shall be applied in all GFCM areas.

In 2012 the adoption of general guidelines for the development of multiannual management triggered a number of actions, including six case studies representative of fisheries in the different GFCM subregions:

- Adriatic Sea: fisheries for small pelagic resources;
- Western Mediterranean: fisheries for small pelagic resources in the Alboran Sea;
- Ionian Sea: fisheries for deepwater rose shrimp and associated species in the Strait of Sicily;
- Eastern–central Mediterranean: fisheries for deepwater blue and red shrimp and giant red shrimp in the eastern–central Mediterranean basin; and
- Black Sea: fisheries for turbot, fisheries for small pelagic species.

*Small pelagic fisheries in the Adriatic:* Recommendation GFCM/37/2013/1 on a multiannual management plan for fisheries on small pelagic stocks in the GFCM GSA 17 (northern Adriatic Sea) and on transitional conservation measures for fisheries on small pelagic stocks in GSA 18 (southern Adriatic Sea).

Recommendation GFCM/38/2014/1, amending Recommendation GFCM/37/2013/1, and on precautionary and emergency measures for 2015 on small pelagic stocks in the GFCM GSA 17; and

Recommendation GFCM/39/2015/1, establishing further precautionary and emergency measures in 2016 for small pelagic stocks in the Adriatic Sea (GSA 17 and GSA 18) – it establishes management

measures and harvest control rules for fisheries targeting sardine *Sardina pilchardus* and anchovy *Engraulis encrasicolus* in the northern Adriatic Sea (GSA 17), as well as transitional conservation measures for small pelagic fisheries in the southern Adriatic Sea (GSA 18).

The plan seeks to maximize the long-term yield of small pelagic fisheries and guarantee a low risk of stock collapse, while maintaining sustainable and relatively stable fisheries. To this end, three specific objectives were adopted in the original Recommendation GFCM/37/2013/1 for GSA 17:

- i. Maintain the exploitation rate below a precautionary generic reference point (exploitation rate lower than 40 percent on appropriate age groups, both for anchovy and sardine stocks).
- ii. Maintain mid-year spawning stock biomass (SSB) above a precautionary level (initially set at 109 200 tonnes for sardine and 250 600 tonnes for anchovy) and ensure – with a set of predefined harvest control rules – that SSB does not fall below a biomass level limit (179 000 tonnes for anchovy or 78 000 tonnes for sardine), below which the reproductive capacity is expected to be impaired.
- iii. Ensure that the fishing fleet capacity and fishing effort do not exceed the effort exerted in 2011.

*Turbot fisheries in the Black Sea:* Work has been under way to develop multiannual management plans for the Black Sea, particularly with regard to turbot fisheries. Management measures such as minimum standards for bottom-set gillnet fisheries for turbot in the Black Sea support this development (Recommendation GFCM/37/2013/2 on the establishment of a set of minimum standards for bottom-set gillnet fisheries for turbot and conservation of cetaceans in the Black Sea), in addition to measures adopted recently to prevent, deter and eliminate IUU fishing in turbot fisheries in the Black Sea (Recommendation GFCM/39/2015/3 on the establishment of a set of measures to prevent, deter and eliminate illegal, unreported and unregulated fishing in turbot fisheries in the Black Sea).

Recommendation GFCM/40/2016/6 on the scientific monitoring, management and control of turbot fisheries in the Black Sea (Geographical Subarea 29). Most recently, GFCM/41/2017/4 implemented a multiannual management plan for turbot fisheries in the Black Sea. This plan is designed to produce high, long-term yields consistent with the MSY, and to guarantee a low risk of stock collapse while maintaining sustainable and relatively stable fisheries. The operational objective of the multiannual management plan is to maintain fishing mortality for turbot within agreed precautionary reference points, with a view to achieving or maintaining fishing mortality at MSY level.

*Demersal fisheries in the Strait of Sicily:* In 2015, steps were taken to set minimum standards for bottom trawling demersal fisheries in the Strait of Sicily (Recommendation GFCM/39/2015/2 on the establishment of a set of minimum standards for bottom trawling fisheries of demersal stocks in the Strait of Sicily, pending the development and adoption of a multiannual management plan).

*Deepwater rose shrimp and hake:* Since then two further recommendations have been made – GFCM/40/2016/4, establishing a multiannual management plan for the fisheries exploiting European hake and deepwater rose shrimp in the Strait of Sicily; and Recommendation GFCM/40/2016/5, establishing a minimum conservation reference size for European hake in the Mediterranean Sea.

*Seabream:* GFCM/41/2017/2 On the management of blackspot seabream fisheries in the Alboran Sea (Geographical Subareas 1–3) for a two-year transition period.

*Red coral:* GFCM has issued two recommendations (GFCM/35/2011/2 on the exploitation of red coral in the GFCM area of application; and GFCM/36/2012/1 on further measures for the exploitation of red coral in the GFCM area of application) establishing minimum common harvesting standards for the species.

Most recently, GFCM/41/2017/5 was put forward, concerning the establishment of a regional adaptive management plan for the exploitation of red coral in the Mediterranean Sea.

### **Managing bycatch interactions**

Recommendation GFCM/33/2009/2 requires countries to adopt and implement either: a minimum 40 mm square mesh codend, or a diamond mesh size of at least 50 mm, or an acknowledged equivalent or higher size selectivity, for all trawling activities exploiting demersal stocks when operating in the GFCM area of application.

### **Managing the interactions vulnerable species**

The GFCM has developed a number of initiatives related to the incidental catch of vulnerable species, including the organization of several meetings involving other partner organizations and national experts. As a result of these consultations and activities, several binding decisions have been adopted by the GFCM in the past few years.

*Deepwater sharks* Recommendation GFCM/29/2005/1 bans fishing activities beyond a depth of 1 000 m. This measure also contributes to reducing the threat of potential pressure on highly vulnerable deepwater species of chondrichthyans.

*Other sharks:* Recommendations 34/2010/4 and 35/2011/7.

GFCM/36/2012/3 adopted a specific management measure for the conservation of sharks and rays in the Mediterranean and the Black Sea. This measure banned finning practices, as well as the capture and trade of shark and ray species.

*Seabirds:* Recommendation GFCM/35/2011/3 on reducing the incidental bycatch of seabirds in fisheries in the GFCM area.

*Sea turtles:* Recommendation GFCM/35/2011/4 on the incidental bycatch of sea turtles in fisheries in the GFCM area of application requires the implementation of fisheries management measures that strongly mitigate or eliminate the risk of incidental bycatch of sea turtles in fishing operations and/or mortality associated with those incidental takings.

*Cetaceans:* Recommendation GFCM/36/2012/2 on the mitigation of incidental catches of cetaceans in the GFCM area, prohibits the deployment of gillnet fisheries with a monofilament of a diameter greater than 0.5 mm. It requires vessels to promptly release live or unharmed cetaceans that have been incidentally caught, to the extent practicable.

Recommendation GFCM/37/2013/2 on the establishment of a set of minimum standards for bottom-set gillnet fisheries for turbot and conservation of cetaceans in the Black Sea.

*Monk seals:* Recommendation GFCM/35/2011/5, on fishery measures for the conservation of the Mediterranean monk seal (*Monachus monachus*) in the GFCM area of application prohibits taking on board, transshipping and landing monk seals, unless otherwise required to rescue.

### **Technical/gear restrictions**

Other technical conservation measures have been implemented to regulate different aspects of the Mediterranean and Black Sea fisheries. Recommendations such as minimum legal size, gear restrictions and closed seasons have been adopted by the GFCM since 1997 in order to promote a more sustainable use of resources in its area of application.

Similarly, Recommendation GFCM/30/2006/2 established a closed season for the dolphinfish fisheries using FAD, which is designed to protect the dolphinfish (*Coryphaenahippurus*), and small fish in particular.

### **Managing bottom impacts and vulnerable ecosystems**

The oldest GFCM conservation measure, which prohibits fishing using bottom-towed gear at depths greater than 1 000 m, was endorsed in 2005 at the Twenty-ninth session of the Commission. Four fisheries restricted areas (FRAs), located both in high seas and national waters, were later established to protect deep-sea sensitive habitats and fish spawning areas in Cyprus, Egypt, Italy and France.

GFCM has not defined VMEs within its management regulations, and there are no formally declared and adopted VMEs within the Mediterranean Sea. Instead, through its ecosystem approach the GFCM has adopted FRAs as a multipurpose spatial-management tool to restrict fishing activities and thus protect deep-sea sensitive habitats, such as VMEs, and essential fish habitats. The GFCM has therefore partially addressed the protection of VMEs already, as described in UNGA Resolutions 59/25, 61/105, and others, principally through the establishment of FRAs in its competence area (which includes international waters).

The total area protected under 1 000 m depth stretches over 1 731 097 km<sup>2</sup>, representing 58 percent of the total surface of the Mediterranean and the Black Sea; the four FRAs cover a total area of 17 678 km<sup>2</sup>, approximately 0.7 percent of the Mediterranean Sea surface.

Regarding GFCM/41/2017/5 on a network of essential fish habitats in the GFCM, the SAC is invited to:

- review the existing information on the distribution of essential fish habitats in the Mediterranean;
- review the existing information on the distribution of sensitive habitats in the Mediterranean;
- identify possible knowledge gaps and provide advice on measures to overcome these, including through predictive modelling and mapping of habitat suitability, showing the likelihood of their presence;
- define a consistent network of essential fish habitats which would also consider sensitive habitats, to be presented at the Forty-Second Session of the GFCM; and
- provide advice on how to implement the protection of this network, and enhance it from 2018, in order to effectively contribute to achieving the maximum sustainable yield and implementing the ecosystem approach to fisheries management, in line with GFCM objectives.

GFCM/41/2017/4 created a permanent working group on vulnerable marine ecosystems. This WGVME should carry out the following tasks:

- collect information and map the distribution of VMEs (annual update);
- advise on new proposals for closures and on the enforcement of existing measures (efficiency of existing FRAs addressing VME protection);
- assess technical information provided by fishers and other institutions;
- advise the SAC on any VME-related matters and coordinate the development of management tools.

In 2006, Recommendation GFCM/30/2006/319 established three FRAs in international waters in which fishing activities with towed dredges and bottom trawl nets are permanently prohibited, with the aim of protecting deep-sea vulnerable habitats.

Recommendation GFCM/29/2005/1 (amended in 2016) also established a ban on using towed dredges and trawl nets below 1 000 m (GFCM, 2016b). Deep-sea bottom trawl fisheries therefore cannot expand

beyond 1 000 m depth, although most of the Mediterranean basin above 1 000 m is considered to be open to fisheries. GFCM has not identified “existing” and “new” bottom fishing areas and no exploratory fishing protocols for new or developing fisheries are in place.

Recommendation GFCM/36 bans trawling in inshore waters.

Recommendation GFCM/41/2017/3 establishes a fisheries restricted area in the Jabuka/Pomo Pit in the Adriatic Sea.

### **Cumulative ecosystem impacts**

None found.

### **Managing social and economic outcomes**

RES-GFCM40/2016/3 on sustainable small-scale fisheries in the GFCM area of application acknowledges the importance of work by the regional conference on building a future for sustainable small-scale fisheries in the Mediterranean and the Black Sea.

The GFCM should facilitate the elaboration of national strategies for the sustainable development of the small-scale fisheries sector, in line with the SSF Guidelines.

CPCs should continue to build political will to invest in participative management approaches – such as co-management schemes – in order to develop fisheries in the Mediterranean and the Black Sea sustainably. Particular attention should be accorded to improving livelihoods and socio-economic opportunities – including access to markets – for small-scale fishers, in line with Target 14 of the United Nations Sustainable Development Goals (SDGs). To this effect, marine spatial planning including inter alia preserved fisheries areas and the installation of artificial reefs, presents an effective tool for engaging stakeholders in sustainable fisheries management.

No other specific measure identified. These will, however, be raised within the Commission and relevant committee meetings.

### **Monitoring and compliance**

REC GFCM/41/2017/7 outlines a regional plan of action to combat illegal, unreported and unregulated fishing in the GFCM area of application. The objective of this plan is the prevention, deterrence and elimination of IUU fishing in the Mediterranean and the Black Sea by providing CPCs with comprehensive, effective and transparent measures. It includes the following:

*Vessel list:* REC.MCS-GFCM/33/2009/6 on the establishment of a GFCM record of vessels over 15 m authorized to operate in the GFCM area; REC.DIR-GFCM/33/2009/5 on the establishment of the GFCM regional fleet register; and REC.MCS-GFCM/33/2009/8 on the establishment of a list of vessels presumed to have carried out IUU fishing in the GFCM area.

*Vessel monitoring (VMS):* REC.MCS-GFCM/33/2009/7 on minimum standards for the establishment of VMS in the GFCM area, and Resolution GFCM/38/2014/1 on guidelines on VMS and related control systems in the GFCM area of competence.

*Observers:* No measures.

*IUU measures:* REC.MCS-GFCM/40/2016/1 is a regional scheme on port state measures to combat IUU, in addition to Recommendation GFCM/39/2015/3 on the establishment of a set of measures to prevent IUU in turbot fisheries in the Black Sea.



*Port measures or PSMA*: REC.MCS-GFCM/40/2016/1 is a regional scheme on port state measures to combat IUU activities.

### **Fisheries data collection systems**

For the Mediterranean Sea, data from fishery-dependent surveys are usually available from most GFCM countries. Fishery-dependent data collection programmes usually gather data on biological as well as socio-economic variables. However, fishery-independent scientific surveys do not yet cover the entire GFCM area of application due to their high cost, and comprehensive studies on the biological status of most demersal fish stocks in some Mediterranean Sea areas are still lacking. However, some countries, including those in the European Union, undertake regular fishery-independent surveys.

Recommendation GFCM/41/2017/6 outlines the submission of data on fishing activities in the GFCM area of application.

Recommendation GFCM/40/2016/2 outlines the progressive implementation of data submission in line with the GFCM Data Collection Reference Framework (DCRF).

The collection of fisheries data in the GFCM area is organized within the Data Collection Reference Framework, the tool used by the SAC to collect the information required for the provision of advice. The DCRF is the first GFCM comprehensive framework for the collection and submission of fisheries-related data, requested as per existing GFCM recommendations and in support of the SAC mandate. The DCRF has been devised as a flexible tool, which should be reviewed regularly by the SAC in the light of possible requirements emanating from the Commission – including those requested as part of new recommendations. The DCRF should be instrumental in achieving a more efficient data collection programme in the whole GFCM region, and thus integrating data collection and subregional multiannual management plans more effectively. The framework encompasses all the necessary indications for the collection of fisheries data by GFCM members in a standardized way, in order to provide the GFCM with the minimum set of data needed to support fisheries management decision-making processes.

The data covered by the DCRF, and their potential uses, are described below:

**Task I.** Global figures of national fisheries: General overview of fisheries in each country, including an indication of capacity and total landings. This task requires annual data on total landings, number of vessels, total capacity and total engine power by country.

**Task II.** Catch: Monitoring of total annual biomass landed by fleet segment, country and area, plus the trends of total catches (landing and discards) of the main commercial species by country, GSA and fleet segment.

**Task III.** Incidental catch of vulnerable species: Quantification of incidental catches of vulnerable species by fleet segment, as well as an assessment of the impact of fisheries on species of conservation concern. This task involves gathering the number of specimens of vulnerable species taken as incidental catches (i.e. seabirds, turtles, marine mammals and shark species) by area, country and fishing gear.

**Task IV.** Fleet: Monitoring of fishing capacity in the GFCM area. Register of fishing vessels with identification features (e.g. vessel name, registration number, port, fishing gear, GSA, etc), and information on technical features (e.g. gross tonnage, kilowatt, overall length, etc) of fleets operating in the GFCM area of application.

**Task V.** Effort: Accounting for the amount of effort deployed and evaluating fishing pressure and trends in catch per unit of effort (CPUE). This task gathers fishing effort data, calculated as a combination of capacity and activity by country, GSA, fleet segment and fishing gear, plus information on CPUE for the main commercial species.

**Task VI.** Socio-economics: Assessing the economic value and social implications of fisheries. This task gathers data related to economic and social variables of fisheries by country, GSA and fleet segment.

**Task VII.** Biological information: This task enables the gathering of information to assess the general status of the main exploited stocks in the Mediterranean and the Black Sea, of marine ecosystems and of stocks of special interest such as red coral, eel and dolphinfish.

### Reporting

The Commission and each of the subcommittees generate annual reports. In addition, there is the Status Report that covers the majority of issues that required reporting.

### Reviews

In addition to the reviews of individual elements the Commission has undertaken a scan of its progress through the mid-term strategy review.

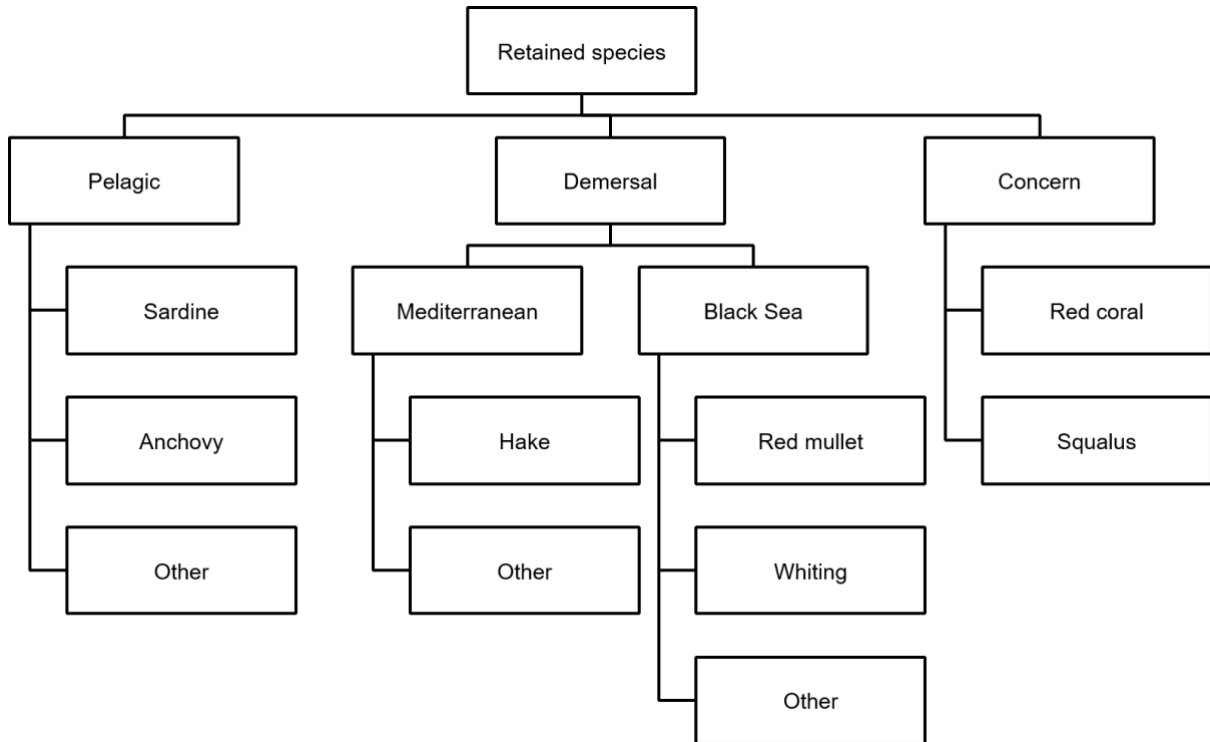
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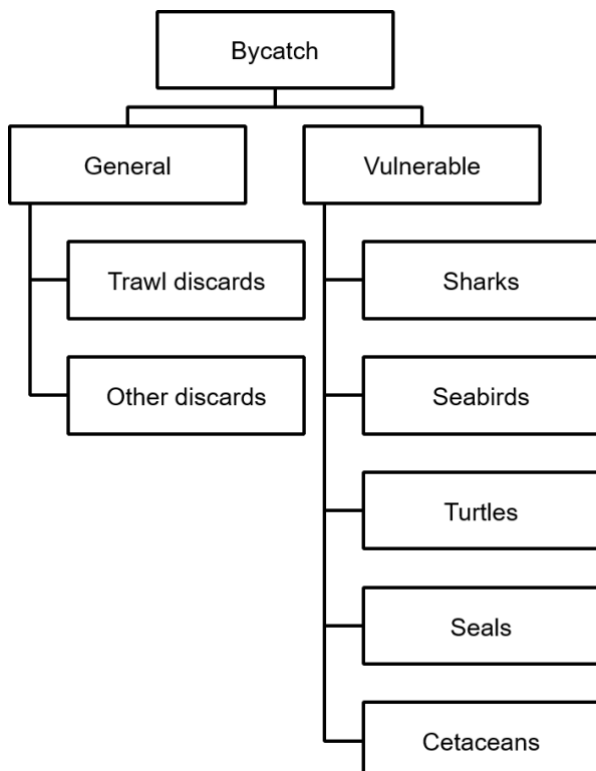
### EAF COMPONENTS GFCM

*N.B. These identify potential issues – a risk analysis would be needed to determine current risk levels.*

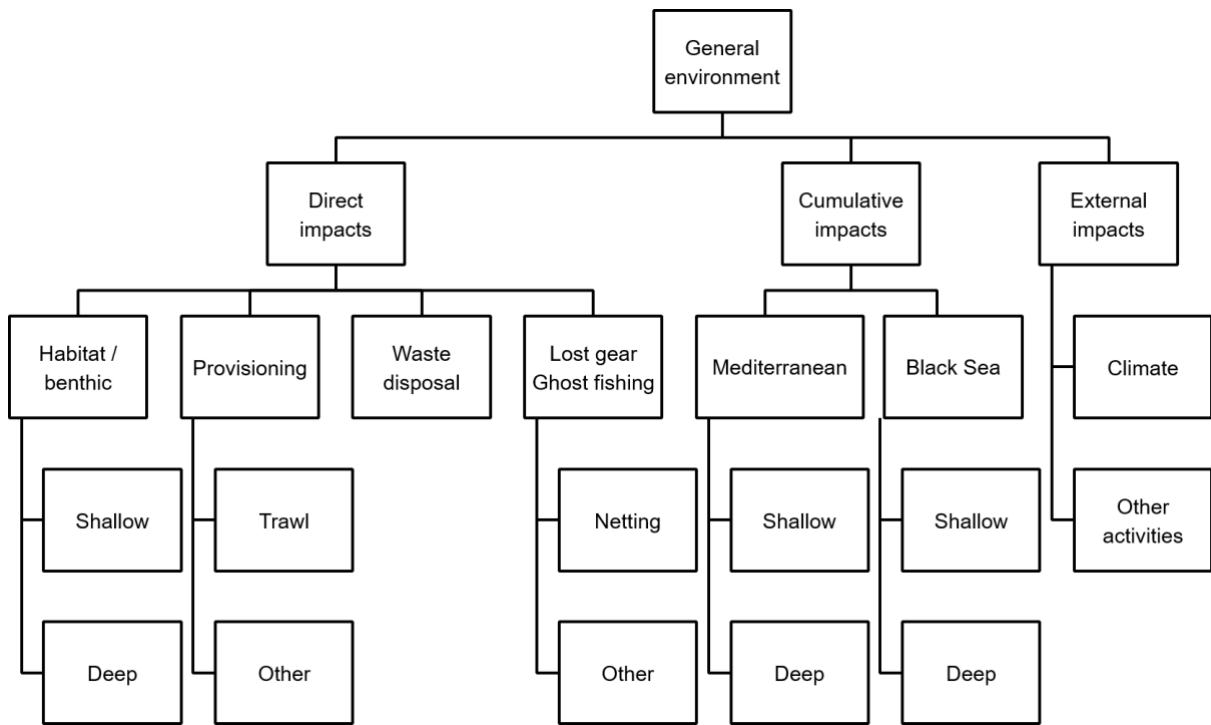
#### Retained species GFCM



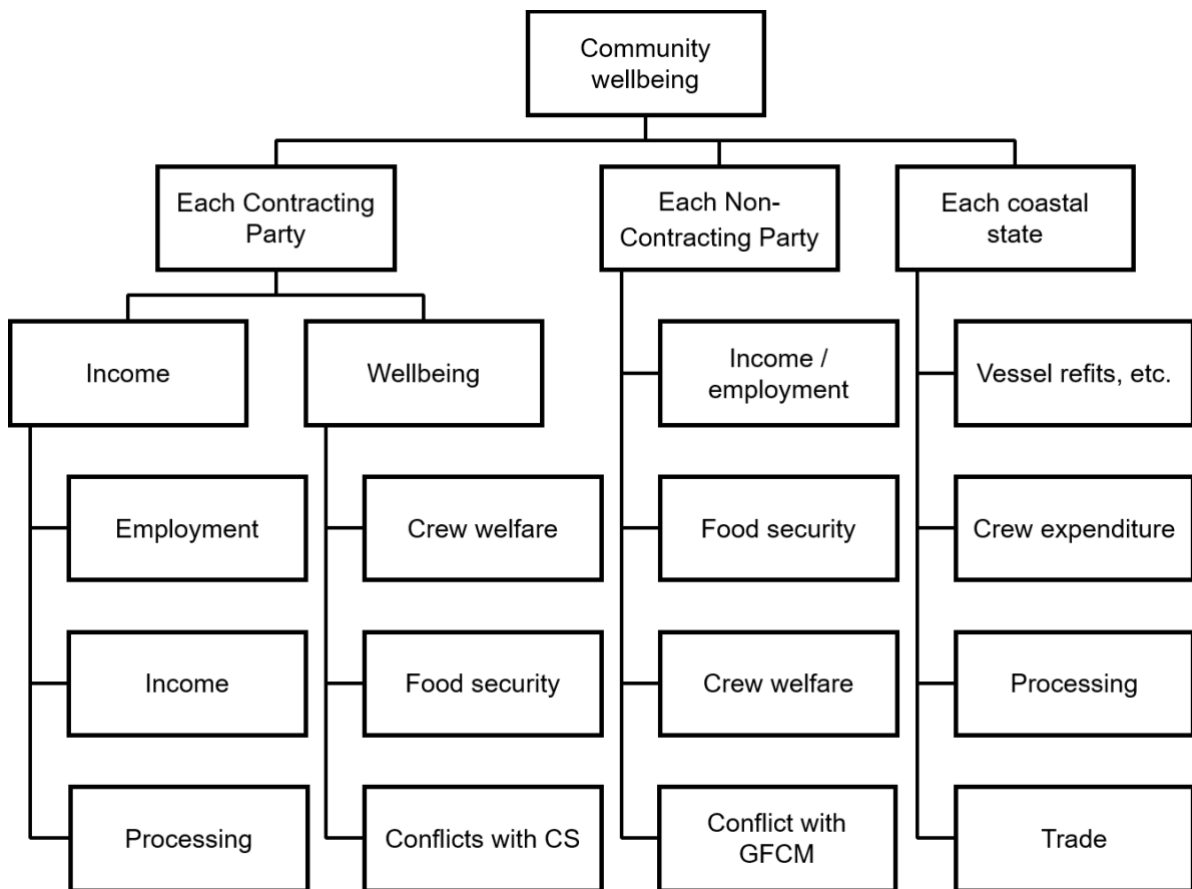
#### Non-retained species (bycatch and vulnerable) GFCM



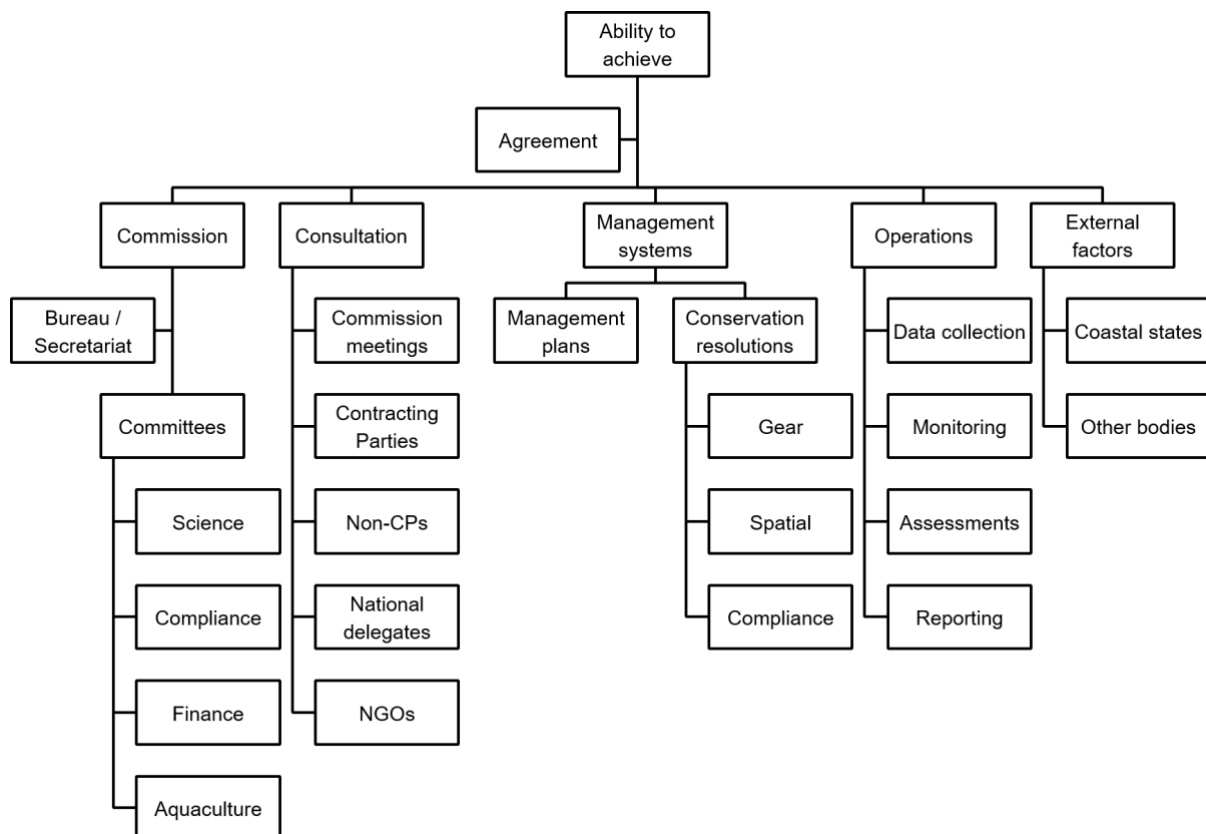
**General environment GFCM**



**Community wellbeing GFCM**



## Governance (ability to achieve) GFCM



## Appendix 1 – GFCM: summary list of recommendations and resolutions

### Recent

- 2017 Res GFCM/41/2017/6 on the application of an International Maritime Organization number
- 2017 Res GFCM/41/2017/5 on a network of essential fish habitats in the GFCM area of application
- 2017 Res GFCM/41/2017/4 on a permanent working group on vulnerable marine ecosystems
- 2017 Res GFCM/41/2017/3 on the reactivation of the Working Group on Fishing Technology
- 2017 Res GFCM/41/2017/2 on guidelines for the streamlining of aquaculture authorization and leasing processes
- 2017 Res GFCM/41/2017/1 on a strategy for the sustainable development of Mediterranean and Black Sea aquaculture
- 2017 Rec GFCM/41/2017/8 on an international joint inspection and surveillance scheme outside the waters under national jurisdiction in the Strait of Sicily (Geographical Subareas 12 to 16)
- 2017 Rec GFCM/41/2017/7 on a regional plan of action to combat illegal, unreported and unregulated fishing in the GFCM area of application
- 2017 Rec GFCM/41/2017/6 on the submission of data on fishing activities in the GFCM area of application
- 2017 Rec GFCM/41/2017/5 on the establishment of a regional adaptive management plan for the exploitation of red coral in the Mediterranean Sea
- 2017 Rec GFCM/41/2017/4 on a multiannual management plan for turbot fisheries in the Black Sea (Geographical Subarea 29)
- 2017 Rec GFCM/41/2017/3 on the establishment of a fisheries restricted area in the Jabuka/Pomo Pit in the Adriatic Sea

- 2017 Rec GFCM/41/2017/2 on the management of blackspot seabream fisheries in the Alboran Sea (Geographical Subareas 1 to 3) for a two-year transition period
- 2017 Rec GFCM/41/2017/1 on the reporting of aquaculture data and information repealing Recommendation GFCM/35/2011/6.
- 1.1 Recommendations on conservation and management
- Recommendation GFCM/40/2016/3 establishing further emergency measures in 2017 and 2018 for small pelagic stocks in the Adriatic Sea (Geographical Subarea 17 and Geographical Subarea 18)
- Recommendation GFCM/40/2016/4 establishing a multiannual management plan for the fisheries exploiting European hake and deep-water rose shrimp in the Strait of Sicily (Geographical Subareas 12 to 16)
- Recommendation GFCM/40/2016/5 establishing a minimum conservation reference size for European hake in the Mediterranean Sea
- Recommendation GFCM/40/2016/6 on the scientific monitoring, management and control of turbot fisheries in the Black Sea (Geographical Subarea 29)
- Recommendation GFCM/40/2016/7 concerning the authorization of the use of remotely operated vehicles within the framework of national scientific research programmes on red coral
- Recommendation GFCM/39/2015/1 establishing further precautionary and emergency measures in 2016 for small pelagic stocks in the Adriatic Sea (Geographical Subareas 17 and 18)
- Recommendation GFCM/39/2015/2 on the establishment of a set of minimum standards for bottom trawling fisheries of demersal stocks in the Strait of Sicily, pending the development and adoption of a multiannual management plan
- Recommendation GFCM/39/2015/3 on the establishment of a set of measures to prevent, deter and eliminate illegal, unreported and unregulated fishing in turbot fisheries in the Black Sea
- Recommendation GFCM/39/2015/4 on management measures for piked dogfish in the Black Sea
- Recommendation GFCM/38/2014/1 on precautionary and emergency measures for 2015 on small pelagic stocks in Geographical Subarea 17 and amending Recommendation GFCM/37/2013/1
- Recommendation GFCM/37/2013/1 on a multiannual management plan for fisheries on small pelagic stocks in Geographical Subarea 17 (northern Adriatic Sea) and on transitional conservation measures for fisheries on small pelagic stocks in Geographical Subarea 18 (southern Adriatic Sea)
- Recommendation GFCM/37/2013/2 on the establishment of a set of minimum standards for bottom-set gillnet fisheries for turbot and conservation of cetaceans in the Black Sea
- Recommendation GFCM/36/2012/1 on further measures for the exploitation of red coral in the GFCM area of application
- Recommendation GFCM/36/2012/2 on the mitigation of incidental catches of cetaceans in the GFCM area of application
- 1.2 Recommendations on monitoring, control and surveillance
- Recommendation GFCM/40/2016/1 on a regional scheme on port state measures to combat illegal, unreported and unregulated fishing activities in the GFCM area of application
- Recommendation GFCM/38/2014/2 concerning the identification of non-compliance, amending and repealing Recommendation GFCM/34/2010/3
- Recommendation GFCM/35/2011/1 concerning the establishment of a GFCM logbook, amending Recommendation GFCM/34/2010/1
- Recommendation GFCM/34/2010/2 on the management of fishing capacity
- Recommendation GFCM/33/2009/6 concerning the establishment of a GFCM record of vessels over 15 metres authorized to operate in the GFCM area of application, amending Recommendation GFCM/29/2005/2
- Recommendation GFCM/33/2009/7 concerning minimum standards for the establishment of a vessel monitoring system in the GFCM area of application
- Recommendation GFCM/33/2009/8 on the establishment of a list of vessels presumed to have carried out illegal, unreported and unregulated fishing in the GFCM area of application, repealing Recommendation GFCM/30/2006/4
- Recommendation GFCM/22/1997/1 on the limitation of the use of driftnets in the Mediterranean
- 1.3 Recommendations on data and information reporting

Recommendation GFCM/40/2016/2 on the progressive implementation of data submission in line with the GFCM Data Collection Reference Framework

Recommendation GFCM/35/2011/6 on reporting of aquaculture data and information, amending Recommendation GFCM/33/2009/4

Recommendation GFCM/33/2009/3 on the implementation of the GFCM Task 1 statistical matrix and repealing Resolution GFCM/31/2007/1

Recommendation GFCM/33/2009/5 on the establishment of the GFCM regional fleet register.

## 2. Resolutions

Resolution GFCM/40/2016/1 on guidelines for drafting GFCM decisions

Resolution GFCM/40/2016/2 for a mid-term strategy (2017–2020) towards the sustainability of Mediterranean and Black Sea fisheries

Resolution GFCM/40/2016/3 on sustainable small-scale fisheries in the GFCM area of application

Resolution GFCM/38/2014/1 on guidelines on vessel monitoring system and related control systems in the GFCM area of application

Resolution GFCM/37/2013/1 on area-based management of fisheries, including through the establishment of fisheries restricted areas in the GFCM area of application and coordination with UNEP-MAP initiatives on the establishment of specially protected areas of Mediterranean importance

Resolution GFCM/37/2013/2 on guidelines on the management of fishing capacity in the GFCM area of application

Resolution GFCM/36/2012/1 on guidelines on allocated zones for aquaculture

Resolution GFCM/35/2011/1 on the submission of combined data on fishing vessels

Resolution GFCM/35/2011/2 on data confidentiality policy and procedures, amending Resolution GFCM/30/2006/1

Resolution GFCM/35/2011/3 on the procedure for the submission of new decision proposals to the GFCM annual sessions

Resolution GFCM/33/2009/1 on the management of demersal fisheries in the GFCM area of application

Resolution GFCM/33/2009/2 on the establishment of Geographical Subareas in the GFCM area of application, amending Resolution GFCM/31/2007/2

Resolution GFCM/32/2008/1 on the reporting on the implementation of GFCM management measures

Resolution GFCM/31/2007/4 on the Pelagos sanctuary for Mediterranean marine mammals

Resolution GFCM/29/2005/2 on general guidelines for a GFCM control and enforcement scheme: needs and principles

Resolution GFCM/21/1995/2 on the reporting of activities of fishing vessels operating in the Mediterranean Sea

Resolution GFCM/15/1980/1 on the definition of a littoral management policy.

## 3. Other decisions

Decision GFCM/38/2014/1 Roadmap to fight illegal, unreported and unregulated fishing in the Mediterranean

Decision GFCM/37/2013/1 on guidelines on precautionary conservation measures pending the development and adoption of GFCM multiannual management plans for relevant fisheries at the subregional level in the GFCM area of application

Decision GFCM/37/2013/2 Roadmap to fight illegal, unreported and unregulated fishing in the Black Sea

Decision GFCM/36/2012/1 on guidelines on a general management framework and presentation of scientific information for multiannual management plans for sustainable fisheries in the GFCM area of application

Decision GFCM/30/2006/1 on guidelines on sustainable Atlantic bluefin tuna farming practices in the Mediterranean.

## A2.3 North Atlantic Ocean – Northwest Atlantic Fisheries Organization

### NAFO BACKGROUND REPORT

#### Acknowledgement of sources

It is acknowledged that the material presented in this background report was largely obtained from information publicly available on the Kulka (2012) history of NAFO, the NAFO website, the FAO Technical Paper 595 (FAO, 2016), with some additional referencing of the FAO Scan on RFMO Measures (FAO, 2018, unpublished). These sources are not referenced individually everywhere in the following text except for tables and figures. The information was last updated August 2018.

#### Overview

The Northwest Atlantic Fisheries Organization (NAFO) is an intergovernmental fisheries science and management body. It was among the first regional fisheries management bodies to be established in the world and operated from 1949, with NAFO founded in 1979 as a successor to International Commission of the Northwest Atlantic Fisheries (ICNAF). The constituent bodies of NAFO are: the Commission, Scientific Council and the Secretariat.

The objective of the NAFO Convention is to ensure the long-term conservation and sustainable use of the fishery resources in the convention area and, in so doing, to safeguard the marine ecosystems in which these resources are found. The NAFO area is the western part of the Atlantic Ocean that extends up the east coast of the United States of America, into the region between Canada and Greenland. The NAFO Regulatory Area (NRA) is comprised of the regions within this area that are outside of the 200 nautical mile EEZs. NAFO has 12 contracting parties: Canada, Cuba, Denmark, European Union, France, Iceland, Japan, Republic of Korea, Norway, Russian Federation, Ukraine, United States of America.

The three main fisheries regulated in the NAFO Regulatory Area are groundfish, shrimp and pelagic redfish. The catch in 2017 was approximately 56 000 tonnes of quota species caught in the NRA, with redfish the predominant species, followed by cod and Greenland halibut.

#### NAFO Convention

*Convention:* NAFO is an intergovernmental fisheries science and management body. NAFO was founded in 1979 as a successor to ICNAF (1949–1978).

A full history of the management of this region is available on the NAFO website. In summary, since 1921 various international bodies have been established to assist fisheries in this area. A number of initiatives were undertaken from this time until 1949, when the immediate predecessor of NAFO, the International Commission for the Northwest Atlantic (ICNAF), was established. ICNAF was among the first regional fisheries management bodies to be established in the world.

The adoption of 200 nautical mile EEZs resulted in most of the original ICNAF area falling under the jurisdiction of individual states. ICNAF was therefore rescinded in 1978, and in 1979 NAFO was formed by a new convention (NAFO, 2004). While the convention area remained the same, NAFO only has management responsibilities in the NAFO regulatory area (NRA), defined as that part of the convention area lying beyond the 200 nautical mile EEZs.

The NAFO Convention has been amended four times: on 1 January 1980, on 9 October 1987, on 13 September 1996 and on 18 May 2017. The first three sets of amendments modified some of the boundaries of subareas, divisions and subdivisions of the convention area contained in Annex I of the Convention. The fourth set of amendments (18 May 2017) were comprehensive, designed to modernize NAFO, particularly by incorporating an ecosystem approach to fisheries management. The fourth set



of amendments also streamlined the NAFO decision-making process, strengthened the obligations of contracting parties, flag states and port states, and instituted a formal dispute settlement mechanism. The current Convention on Cooperation in the Northwest Atlantic Fisheries was ratified in May 2017.

### **Objectives of the Convention**

The objective of the Convention is described in Article II: to ensure the long-term conservation and sustainable use of the fishery resources in the Convention Area and, in so doing to safeguard the marine ecosystems in which these resources are found.

In giving effect to the objective of this Convention, contracting parties individually or collectively, as appropriate, shall:

- promote the optimum utilization and long-term sustainability of fishery resources;
- adopt measures based on the best scientific advice available to ensure that fishery resources are maintained at, or restored to, levels capable of producing maximum sustainable yield;
- apply the precautionary approach in accordance with Article 6 of the 1995 Agreement;
- take due account of the impact of fishing activities on other species and marine ecosystems and in doing so, adopt measures to minimize harmful impacts on living resources and marine ecosystems;
- take due account of the need to preserve marine biological diversity;
- prevent or eliminate overfishing and excess fishing capacity, and ensure that levels of fishing effort do not exceed those commensurate with the sustainable use of the fishery resources;
- ensure that complete and accurate data concerning fishing activities within the Convention Area are collected and shared among them in a timely manner;
- ensure effective compliance with management measures and that sanctions for any infringements are adequate in severity; and
- take due account of the need to minimize pollution and waste originating from fishing vessels as well as minimize discards, catch by lost or abandoned gear, catch of species not subject to a directed fishery, and impacts on associated or dependent species, in particular endangered species.

### **Contracting parties to the Convention**

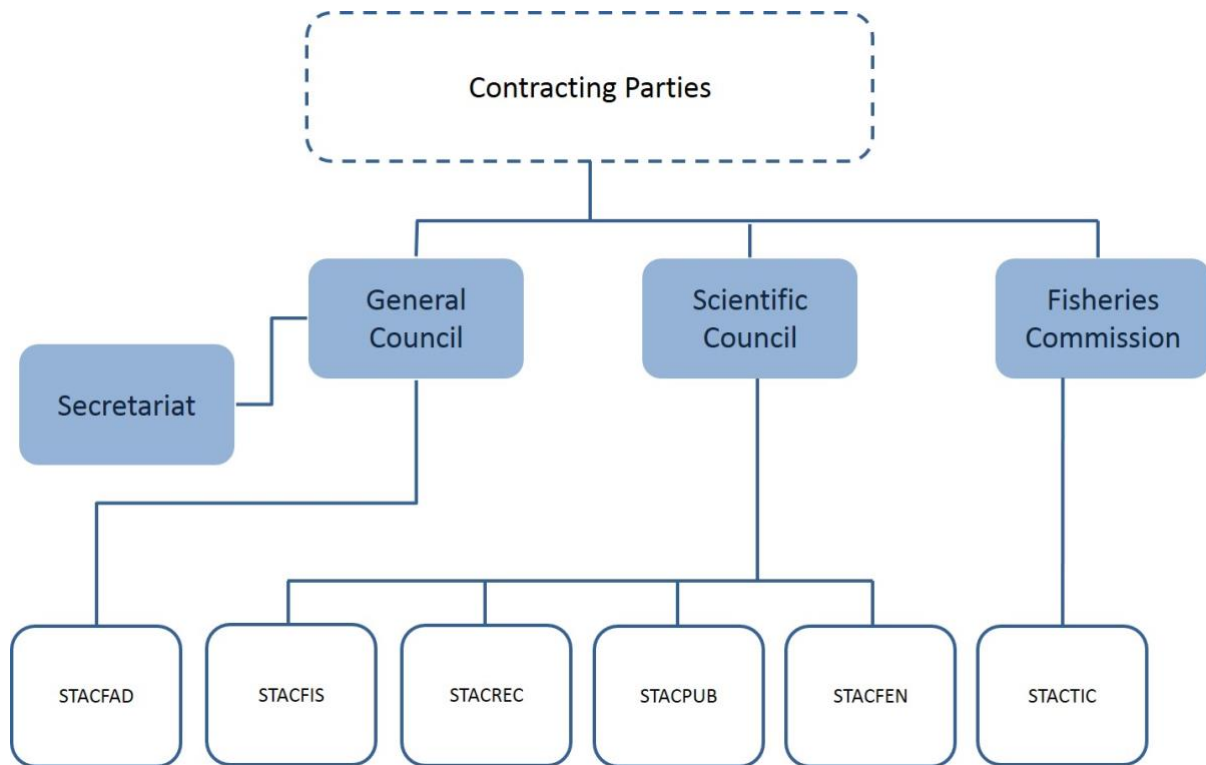
Currently NAFO has 12 contracting parties: Canada, Cuba, Denmark (in respect of the Faroe Islands and Greenland), European Union, France (in respect of Saint Pierre et Miquelon), Iceland, Japan, Republic of Korea, Norway, Russian Federation, Ukraine, United States of America.

### **Non-contracting parties**

None identified.

### **NAFO governance structure**

The constituent bodies of NAFO are: the Commission, Scientific Council and the Secretariat, of which the specific functions are set out in the Convention and the Rules of Procedure.



**Figure A2.3.1:** NAFO Governance structure (Reproduced from Thomsson et al. 2016)

### The Commission

The purpose of the Commission is to supervise and coordinate the organizational, administrative, financial and other internal affairs of the organization, including its external relations and those among its constituent bodies. Each contracting party is a member and appoints up to three representatives to the Council. The Commission is the amalgamation of the General Council (GC) and the Fisheries Commission (FC); this amalgamation occurred when the amended Convention entered into force on 18 May 2017.

The Commission shall, in collaboration with the Scientific Council:

- regularly review the status of fish stocks and identify actions required for their conservation and management;
- collect, analyse and disseminate relevant information;
- assess the impact of fishing activities and other human activities on living resources and their ecosystems;
- develop guidelines for the conduct of fishing activities for scientific purposes; and
- develop guidelines for the collection, submission, verification, access to and use of data.

In applying the principles set out in Article III, the Commission shall adopt:

- conservation and management measures to achieve the objective of this Convention;
- conservation and management measures to minimize the impact of fishing activities on living resources and their ecosystems;
- total allowable catches and/or levels of fishing effort, and determine the nature and extent of participation in fishing;
- measures for the conduct of fishing for scientific purposes
- measures for the collection, submission, verification, access to and use of data

- measures to ensure adequate flag state performance.

The Commission also currently has two standing committees:

*The Standing Committee on Finance and Administration (STACFAD) issues advice to the Commission on:* matters relating to the Secretariat; the organizational budget; the time and place of organizational meetings; and organizational publications.

*The function of the Standing Committee on International Control (STACTIC) is to:* review and evaluate the effectiveness of the conservation and enforcement measures established by the Commission; review and evaluate the compliance by contracting parties with the conservation and enforcement measures established by the Commission; review and evaluate reports on the inspection and surveillance activities carried out by the contracting parties; review and evaluate reports on infringements, including serious infringements, and the ensuing follow-up with the contracting party concerned; and produce an annual report on compliance by all contracting parties for the preceding calendar year.

The report shall be based on a comprehensive, provisional compilation of relevant reports by the Executive Secretary, submitted by contracting parties alongside any other information available to the Executive Secretary. This information shall be dispatched to all contracting parties together with the draft provisional agenda, pursuant to Rule 4.1:

- promote the co-ordination of inspection and surveillance activities carried out by the contracting parties;
- develop inspection methodologies;
- consider the practical problems of international measures of control;
- consider such other technical matters as may be referred to it by the Commission;
- obtain and compile all available information on the fishing activities of non-contracting parties in the regulatory area, including details on the type, flag and name of vessels and reported or estimated catches by species and area;
- obtain and compile all available information on landings, and transshipments of fish caught in the regulatory area by non-contracting parties, including details on the name and flag of the vessels, the quantities by species landed or transshipped, and the countries and ports through which the product was shipped;
- examine and assess all options open to NAFO contracting parties including measures to control imports of fish caught by non-contracting party vessels in the regulatory area and to prevent the reflagging of fishing vessels to fish under the flags of non-contracting parties; and
- make appropriate recommendations to the Commission.

### **The Scientific Council**

The Scientific Council compiles and maintains statistics and records, and publishes information pertaining to the fisheries, including environmental and ecological factors. Upon request, Scientific Council also provides advice for the Commission and coastal states on stocks, as well as the conservation and management of fishery resources. Each contracting party is a member of the Scientific Council and appoints its own representatives.

The Scientific Council has established four standing committees:

*Standing Committee on Fisheries Science (STACFIS):* assesses the status of fish stocks; assesses the effects on fish stocks of fishing strategies and management; and evaluates new methods for fish stock assessment.

*The Standing Committee on Fisheries Environment (STACFEN):* develops policies and procedures for the collection, compilation and dissemination of environmental information; provides periodic regular

reviews of environmental conditions and advises the Scientific Council on the effects of the environment on fish; and encourages and promotes cooperation among contracting parties in scientific research.

*The Standing Committee on Research Coordination (STACREC)*: leads on issues relating to the collection, compilation and dissemination of statistical information on fisheries in the convention area; coordinates the planning and execution of international cooperative research; encourages and promotes cooperation in scientific research; and reviews and evaluates data and information on advances in the knowledge of biology.

*The Standing Committee on Publications (STACPUB)*: develops, coordinates and reviews the publications, editorial policies and procedures of the Scientific Council.

### **The NAFO Secretariat**

The Secretariat provides administrative services to the organization. Its chief administrative officer is the Executive Secretary who is appointed by the Commission.

The Secretariat's duties include:

- make all arrangements necessary for the Commission and Scientific Council meetings;
- prepare and transmit draft provisional and provisional agendas;
- address communications to the Depository Government;
- receive the credentials of the representatives and of observers at annual and special meetings and report on them to the Commission as required; and
- perform such other functions as may be assigned by the Commission, its chair, or the chair of another committee.

### **Interactions with other fishery bodies**

There is a specific article (17) in the Convention that requires NAFO to work collaboratively with other organizations. This includes NEAFC, its counterpart in the northeast Atlantic Ocean, which includes forming a joint advisory group on data management and agreeing to a joint Deployment Plan to coordinate control and inspection activities. Similar to other RFMOs, NAFO collaborates with FAO on its various programmes. NAFO has a longstanding relationship with the International Council for the Exploration of the Seas (ICES), including a joint working group on VMEs and stock assessments. Further, NAFO collaborates with its Pacific counterpart, the North Pacific Marine Science Organization (PICES). The Sargasso Sea Commission, established in 2014 is now an observer to NAFO, and requests advice regarding fisheries in the part of the Sargasso Sea that overlaps with the NAFO Convention Area.

### **Consultation and decision-making**

NAFO operates under a formal system of communication between the Fisheries Commission and the Scientific Council that governs the flow of information between these two bodies. The Commission adopts proposals for joint action by the contracting parties designed to achieve optimum utilization of the fishery resources of the regulatory area. As a general rule, decision-making within the Commission is by consensus.

The Commission may refer any questions pertaining to the scientific basis for the decisions it may need to take to the Scientific Council, concerning either fishery resources, the impact of fishing activities on living resources, and/or the safeguarding of the ecosystem in which these resources are found. The Commission collaborates with the Scientific Council on conservation and management measures to

minimize the impact of fishing activities on living resources and their ecosystems, total allowable catches and/or levels of fishing effort, and determining the nature and extent of participation in fishing.

The contracting parties review recommendations from the Scientific Council prior to the annual meeting of the Fisheries Commission in September, and either individually, bilaterally, or multilaterally, develop proposals for the Fisheries Commission to act on, based on the Scientific Council's recommendations or on any other information that the Fisheries Commission may have. The recommendations and proposals are discussed by the Fisheries Commission at its annual meeting, and, if appropriate, amendments to the NAFO Conservation and Enforcement measures (NCEM) are adopted. The Scientific Council meets concurrently with the Fisheries Commission at the NAFO Annual meeting in September

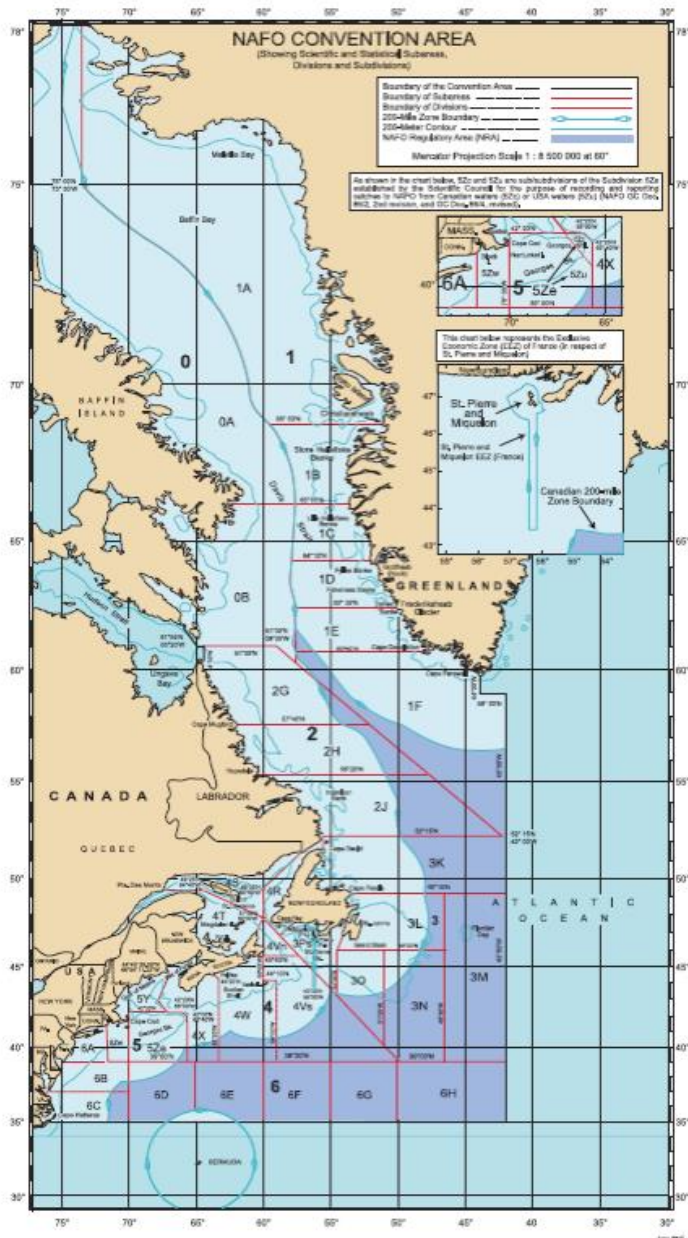
In considering such proposals, the Commission takes into account any relevant information or advice provided to it by the Scientific Council. The Commission seeks to ensure consistency between:

- Any proposal that applies to a stock or group of stocks occurring both within the Regulatory Area and within an area under the fisheries jurisdiction of a coastal state, or any proposal that would have an effect through species interrelationships on a stock or group of stocks occurring in whole or in part within an area under the fisheries jurisdiction of a coastal state.
- Any measures or decision taken by the coastal State for the management and conservation of that stock or group of stocks regarding fishing activities conducted within the area under its fisheries jurisdiction.
- Geographic scope and fisheries activities of NAFO.

*Convention area:* The convention area applies to the waters of the Northwest Atlantic Ocean north of 35°00' N and west of a line extending due north from 35°00' N and 42°00' W to 59°00' N, thence due west to 44°00' W, and thence due north to the coast of Greenland, and the waters of the Gulf of St. Lawrence, Davis Strait and Baffin Bay south of 78°10' N (see Figure A2.3.2).

The NAFO Convention Area encompasses a large portion of the Atlantic Ocean and includes the 200 nautical mile zones of coastal states jurisdiction (United States of America, Canada, St. Pierre et Miquelon, and Greenland), as well as a 50-mile circular segment of Bermuda's 200 nautical mile zone – essentially the western part of the Atlantic Ocean that extends up the east coast of the United States of America and into the region between Canada and Greenland. The total area under the NAFO Convention is 6 551 289 km<sup>2</sup>. The NAFO Convention Area is not restricted to international waters; it also covers the 200-mile-zones under national jurisdiction. Consequently, the objective of conserving and utilizing fishery resources applies to the whole NAFO Convention Area. This plays an important role in ensuring the cooperation of contracting parties, in particular with regard to fish stock assessment.

*Regulatory area:* The NAFO regulated fishery takes place in the NAFO Regulatory Area, which is defined in the NAFO Convention as that part of the convention area which lies beyond the areas in which coastal states exercise fisheries jurisdiction (outside of the Exclusive Economic Zones). The area that is directly under NAFO management applies only to the areas straddling and outside the EEZs (Exclusive Economic Zones). This is known as the NAFO Regulatory Area (NRA) and is 2 707 895 km<sup>2</sup>.



**Figure A2.3.2:** NAFO Convention Area. The Regulatory Area is indicated as darker blue (NAFO, 2020)

### Key target species and fisheries

The NAFO mandate covers all fishery resources in the Northwest Atlantic except tunas, marlins, salmon, mammals and sedentary species (e.g. shellfish), which are managed by other fishery bodies: salmon are managed NASCO, tunas/marlins by ICCAT, marine mammals by North Atlantic Marine Mammal Commission (NAMMCO)/IWC, and sedentary species by coastal states.

In the NAFO context, managed species are those that appear in the quota table or effort table in Annex I of the NAFO Conservation and Enforcement.<sup>19</sup> The managed species cover both “incidental” and “directed” catch, with all species catches counted against the contracting party quota.

<sup>19</sup> <https://www.nafo.int/Fisheries/Conservation>

The three main fisheries regulated in the NAFO Regulatory Area are groundfish, shrimp and pelagic redfish. There are currently moratoria on the shrimp and pelagic redfish fisheries. The groundfish fishery occurs mainly in NAFO Divisions 3LMNO within the fishing footprint, and is conducted mainly using bottom trawls. The key species include: cod (*Gadus callarias*), redfish (*Sebastes* spp) Atlantic halibut (*Hippoglossus hippoglossus*), American plaice (*Hippoglossoides platessoides*), yellowtail flounder (*Limanda ferruginea*), witch flounder (*Glyptocephalus cynoglossus*), white hake (*Urophycis tenuis*), , and Greenland halibut (*Reinhardtius hippoglossoides*), northern prawn (*Pandalus borealis*), squid (*Illex* spp.) and thorny skate (*Amblyraja radiata*).

### Catch and effort history

Historically, demersal fish and shrimp catches have almost all been taken with demersal otter trawls. There has been a small proportion of longlines and midwater trawlers, but the majority of vessels use a variety of demersal otter trawl gears (single-rig, multi-rig, pair trawl, etc).

The number of vessels and effort (in days) for bottom trawls in the NRA during 2005–2012 are shown in Table A2.3.1 (FAO, 2016). Effort remained fairly constant for the groundfish fisheries, however, the effort for the shrimp fishery declined and there are now moratoria in place for this fishery and American Plaice.

**Table A2.3.1:** Number of vessels, and effort, in days fishing, for groundfish and prawns in the NAFO Regulatory Area, 2005–2012

Year	Groundfish		Prawns	
	No. of vessels	Days in NRA	No. of vessels	Days in NRA
2005	50	6 948	27	3 558
2006	45	5 908	21	1 776
2007	45	4 158	14	1 948
2008	38	3 302	13	1 551
2009	41	4 122	20	889
2010	42	4 170	16	584
2011	47	4 922	8	360
2012	44	5 050	5	250
2013	54	4 510	7	190

Since this time effort has declined. In 2017, there were 45 fishing vessels spending approximately 3 800 days in the NRA. The catch in the NRA in 2017 was approximately 56 000 tonnes of the species subject to catch limitation (species listed in the Quota Table); the catches are indicated, by stock, in NAFO 2017 Annual Report (Table A2.3.2). Redfish remains the predominant species, followed by cod and Greenland halibut.

**Table A2.3.2:** Catches of species in the NRA subject to catch limitation (species listed in the Quota Table) in the 2017 calendar year, based on the daily catch reports (CATs)

Stock Area	Species	Amount (tonnes)
3L	COD	103
3M	COD	14 189
3NO	COD	581
3LN	RED	7 806
3M	RED	7 085
3O	RED	7 267
1F23K	REB	0
3LNO	PLA	984
3M	PLA	160
3LNO	YEL	3 880
3L	WIT	46
3NO	WIT	253
3NO	HKW	182
3NO	CAP	11
3LNO	SKA	4 144
3LMNO	GHL	9 260
3+4	SQI	17
3LNO	PRA	0
3M	PRA	0
<b>Total</b>		<b>55 968</b>

### Stock assessment of target species

Currently, NAFO assesses eight groundfish species, as well as shrimp and squid. Scientific advice is generated through a joint effort by NAFO Members, and makes use of different data sampling programmes carried out by Member Countries. Additional available statistics on the resources and their environment are also used when producing the advice.

Scientific advice for stock management is provided by the Scientific Council upon request by: the Commission, for specific fish stocks within the NAFO Regulatory Area; or coastal states who need information on stocks within their EEZs, or on stocks that straddle two jurisdictional areas.

The Scientific Council may also conduct stock assessments of its own accord and present the results to the Commission. Designated experts take the lead role in coordinating these assessments. Additional scientific advice is also routinely requested by the Commission on topics such as marine ecosystems and stock interactions.

The NAFO website includes a schedule for timing of the next assessment of each of the relevant NAFO and coastal stocks.

The majority of scientific assessments occur during the annual scientific council meeting in June; however, assessments are also completed in the autumn, during the shrimp meeting and NAFO annual meeting, respectively.

Details of all matters addressed by the Scientific Council, including advice, are published in the NAFO Scientific Council reports.<sup>20</sup>

<sup>20</sup> [www.nafo.int/Library/Science/SC-Reports](http://www.nafo.int/Library/Science/SC-Reports)



### Bycatch species

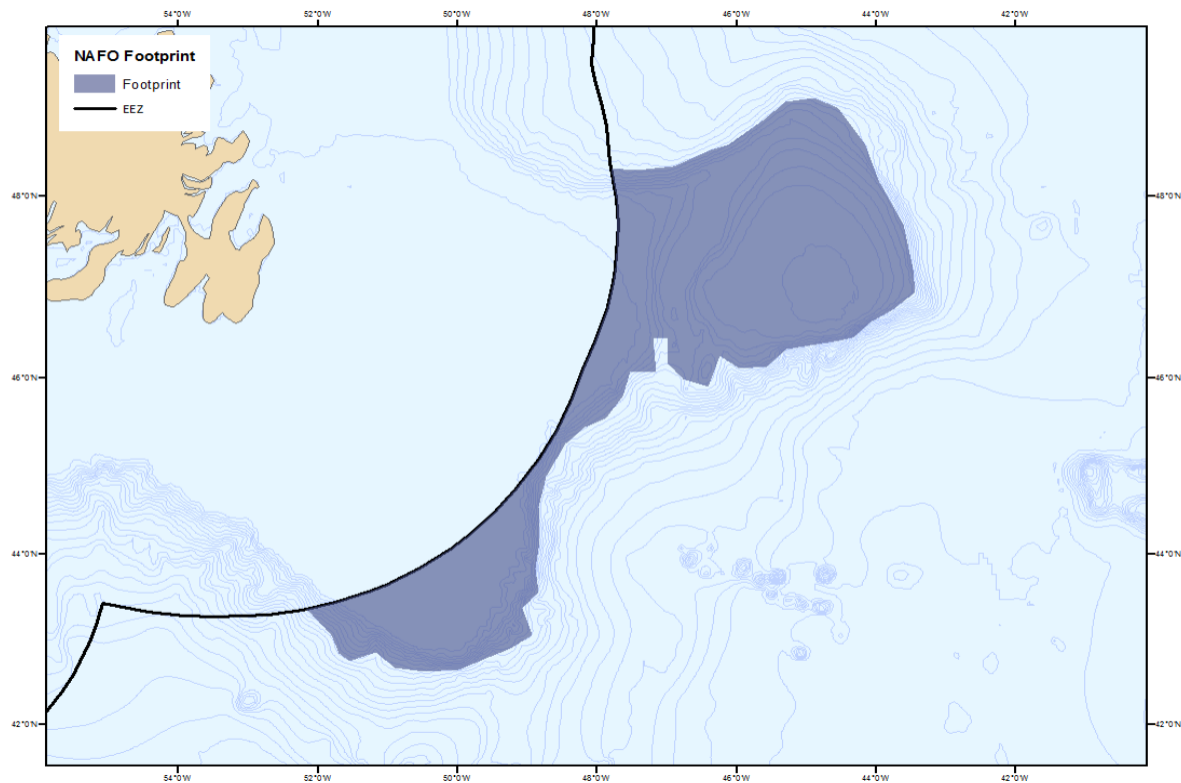
The Scientific Committee (SC) conducts full stock assessments of “unmanaged” stocks (those that do not appear in the NAFO quota table – see Annex 1), either based on a request from the Commission (e.g. alfonosinos) or of the SC’s own accord (e.g. grenadiers). This is the first step towards a species or stock becoming a “managed” stock.

### Seabird and mammal interactions

No assessments were identified.

### Bottom impacts/VMEs and impact assessments

The total area subjected to bottom fishing (all gears combined, from 1987–2007) were plotted from data submitted by contracting parties and used to delineate a perimeter around the existing fishing areas, by fishery. This footprint was determined based on an analysis of logbook and VME data for bottom trawling in a process that took over two years.



**Figure A2.3.3:** Fishing footprint in NAFO NRA (Source: NAFO, 2020)

### Ecosystem impact (cumulative) assessments

This is currently in progress by the Working Group on the Ecosystem Approach to Fisheries Management (WG-EAFM).

## Climate effects

An annual update of the various oceanographic and climate variables that may affect fisheries is undertaken and published.<sup>21</sup>

General climate indicators within the NAFO Convention Area: North Atlantic Oscillation, SST, air temperature, and ice cover. Oceanographic conditions in NAFO waters are to a large degree determined by the strength of the winter atmospheric circulation over the Northwest Atlantic, which is measured by the NAO Index.

## Social and economic status/impacts

None identified.

## MANAGEMENT

### NAFO policies

*Precautionary approach:* Upon the recommendation of the NAFO Scientific Council, in 2004 the NAFO Fisheries Commission adopted a precautionary approach framework (PAF) to guide fisheries management decision-making. The PAF is used to improve the protection of resources, and to determine appropriate resource management measures in the absence of sufficient scientific data.

In 2014, the joint Fisheries Commission-Scientific Council Working Group on Risk-based Management Strategies (WG-RBMS) was established. This group enhances the application of risk-based assessment approaches when evaluating management strategies, as well as implementing the broader use of the NAFO precautionary approach framework; as of May 2017 it became the Commission-Scientific Council (COM-SC).

*Management strategy evaluation (MSE):* In 2008 NAFO began the process of developing a management strategy approach to the Greenland halibut stock. This concept describes a novel approach to understanding and evaluating the interactions among various management strategies against a background of uncertainty and trade-offs. Under MSE, management strategy is applied based on the simulated perceived state of the stock and the impact is evaluated with respect to the simulated true stock.

MSE was reviewed (FC Doc. 13-23) and it was agreed to use the current management strategy for three additional years (2015–2017). Subsequently, a new management strategy for this species was adopted in 2017 for five additional years (2018–2023) (COM Doc. 17-17).

*Risk-based management strategies:* During 2013 Terms of Reference for a Joint Fisheries Commission-Scientific Council Working Group on Risk-based Management Strategies were developed (FC Doc. 13-18). This group would also incorporate work for the Greenland halibut management strategy evaluation. The group will consider enhancing the application of risk-based assessment approaches when evaluating management strategies as well as broader use of the precautionary approach framework.

In responding to requests for advice and recommendations from the Commission, and considering the associated advice of the Scientific Council, the Working Group shall:

- Review, update and further develop a general framework, including management objectives and performance statistics for the elaboration of management strategies, conservation plans and rebuilding strategies for all NAFO managed stocks.

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<sup>21</sup> <https://www.nafo.int/Science/Ocean-Climate>

- Evaluate and, as appropriate, update existing management strategies – developing new ones where none exist – together with conservation plans and rebuilding strategies implemented in NAFO with respect to the precautionary approach framework, management objectives and performance statistics.
- Develop alternative strategies for stocks that may not be suited to formulaic rules, and/or for stocks where reference points do not exist or cannot be developed.
- Consider all matters related to use of the NAFO precautionary approach framework.
- Consider risk management approaches in the review, updating and considering the future development of conservation plans and rebuilding strategies.

As of 18 May 2017, the Fisheries Commission amalgamated with the General Council and became the Commission, by virtue of the entry into force of the amended Convention.

*Ecosystem approach:* The basis of an ecosystem approach to fisheries (EAF) is to plan, develop and manage fisheries in a manner that addresses the multiple needs and desires of societies, without jeopardizing the options for future generations to benefit from the full range of goods and services provided by marine ecosystems. The ecosystem approach is an extension of the conventional principles for sustainable development to cover the ecosystem as a whole. The aim is to ensure that, despite variability, uncertainty and likely natural changes in the ecosystem, the capacity of the ecosystem to produce food, revenues, employment and, more generally, other essential services and livelihoods, is maintained indefinitely for the benefit of present and future generations.

NAFO began the implementation of an ecosystem approach to fisheries management in the years following the publication of the FAO Guidelines on Deep-sea Fisheries. In 2008, the then General Council of NAFO adopted a Resolution (Resolution 1/08) giving effect to the adoption of the ecosystem approach, among other matters, pending the ratification of amendments to the Convention (these amendments were eventually ratified in May 2017).

In addition to the traditional stock assessment of commercial fish species, NAFO also required advice on vulnerable species and habitats. In response, the Scientific Council established a new Working Group on the Ecosystem Approach to Fisheries Management (WG-EAFM), which began meeting in 2008 to identify and delineate marine benthic habitats subject to significant adverse impacts and in need of protection. This working group aided in changing the NAFO conservation and enforcement measures to prohibit bottom fishing in a number of areas where VME indicator species were known to occur in high densities, and placing stocks of forage fishes such as Capelin in Division 3NO under long-term moratoria, thereby recognizing the important role they play in the food web.

In 2013 the working group changed its name to the Working Group on Ecosystem Science and Assessment (WG-ESA); in recent years, a greater emphasis has been placed on encounter thresholds with sponges and corals, ecological interactions between cod, redfish and shrimps, while comprehensive lists of VME indicator species and VME elements have also been discussed, as well as the development of a roadmap for the implementation of the ecosystem approach for NAFO.

In addition, a joint Commission and Scientific Council Working Group on the Ecosystem Approach Framework to Fisheries Management (WG-EAFFM) was established to report on ecosystem developments and the work of WG-ESA, both to the Commission and Scientific Council, in order to consider the advice of the latter, and thus provide recommendations to the former.

### **Conservation and enforcement measures**

There is a compendium of CEMs for NAFO that is updated annually and presented on the NAFO website. These are divided into chapters covering:

- Conservation and management measures

- Protection of Vulnerable Marine Ecosystems in the regulatory area from bottom fishing activities
- Vessel requirements and chartering
- Monitoring of fisheries
- Observer scheme
- At-sea inspection and surveillance
- Port state control
- Non-contracting party scheme
- Annexes
- Fisheries management
- Reporting
- Gear
- Inspection
- Management of target species

Article 5 of the CEM outlines the catch and effort limitations: these are the primary management method used for target species, by imposing annual quotas.

Quotas are set on an annual basis by consensus by the Commission. When no agreement can be reached on a NAFO managed stock, whether by consensus or vote, the Commission shall maintain the existing relative percentage quota shares for that stock, as reflected in Annex I.A and Annex I.B. This shall be deemed to be a proposal of the Commission in accordance with Article VI and Article XIV of the Convention for the following calendar year.

Every contracting party must close its fishery when the quota under Annex IA is reached. A contracting party may partly or fully transfer its allocated quota under Annex I.A to another contracting party.

Article 13 of the CEM also features gear controls including minimum mesh sizes, and in accordance with Article 14, no vessel shall retain any fish smaller than the established minimum size on board. Where the number of undersized fish in a single haul exceeds 10 percent of the total, the vessel shall, during its next tow, maintain a minimum distance of 5 nautical miles from any position adopted during its previous tow.

### **Harvest strategies**

There are formal harvest control rules and recovery plans in place for a number of cod stocks, American plaice, Greenland halibut, shrimp and redfish.

In 2010 the Commission adopted an MSE approach to Greenland halibut stock in Subarea 2 and Division 3KLMNO (FC Doc. 10/12). This approach considers a survey-based harvest control rule (HCR) to set a TAC for this stock on an annual basis for the next four-year period.

In 2014 the Commission adopted an MSE approach for redfish in Division 3LN (FC Doc. 14/29). This approach uses a harvest control rule designed to reach 18 100 tonnes of annual catch by 2019–2020 through a stepwise, biannual catch increase, with the same increase every two years.

### **Management of bycatch**

Article 6 of the CEM states that to the extent possible, each contracting party shall ensure that its vessels – including vessels chartered in accordance with Article 26 – minimize bycatch of species from stocks identified in Annex I.A, while operating in the Regulatory Area.

The action plan in the Management and Minimization of Bycatch and Discards (NAFO/COM Doc 17-26) includes the following overarching objectives:

- effective management and the minimization of bycatch and discards, and improvement of selectivity, in fisheries of the NRA;
- accurate reporting of target, non-target and incidental catch;
- account for total catch (retained and non-retained) in scientific assessments and management measures;
- management measures are adaptive and address changing fishery conditions over time, or differences among areas and fleets;
- management measures reflect the precautionary and ecosystem approaches to fisheries management;
- identify priority areas for bycatch management, in particular areas where there is a risk of causing serious harm to bycatch species; and
- ensure linkage with other NAFO bodies doing work related to bycatch management (e.g. STACTIC, WG-EAFFM, WG-ESA, WG-CR).

Article 12 – Conservation and Management of Sharks requires that each contracting party shall:

- report all catches of sharks, including available historical data, in accordance with the data reporting procedures set out in Article 28;
- prohibit the removal of shark fins on board vessels; and
- prohibit the retention on board, transshipment and landing of shark fins fully detached from a carcass.

#### **Management of seabirds and mammal interactions**

None identified.

#### **Management of benthic impacts**

Article 17 – Area Restrictions for Bottom Fishing Activities.

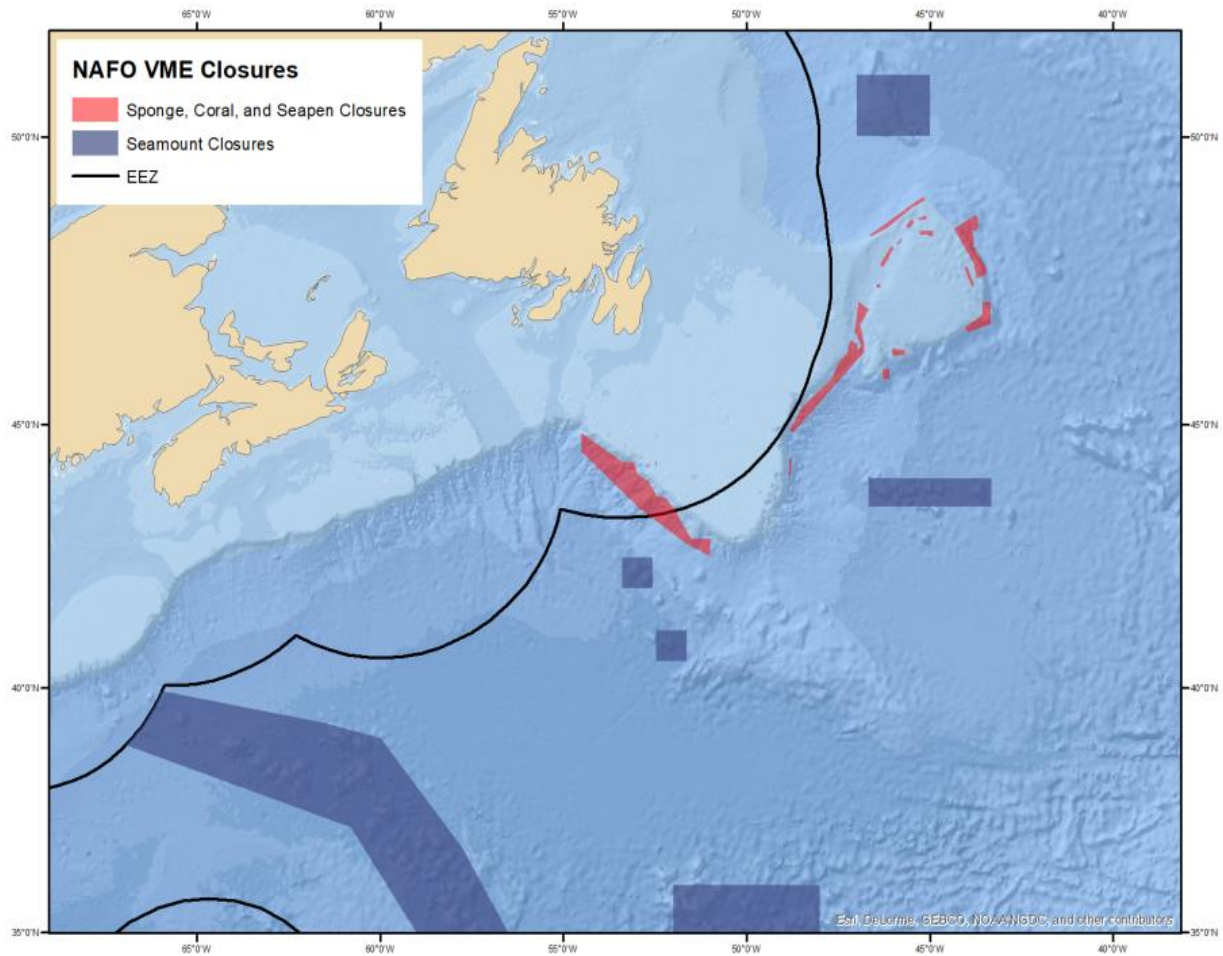
#### **VMEs (including seamounts)**

NAFO began developing protocols to protect VMEs from possible significant adverse impacts resulting from the use of bottom contact fishing gears as part of its implementation of an ecosystem approach to fisheries management in 2006, following the adoption of UNGA Resolution 61/105.

The outcome of extensive work done by WGEAFM and WGESA was a number of changes to the NAFO conservation and enforcement measures to prohibit bottom fishing in several areas where VME indicator species were known to occur in high densities, in order to protect the biodiversity of these places. Initially, four seamount areas were closed in 2007 as a precautionary measure.

Currently, NAFO has identified 21 sites within its convention area as being vulnerable to bottom contact gears, and subsequently closed these areas to bottom fishing (see Article 17 of the NAFO CEM). NAFO has also delineated existing bottom fishing areas (the fishing footprint) to regulate bottom fisheries that have a significant adverse impact on vulnerable marine ecosystems.

The VME closed areas are divided into two components: the blue areas in the map below represent the seamount closures, while the red areas represent the sponge, coral, and seapen closures. As reflected in Article 17 of the NAFO CEM, no vessel shall engage in bottom fishing activities in any of these areas. The coordinates for these areas are provided in Article 17 of the NAFO CEM.



**Figure A2.3.4:** VMEs in NAFO NRA (NAFO, 2020)

### Exploratory fishing

*Article 20:* Management of Exploratory Bottom Fishing Activities. In 2008, the NCEM defined “existing bottom fishing areas” as those areas where VMS data and/or other available geo-reference data indicate that bottom fishing activities have been conducted in at least two years of the 1987–2007 period. “New bottom fishing areas” were defined as all other areas within the NRA which are not defined as existing bottom fishing areas.

*Article 21:* Evaluation of Exploratory Bottom Fishing Activities. Bottom fisheries may now be conducted outside of the footprint only if the exploratory bottom fishing activities protocol outlined in Chapter II of the NAFO Conservation and Enforcement Measures is followed.

### Encounter protocols

The encounter provisions in Article 22 set out the rules for the actions to be taken by vessels and vessel masters upon encountering catches of VME indicator species above threshold levels. NAFO first established an encounter protocol in 2007 for fishing permitted within the four areas closed to bottom fishing.

In existing fishing areas, catches above the threshold must be reported, and the vessel is required to move at least 2 nautical miles away. These encounters are reported to the Fisheries Commission and

Scientific Council for any appropriate actions required. The Scientific Council has provided the Fisheries Commission with scientifically based encounter thresholds and “move-on” rules.

*Encounter threshold:* An encounter with VME indicator species is defined as a catch per set (e.g. trawl tow, longline set, or gill net set) of more than 7 kg of sea pens and/or 60 kg of other live coral and/or 300 kg of sponges.

Article 22 requires that masters of vessels entitled to fly the contracting party’s flag and conducting bottom fishing activities in the NAFO Regulatory Area abide by the following rules, where evidence of VME indicator species, in accordance with Annex I.E, are encountered during the course of fishing operations.

### **Other direct impacts**

Article 13 also deals with lost or abandoned fishing gears. Each contracting party shall ensure that:

- (a) vessels fishing in the NRA entitled to fly its flag have equipment on board to retrieve lost gear;
- (b) the master of a vessel that has lost gear or part of it shall make every reasonable attempt to retrieve it as soon as possible.

### **Cumulative ecosystem implications and effects**

The Scientific Council Working Group on Ecosystem Science and Assessment (WG-ESA) has already helped to changing the NAFO conservation and enforcement measures to prohibit bottom fishing in a number of areas where VME indicator species were known to occur in high densities, and placing stocks of forage fishes such as Capelin under long-term moratoria, recognizing the important role they play in the food web.

The working group meeting in November 2017 continues to move forward with the ecosystem approach, conducting risk assessments for impacts of trawl surveys on VMEs in closed areas and an assessment of NAFO bottom fisheries for significant adverse impacts on vulnerable marine ecosystems. Work continues on the development of ecosystem summary sheets and further improvements to the models of fisheries productivity potential and the NAFO roadmap (NAFO SCS Doc. 16/21).

### **Management of social and economic outcomes**

The inclusion of social and economic outcomes in management decisions will occur through the various contracting parties’ input.

### **Compliance**

Enforcement of the conservation measures of the fish stocks in the NAFO area is a prime consideration, and contracting parties take their reporting obligations and the compliance of fishing vessels seriously. Considerable efforts are made to ensure and maintain a high level of compliance with regard to conservation and enforcement measures, including:

- At-sea inspection and surveillance scheme
- The at-sea inspection and surveillance scheme is outlined in Chapter VI of the NAFO Conservation and Enforcement Measures.
- The purpose of the scheme is to ensure that vessels fishing in the NAFO Regulatory Area comply with conservation and enforcement measures.
- Port state control

Port state control measures are outlined in Chapter VII of the NAFO Conservation and Enforcement Measures and apply to landings or transshipments in ports of contracting parties by fishing vessels flying the flag of another contracting party.

The provisions apply to the landing or transshipment of fish caught in the NAFO Regulatory Area, or fish products originating from such fish, that have not been previously landed or offloaded at a port.

### **The observer scheme**

The NAFO Observer Scheme is outlined in Chapter V of the NAFO Conservation and Enforcement Measures and requires vessels to carry an observer on board when operating in the NAFO Regulatory Area.

The flag state contracting party shall submit the observer report (as set out in Annex II.M of the NAFO CEM) in electronic format, to be forwarded to the Executive Secretary within 30 days of the vessel's arrival in port (Article 30.A.2.h).

Over 120 at-sea inspections were conducted on the vessels during 2017 fishing trips. From these inspections, fewer than 10 apparent infringements (AI) were detected by the inspectors, and the nature of the AIs range from non-serious (e.g. failure to maintain a stowage plan) to serious (e.g. exceeding bycatch thresholds of a moratorium species).

An annual compliance review has been conducted since 2004. The scope of the review is to determine how international fisheries complied with the annually updated NAFO Conservation and Enforcement Measures when fishing in the NAFO Regulatory Area, and assess the performance of NAFO contracting parties with regard to their reporting obligations. The format of the compliance review is being continuously developed by the Standing Committee on International Control (STACTIC).

The NAFO website includes a list of current IUU vessels and activities.

### **NAFO review**

NAFO has agreed to relaunch its second performance review. This performance review should be completed by September 2018 and will address: conservation and management; compliance and enforcement; governance; science; international cooperation; financial and administrative issues. The previous performance review took place in 2011, with all of its recommendations subsequently addressed. The second performance review will also assess how NAFO has addressed these recommendations.

### **Monitoring and reporting**

Under Article 28 – Monitoring of Catch, the following must be done:

*Recording of catch and stowage:* For the purposes of monitoring catch, each fishing vessel shall utilize a fishing logbook, a production logbook and a stowage plan as defined below, to record fishing activities in the Regulatory Area.

*VMS Position data and costs:* Every fishing vessel operating in the Regulatory Area shall be equipped with a satellite monitoring device capable of continuous automatic transmission of position to its land-based fisheries monitoring centre (FMC).

NAFO Members send their annual compilation of information on national catches and landings to the NAFO Secretariat. These data are used for statistical purpose within NAFO (and elsewhere). Complete statistical data have been published in Statistical Bulletin since 1951. The electronic database of STATLANT 21 data is updated regularly as new information becomes available.



## Scientific studies

Scientists from many different countries and areas of expertise cooperate within NAFO to coordinate research in its regulatory area.

Some of the important research carried out by Scientific Council participants is related to fish stock assessment in the NAFO area. In addition, other relevant marine research topics are reviewed and discussed, thus ensuring that NAFO science is using modern and updated methods and approaches. For example, most recently, NAFO Scientific Council participants developed a NAFO precautionary approach which was adopted in 2004. Recognizing the importance of general research topics for NAFO-related scientific work, NAFO publishes the *Journal of Northwest Atlantic Fishery Science*, which focuses on environmental, biological, ecological and fishery aspects of living marine resources and ecosystems of the northwest Atlantic.

Recently the NEREIDA expedition carried out research in the NAFO Regulatory Area. This project was multidisciplinary research of the sensitive habitats and fishing activities as well as analysis of the fishing resources for the study and protection of the vulnerable ecosystems.

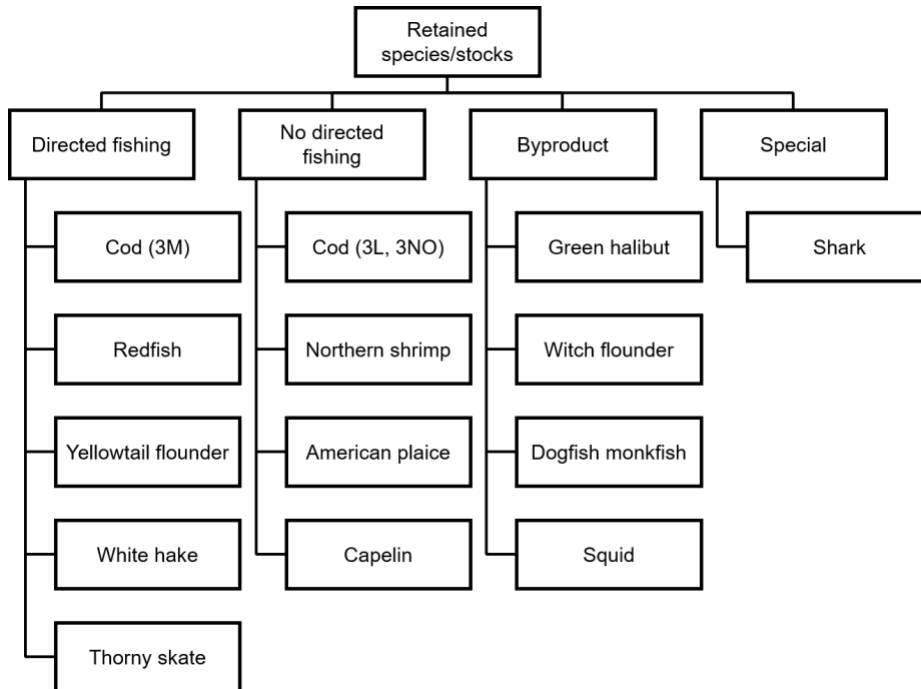
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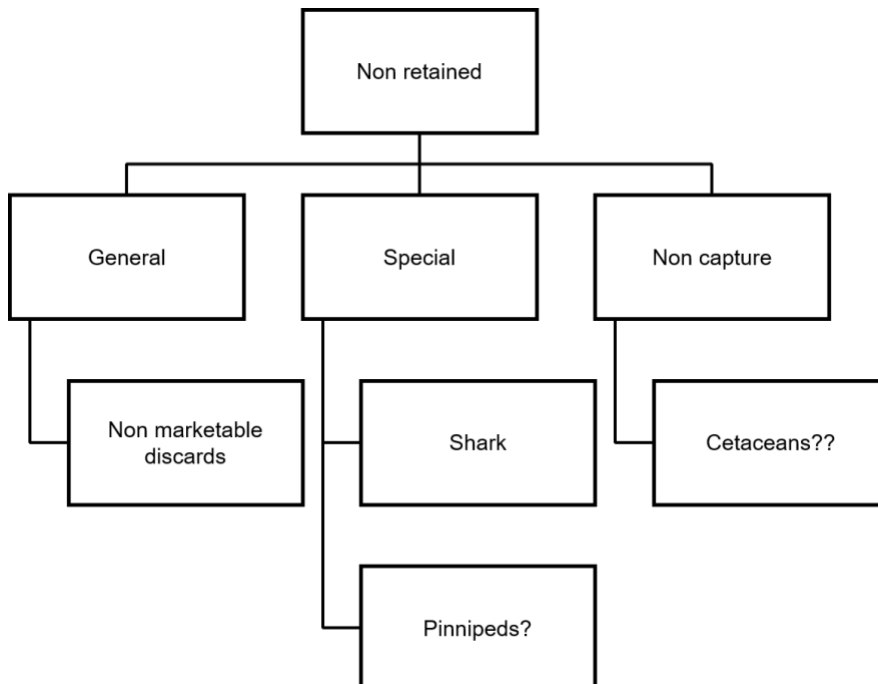
**EAF COMPONENT TREES NAFO**

*N.B. These identify potential issues – a risk analysis would be needed to determine current risk levels and therefore whether direct management was needed.*

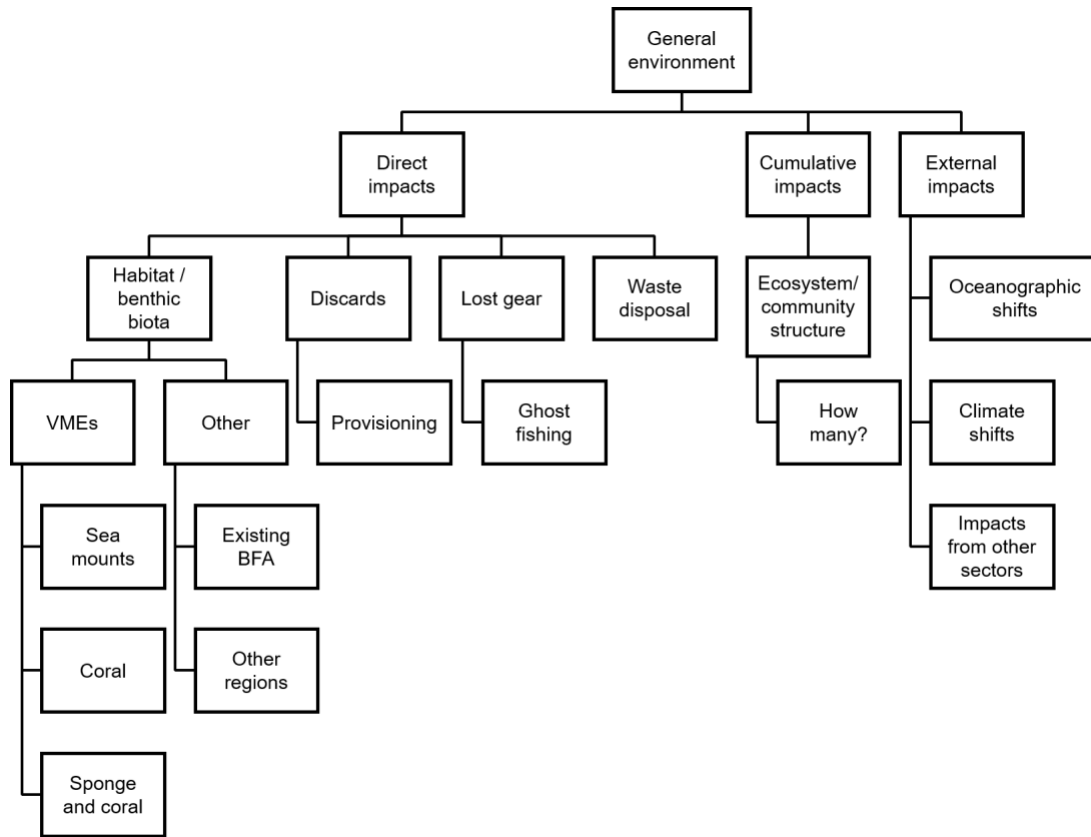
**Retained species NAFO**



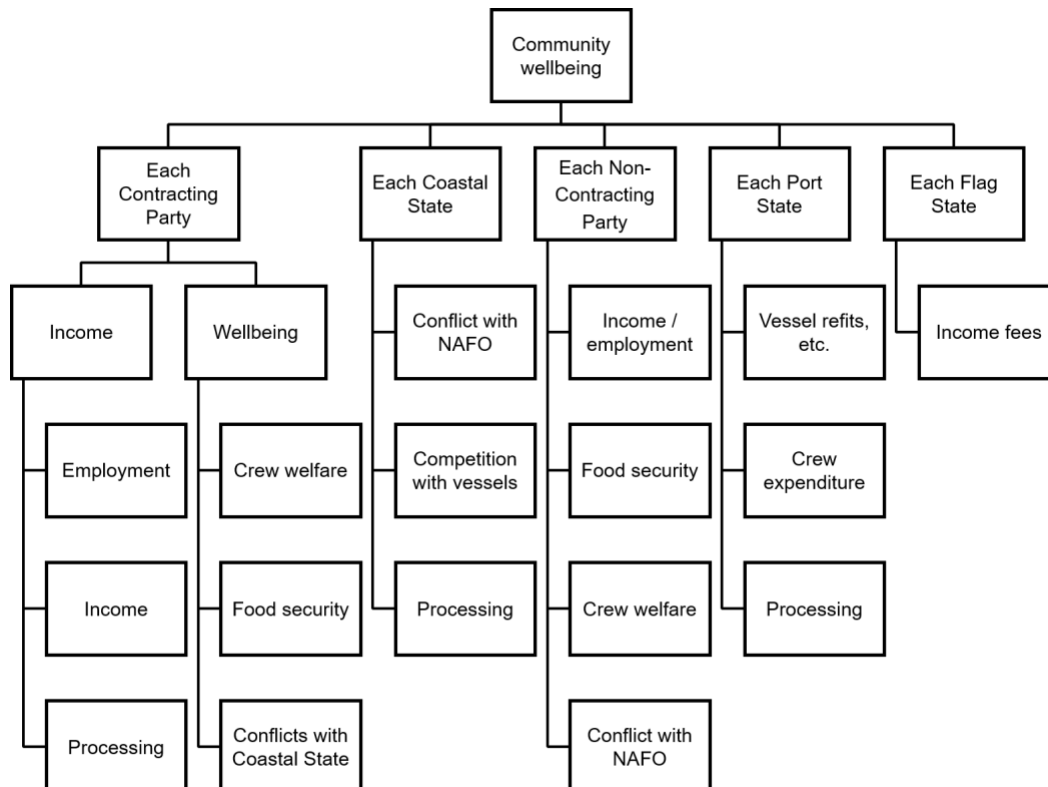
**Non-retained species NAFO**



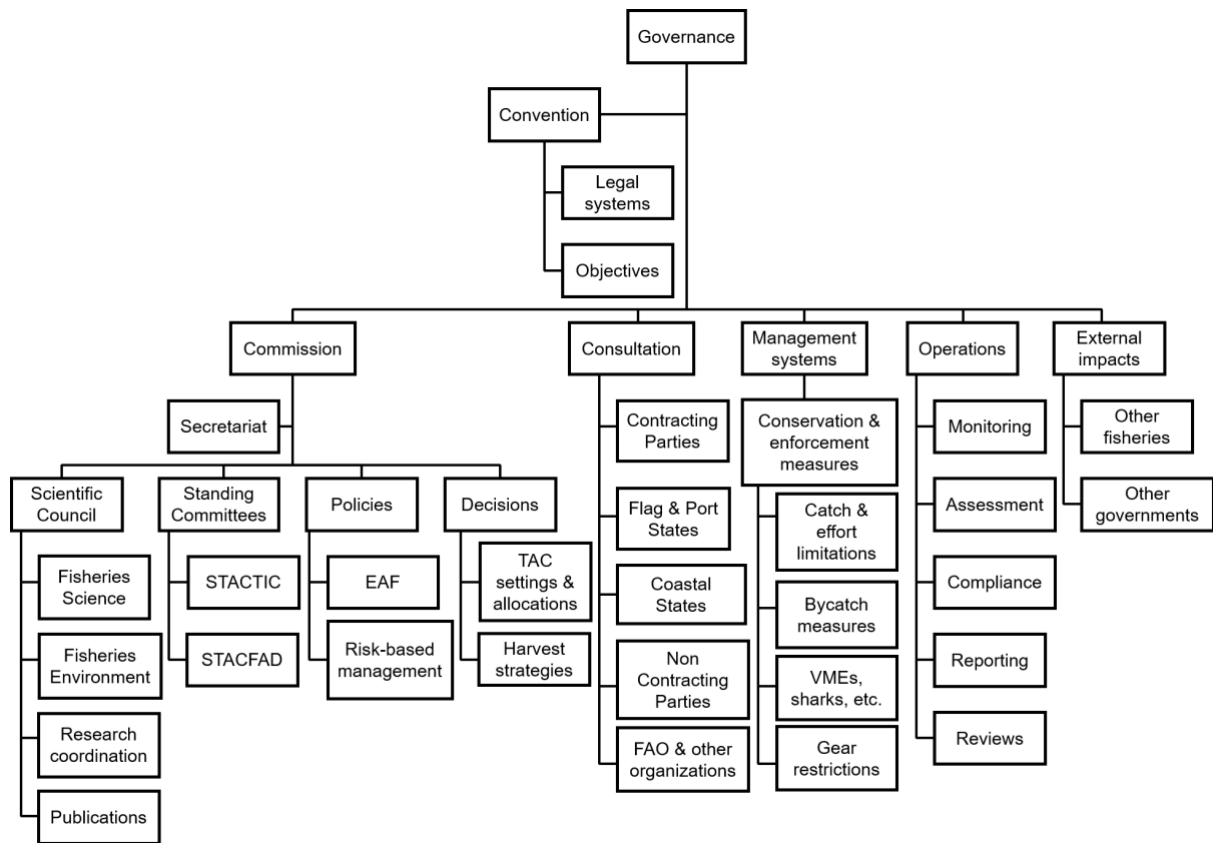
**General environment and ecosystem NAFO**



**Community wellbeing NAFO**



**Governance (ability to achieve) NAFO**



## A2.4 North East Atlantic Ocean - North East Atlantic Fisheries Commission

### EAFC BACKGROUND REPORT

#### Acknowledgement of sources

A significant proportion of the material used for this background report was obtained from information publicly available on the NEAFC website,<sup>22</sup> the relevant chapter of the FAO Technical Paper 595 (Ásmundsson et al., 2016) and the FAO Scan on RFMO Measures (FAO, 2018, unpublished). These sources are not referenced individually everywhere in the following text except for tables and figures.

#### Overview

The NEAFC operates in the northeast Atlantic and most of its convention area is comprised of parts of the region's coastal state EEZs. There are essentially three regulatory areas where the Convention operates, with five contracting parties and five non-contracting parties. While a management body for this area has been in place since 1959, it was only formally converted into a Commission in 2004.

There are two main types of fishing managed in these areas: a pelagic fishery that captures herring, redfish and mackerel using pelagic gear, and fisheries that target haddock and other deep-sea species using demersal fishing gears. Especially for the deep-sea fisheries, the majority of the captures occur in non-regulatory areas that are part of the EEZs of the main contracting parties.

Historically, NEAFC has focused on the target species of the fisheries being managed, and bycatches of other economically important species. Since the 1990s, there has been an increasing focus on the effects of fisheries on other parts of the marine ecosystem and on the protection of biodiversity. In 2006, the NEAFC Convention was amended to formally enable measures to be adopted for this purpose.

#### Convention/mandate

The North East Atlantic Fisheries Commission (NEAFC) is a regional fisheries management organization (RFMO) established under Article 118 of the United Nations Convention on the Law of the Sea to promote the cooperation of states in the conservation and management of living marine resources in the high seas. It was originally established in 1959, but in 1982 a new convention, with broadly similar objectives, entered into force. Amendments to the 1982 Convention adopted in 2004 and 2006 formed the “new” convention which, among other things, modernized the 1982 Convention to bring it in line with current approaches to managing fisheries, including applying the ecosystem approach.

#### NEAFC Convention

The Convention of Future Multilateral Cooperation in North-East Atlantic Fisheries was adopted on 18 November 1980 and entered into force in 1982, replacing the earlier 1959 North-East Atlantic Fisheries Convention. The current version includes amendments that were adopted by the Commission in 2006 and which entered into force for all contracting parties on 29 October 2013.

*Convention objective:* The objective of the NEAFC is to, “ensure the long-term conservation and optimum utilisation of the fishery resources in the Convention Area, providing sustainable economic, environmental and social benefits.”

To achieve this objective, NEAFC adopts management measures for various fish stocks, and control measures to ensure that they are properly implemented. NEAFC also adopts measures to protect other parts of the marine ecosystem from potential negative impacts by fisheries.

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<sup>22</sup> <https://www.neafc.org/>

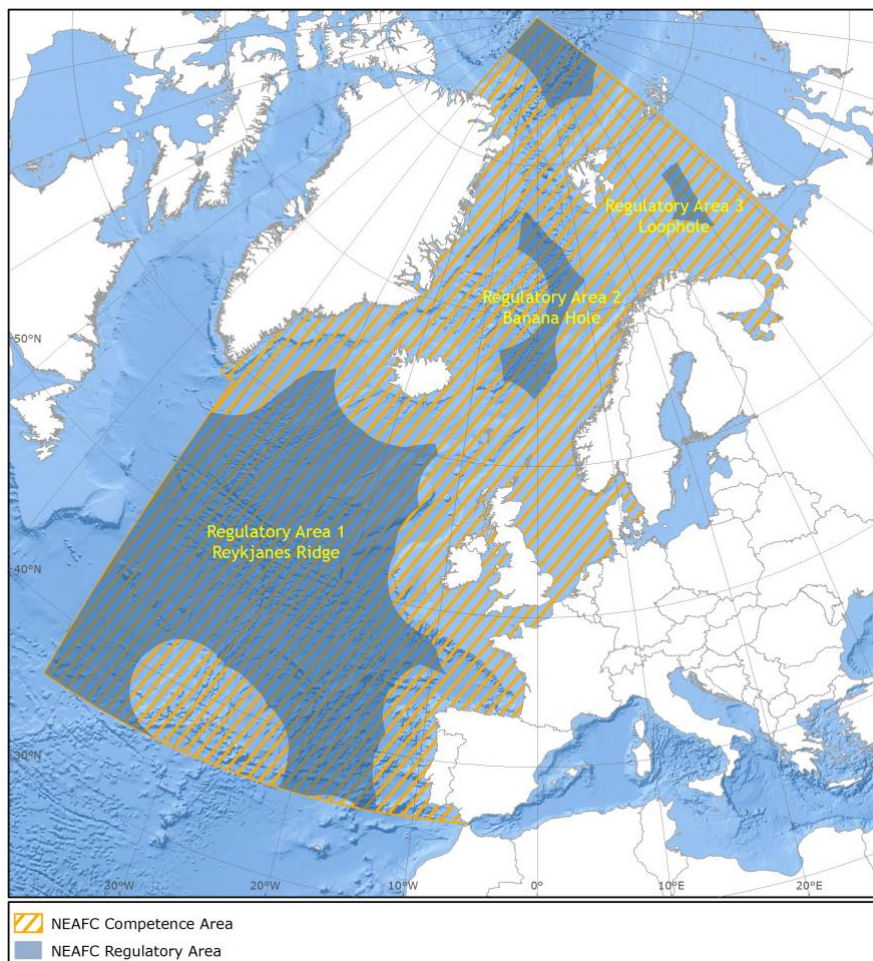
## Guidelines

When making recommendations in accordance with Article 5 or Article 6 of this Convention the Commission shall in particular:

- ensure that such recommendations are based on the best scientific evidence available;
- apply the precautionary approach;
- take due account of the impact of fisheries on other species and marine ecosystems, and in doing so adopt, where necessary, conservation and management measures that address the need to minimize harmful impacts on living marine resources and marine ecosystems; and
- take due account of the need to conserve marine biological diversity.

## Convention and regulatory areas

The convention area is in the northeast Atlantic (Figure A2.4.1). While NEAFC can, with permission of the relevant coastal contracting parties, adopt legally binding measures on all parts of its convention area, in practice the NEAFC is largely focused on those portions that are beyond national jurisdiction. These are collectively known as the Regulatory Area, which comprises four separate areas; however, as the northernmost (Arctic) area is almost permanently ice-covered, there are three high-seas areas.



**Figure A2.4.1:** NEAFC Competence and regulatory areas (Source: FAO, 2016)

*Contracting parties to the Convention:* There are currently five contracting parties: Denmark (in respect of the Faroe Islands and Greenland), the European Union, Iceland, Norway, and the Russian Federation; there are also five cooperating, non-contracting parties (Bahamas, Canada, Liberia, New Zealand, and Saint Kitts and Nevis).

## Governance and administration

### *The Commission*

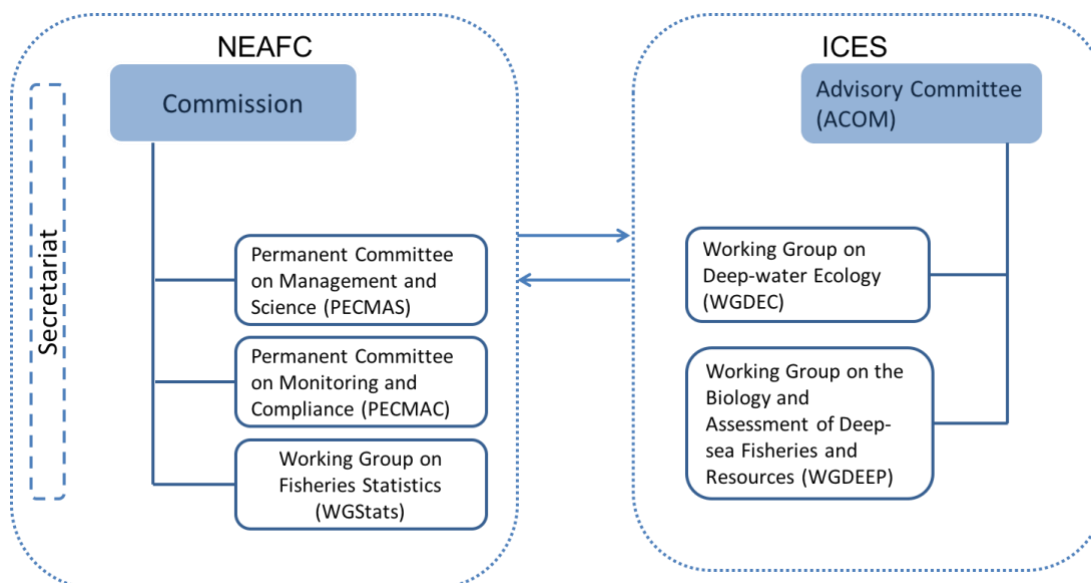
The governing body of NEAFC is called the Commission, which consists of no more than two representatives from each contracting party.

The Convention requires the Commission to provide a forum for consultation and exchange of information on the state of the fishery resources in the convention area, as well as on management policies, including examination of the overall effects of such policies on the fishery resources and, as appropriate, other living marine resources and marine ecosystems. Proposals for action are submitted to the Commission by a contracting party or a subsidiary body. These are usually considered at the Commission's annual meeting.

The Commission may consider measures for:

- the regulation of fishing gear and appliances, including the size of mesh of fishing nets;
- the regulation of the size limits of fish that may be retained on board vessels, or landed or exposed or offered for sale;
- the establishment of closed seasons and of closed areas;
- the improvement and increase of fishery resources, which may include artificial propagation, the transplantation of organisms and the transplantation of young;
- the establishment of total allowable catches and their allocation to contracting parties;
- the regulation of the amount of fishing effort and its allocation to contracting parties.

NEAFC does not have an internal scientific body. Instead, this advice is largely provided by the International Council for the Exploration of the Seas (ICES) through a Memorandum of Understanding (MoU) (see Figure A2.4.2).



**Figure A2.4.2:** Relationship between NEAFC and ICES, adjusted from FAO report (Source: FAO, 2016)

The Commission is further assisted by three permanent internal committees, a number of working groups, and a secretariat.

PECMAC Permanent Committee on Monitoring and Compliance - this committee is comprised of representatives from all contracting parties. It is responsible for advising the Commission on issues relating to fishing controls and the enforcement of the scheme.

PECMAS Permanent Committee on Management and Science - this committee manages contact with ICES, the International Council for the Exploration of the Sea, which provides science-based advice to NEAFC. It advises the Commission on measures related to area management (areas closed to fisheries).  
 FAC Finance and Administration Committee - this committee is comprised of representatives drawn from different contracting parties, with all contracting parties represented. It is responsible for advising the Commission on all aspects of the Commission's annual budget. The FAC also advises the Commission on staffing and administrative matters.

### **Working groups**

Working groups are formed from representatives of the contracting parties to discuss very detailed information concerning specific issues and areas; they then present their advice to the Commission as a whole.

JAGDM Joint Advisory Group on Data Management is an independent group active between the North East Atlantic Fisheries Commission (NEAFC) and the North West Atlantic Fisheries Organization (NAFO) to harmonize data collection between the two organizations and offer technical advice to contracting parties and other RFMOs if requested. Information on this joint group is published on its own website.<sup>23</sup>

WGStats Working Group on Statistics is responsible for the collection and communication of statistics relating to the fisheries regulated by NEAFC.

WGFN Working Group on the Future of NEAFC.

*The Secretariat:* The management of the Commission is undertaken by an independent secretariat based in London. The Secretariat was established in 1999 following changes in relevant international law. The current secretariat is made up of six members of staff. The position of Secretary is a fixed-term appointment for four years.

### **Scientific studies and advice**

The Convention outlines that the Commission shall seek information and advice from the International Council for the Exploration of the Sea. Such information and advice shall be sought on those matters relating to the Commission's activities and falling within the competence of ICES, including information and advice on: the biology and population dynamics of the fish species concerned, the state of the fish stocks, the effect of fishing on those stocks, and measures for their conservation and management (see Figure A2.4.2).

In order to facilitate the task of ICES providing information and advice to the Commission, the Commission shall seek to establish, in cooperation with the Council, arrangements to ensure that research studies for this purpose, including joint studies, are encouraged and conducted efficiently and without undue delay. The Commission may establish working arrangements with any other international organization which has related objectives.

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<sup>23</sup> <https://www.jagdm.org/>



There is an MOU between ICES and NEAFC which requires ICES to: provide NEAFC with scientific information and advice, which is independent and free from political influence and subject to best international quality procedures for research and research-based advice. The technical basis for the advice and the process through which it is produced will be transparent and the quality of the technical basis is ensured through internal and external peer review (NEAFC, 2007).

### **Interactions with other fisheries and bodies**

The Convention outlines that the Commission shall seek to ensure consistency between its recommendations to stocks or group of stocks and those occurring under the jurisdiction of a contracting party, and any measures and decisions taken by such a contracting party for the management and conservation of that stock or group of stocks with respect to fisheries within the area under its jurisdiction. While there are other management bodies that operate in the convention area (e.g. salmon, tuna, whales) NEAFC does not assess or manage any of the species managed by these bodies.

NEAFC works collaboratively with NAFO, which is effectively its counterpart in the northwest Atlantic Ocean. Furthermore, all NEAFC contracting parties are also parties of NAFO, and may be in other RFMOs and provide reports to these other bodies where relevant. Some NEAFC contracting parties are also members of the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR) and the Secretariat is encouraged to cooperate with all relevant bodies (e.g. UN, FAO, ICES etc). The NEAFC annual report outlines that it has relationships with ICES, UN, FAO, OSPAR, International MCS Network, North Atlantic Coast Guard, Forum Nordic cooperation, civil society.

### **Consultation and decision-making processes**

When the Commission makes recommendations on fisheries resources and management, these decisions must: a) be based on the best scientific evidence available; b) apply the precautionary approach; c) take account of the impact of fisheries on other species and marine ecosystems, and minimize harmful impacts on living marine resources and marine ecosystems; and d) take account of the need to conserve marine biological diversity.

Each contracting party has one vote in the Commission. Decisions shall be taken by a simple majority, or, if this Convention specifically requires a qualified majority, by a two-thirds majority of the votes of all contracting parties present. If there is an even split of votes on any matter which is subject to a simple majority decision, the proposal shall be regarded as rejected.

The Commission may, by a qualified majority, make recommendations concerning measures of control relating to fisheries conducted in areas beyond the national jurisdiction of contracting parties for the purpose of ensuring the application of this Convention and any recommendations adopted thereunder.

### **Overview of the fishery**

#### *Fishing fleet and methods*

NEAFC divides its fisheries into the following categories:

*Pelagic fisheries using pelagic gear:* redfish (oceanic *Sebastes mentella* and pelagic deep-sea *Sebastes mentella*); mackerel; haddock; herring (Norwegian Spring- Spawning Atlanto-Scandian); and blue whiting.

*Deep-sea species:* those fisheries that target haddock and other deep-sea species, which use demersal fishing gears. These demersal gears include those that touch the bottom during normal operation, plus benthopelagic gears targeting grenadier (*Coryphaenoides rupestris*) and alfonsino (*Beryx splendens* and *B. decadactylus*) that may not touch bottom but catch fish resources just off the seabed.

The main deepwater fisheries in the regulatory area are currently conducted on the upper slopes of Hatton and Rockall Banks. Deep-sea fishing has been conducted by the Faroese, Icelandic, Latvian, Polish, Spanish and Russian trawl and Norwegian longline vessels throughout the northeast Atlantic in ICES Subareas X, XII, XIV and V.

## Fisheries resources

### *Target species*

Pelagic fisheries: The main species are haddock, herring mackerel and redfish and blue whiting. There are no discards of these species (which are on the list Annex I A) of the Scheme of Control and Enforcement (recommendation 16/2010). The catches of these species taken in 2015 in the regulatory area were:

Species	Reported catch NEAFC RA (tonnes)
Haddock	243
Herring	22 470
Mackerel	147 465
Redfish	31 428
Blue Whiting	336 745

*Deepwater fishery:* There are approximately 40 species captured by bottom fishing (Annex 1). These were principally Greenland halibut (*Reinhardtius hippoglossoides*) and roughhead grenadier. For the entire convention area (regulatory area and national waters), landings of deep-sea species in 2012 were 173 000 tonnes; but the landings from the regulatory area were a small proportion of this, with only a few thousand tonnes (1.2 percent) of the total landings of these species from the northeast Atlantic.

### Catch and effort history

*Deep-sea fishery:* A report has recently been published (Bergstad, 2018) on deep-sea fisheries in the North East Atlantic Commission (NEAFC) Regulatory Area 1973–2016. The report is based on analysis of data provided to NEAFC by its contracting parties covering a period from 1973 to 2016, and in particular on data from 2003 to 2016.

The species of deep-sea fish covered in the report are those regulated by NEAFC, which include 25 bony fishes, 23 sharks, rays, and chimaeras and the deep-sea red crab. The report does not cover discarded fish, and aims to restrict itself to the NEAFC regulatory area.

Key findings were that the landings and effort in the regulatory area have declined significantly in the most recent years of the 1973–2016 period. Some contracting parties that previously fished deep-sea species in the regulatory area have barely fished there in recent years. The combined landings of deep-sea species for all contracting parties in the NEAFC regulatory area for the period 2003–2015 suggest a declining trend after around 2008 to less than 2 000 tonnes in 2011–2012.

The 2014 WGDEEP report provides an extensive review of deep-sea fisheries, including a section that covers the fisheries of the MAR, which started in 1973 and in 1975 landed around 30 000 tonnes of

roundnose grenadier (*Coryphaenoides rupestris*) alone. Later, aggregations of alfonsino (*Beryx splendens*), orange roughy (*Hoplostethus atlanticus*), cardinal fish (*Epigonus telescopus*), tusk, giant redfish (*Sebastes marinus*) and blue ling (*Molva dypterygia*) were found. Since then the catches of these fisheries have fallen to comparatively low levels, but have stabilized at reduced levels on continental slopes.

### **Stock assessments**

The ICES MOU outlines that ICES agrees to provide NEAFC with: (a) annual standard “recurring” advice on the state and management of the main commercial stocks in the NEAFC convention area listed in Annex 1, and the state of the marine ecosystem according to the form established in Annex 2. In particular, ICES will focus on resources in NEAFC regulatory area as set out in list A in Annex 1.

Advice is provided regarding marine ecosystems within the geographical scope of this agreement. The particular stocks listed in Annex 1 of the MOU cover all main species and stocks for which the Commission has specific responsibility.

Advice is normally provided for each calendar year. However, for stocks where measurement precision is low compared to the expected magnitude of changes in stock size, advice may be provided at greater than yearly intervals. For short-lived species and highly seasonal fisheries the timing of the advice shall be adapted as appropriate.

The recurring advice shall:

- include information on the state of marine ecosystems and human impacts, including historical developments in the main parameters and information on the present state and recent development of stocks;
- provide information on the state of stocks and fisheries including, where available, historical developments in spawning stock biomass, total stock biomass, fishing mortality, landings and discards;
- include advice on long-term management strategies and the short- and medium-term implications of these as detailed below.

When providing fisheries advice ICES shall take account of all available information and the context of fisheries management, including information from the fishing industry, ecosystem considerations, environment and hydrographical conditions, regulations in force that affect fisheries, factors affecting fishing operations and information about the fisheries, development of fisheries technology and relevant performance changes, as well as other relevant factors that affect fishing or fish stocks.

### **Non-retained species**

The MOU with ICES covers the most of the bycatch species including 40 species of demersal fish, sharks, rays etc.

### **Seabirds/mammal interactions**

No information found.

### **Bottom impacts/VMEs and impact assessments**

The mapping of bottom fishing areas commenced with discussions in PECMAS in June 2008. The Secretariat also compiled maps of bottom fishing from VMS records, although it was not always possible to identify the type of fishery from those records. The first map of existing bottom fishing areas was adopted in 2009, then improved and modified in 2010 and 2014.

### Other potential direct and cumulative ecosystem impact assessments

The advice from ICES shall be based on an ecosystem approach. This will be implemented incrementally so that any information on the interactions between fisheries, fish stocks and the marine ecosystem is considered and incorporated into advice as it becomes available; specifically, by taking ecosystem and environmental considerations into account when providing the recurring advice mentioned above, ICES will:

- Assess the extent to which fishing disturbs the marine ecosystems and, where reference levels have been established, compare the impact to the reference level chosen.
- Provide any new information regarding the impact of fisheries on other components of the ecosystem, including small cetaceans and other marine mammals, sea birds and sensitive habitats.
- Inform NEAFC of any notable impact(s) from other factors on ecosystem structure – and any consequent and imbalances in this same – which may prejudice the stocks of commercially valuable species and their long-term exploitation.
- Propose reference points as guidance for management in an ecosystem context. In addition, ICES will provide warnings of any serious threats from fishing activities, whether isolated or in conjunction with any other relevant activity, to local ecosystems or species as soon as ICES becomes aware of such threats.

### Social and economic status/impacts

No information identified.

### Fisheries management

#### *Management measures*

NEAFC decides on conservation and/or management measures for the regulatory area (Article 5). Article 7 of the Convention outlines that it may exercise its functions through the Commission by considering measures for:

- (a) the regulation of fishing gear and appliances, including the size of mesh of fishing nets;
- (b) the regulation of the size limits of fish that may be retained on board vessels, or landed or exposed or offered for sale;
- (c) the establishment of closed seasons and of closed areas;
- (d) the improvement and increase of fishery resources, which may include artificial propagation, the transplantation of organisms and the transplantation of young;
- (e) the establishment of total allowable catches and their allocation to contracting parties;
- (f) the regulation of the amount of fishing effort and its allocation to contracting parties.

Measures are decided by the parties which make up the Commission on the basis of scientific advice from an independent scientific body (ICES). The current set are summarized in Table A2.4.1.

**Table A2.4.1:** Current set of management recommendations

Recommendation	In force from	In force to
Rec 18 2018: Blue whiting	2018-04-07	2018-12-31
Rec 01 2018: Redfish in the Irminger Sea	2018-02-28	2018-12-31
Rec 03 2018: Herring	2018-02-08	2018-12-31

<b>Recommendation</b>	<b>In force from</b>	<b>In force to</b>
Rec 04 2018: Mackerel	2018-02-08	2018-12-31
Rec 05 2018: Rockall haddock	2018-02-08	2018-12-31
Rec 06 2018: Deep-sea species	2018-02-08	2018-12-31
Rec 07 2018: Deep-sea fisheries	2018-02-08	2018-02-08
Rec 08 2018: Roundnose, roughhead, roughsnout and other grenadiers	2018-03-21	2018-12-31
Rec 09 2018: Roundnose, roughhead, roughsnout and other grenadiers on the Hatton Rockall Bank	2018-03-21	2018-12-31
Rec 10 2018: Recommendation to amend Recommendation 19:2014 on the Protection of VMEs	2018-02-08	2018-02-08
Rec 07 2017: Blue ling in ICES Area XIV	2017-02-09	2020-12-31
Rec 10 2017: Deep-sea sharks	2017-02-09	2019-12-31
Rec 11 2017: Deep-sea rays (Rajiformes)	2017-02-09	2019-12-31
Rec 12 2017: Deep-sea chimaeras	2017-02-09	2019-12-31
Rec 13 2017: Spurdog	2017-02-09	2018-12-31
Rec 14 2017: Providing VMS and Catch Data to ICES	2017-02-09	2018-12-31
Rec 07 2016: Porbeagle: 2016–2019	2016-02-04	2019-12-31
Rec 08 2016: Basking shark 2016–2019	2016-02-04	2019-12-31
Rec 10 2015: Shark fins	2015-02-06	2015-02-06
Rec 11 2015: Sorting grids for shrimp fisheries	2015-02-06	2015-02-06
Rec 19 2014: Protection of VME in NEAFC RA	2014-09-11	2022-12-31
Rec 16 2010: Discards ban 2010	2010-03-03	2010-03-03
Rec 03 2006: Gillnets 2006	2006-02-10	2006-02-10
Rec 02 1986: Blue whiting mesh size 1986	1987-01-01	1987-01-01
Rec 01 1984: Capelin mesh size 1984	1985-01-01	1985-01-01

### **Management of target species**

NEAFC (2016) has adopted an approach to deep-sea fisheries conservation and management that aims to place individual species/stocks into one of the four following components, each of which requires a different character and level of NEAFC regulation:

1. Stock-specific measures. This should apply stocks for which ICES provides stock-specific, catch-level advice based on established stock definitions and where the entire or a significant proportion of the catch is taken in the NEAFC regulatory area. Such measures may be of varying nature, but should typically specify catch limits for fisheries in the NEAFC regulatory area.

2. Measures stipulating that directed fisheries are not authorized and that bycatches should be minimized. This should apply to stocks for which the ICES advice statement is “no directed fishery, minimize bycatch” or similar, but for which no specific catch limit is advised.
3. Measures to respond in a timely and adequate manner to new deep-sea species fishing activity within the NEAFC RA. This should apply to developing fisheries targeting previously unexploited or lightly exploited species/stocks. NEAFC should prevent the unregulated expansion of deepwater fisheries even before information has been gathered to facilitate ICES assessment and advice. Pending ICES advice facilitating the stock-specific measures outlined in point 1 above, such fisheries should be regulated with a precautionary catch limit, preferably but not necessarily advised by ICES.
4. Measures for fisheries primarily restricted to EEZs. NEAFC RA measures may in such cases be irrelevant and could at most be complementary to coastal state conservation and management measures. If an NEAFC measure is deemed necessary or useful, the aim of such a measure would be to complement EEZ measures in order to ensure that total catches remain stable, i.e. within catch limits advised by ICES.

*Catch and effort:* There are recommendations that limit fishing effort and catch related to the management of individual pelagic species, notably: Redfish Rec 01/2018; Herring 03/38, 18:2018 Mackerel 04/18; Haddock 05/18; Blue Ling 07/2017).

There is also a recommendation that limits effort and directed fishing for the suite of deepwater species (Rec 6 /2018).

*Gear:* NEAFC has limited mesh sizes for capelin (Rec 1/1984) and whiting (Rec 2/1986) and it has prohibited the deployment of gillnets, entangling nets, and trammel nets in any position where charted depth is greater than 200 m (Recommendation 3/2006).

### **Harvest strategies**

*Management Advice:* The ICES MOU outlines that it will provide advice on management measures separately for a risk avoidance approach, based on the precautionary approach, and an MSY approach within the limitations of the precautionary approach. The short-term implications of such measures shall be provided and will, when adequate data are available, be expressed as quantified consequences of the management measures currently implemented for that stock or fishery. For the management year (or years in the case of multiannual management regimes), the short-term consequences of relevant management measures should be given for relevant intervals of action while reflecting the uncertainties over expected outcomes. In those cases where uncertainties in the evaluation of outcomes are such that a quantitative distinction between management measures is not possible, ICES shall provide quantitative or qualitative information regarding the expected outcomes of relevant management measures over intervals of action which reflect the uncertainty in the evaluation. In cases where data are insufficient to provide the basis for quantitative advice, ICES shall provide information on the reasons for this deficiency and advice on management measures which, given the uncertainties, are considered consistent with the NEAFC Convention.

Harvest control rules are identified for some stocks and ICES is to provide reference points where required (see above).

### **Management of bycatch species**

Recommendation (11/2015): sorting grids have been implemented for shrimp fishing.

### **Species prohibitions**

There are a number of recommendations related to the prohibited targeting of certain sharks, rays etc (Recommendations 8:2016; 7:2016, 13:2017; 11:2017).

Recommendation 3/2006 prohibited the deployment of gillnets, entangling nets, and trammel nets in any position where charted depth is greater than 200 m.

Recommendation 16: 2010: each contracting party shall ensure that its fishing vessels operating in the regulatory area are prohibited from discarding or releasing catches of any of the species listed in Annex I A of the Scheme of Control and Enforcement.

### **Management of mammals/seabirds**

None found.

### **Management of benthic impacts**

*Area and spatial controls:* NEAFC has used area closures as a key tool to protect vulnerable marine ecosystems. In this light, four NEAFC measures have been further developed over time and now include a number of areas that are closed to bottom fishing. The general approach of NEAFC has been to identify areas where VMEs are known or likely to occur, and to close these areas to bottom fishing activities, in order to protect the VMEs from significant adverse impacts. A number of areas within both 'existing' and 'new' bottom fishing areas have therefore been closed to bottom fishing to prevent significant adverse impacts on VMEs.

Furthermore, severe restrictions are implemented on bottom fishing activities in all areas where bottom fishing activities have not been demonstrated in the recent past. This means that the vast majority of the high seas in the North Atlantic are subject to either a prohibition or severe restrictions on bottom fishing. The closures may be applied to either: bottom trawling and fishing with static gear, including bottom gillnets and longlines, or fishing with gear that is likely to contact the sea floor during the normal course of fishing operations. The current measure (Recommendation 19/2014) uses the latter definition, terming them “bottom fishing activities”. This definition protects VMEs by closing areas to bottom-contact fishing gears regardless of target species, but allows fishing with pelagic and benthopelagic gears to continue, as well as fishing targeting deep-sea species. There is an exploratory fishing protocol related to fishing in “new bottom fishing areas” i.e. outside of the “existing bottom fishing areas”.

Since 2009, all bottom fishing activities in new bottom fishing areas, or with bottom gear not previously used in the area concerned, are considered exploratory fisheries and must be conducted in accordance with an exploratory bottom fisheries protocol (2015), which stipulates that vessels are required to carry observers onboard.

Even in areas where bottom fishing is authorized, several safeguards are in place, including encounter protocols and temporary closures of areas where vulnerable marine ecosystems are unexpectedly encountered. Currently, where encounters in any area are above threshold levels, they are considered an encounter with a possible VME. However, as the possible fishing areas where VMEs are known or likely to occur are either closed to bottom fishing or lie in ‘new’ bottom fishing areas that will probably remain largely unfished, fishing vessels are not expected to encounter VMEs. The list of VME indicator species is available in Annex 5 of Rec 9: 2014; threshold levels for corals and sponges are outlined in Article 9 of Rec 9: 2014.

The encounter protocol for VMEs (Article 8 of Rec 9: 2014), particularly para. 1(b)(ii) of Article 8 (Rec 9: 2014) specified that vessels will move out of an area if an encounter is reported. If there is an encounter, the Secretary will implement a temporary closure (see Article 8, para. 2 of Rec 9: 2014); PECMAS will then determine whether the area should remain closed or if it can be reopened (see Article 8, para 4 of Rec 9: 2014).

Management of gear loss and other restrictions: There is an obligation for vessels fishing with fixed gears to have onboard equipment to retrieve lost gear, and to attempt to do so as soon as possible

(NEAFC, 2018b). If the gear cannot be retrieved, the vessel must report the incident, including the type of gear and its position.

### **Cumulative impacts**

No information found.

### **Management of social and economic outcomes**

No information found.

*Economic impacts:* There are no recommendations that relate directly to economic outcomes.

*Social impacts:* There are no recommendations related to social impacts, but a number of resolutions related to vessel safety.

### **Compliance**

The NEAFC Scheme of Control and Enforcement describes the procedures for monitoring, control and surveillance (MCS) of fishing activities within the NEAFC regulatory area. It is the responsibility of the flag state that licenses the vessel to fish to ensure that it complies with all regulations.

The NEAFC Scheme of Controls and Enforcement covers most aspects required, including:

- Authorizations to fish (Article 4)
- Notifications (Article 5)
- Vessel requirements (Article 6)
- Labelling of fish (Article 8)
- Marking and lost gear (Article 7)
- Inspections at sea (Articles 15–19)
- Port state controls (Articles 20–27)
- Infringements (Articles 28–33)

*Monitoring and surveillance:* The requirements are outlined in the Scheme of Control and Enforcement: VMS the SCE Article 11 requires all contracting party vessels to have VMS.

*Observers:* NEAFC requires that vessels undertaking exploratory fishing carry an onboard observer who collects data in accordance with the VME data collection protocol.

*Reporting:* The annual report of the Commission is posted, as are the reports of the various working groups. Assessments are located on the ICES website. This material is therefore fragmented and it is hard to put together a complete picture of the situation. While this includes annual catches and a document of total catch levels for the region, these are not broken down into regulatory area versus convention area.

### **Scientific information and data collection**

Each contracting party is also required to provide the Commission with the scientific and statistical information required to implement the Convention.

*Catch and effort:* the Scheme of Control and Enforcement requires each contracting party to ensure that all fishing vessels flying its flag and conducting fishing activities under Article 2 keep either a bound fishing logbook with numbered pages or an electronic logbook. In addition, and where appropriate,



vessels should keep a production logbook and stowage plan by species, with their live weight in kilograms – either on a daily basis and/or for each haul. This should include:

- catches retained on board;
- the estimated cumulative catch since entry into the regulatory area;
- the type of gear (number of hooks, length of gillnets, etc);
- the number of fishing operations per day (where appropriate);
- the small statistical rectangle or fishing location (longitude and latitude);
- the amount of fish discarded; and
- the fishing depth (where appropriate).

*Surveys:* Members of ICES conduct scientific cruises and undertake numerous regular repeat surveys in the northeast Atlantic, some of which provide information for assessing deepwater resources and VMEs in the NEAFC regulatory area.

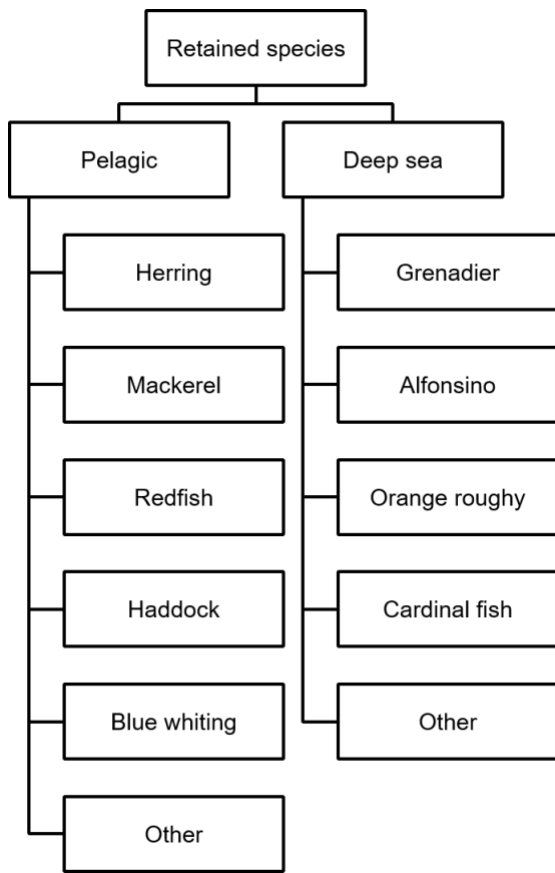
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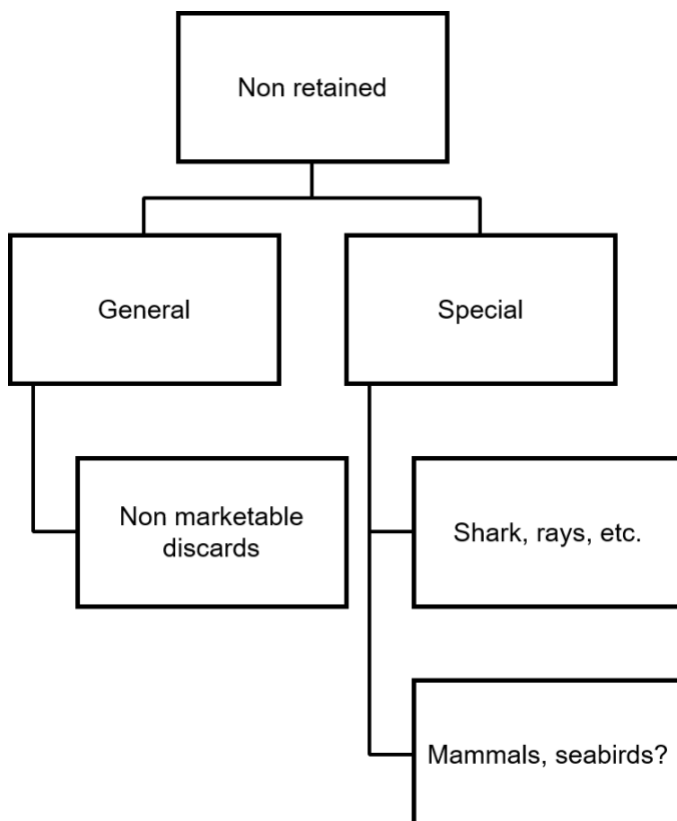
### EAF COMPONENTS NEAFC

*N.B. These identify potential issues – a risk analysis would be needed to determine current risk levels and therefore whether direct management was needed.*

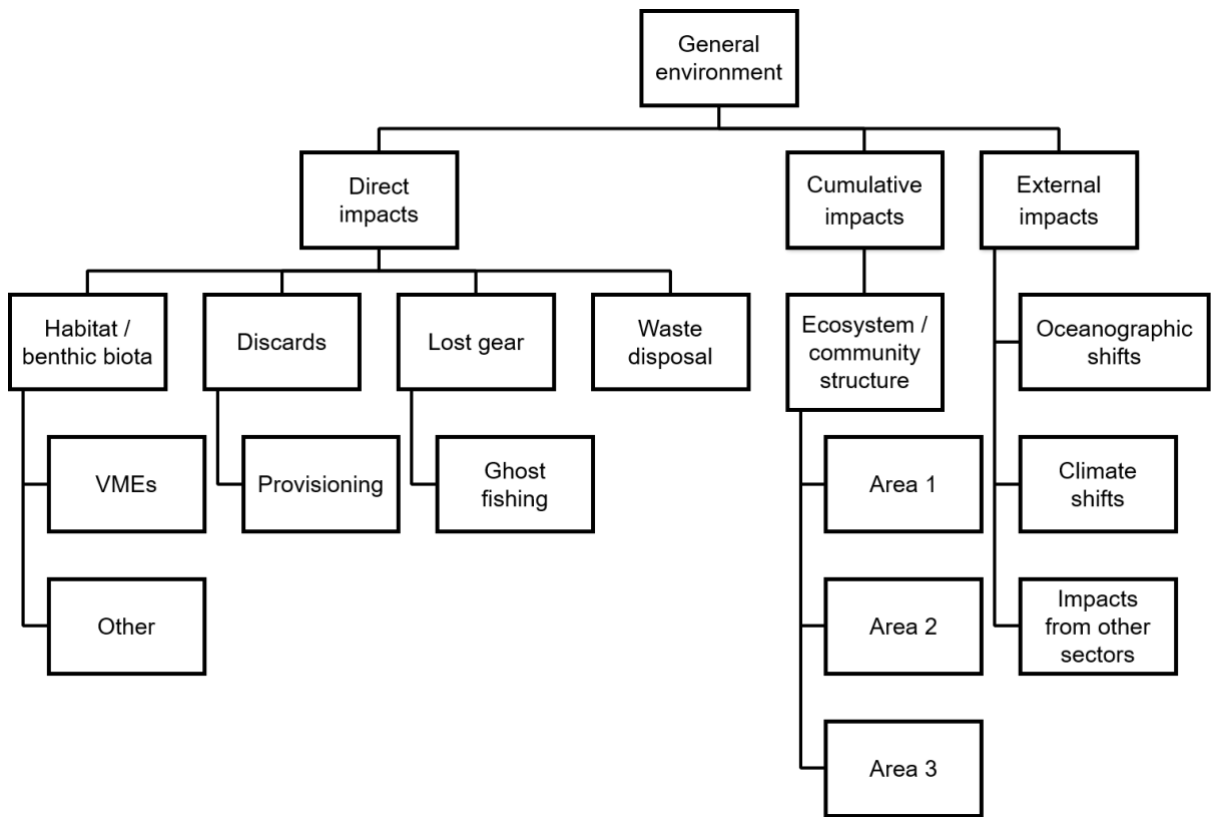
### Retained species NEAFC



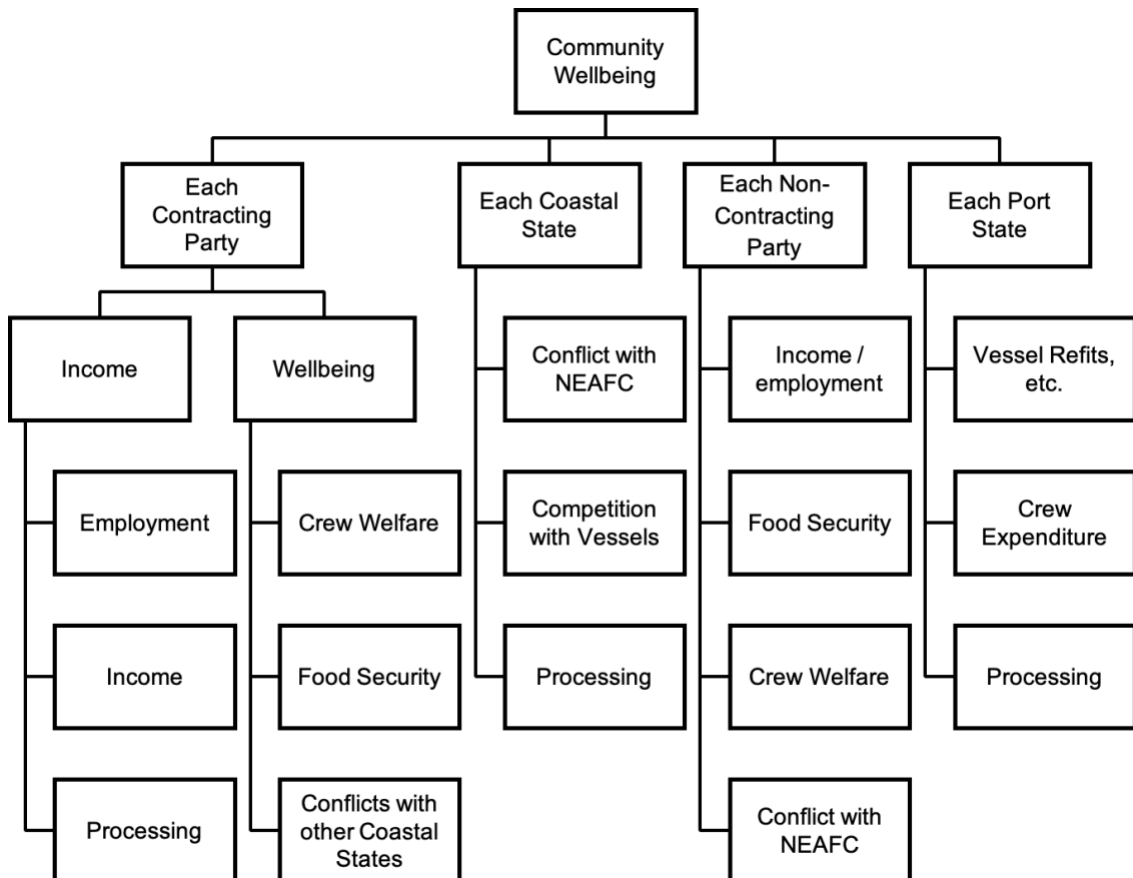
### Non-retained species NEAFC



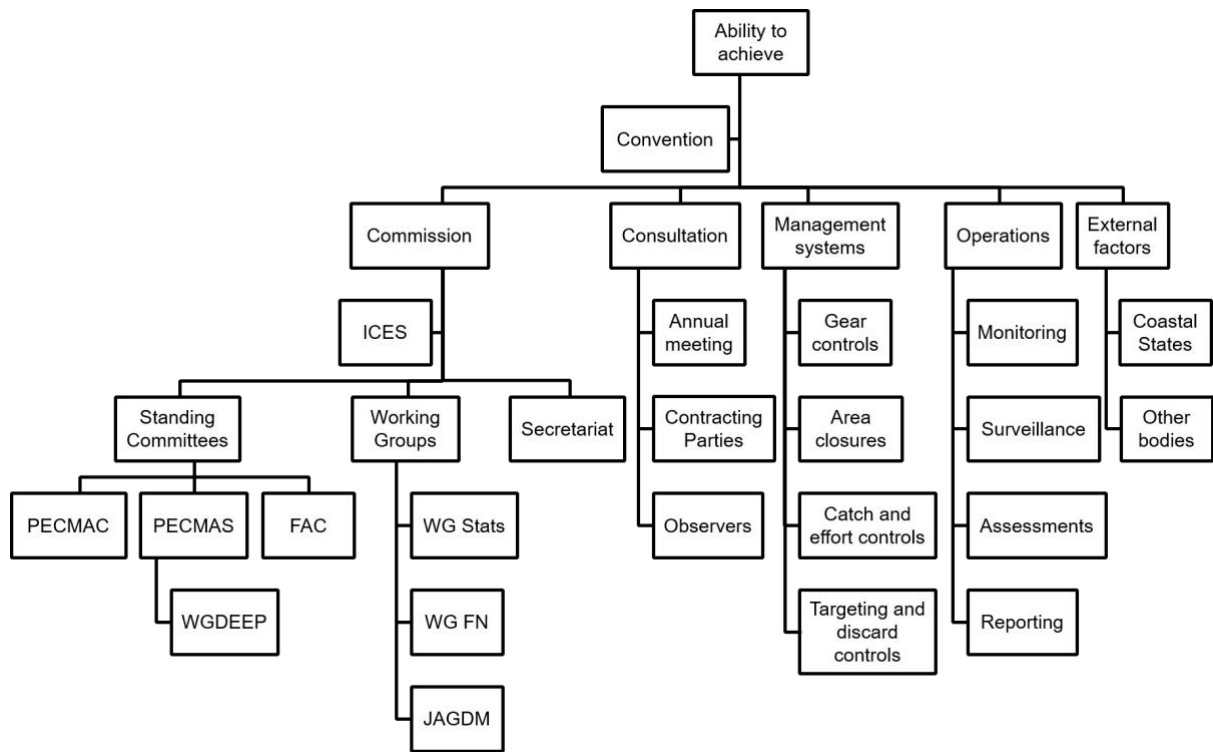
**General environment and ecosystems NEAFC**



**Community wellbeing NEAFC**



**Governance (ability to achieve) NEAFC**



## A2.5 North Pacific Ocean - The North Pacific Fisheries Commission

### EAF BACKGROUND REPORT

#### Acknowledgement of sources

A significant proportion of the material used for this background report was summarized and some cases directly inserted from the relevant chapter of FAO Technical Paper 595 (Dionne, 2016), as well as the documents and pages presented or available on the NPFC website.<sup>24</sup> These sources are not referenced individually everywhere in the following text except for tables and figures.

#### Overview

The North Pacific Fisheries Commission (NPFC) is an intergovernmental organization established by the Convention on the Conservation and Management of High Seas Fisheries Resources in the North Pacific Ocean, which came into effect in 2015.

The objective of the Convention is to ensure the long-term conservation and sustainable use of the fisheries resources in the convention area while protecting the marine ecosystems of the North Pacific Ocean in which these resources occur. The Commission manages the fisheries for both the pelagic and bottom fish stocks.

The fisheries resources covered by the Convention are all fish, mollusks, crustaceans and other marine species caught by fishing vessels within the convention area, excluding:

- sedentary species, insofar as they are subject to the sovereign rights of coastal states; and indicator species of vulnerable marine ecosystems as listed in, or adopted pursuant to the NPFC Convention;
- catadromous species;
- marine mammals, marine reptiles and seabirds; and
- other marine species already covered by pre-existing international fisheries management instruments within the area of competence of such instruments.

Currently, the fish species targeted by the NPFC Members include bottom fish stocks and pelagic fish stocks. The primary target species of the bottom trawl fisheries have been North Pacific armourhead (*Pentaceros wheeleri*) and splendid alfonsino (*Beryx splendens*); the primary target species of the bottom gillnet fisheries have been splendid alfonsino, oreo (*Allocyttus verrucosus*), and mirror dory (*Zenopsis nebulosa*). The pelagic stocks include Pacific saury, chub mackerel (*Scomber japonicus*), spotted mackerel (*Scomber australasicus*), Japanese sardine (*Sardinops melanostictus*), neon flying squid (*Ommastrephes bartramii*), and Japanese flying squid (*Todarodes pacificus*). Catches of each of these species are large, with some (such as mackerel) exceeding a million tonnes per annum in some years.

*Current Members include:* Canada, China, Japan, the Republic of Korea, the Russian Federation, Taiwan Province of China, the United States of America and Vanuatu.

Given this Commission has only just been established, it is to be expected that progress towards implementing many EAF components will only have just been initiated.

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<sup>24</sup> [www.npfc.int](http://www.npfc.int)

## Convention/mandate

Informal consultations on the formation of a commission to address the gap in management of fisheries issues in the North Pacific Ocean commenced in 2006. After formal consultations and preparatory conferences, the Convention on the Conservation and Management of the High Seas Fisheries Resources in the North Pacific Ocean was adopted on 24th February 2012 and came into force on 19 July 2015.

### NPFC Convention

The Convention on the Conservation and Management of High Seas Fisheries Resources in the North Pacific Ocean (2015).

*Convention objective:* The objective of the Convention (Article 2) is “to ensure the long-term conservation and sustainable use of the fisheries resources in the Convention Area while protecting the marine ecosystems of the North Pacific Ocean in which these resources occur.”

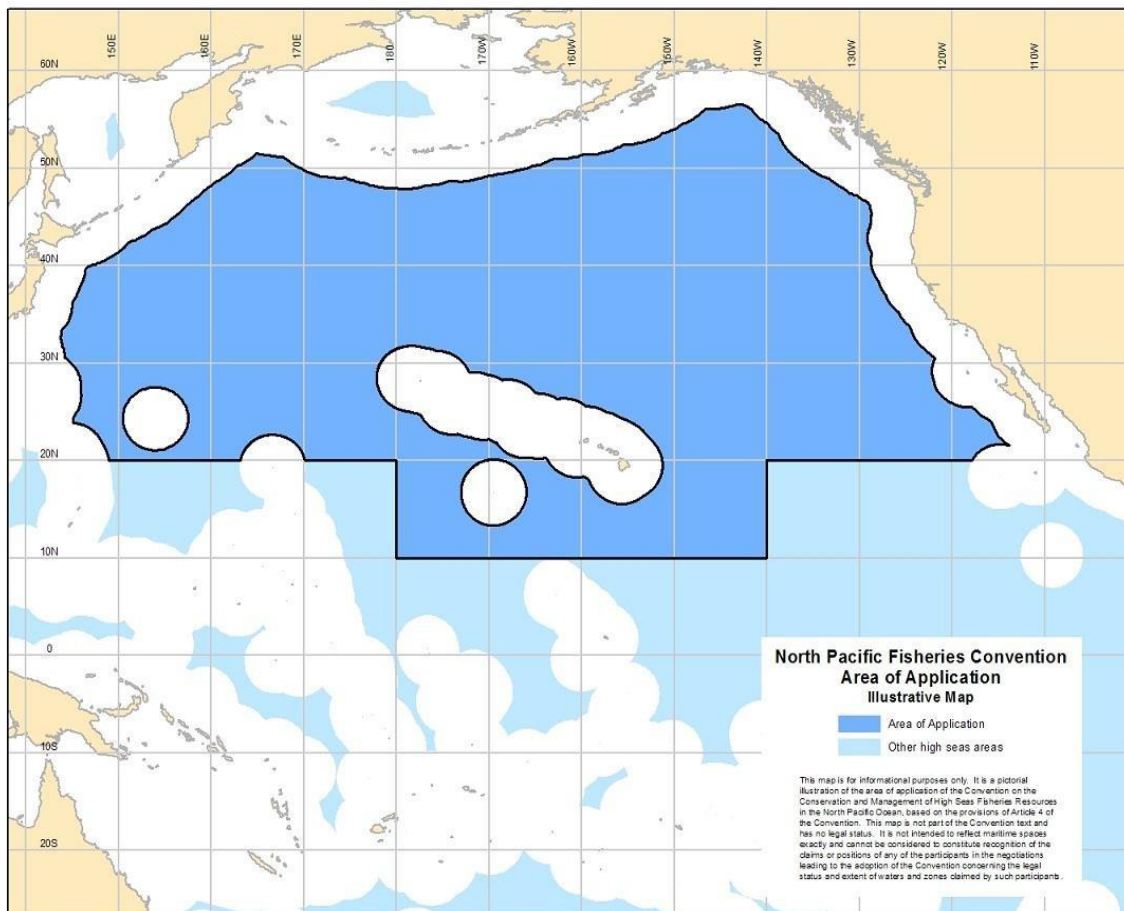
*General principles:* Article 3 gives effect to the objective through the following actions, whether taken individually or collectively as appropriate:

- (a) promoting the optimum utilization and ensuring the long-term sustainability of fisheries resources;
- (b) adopting measures, based on the best scientific information available, to ensure that fisheries resources are maintained at, or restored to, levels capable of producing maximum sustainable yield, taking into account fishing patterns, the interdependence of stocks and any generally recommended international minimum standards whether subregional, regional or global;
- (c) adopting and implementing measures in accordance with the precautionary approach and an ecosystem approach to fisheries, and in accordance with the relevant rules of international law, in particular as reflected in the 1982 Convention, the 1995 Agreement and other relevant international instruments;
- (d) assessing the impacts of fishing activities on species belonging to the same ecosystem or dependent upon or associated with the target stocks and adopting, where necessary, conservation and management measures for such species, with a view to maintaining or restoring their populations above levels at which their reproduction may become seriously threatened;
- (e) protecting biodiversity in the marine environment, including by preventing significant adverse impacts on vulnerable marine ecosystems, taking into account any relevant international standards or guidelines including the FAO International Guidelines;
- (f) preventing or eliminating overfishing and excess fishing capacity, and ensuring that levels of fishing effort or harvest levels are based on the best scientific information available and do not exceed those commensurate with the sustainable use of the fisheries resources;
- (g) ensuring that complete and accurate data concerning fishing activities, including with respect to all target and non-target species within the convention area, are collected and shared in a timely and appropriate manner;
- (h) ensuring that any expansion of fishing effort, development of new or exploratory fisheries, or change in the gear used for existing fisheries, does not proceed without prior assessment of the impacts of those fishing activities on the long-term sustainability of fisheries resources and a determination that those activities would not have significant adverse impacts on vulnerable marine ecosystems, or ensuring that those activities are either managed to prevent those impacts or are not authorized to proceed;
- (i) ensuring, in accordance with Article 7 of the 1995 Agreement, that conservation and management measures established for straddling fish stocks on the high seas and those adopted for areas under national jurisdiction are compatible, in order to ensure conservation and management of these fisheries resources in their entirety;

- (j) ensuring compliance with conservation and management measures, and that sanctions applicable in respect of violations are adequate in severity so as to be effective in securing compliance, to discourage violations wherever they occur and to deprive offenders of the benefits accruing from their illegal activities;
- (k) minimizing pollution and waste originating from fishing vessels, discards, catch by lost or abandoned gear, and impacts on other species and marine ecosystems through measures including, to the extent practicable, the development and use of selective, environmentally safe, and cost-effective fishing gear and techniques; and
- (l) applying this Convention in a fair, transparent and non-discriminatory manner, consistent with international law.

*Contracting parties to the Convention:* The initial parties were Canada, China, Japan, the Republic of Korea, the Russian Federation, the United States of America and Taiwan Province of China, who negotiated on the Convention. Subsequently, the NPFC welcomed two new Members, the United States of America (on 18 February 2017) and the Republic of Vanuatu (on 11 June 2017).

*Area of application:* Article 4 outlines that this Convention applies to the waters of the high seas area of the North Pacific Ocean, excluding the high seas areas of the Bering Sea and other high seas areas that are surrounded by the exclusive economic zone of a single state (see Figure A2.5.1). The area of application is bounded to the south by a continuous line that begins at the seaward limit of waters under the jurisdiction of the United States of America around the Commonwealth of the Northern Mariana Islands at 20° North latitude, then proceeding East and connecting the following coordinates: 20°00'00"N, 180°00'00"E/W; 10°00'00"N, 180°00'00"E/W; 10°00'00"N, 140°00'00"W; 20°00'00"N, 140°00'00"W; and thereafterwards East to the seaward limit of waters under the fisheries jurisdiction of Mexico.

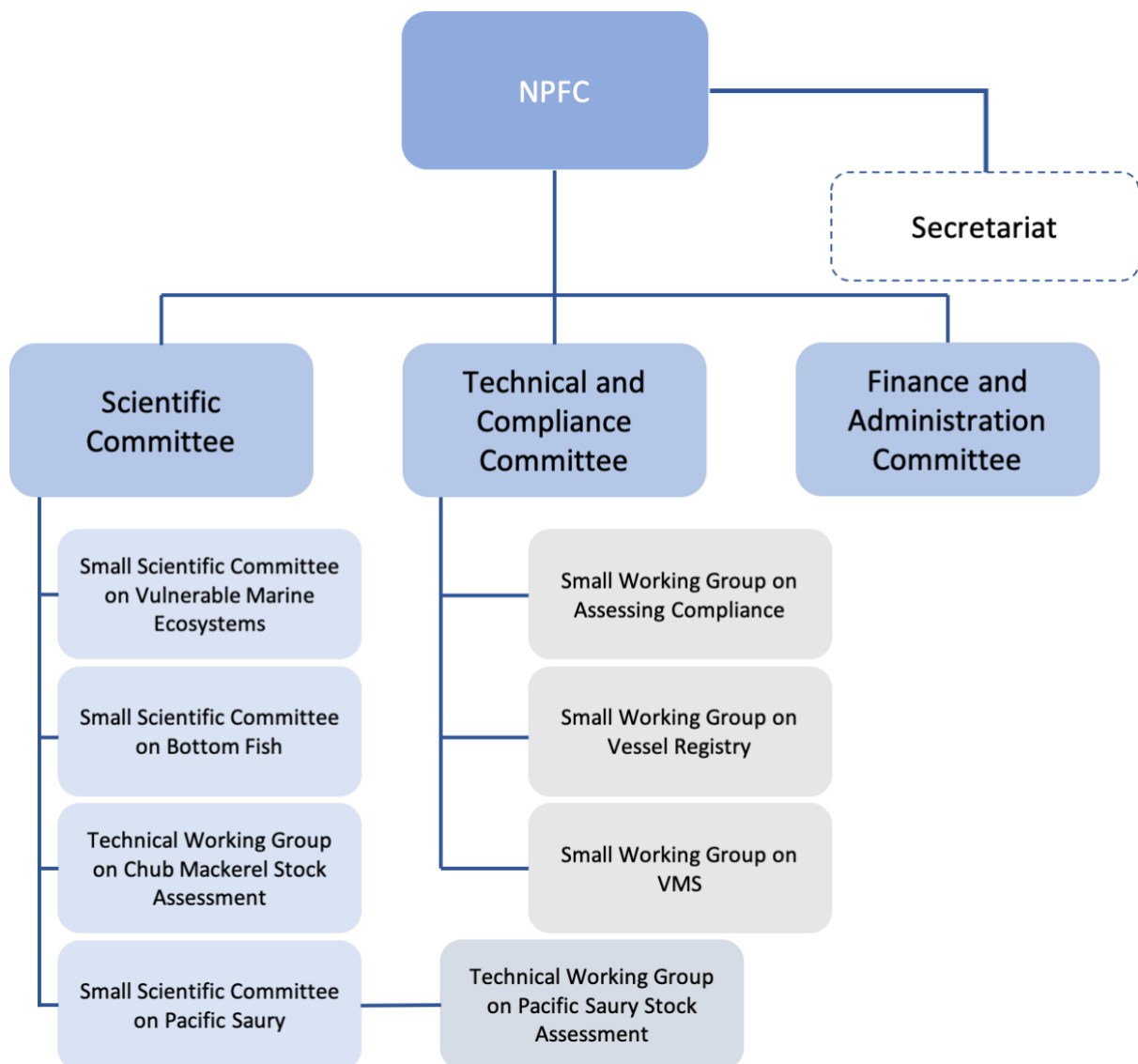


**Figure A2.5.1:** Map of the convention area showing its area of application (NPFC, 2020)

## Structure of the Commission

The Commission was established under Article 5 and is formed by all its Members and cooperating non-contracting parties. The Commission is supported by three subsidiary bodies: the Scientific Committee (SC); the Technical and Compliance Committee (TCC) and the Finance and Administration Committee (FAC). Each of these subsidiary bodies may then have their own specialist technical supporting groups (see Figure A2.5.2).

At present, there are five such groups under the Scientific Committee: the Small Scientific Committee on Pacific Saury (SSC PS); the Small Scientific Committee on Bottom Fish (SSC BF); the Small Scientific Committee on Vulnerable Marine Ecosystems (SSC VME); the Technical Working Group on Pacific Saury Stock Assessment; and the Technical Working Group on Chub Mackerel Stock Assessment.



**Figure A2.5.2:** Governance Structure of NPFC (adapted from NPFC, 2020)



Following the Third Commission Meeting, the Technical and Compliance Committee formed three small working groups (SWGs) to address specific areas of its work plan: SWG on Assessing Compliance; SWG on Vessel Registry and SWG on Vessel Monitoring Systems (VMS).

In the first two years the NPFC has established a Scientific Committee which has conducted two full sets of meetings with the small scientific committees for: Vulnerable Marine Ecosystems; North Pacific armourhead; and Pacific saury; as well as two scientific committee meetings and a series of two preliminary stock assessment meetings, in addition to one for chub mackerel.

Furthermore, there have been two Technical and Compliance Committee meetings, and a Special Working Group on Finance and Administration; the latter led to the establishment of a formal Finance and Administration Committee, which had its first official meeting as a new subsidiary committee in July 2017.

### **The Commission**

In accordance with the principles set out in Article 3 of the Convention, and based on the best scientific information available as well as the advice of the Scientific Committee, the Commission shall:

- (a) adopt conservation and management measures to ensure the long-term sustainability of the fisheries resources within the convention area, including the total allowable catch or total allowable level of fishing effort for those fisheries resources as the Commission may decide;
- (b) ensure that levels of total allowable catch or total allowable level of fishing effort are in accordance with the advice and recommendations of the Scientific Committee;
- (c) adopt, where necessary, conservation and management measures for species belonging to the same ecosystem, or dependent upon or associated with the target stocks;
- (d) adopt, where necessary, management strategies for any fisheries resources and for species belonging to the same ecosystem, or dependent upon or associated with the target stocks, as may be necessary to achieve the objective of this Convention;
- (e) adopt conservation and management measures to prevent significant adverse impacts on vulnerable marine ecosystems in the convention area, including but not limited to:
- (f) measures for conducting and reviewing impact assessments to determine whether fishing activities would produce such impacts on such ecosystems in a given area
- (g) measures to address unexpected encounters with vulnerable marine ecosystems in the course of normal bottom fishing activities, and
- (h) as appropriate, measures that specify locations in which fishing activities shall not occur;
- (i) determine the nature and extent of participation in existing fisheries, including through the allocation of fishing opportunities;
- (j) establish by consensus the terms and conditions for any new fisheries in the convention area and the nature and extent of participation in such fisheries, including through the allocation of fishing opportunities; and
- (k) agree on means by which the fishing interests of new contracting parties may be accommodated in a manner consistent with the need to ensure the long-term sustainability of the fisheries resources covered by this Convention.

The Commission shall adopt measures to ensure effective monitoring, control and surveillance, as well as compliance with, and enforcement of, the provisions of this Convention and measures adopted pursuant to it. To this end, the Commission shall:

- (a) establish procedures for the regulation and monitoring of transshipment of fisheries resources and products of fisheries resources taken in the convention area, including notification to the Commission of the location and quantity of any transshipment;
- (b) develop and implement a North Pacific Ocean Fisheries observer program (“Observer Program”), taking into account relevant international standards and guidelines;
- (c) establish procedures for the boarding and inspection of fishing vessels in the convention area;

- (d) establish appropriate cooperative mechanisms for effective monitoring, control and surveillance to ensure enforcement of the conservation and management measures adopted by the Commission including mechanisms to prevent, deter and eliminate IUU fishing;
- (e) develop standards, specifications and procedures for members of the Commission to report movements and activities using real-time satellite position-fixing transmitters for vessels engaged in fishing activities in the convention area and, in accordance with those procedures, coordinate timely dissemination of data collected from members' satellite vessel monitoring systems;
- (f) establish procedures by which entry into and exit from the Convention Area of fishing vessels catching or planning to catch fisheries resources in the Convention Area are notified to the Commission in a timely manner;
- (g) establish, where appropriate, non-discriminatory market-related measures consistent with international law to prevent, deter and eliminate IUU fishing; and
- (h) establish procedures for reviewing compliance with the provisions of this Convention and measures adopted pursuant to this Convention.

### **Secretariat**

Under Article 5 (9) of the Convention, the Commission may establish a permanent Secretariat to carry out contractual arrangements and other administrative aspects of the operations of the Commission.

### **Scientific Committee**

Article 10 states that the functions of the Scientific Committee shall be to:

- (a) recommend to the Commission a research plan, including specific issues and items to be addressed by the scientific experts or by other organizations or individuals, as appropriate, and identify data needs and coordinate activities that meet those needs;
- (b) regularly plan, conduct and review the scientific assessments of the status of fisheries resources in the Convention Area, identify actions required for their conservation and management, and provide advice and recommendations to the Commission;
- (c) collect, analyze and disseminate relevant information;
- (d) assess the impacts of fishing activities on fisheries resources and species belonging to the same ecosystem or dependent upon or associated with the target stocks;
- (e) develop a process to identify vulnerable marine ecosystems, including relevant criteria for doing so, and identify, based on the best scientific information available, areas or features where these ecosystems are known to occur, or are likely to occur, and the location of bottom fisheries in relation to these areas or features, taking due account of the need to protect confidential information;
- (f) identify and advise the Commission on additional indicator species for vulnerable marine ecosystems for which directed fishing shall be prohibited;
- (g) establish science-based standards and criteria to determine if bottom fishing activities are likely to produce significant adverse impacts on vulnerable marine ecosystems or marine species in a given area based on international standards such as the FAO International Guidelines and make recommendation for measures to avoid such impacts;
- (h) review any assessments, determinations and management measures and make any necessary recommendation in order to attain the objective of this Convention;
- (i) develop rules and standards, for adoption by the Commission, for the collection, verification, reporting, and the security of, exchange of, access to and dissemination of data on fisheries resources, species belonging to the same ecosystem, or dependent upon or associated with the target stocks and fishing activities in the Convention Area;
- (j) to the extent practicable, provide analysis to the Commission of alternative conservation and management measures that estimates the extent to which each alternative would achieve the objectives of any management strategy adopted or under consideration by the Commission; and

- (k) provide such other scientific advice to the Commission as it considers appropriate or as may be required by the Commission.

Technical and compliance committee: The NPFC has a Technical and Compliance Committee (TCC) is listed under Article 11 and is to address compliance matters. The key functions of TCC include:

- (a) monitor and review compliance with conservation and management measures adopted by the Commission and make recommendations to the Commission as may be necessary; and
- (b) review the implementation of cooperative measures for monitoring, control, surveillance and enforcement adopted by the Commission and make recommendations to the Commission as may be necessary.
- (c) Further, in carrying out its functions, TCC shall:
- (d) provide a forum for exchange of information concerning the means by which members of the Commission are implementing the conservation and management measures adopted by the Commission in the Convention Area and complementary measures in adjacent waters as appropriate;
- (e) provide a forum for the exchange of information on enforcement, including enforcement efforts, strategies and plans;
- (f) receive reports from each member of the Commission relating to measures that the member has taken to monitor, investigate and penalize violations of provisions of this Convention and measures adopted pursuant to this Convention;
- (g) report to the Commission its findings or conclusions on the extent of compliance with conservation and management measures;
- (h) make recommendations to the Commission on matters relating to monitoring, control, surveillance and enforcement;
- (i) develop rules and procedures governing the use of data and other information for monitoring, control and surveillance purposes; and
- (j) consider and/or investigate any other matters as may be referred to it by the Commission.

### **Consultation and decision-making processes**

Article 8 states that:

1. As a general rule, the Commission shall make its decisions by consensus.
2. Except where this Convention expressly provides that a decision shall be taken by consensus, if the Chairperson considers that all efforts to reach consensus have been exhausted:
3. decisions of the Commission on questions of procedure shall be taken by a majority of members of the Commission casting affirmative or negative votes; and
4. decisions on questions of substance shall be taken by a three-quarters majority of members of the Commission casting affirmative or negative votes.
5. When the issue arises as to whether a question is one of substance or not, that question shall be treated as one of substance.
6. No decisions shall be taken unless there is a quorum of two-thirds of the members of the Commission present at the time the decision is to be taken.

### **Interactions with other fishery bodies and compliance with international treaties**

Article 21 states that The Commission shall cooperate, as appropriate, on matters of mutual interest with FAO, with other specialized agencies of the United Nations and with relevant regional organizations or arrangements, especially with those regional fisheries management organizations or arrangements with responsibility for fisheries in marine areas near or adjacent to the convention area.

The Commission also takes into account the conservation and management measures or recommendations of other regional fisheries management organizations and arrangements and other

relevant intergovernmental organizations especially those sharing resources belonging to the same ecosystem or dependent upon or associated with the target stocks, and that have objectives that are consistent with and supportive of the objective of this Convention.

The Commission shall seek to develop cooperative working relationships with intergovernmental organizations and will seek to make suitable arrangements for consultation, cooperation and collaboration with other regional fisheries management organizations or arrangements in order to utilize, to the maximum extent possible, existing institutions to achieve the objective of this Convention. To this end the Secretariat represented the Commission at the:

- FAO Committee on Fisheries (COFI);
- The Regional Secretariats' Network (RSN) meeting;
- Worldwide Review of Bottom Fisheries in the High Seas Meeting of the FAO project on management of areas beyond national jurisdiction (ABNJ) for deep-sea fisheries;
- UN Evaluation of the implementation of the United Nations Fish Stock Agreement (UN FSA);
- Annual Meetings of the North Pacific Anadromous Fisheries Commission (NPAFC);
- North Pacific Marine Science Organization (PICES) Annual Meetings;
- Preparatory Conference Meetings for the development of the United Nations international, legally binding instrument (ILBI) on Biodiversity Beyond National Jurisdictions (BBNJ)

## Overview of fishery

### *Summary of fisheries activities*

Currently the fish species targeted by the NPFC Members include bottom fish stocks and pelagic fish stocks as follows: fishery for bottom fish stocks: In the northwestern Pacific Ocean, bottom trawl fisheries, bottom gillnet fisheries, bottom longline fisheries and bottom pot fisheries have been conducted over the Emperor seamounts by Japan, the Republic of Korea, and the Russian Federation. The primary target species of the bottom trawl fisheries have been North Pacific armorhead (*Pentaceros wheeleri*) and splendid alfonsino (*Beryx splendens*), while the primary target species of the bottom gillnet fisheries have been splendid alfonsino, oreo (*Allocyttus verrucosus*), and mirror dory (*Zenopsis nebulosa*).

**Table A2.5.1:** Main bottom fisheries in the North Pacific Ocean (Source: Dionne, 2016)

Fishing gear	Target species
Bottom Trawl	Alfonsino <i>Beryx</i> spp.; North Pacific (=pelagic) armorhead ( <i>Pseudopentaceros wheeleri</i> )
Bottom gillnet	Warty oreo ( <i>Allocyttus verrucosus</i> ); alfonsino ( <i>Beryx</i> spp.); North Pacific (=pelagic) armorhead ( <i>Pseudopentaceros wheeleri</i> )
Bottom longline	Deep-sea sharks; channeled rockfish (scorpionfish) ( <i>Setarches guentheri</i> ); rockfishes nei ( <i>Helicolenus avius</i> , <i>Hozuklus guyotensis</i> , etc.); skilfish ( <i>Erilepis zonifer</i> )
Traps/pots	Deep-sea (red) crabs ( <i>Geryon</i> spp.); deep-sea crabs ( <i>Paralomis</i> spp.)
Coral tangle net	Red/pink corals ( <i>Corallium</i> and <i>Paracorallium</i> spp.) were fished in the ES-NHR area from the mid-1960s to the late 1980s and is possibly still fished by non-participating Participating States
Hook and line, longline trap	Sablefish ( <i>Anoplopoma fimbria</i> )

In the northeastern Pacific Ocean, the seamount longline fishery began in the 1970s. Four seamount aggregations (Eickelberg Seamounts, Warwick Seamount, Cobb Seamounts, and Brown Bear

Seamounts) have been fished by Canada using longline hook and longline trap gear. Since the inception of the fishery, the target species of both the longline hook and longline trap harvesters has been sablefish (*Anoplopoma fimbria*).

*Fishery for pelagic fish stocks:* Pacific saury (*Cololabis saira*) has been harvested by China, Japan, the Republic of Korea, the Russian Federation, Taiwan Province of China and Vanuatu. These vessels mainly use stick-held dip nets or lift nets (a similar fishing method which uses fishing lamps) to catch Pacific saury. While Japanese and Russian vessels operate mainly within their EEZs, Chinese, Korean and Vanuatuan vessels operate mainly in the high seas of the North Pacific.

Besides Pacific saury, chub mackerel (*Scomber japonicus*), spotted mackerel (*Scomber australasicus*), Japanese sardine (*Sardinops melanostictus*), neon flying squid (*Ommastrephes bartramii*) and Japanese flying squid (*Todarodes pacificus*) are important for fisheries within the both convention area and adjacent areas.

### Priority species

Fisheries resources covered by the Convention include all fish, mollusks, crustaceans and other marine species, with some exceptions. Eight of these are recognized as priority species:

**North Pacific armorhead (*Pentaceros wheeleri*):** Distribution extends from the North Pacific – Gulf of Alaska to the North Pacific Ocean off central California and south of Japan, with the centre of abundance within the Convention area, at the seamounts of the southern Emperor–northern Hawaiian Ridge.

*Catch trend:* North Pacific armorhead catches by Japan, the Republic of Korea and the Russian Federation have varied greatly from year to year. Catches were at their lowest level in 2002–2003 (400 tonnes), and increased in 2004–2012 (up to 25 000 tonnes). From 2013 to 2015, catches tended to decrease.

**Splendid alfonso (*Beryx splendens*):** Widely distributed throughout the world in the tropical and temperate waters at the depths of 25 m to more than 1300 m; widespread in the western and central North Pacific, including the NPFC convention area.

*Catch trend:* Splendid alfonso catches by Japan, the Republic of Korea and the Russian Federation varied from 800 to 5 600 tonnes in 2002–2015.

**Pacific saury (*Cololabis saira*):** Distribution extends from the North Pacific – Korea and Japan eastward to the Gulf of Alaska and southward to Mexico, including the NPFC Convention area. Highly migratory species.

*Catch trend:* Generally, Pacific saury catches (China, Japan, the Republic of Korea, the Russian Federation and Taiwan Province of China) tended to increase from the 1990s to 2000s, with the lowest values in 1998 and 1999 (160 000 tonnes) and the highest in 2008 (607 000 tonnes) and 2014 (621 000 tonnes). In 2015, catch decreased and was the lowest for the last 13 years (about 350 000 tonnes).

**Neon flying squid (*Ommastrephes bartramii*):** Distributed widely across the North Pacific; cosmopolitan in subtropical and temperate waters.

*Catch trend:* In the North Pacific, catches (China, Japan, the Republic of Korea, the Russian Federation and Taiwan Province of China) tended to decrease in 1990s and dropped to its lowest level in the early 2000s (10 000 tonnes). In 2005–2008, catches rose sharply (131 000 tonnes) and then tended to decrease.

**Japanese flying squid (*Todarodes pacificus*):** Distribution extends from the Western Pacific (20° N to 60° N), excluding the Bering Sea; in the Northern and eastern Pacific from Japan north and east to Canada. The species inhabits the convention area.

*Catch trend:* In 2013—2015, total catches by China and the Russian Federation varied from 6 000 to 13 000 tonnes.

**Chub mackerel (*Scomber japonicus*):** Distribution is widespread in the Indo-Pacific and North Pacific, but usually found in the northwestern, southeastern, and northeastern Pacific. In the eastern Pacific, it can be found from central Mexico to southeastern Alaska. The species inhabits the convention area.

*Catch trend:* Annual catches by Japan and the Russian Federation were at high level (about 1 million tonnes) in the 1970s, decreased rapidly in the 1980s, and recorded their lowest value (24 000 tonnes) in 1991. In the 1990s and 2000s catches remained at relatively low levels, with an increasing trend in 2010s. Annual catches of chub mackerel were 144 000 tonnes in 2013 and 260 000 tonnes in 2014.

**Spotted mackerel (*Scomber australasicus*):** Widespread in the Indo-West Pacific. In the Pacific Ocean it is widely distributed from Japan, south to Australia and New Zealand. In the Eastern Pacific found around Hawaii and off Mexico. The species inhabits the convention area.

*Catch trend:* Annual catches of North Pacific stock were relatively low in the 1980s and early 1990s (about 20 000 tonnes). After the 1990s catches increased and remained at relatively high levels. Annual catches of spotted mackerel were 126 000 tonnes in 2013.

**Japanese sardine (*Sardinops melanostictus*):** Widespread in the North Pacific, including the central Pacific, Japan Sea and southern areas of the Okhotsk Sea and Bering Sea during periods of high abundance.

*Catch trend:* Sardine catches were very high in the 1980s (about 2–5 million tonnes), but decreased markedly in the early 1990s and have remained low since then. From the mid-2000s to the 2010s, sardine catches tended to increase (from less than 100 000 to about 300 000 tonnes).

### Stock status and assessments

The Scientific Committee includes stock assessments in the five-year plan.

Pelagic fish and squids are primary fisheries resources for NPFC Members. They comprised more than 99 percent of total catch of species covered by the Convention. Many of them are migratory species with wide geographical distributions, including both the EEZs of the North Pacific rim countries and the high seas. The management of such stocks requires close cooperation between Members concerned to ensure the sustainable use and conservation of fisheries resources.

Four fish species and two squid species were recognized by the Scientific Committee as priority species: Pacific saury (*Cololabis saira*), Chub mackerel (*Scomber japonicus*), Spotted mackerel (*Scomber australasicus*), Japanese sardine (*Sardinops melanostictus*), Neon flying squid (*Ommastrephes bartramii*), and Japanese flying squid (*Todarodes pacificus*).

Areas of work:

- completion of stock assessment for Pacific saury and development of the framework and timeline for its regular improvement and update;
- conducting stock assessments for Chub mackerel and other priority species considering their top-down prioritization (Spotted mackerel, Japanese sardine, Neon flying squid, Japanese flying squid) as well as available funds and capacity;

- identification of data gaps, determination of activities to address those gaps and development of standards and mechanisms for data collection and verification.

*Bottom species:* Data used for traditional stock assessment are sparse for bottom fish, plus some bottom species have unique life cycles, sporadic recruitment patterns and irregular spawning-recruitment relationships that also makes accurate stock assessments difficult. All these require specific approaches for management and a sustainable use of bottom fisheries resources. More than ten bottom species have been exploited by fisheries in the convention area over the last decade. Two fish are recognized as priority species: North Pacific armorhead (*Pentaceros wheeleri*) and Splendid alfonsino (*Beryx splendens*).

Areas of work:

- review of applicable approaches for the stock assessment of target bottom species and investigate various management strategies;
- further development of the adaptive management approach for North Pacific armorhead and mechanism for its implementation;
- identification of data needs and establishment of activities to fill data gaps.

### **Bycatch species**

Stock assessments for bycatch species are included in the Scientific Committee's five-year plan. No information available to date.

### **Bottom impacts/VMEs and impact assessments**

At the Fourth Intergovernmental Meeting in 2008, the existing trawl footprint was identified as the summits, and the bottom gillnet footprint as the summits and slopes. A number of key seamounts were identified from information provided by participating states on fished areas, including gear deployed and fishing effort for 2002–2006 (NPFC, 2009).

The impact assessments on VMEs and marine species undertaken by Canada, Japan, the Republic of Korea, the Russian Federation, and the United States of America are available online (NPFC, 2015). No current fisheries are reported as having significant adverse impacts on VMEs, although it is acknowledged that information is limited, and that participants have not reached agreement on identifying VMEs.

### **Resource management**

#### *Pre-convention measures*

Interim measures for the northwestern Pacific Ocean were adopted by the participants in February 2007, and subsequently revised in October 2007, October 2008 and February 2009. These included: 1) limit fishing effort in bottom fisheries to the existing level in terms of the number of fishing vessels, so as to reflect the level of fishing effort, fishing capacity or potential impacts on marine ecosystems; and 2) limit bottom fisheries to seamounts located south of 45°N latitude and prohibit bottom fisheries from expanding into areas of the northwestern Pacific Ocean where no such fishing was occurring. Exceptions could be made where it was shown that any fishing activity beyond such limits or in any new areas would not have significant adverse impacts on marine species or VMEs. Such fishing activity is subject to an exploratory fishery protocol.

Interim measures for the northeastern Pacific Ocean were adopted in March 2011. These included: 1) prohibiting vessels from engaging in directed fishing on four orders of coral as well as any other indicator species for VMEs as may be identified; and 2) the closure of areas where VMEs are known to

occur or are likely to occur, based on the best available scientific information, unless conservation and management measures have been established to prevent significant adverse impacts on VMEs.

#### *Current management measures*

There are currently nine conservation management measures (CMMs) to manage, conserve and protect the fisheries resources and marine ecosystems of the convention area:

- CMM 2016-01 on information requirements for vessel registration
- CMM 2017-02 to establish a list of vessels presumed to have carried out IUU activities in the NPFC Convention Area
- CMM 2016-03 on the interim transshipment procedures for the NPFC
- CMM 2016-04 on vessels without nationality
- CMM 2017-05 for bottom fisheries and protection of VMEs in the northwest Pacific Ocean
- CMM 2017-06 for bottom fisheries and protection of VMEs in the northeast Pacific Ocean
- CMM 2017-07 for Chub mackerel
- CMM 2017-08 for Pacific Saury
- CMM 2017-09 on High Seas Boarding and Inspection Procedures for the NPFC

#### **Spatial regulations**

Participants have agreed to close C-H seamount and the southeastern part of Koko seamount. Specifically, for the latter, the area south of 34°57' N, east of the 400 m isobaths, east of 171° 54' E, north of 34°50' N, for potential VME conservation (para H of the CMM 2017-05).

Members prohibit fishing at depths greater than 1 500 m (para. b of CMM 2017-05). The participants have identified areas that have been fished in the high-seas part of the North Pacific Ocean, and all are located on seamounts. They have also identified high-seas areas in the North Pacific Ocean in which there are other interim measures to identify and protect VMEs where they are not currently known to exist.

#### **Contracting party and flag state responsibilities**

In addition to the CMMs, each contracting party shall require fishing vessels that are entitled to fly its flag and that are engaged in fishing activities in the convention area to abide by a number of requirements, as per the convention. All vessels shall:

- (a) use real-time satellite position-fixing transmitters while in the convention area in accordance with procedures developed pursuant to Article 7, subparagraph 2(e);
- (b) notify the Commission of their intention to enter and exit the convention area in accordance with procedures developed pursuant to Article 7, subparagraph 2(f); and
- (c) notify the Commission of the location of any transshipment of fisheries resources and products of fisheries resources taken in the convention area, pending the adoption by the Commission of procedures for the regulation and monitoring of transshipments pursuant to Article 7, subparagraph 2(a).

Each contracting party shall prohibit vessels entitled to fly its flag from engaging in directed fishing on the following orders: Alcyonacea, Antipatharia, Gorgonacea, and Scleractinia, as well as any other indicator species for vulnerable marine ecosystems as may be identified from time to time by the Scientific Committee and adopted by the Commission.

Each contracting party shall place observers on board fishing vessels entitled to fly its flag operating in the convention area in accordance with the observer programme, which shall be established in accordance with Article 7, subparagraph 2(b). Fishing vessels engaged in bottom fishing in the



convention area shall have one hundred percent coverage under the observer programme. Fishing vessels engaged in other types of fishing activities in the convention area shall have a level of observer coverage as the Commission may decide.

Each contracting party shall ensure that fishing vessels entitled to fly its flag accept boarding by duly authorized inspectors in accordance with procedures for the boarding and inspection of fishing vessels in the convention area adopted by the Commission.

Each contracting party shall:

- (a) maintain a record of fishing vessels entitled to fly its flag and authorized to be used for fishing activities in the convention area in accordance with the information requirements, rules, standards, and procedures adopted by the Commission;
- (b) provide annually to the Commission, in accordance with the procedures which shall be established by the Commission, information, as decided by the Commission, with respect to each fishing vessel entered in the record required to be maintained under this paragraph, and shall promptly notify the Commission of any modifications to this information; and
- (c) provide to the Commission, as part of the annual report required pursuant to Article 16, the names of the fishing vessels entered in the record that conducted fishing activities during the previous calendar year.

### **Science and assessment and data collection**

The Science Committee have developed a five-year research plan. The proposed priority research areas are:

#### 1. Stock assessments for target fisheries and bycatch species:

- development of baseline assessment of the status of priority stocks;
- review of existing data standards in relation to stock assessments (e.g. annual report template, future vessel monitoring system);
- stock delineation of important commercial species for the purpose of providing advice for the determination of management units;
- determination of data requirements for each commercial species, including data availability and data gaps; identification, where possible, of strategies to fill the data gaps, including for bycatch;
- development of a standardized method to provide advice to the Commission;
- development of assessment models by species and research as required to determine various assessment parameters.

#### 2. Ecosystem approach to fisheries

Formulation of a research plan on how to implement the ecosystem approach to fisheries in the convention area, including:

- Vulnerable Marine Ecosystems
- understanding ecological interactions between species
- ecosystem modelling
- evaluate impacts of fishing on fisheries resources and their ecosystem components, including bycatch species
- other issues related to marine ecosystem including marine debris and pollution.

### 3. Vulnerable Marine Ecosystems

- Review existing NPFC standards on VME data collection, including guidelines set forth in the CMMs for bottom fisheries and protection of vulnerable marine ecosystems in the northwestern and northeastern Pacific Ocean (CMM 2017-05 and CMM 2017-06), and determine whether any modifications to these standards are needed in the short-term and/or longer term.
- Review of Encounter Protocol for bottom fisheries on Vulnerable Marine Ecosystems.
- Determination of data requirements and identification of the data that may be collected through commercial fishing operations.
- Develop consensus on criteria used to identify VMEs and how this might be applied in the NPFC (note that guidelines from the FAO are already referenced in Annex 2 of the CMM 2017-05 and CMM 2017-06).
- Analysis of known or suspected VMEs in the convention area.
- Surveys of VMEs for data collection.
- Development of a framework to conduct assessments of impacts of bottom fishing activities on Vulnerable Marine Ecosystems.

#### **Review of encounter protocol(s) for bottom fisheries on vulnerable marine ecosystems**

Consideration of the following subjects of research and analyses are recommended to further refine encounter protocols in the convention area (as notified in Appendix C, NPFC01-2016-SSC- 194 VME01- Final Report):

- other taxa, topographical, geographical and geological features that may indicate the presence of VMEs;
- taxon-specific encounter thresholds and reporting;
- framework for evaluating the effectiveness of encounter protocols;
- tiered approach with different encounter protocols associated with different thresholds;
- gear-specific thresholds to reflect differences in catchability;
- gear-specific move-on distances to reflect type of gear;
- different reporting requirements for different catches;
- tiered approach to reporting bycatch of VME indicator taxa;
- different encounter protocols for existing and new fishing areas.

### 4. Data collection, management and security

- review of data standards related to stock assessments and other relevant data, including VME data collection and vessel monitoring systems;
- identify data sources to meet data needs for priority areas of work outlined above and develop programmes for data collection;
- develop a data security policy, including data handling and sharing protocols, information confidentiality classification and access control security guidelines.

#### **Observers**

Article 13(6) of the Convention stipulates that fishing vessels engaged in bottom fishing in the convention area shall have one hundred percent coverage under the observer programme. Fishing vessels engaged in other types of fishing activities in the convention area shall have a level of observer coverage as the Commission may decide.

## Compliance

The NPFC compliance programme has many components which make up the regional monitoring, control, surveillance and enforcement toolbox. The central pillar of the compliance programme is the detailed list of authorized fishing vessels, including all support vessels (whether chartered or owned by the Member). At the Technical and Compliance Committee meeting it was decided to establish three small working groups (SWG) to advance the compliance work plan between sessions. These three SWGs address priority compliance issues and include:

1. SWG on Vessel Registration;
2. SWG on Assessing Compliance, including the implementation of the CMM on High Seas Boarding and Inspection; and
3. SWG on the Vessel Monitoring System (VMS).

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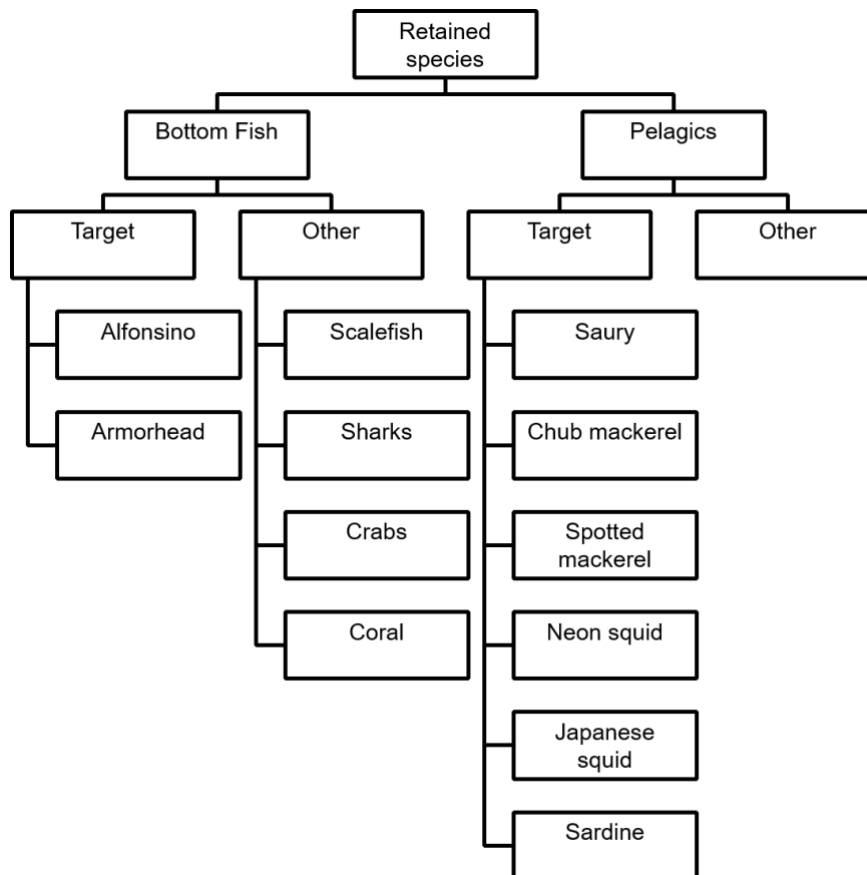
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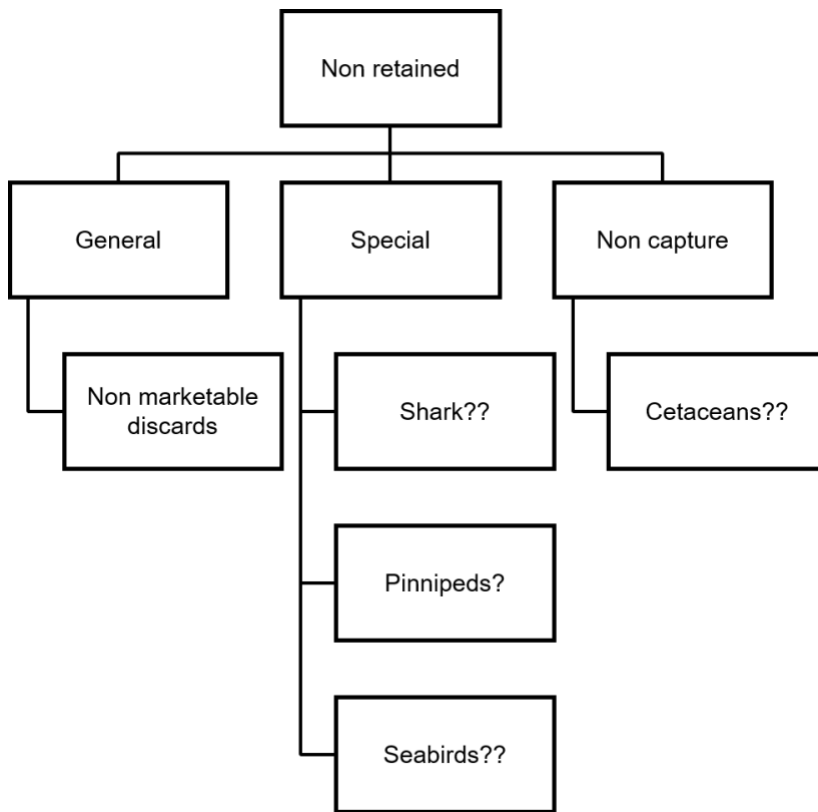
### EAF COMPONENTS NPFC

*N.B. These identify potential issues – a risk analysis would be needed to determine current risk levels and therefore whether direct management was needed.*

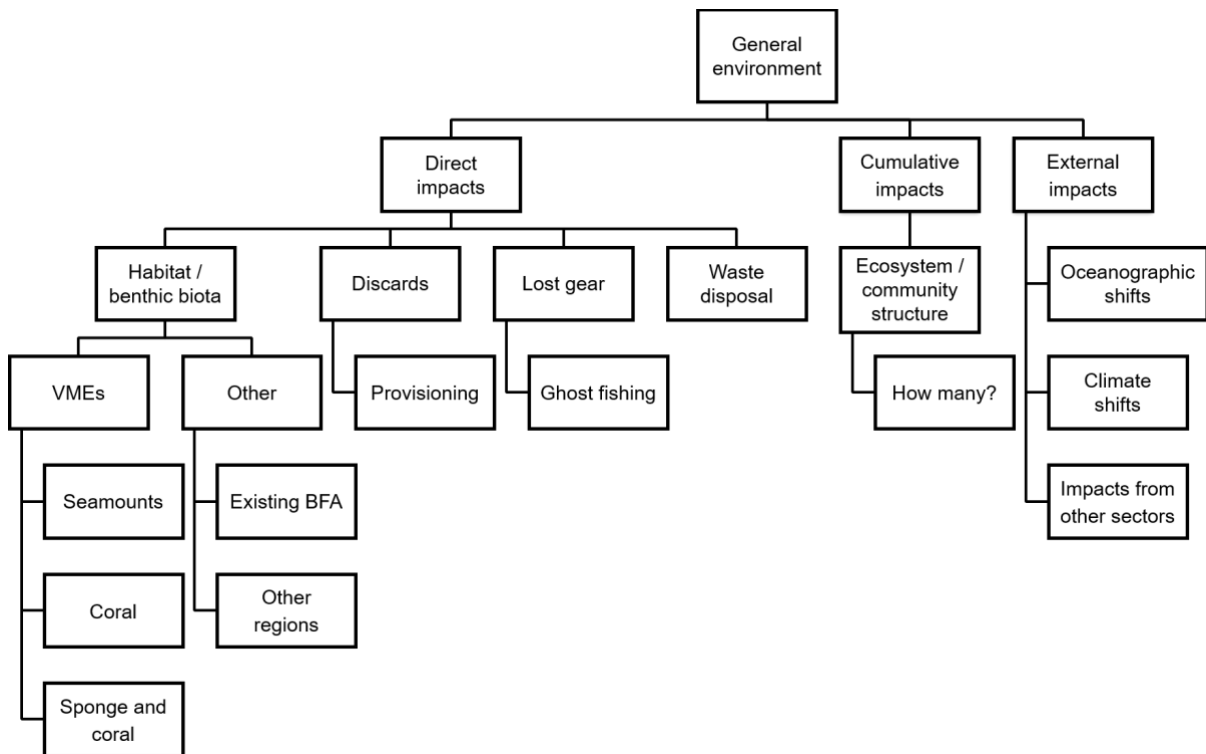
#### Retained species NPFC



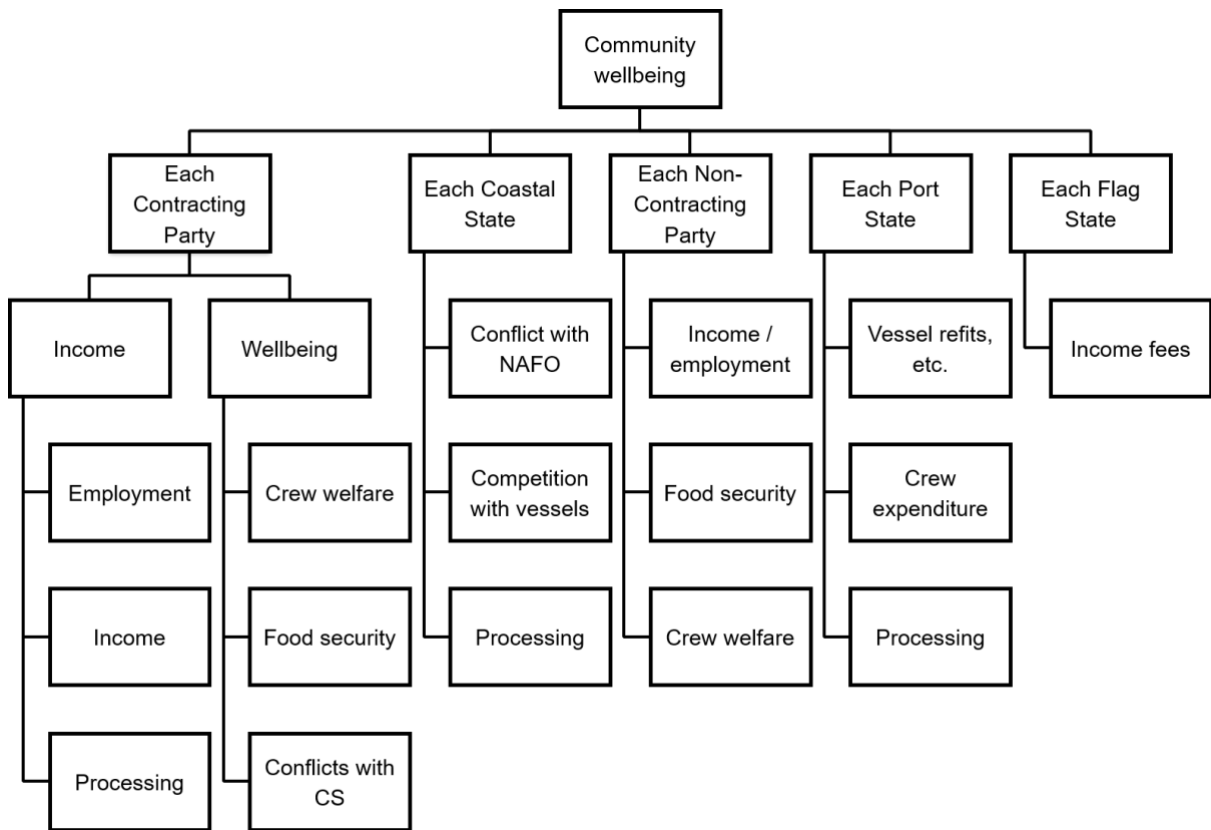
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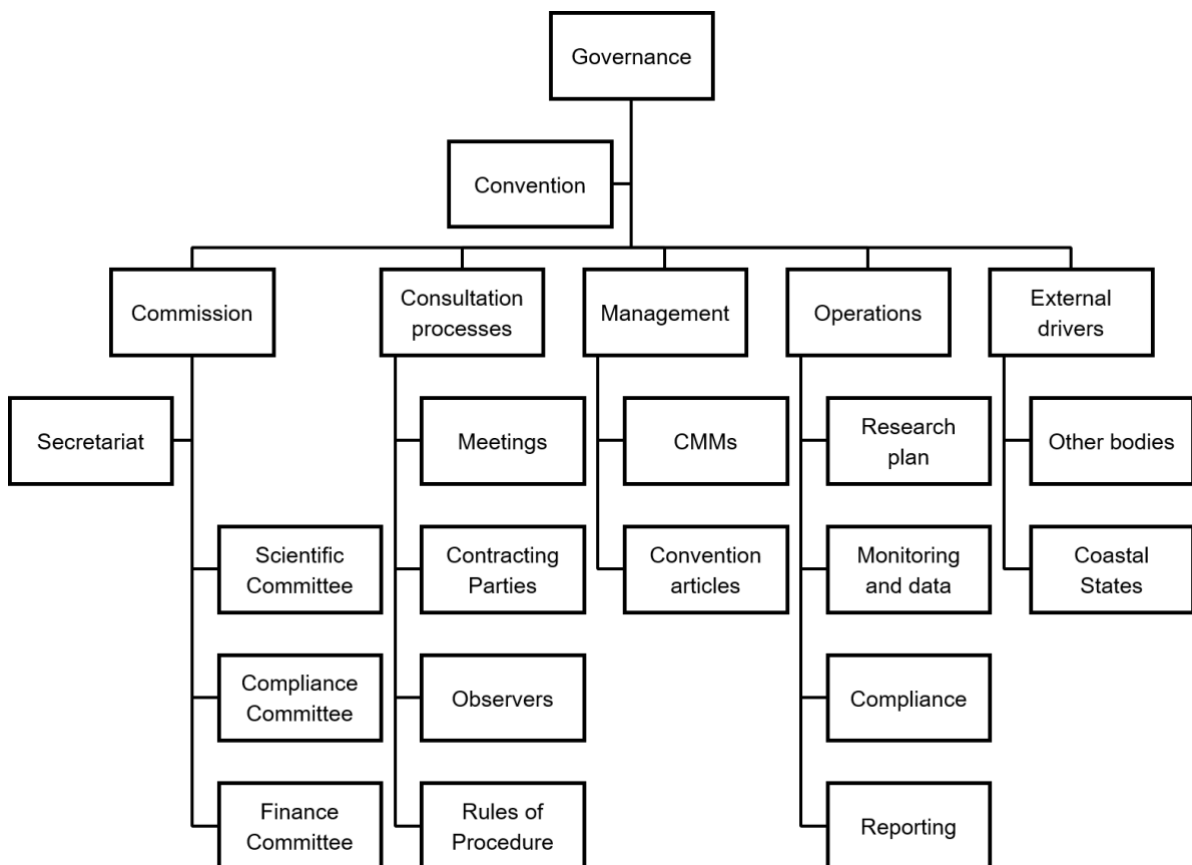
**General environment NPFC**



**Community wellbeing NPFC**



**Governance (ability to achieve) NPFC**



## **A2.6 South East Atlantic Ocean - South East Atlantic Fisheries Organisation**

### **EAF BACKGROUND REPORT**

#### **Acknowledgements**

A significant proportion of the material used for this background report was either obtained or summarized from the relevant chapter of FAO Technical Paper 595 (Van Zyl et al., 2016), the documents on the SEAFO website<sup>25</sup> and especially the 2016 SEAFO Performance Review (SEAFO, 2016). These sources are not referenced individually everywhere in the following text except for tables and figures. The information was last updated in August 2018.

#### **Overview and context**

The South East Atlantic Fisheries Organisation (SEAFO) is a regional fisheries management organization in southeast Atlantic Ocean. It was established in 2001 and the objective of its Convention is to ensure the long-term conservation and sustainable use of the fishery resources in its convention area. The convention area excludes exclusive economic zones of the coastal states in the region. The contracting parties are Angola, the European Union, Japan, the Republic of Korea, Namibia, Norway and South Africa.

The economically important SEAFO fish species in the convention area include sedentary/discrete and straddling deepwater finfish species such as alfonso, orange roughy, and crustacean species such as red crab. The catches in the convention area have always been relatively small (< 1,000 tonnes annually) and have decreased in recent years with only approximately 150 tonnes (mostly red crabs) taken in 2017.

There are species-specific measures including TACs for target species or former target species (CM 31/15 TACs for 2016), bycatch rules for sharks (CM 04/06), turtles (CM 14/09) and seabirds (CM 25/12). Habitat-related measures have been adopted in relation to bottom fishing and VMEs (CM 30/15).

The recent performance review concluded that with the present low fishing effort and low commercial interest in the fisheries, SEAFO focus on a legal regulatory framework that ensures: 1) all fisheries activities in the convention area are subject to principles as laid down in international agreements; 2) any future developments of the fisheries in the area is undertaken with due consideration of the need to ensure the sustainability of such fisheries; and 3) any fisheries activities should not damage other components of the marine ecosystem which may be sensitive to their impacts. The review notes that in order to economize scientific resources, a risk-based approach should be adopted for maximum impact on the status of stocks and the ecosystem.

*N.B. The small scale of fishing operations was taken into account when scoring compliance for each of the components undertaken for the present EAF Review.*

#### **Convention/mandate**

SEAFO Convention: The SEAFO Convention (The Convention on the Conservation and Management of Fisheries Resources in the South East Atlantic Ocean) was signed in 2001, and entered into force in 2003. It was the first convention to be drafted and to enter into force following the adoption of the 1995 United Nations Fish Stocks Agreement. This influenced its style, as did the generally broader requirement to consider an ecosystem approach, a trend which began in the 1990s.

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<sup>25</sup> [www.seafo.org](http://www.seafo.org)

The Convention is designed to address the management of fishery resources including fish, molluscs, crustaceans and other sedentary species within the convention area, but excludes highly migratory species (typically tuna and tuna-like fishes) and some specific sedentary species. The geographical coverage of the Convention is restricted to the high seas (i.e. beyond national EEZs).

### Convention objective and general principles

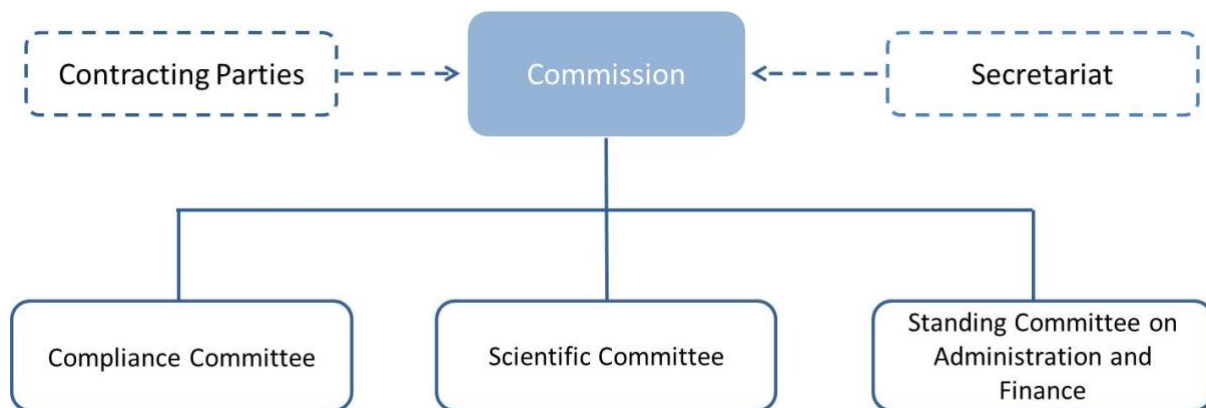
The objective of the Convention is to ensure the long-term conservation and sustainable use of the fishery resources in the convention area. This is given effect by Article 3 (General Principles) of this Convention whereby the organization shall:

- (a) adopt measures, based on the best scientific evidence available, to ensure the long-term conservation and sustainable use of the fishery resources to which this Convention applies;
- (b) apply the precautionary approach, in accordance with Article 7;
- (c) apply the provisions of this Convention relating to fishery resources, taking due account of the impact of fishing operations on ecologically related species such as seabirds, cetaceans, seals and marine turtles;
- (d) adopt, where necessary, conservation and management measures for species belonging to the same ecosystem as, associated with or dependent upon, the harvested fishery resources;
- (e) ensure that fishery practices and management measures take due account of the need to minimize harmful impacts on living marine resources as a whole; and
- (f) protect biodiversity in the marine environment.

*Contracting parties to the Convention:* The contracting parties (Angola, European Union, Japan, Republic of Korea, Namibia, Norway and South Africa) are represented on the Commission and its subsidiary bodies, all of which meet annually.

### Governance and organizational structure

The organizational structure of SEAFO is defined in the Convention, and consists of a Commission with three main subsidiary bodies. These are the Scientific Committee (SC), the Compliance Committee (CC) and the Standing Committee on Administration and Finance (SCAF), together with the Secretariat.



**Figure A2.6.1:** Outline of SEAFO organizational structure (Reproduced from FAO, 2016)

*The Commission:* The Commission is the main decision-making body of SEAFO and has a wide range of functions, as outlined in Article 6 of the Convention. The functions of the Commission shall be to:

- (a) identify conservation and management needs;
- (b) formulate and adopt conservation and management measures;



- (c) determine total allowable catches and/or levels of fishing effort, taking into account total fishing mortality, including of non-target species;
- (d) determine the nature and extent of participation in fishing;
- (e) keep under review the status of stocks and gather, analyse and disseminate relevant information on stocks;
- (f) encourage, promote and, where appropriate by agreement, coordinate scientific research on fishery resources within the convention area and in adjacent waters under national jurisdiction;
- (g) manage stocks on the basis of the precautionary approach, to be developed in accordance with Article 7;
- (h) establish appropriate cooperative mechanisms for effective monitoring, control, surveillance and enforcement;
- (i) adopt measures concerning control and enforcement within the convention area;
- (j) develop measures for the conduct of fishing for scientific research purposes;
- (k) develop rules for the collection, submission, verification of, access to and use of data;
- (l) compile and disseminate accurate and complete statistical data to ensure that the best scientific advice is available, while maintaining confidentiality, where appropriate;
- (m) direct the Compliance and Scientific Committees, other subsidiary bodies, and the Secretariat;
- (n) approve the organizational budget; and
- (o) carry out such other activities as may be necessary to fulfil its functions.

Each contracting party is a member of the Commission and is entitled to be represented by one representative, who may be accompanied by alternate representatives and advisors. The Commission meetings are open to observers, as per the Rules of Procedure.

The Scientific Committee provides scientific advice on the status of marine resources and on harvesting. Each party is entitled to be represented by one representative at the Scientific Committee meeting, who may be accompanied by alternate representatives and advisors.

The committee currently undertakes:

- provision of stock status reports for commercially targeted (or formerly targeted) stocks – these are updated annually for those stocks where a targeted fishery is taking place;
- recommendations regarding TACs for targeted or formerly targeted stocks – provided as part of the Stock Status reports;
- provision advice on data collection of relevance to scientific assessments.;
- review and compile data of relevance to scientific assessments;
- development of identification guides concerning target species, bycatch species and VME fauna for observers and other staff involved in data collection.
- addressing any other issues raised which are of a scientific nature, including reporting from surveys and reporting from relevant scientific activities in contracting party states and organizations;
- organize dissemination and exchange fora for scientific information.

The Compliance Committee is one of the key bodies in the organization and was constituted in 2007 under Article 9 of the Convention, with specific terms of reference. This Committee provides the Commission with information, advice and recommendations on the implementation of, and compliance with, conservation and management measures.

The Standing Committee on Administration and Finance is responsible for advising the Commission on the budgetary and administrative matters of the organization.

The SEAFO Secretariat consisted, in 2018, of an Executive Secretary appointed by the Commission and an Administrative Officer. It is based in Swakopmund, Namibia and is considered the

administrative headquarters of the organization. The primary aim of the Secretariat is to coordinate the organization's activities.

**Contracting parties.** The contracting parties are Angola, European Union, Japan, Republic of Korea, Namibia, Norway and South Africa, which are represented on the Commission and its subsidiary bodies, all of which meet annually at the Commission Meeting.

**Non contracting parties.** Article 22 outlines that the contracting parties shall, either directly or through the Commission, request non-parties to this Convention whose vessels fish in the convention area to cooperate fully with the organization, either by becoming party to the Convention, or by agreeing to apply the conservation and management measures adopted by this same, with a view to ensuring that such measures are applied to all fishing activities in the convention area.

**Consultation and decision-making processes:** Decisions of the Commission on all matters of substance are by consensus. The question of whether a matter is one of substance is treated as a matter of substance.

Decisions on other matters are by simple majority of the parties present (as per Article 17). There is a limited procedure for notification of non-acceptance of the decision, as a last resort (Article 24). SEAFO has adopted dispute settlement procedures (see Dispute Settlement Procedures).

SEAFO publishes its Conservation Measures (CMs) on its website, along with the SEAFO System of Observation, Inspection, Compliance and Enforcement (SEAFO System, 2015), which lays out all the requirements and procedures established by SEAFO to regulate its fisheries.

*Interactions with other fisheries, international bodies and agreements:* Article 6(12) of the Convention requires the Commission to take account of measures established by other organizations which affect living marine resources in the convention area, and seek to ensure consistency with such measures. Article 19 requires that there is compatibility with measures in coastal states and other related fisheries.

Therefore, the Commission does not address species that are managed by the International Commission for the Conservation of Atlantic Tuna (ICCAT), the Indian Ocean Tuna Commission (IOTC), the Commission for the Conservation of Southern Bluefin Tuna (CCSBT), the South West Indian Ocean Fisheries Arrangement (SWIOFA) or the International Whaling Commission.

The SEAFO Commission cooperates with other regional fisheries management organizations to strengthen global high seas fishery governance in general and to share information, such as IUU fishing activities. SEAFO is represented as an observer at annual meetings of CCAMLR, ICCAT, NAFO, NAMMCO, SIOFA and NEAFC.

Article 18 requires SEAFO to collaborate with FAO, alongside other RFMOs, across data management and reporting (Fisheries Global Information System, FIGIS), the coordination of fisheries statistics (Coordinating Working Party on Fishery Statistics, CWP), the development of a VME DataBase, and the curation of bibliographic information on marine sciences (Aquatic Sciences and Fisheries Abstracts, ASFA). More recently, SEAFO has been working with CCAMLR on the Patagonian toothfish fishery, which may represent a straddling stock.

### **Review panel considerations of SEAFO compliance with international agreements**

SEAFO management arrangements comply with the requirements of the FAO Compliance Agreement. SEAFO Convention is consistent with the requirements and provision of the UN Fish Stock Agreement.

SEAFO is currently not in the situation where it is necessary to adjust or restrict capacity in this fishery.

SEAFO has implemented the International Plan of Action (IPOA) by adopting measures aiming to reduce the incidental bycatch of seabirds in the convention area: cf. Conservation Measure 15/09. This measure was updated in Conservation Measure 25/12. Bycatch interaction is monitored by scientific observers and reported through their reports to the Secretariat. This information is considered by the SC and recommendations are made to the Commission for consideration; if necessary, the measures are strengthened.

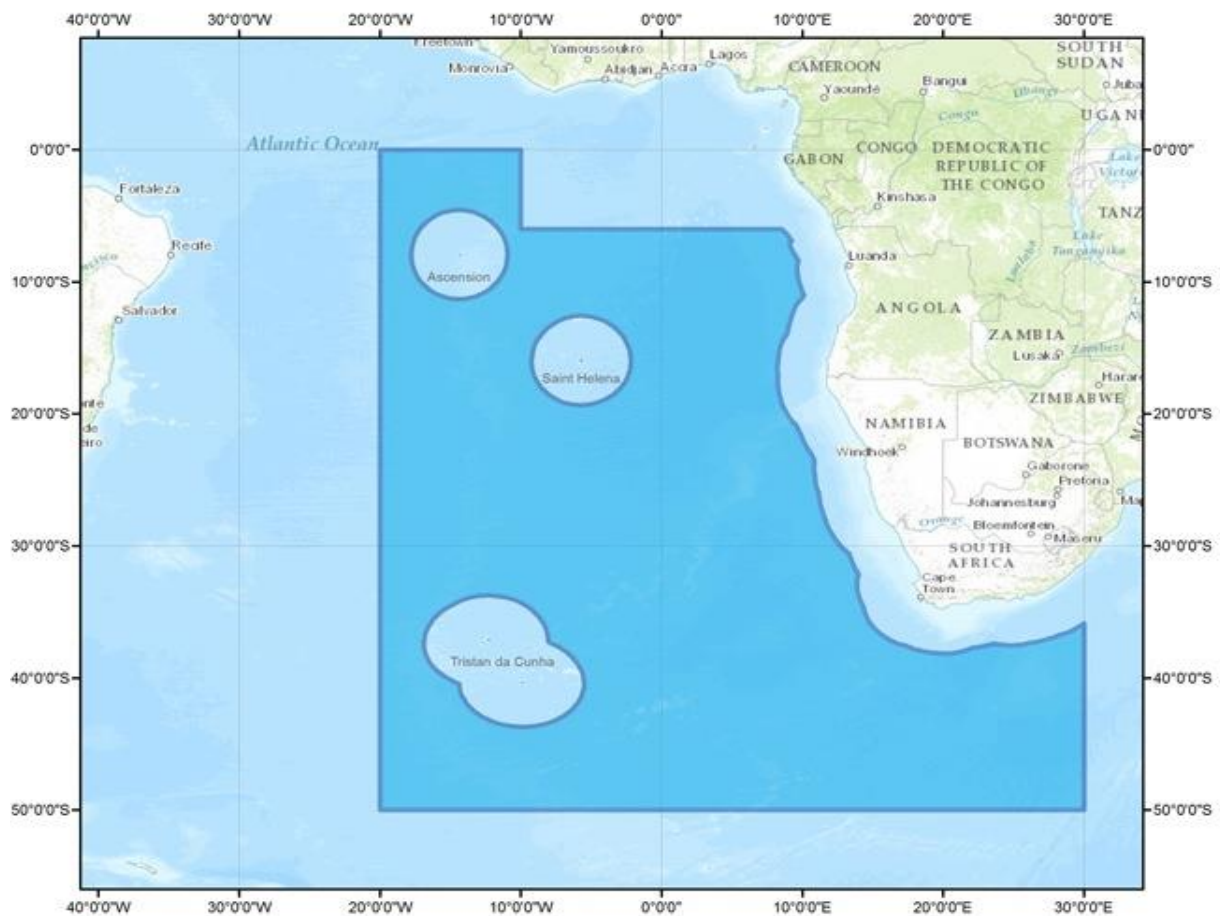
The Commission has implemented the IPOA by adopting Conservation Measure 04/06 on the conservation of sharks caught in association with fisheries managed by SEAFO and Recommendation 1/2008 which places a voluntary ban on the catch of deepwater sharks.

The SEAFO Convention contains several provisions which are relevant to the fight against IUU fishing, in particular: Article 9, which establishes the Compliance Committee; Article 14 on flag state duties; Article 15 on port state duties and measures taken by a port state; Article 16 on observation, inspection, compliance and enforcement; and Article 22 on non-parties to the Convention.

## OVERVIEW OF SEAFO FISHERIES

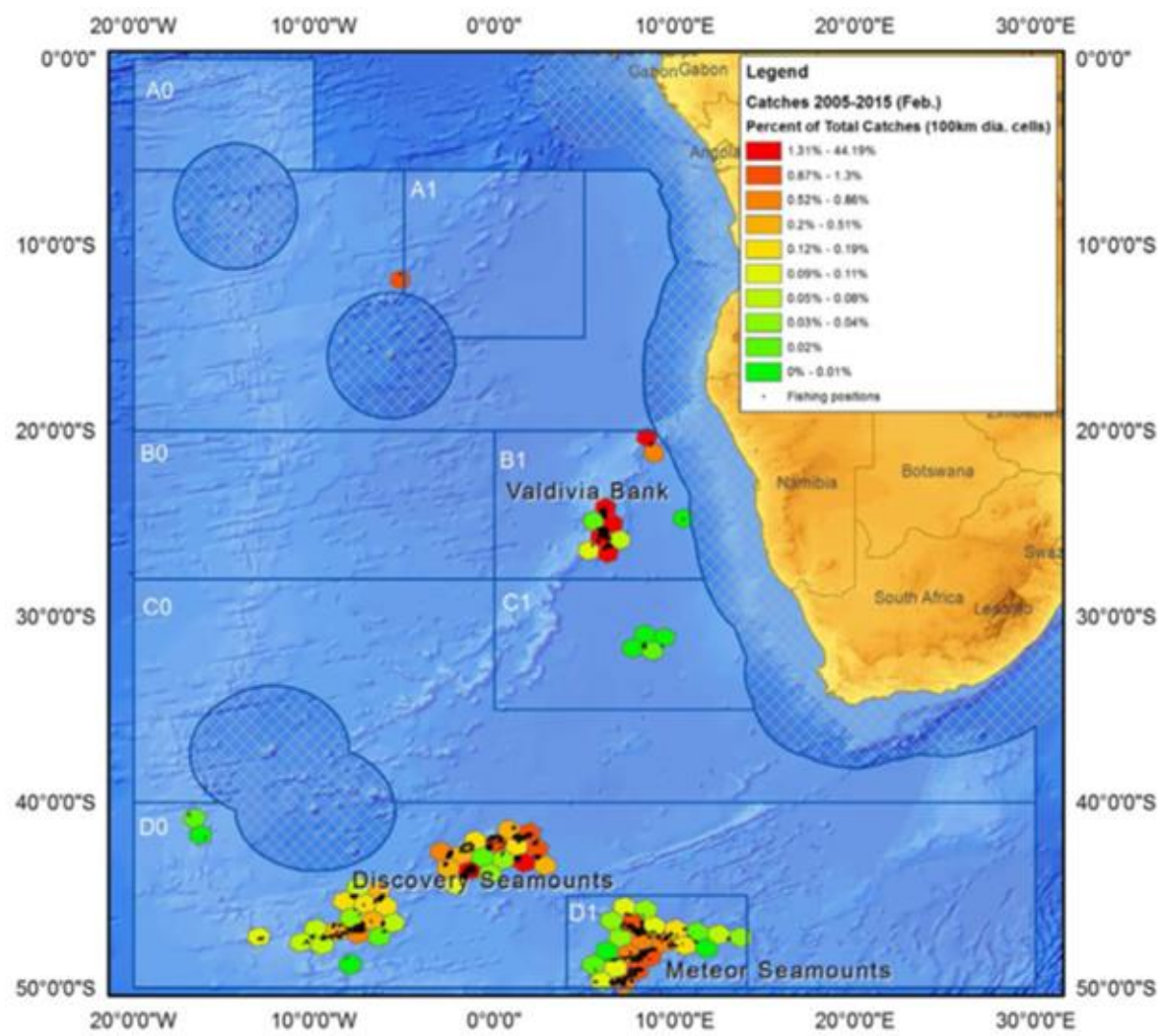
### Geographic scope and fisheries activities

Convention area: The SEAFO Convention Area (see Figure A2.6.2) lies within FAO Major Fishing Area 47 and a small part of the eastern central Atlantic Ocean, in FAO Major Fishing Area 34, but excludes the 200-nautical-mile EEZs of all national jurisdictions (Angola, Namibia, South Africa, and the United Kingdom of Great Britain and Northern Ireland).



**Figure A2.6.2:** SEAFO convention area (Source: <http://www.seafo.org/>)

Much of this area is deep water but there are numerous seamounts, guyots, banks, and plateaus – notably Valdivia Bank, and the Vema, Discovery and Meteor seamounts. It is believed that a relatively small portion (< 2 percent) of the region is less than 2 000 m deep and fishing is restricted to a few small areas (see Figure A2.6.3).



**Figure A2.6.3:** Fishing Effort (Source: van Zyl et al, 2016)

### Target species

The main commercial target species caught in recent years in the SEAFO Convention Area are: deep-sea red crab (mainly *Chaceon erytheiae*), alfonsinos (mainly *Beryx splendens*), Patagonian toothfish (*Dissostichus eleginoides*), and pelagic armorhead (=southern boarfish, *Pseudopentaceros richardsoni*). The Scientific Committee develops or updates stock status reports for all commercially exploited species on an annual basis.

Orange roughy (*Hoplostethus atlanticus*) was the target species of an important fishery conducted between 1995 and 2005; a recent fishery targeting the Tristan da Cunha rock lobster (*Jasus tristani*) took place until 2006 at Vema Seamount.

Alfonsino and southern boarfish are mainly caught using bottom and midwater trawls in Division B1 at depths ranging from 200 to 700 m. These fisheries typically occur at the top and along the slopes of Valdivia Bank, depending on the spatial distribution of the species and their circadian rhythm.

Deep-sea red crabs are caught with Japanese beehive pots, set in lines of about 400 pots (typically about 7.7 km in length), anchored at both ends. The fishery is focused mainly on the Valdivia Bank area (Division B1), at depths of 280–1 150 m.

Patagonian toothfish are caught with longlines and trotlines. The main fishery occurs on the Discovery seamounts and around the Meteor complex seamounts in Subarea D. A smaller, more sporadic fishery occurs on the western seamounts in Subarea D, at depths of 900–1 500 m.

The full list of fisheries resources is listed in Annex 1 of the 2017 system.

### **Bycatch species**

Fish bycatch is dominated by the blackbelly rosefish (*Helicolenus mouchezi*) in the Valdivia Bank trawl fishery, and macrourid species (*Macrourus* spp.) in the Patagonian toothfish fishery.

### **Special species**

Specific attention is paid to minimize and monitor the bycatch of seabirds, turtles and deepwater sharks. Bycatch interaction is monitored by scientific observers and reported through their reports to the Secretariat. This information is considered by the SC and recommendations made to the Commission for consideration and if necessary, strengthening of the measures.

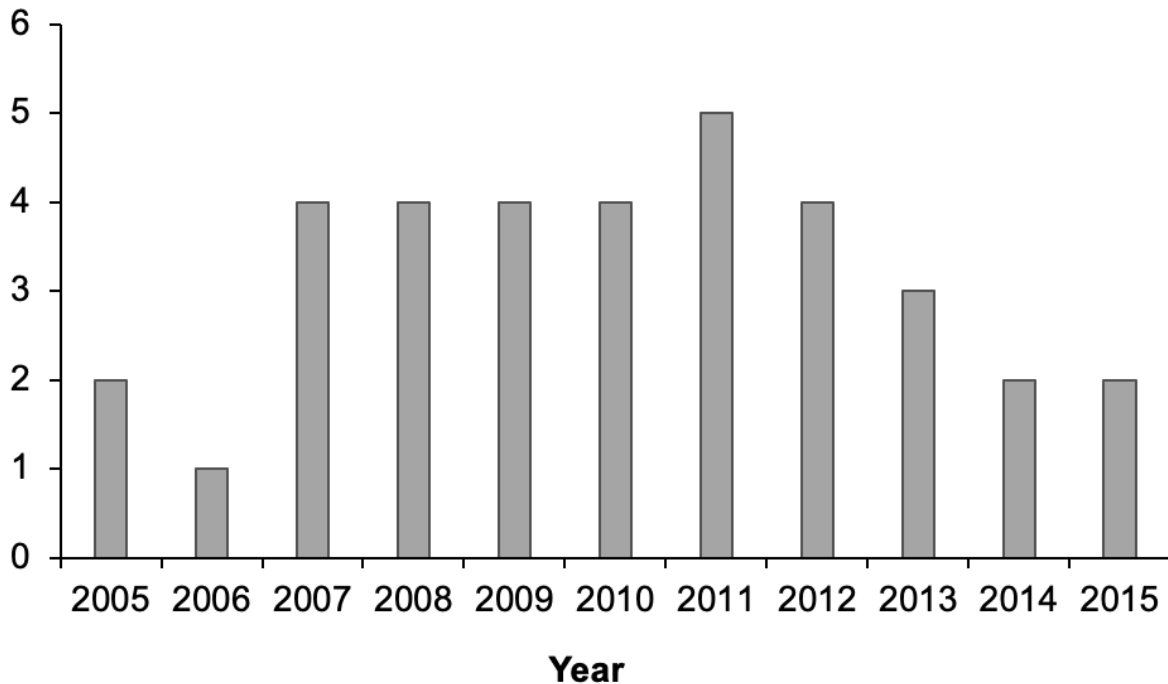
### **Catch and effort history**

All fishing in the SEAFO Convention Area occurs on or around seamounts. Nowadays vessels concentrate fishing operations mainly in three distinct areas: the Valdivia Bank seamounts complex in Division B1, the Discovery seamounts in division D0, and the Meteor seamounts in Division D1.

This fishing uses a variety of fishing methods including longline, trotline, bottom and midwater trawls and potting. The method is tightly matched to the targeted species.

Catches of species managed by SEAFO are highly variable within the convention area (Figure A2.6.4). Total annual catches for all species have exceeded 1 000 tonnes only in 2004 and 2010. The average (minimum, maximum) annual catches for 2003–2013 were: pelagic armorhead 79 (0, 688) tonnes, for red crab 223 (5, 809) tonnes, for alfonsino 128 (0, 914) tonnes, and for Patagonian toothfish 158 (26, 393) tonnes. Annual catches of orange roughy were 5–75 tonnes during 1995–2005 (mostly from division B1), after which the fishery ceased in the convention area and there has been no reported catch. Annual catches of all species have decreased consistently since 2010, with annual catches in 2014 estimated to be only 135 tonnes of red crab and 26 tonnes of Patagonian toothfish. Similar low catches were presented in the recent performance review for 2015.

## Number of species targeted each year in SEAFO waters



**Figure A2.6.4:** Number of species targeted each year (Adapted from SEAFO, 2016)

### Bottom impacts/VMEs and impact assessments

The extent of VMEs is only poorly known in the SEAFO convention area. It is not achievable to map these in any useful sense by direct observation. Inference about potential areas can be made from bathymetric maps, but large areas of the convention area are not well covered with bathymetric data. As a consequence, and as a precautionary measure, fairly large areas have been closed to all fishing where more specific information might have made it possible to focus such closures more effectively on potential VME areas.

## MANAGEMENT

### Management measures

SEAFO employs an ecosystem and precautionary approach to fisheries management when deciding on management and conservation measures. The Commission adopts resolutions and recommendations based on scientific advice from the Scientific Committee; and monitoring, control and surveillance (MCS) advice from the Compliance Committee.

It is the responsibility of each SEAFO contracting party to ensure that regulations are being adhered to by vessels of their flag state contracting party. Contracting parties have the obligation to ensure that legal proceedings are being undertaken to mitigate infringements of SEAFOs conservation and enforcement regulations.

### Target species

Given the lack of data, classical biomass-based stock assessments have not been possible. The 2014 stock status reports included candidate harvest control rules (HCR) that proposed changes in catch per

unit of effort (CPUE) to provide advice on whether changes to TACs are needed. SEAFO has therefore been able to implement TACs for the main target species (Table A2.6.1).

**Table A2.6.1:** 2015 TACs for main target species (SEAFO, 2016)

Species	Quota	Actual catch 2015
Toothfish	264 tonnes	51 tonnes
Deep-sea crabs	190 tonnes B1	104 tonnes
	200 tonnes rest	
Orange roughy	4 tonnes bycatch	N/F (no fishing)
	50 tonnes TAC	
Alfonsino	200 tonnes	N/F
Boarfish/AH	143 tonnes	N/F

### Special bycatch species

The Commission has also implemented management measures for the protection of deep-sea sharks by banning sharks as a directed species. Vessels are also expected to report all catches of sharks, have full utilization and retention (not including gut, skin and head), and not have fins that total more than 5 percent of the weight of sharks onboard.

Management measures have also been put in place to reduce incidental bycatch of seabirds in the SEAFO Convention Area, and to improve the reporting of bycatch of sea turtles with the intent of reducing mortality arising from fishing operations. Bycatch interaction is monitored by scientific observers and reported through their reports to the Secretariat. This information is considered by the SC and recommendations made to the Commission for consideration and if necessary, strengthening of the measures.

SEAFO has also recommended banning gillnets in the convention area, and has adopted stringent protocol for the retrieval and reporting of lost gear.

Article 10 of the 2017 system requires information be recorded for retained bycatch species and discarded TAC species. However, for non-TAC species, only discards > 10 kg need to be recorded by species.

### Broader ecosystem impacts and VMEs

The Commission has instigated a reporting system regarding biota associated with Vulnerable Marine Ecosystems (VME). Observers on fishing vessels are required to report bycatches of sponges and corals. An identification guide has been developed to support observers in this task. Stock status reports include information on the potential ecosystem impacts of each of the fisheries.

The Commission has taken specific measures to protect bottom habitats from impacts from bottom-touching fishing gear and to protect VMEs from fisheries impacts (CM 30/15). The measures regarding bottom fishing activities and VMEs (CM 30/15) include an identification of specific areas where bottom trawling and/or longlining can take place, as well as areas which are closed to all fishing activities. There are also protocols for data reporting, for exploratory fishing and for encounters of VME biota.

*Article 3. Regulation of bottom fishing activities*

The Commission shall, taking account of the advice provided by the Scientific Committee, as well as data and information arising from reports pursuant to Article 8, adopt conservation and management measures to prevent significant adverse impacts on VMEs. Such measures may include:

- (a) allowing, prohibiting or restricting bottom fishing activities;
- (b) requiring specific mitigation measures for bottom fishing activities;
- (c) allowing, prohibiting or restricting bottom fishing activities with certain gear types, or changes in gear design and/or deployment; and/or
- (d) any other relevant requirements or restrictions to prevent significant adverse impacts on VMEs.

*Article 4. Existing bottom fishing areas*

Based on information concerning bottom fishing activities in the period of 1987 to July 2011, there are hereby established existing bottom fishing areas as set out in Annex 1. The Executive Secretary shall update Annex 1 following decisions by the Commission pursuant to Articles 6, paragraph 8.

*Article 5. Area closures for the protection of VMEs*

1. Notwithstanding the area closure to the south of Valdivia Bank – explicitly identified as being closed to all fishing except for pots and set longlines (Annex 2B) – all fishing activities shall be prohibited in the areas set out and within the coordinates defined in Annex 2.
2. Within the areas referred to in paragraph 1, contracting parties intending to conduct fisheries research and basic marine science activity – which, pursuant to Article 6, shall exclude exploratory bottom fishing – shall notify the Executive Secretary of their intended research programmes, taking account of Article 206 of the UN Convention on the Law of the Sea, The Executive Secretary shall forward such notifications to all contracting parties as well as to the Scientific Committee. Adopted: 3 December 2015. Entered into force: 15 February 2016.
3. In the case where an existing bottom fishing area overlaps with a closed area, the existing bottom fishing area square is deemed to be closed.

*Article 6. Exploratory bottom fishing*

1. Prior to undertaking exploratory bottom fishing, contracting parties shall gather the relevant data to facilitate assessments of exploratory bottom fishing by the Scientific Committee. Such data should preferably include data from seabed mapping programmes, i.e. data from echo sounders (if practicable multibeam sounders), and/or other relevant data for a preliminary assessment of the risk of significant adverse impacts on VMEs.
2. The relevant contracting party shall forward a Notice of Intent to undertake exploratory bottom fishing to the Executive Secretary at least 60 days prior to the proposed start of the fishery. The Notice of Intent shall be accompanied by the following information:
  - a. harvesting plan, which outlines target species, proposed dates and areas and the type of bottom fishing gear to be used. Area and effort restrictions shall be considered to ensure that fishing may occur on a gradual basis in a limited geographical area;
  - b. mitigation plan, including measures to prevent significant adverse impact to VMEs that may be encountered during the fishery;
  - c. catch monitoring plan, including recording/reporting of all species caught;
  - d. a sufficient system for the recording/reporting of catch, detailed to conduct an assessment of activity, if required;
  - e. data collection plan to facilitate the identification of VMEs in the area fished.

The contracting party shall make every effort to include the following, additional information:



- (a) fine-scale data collection plan on the distribution of intended tows and sets – to the extent practicable on a tow-by-tow and set-by-set basis;
- (b) plans for the monitoring of bottom fishing activities using gear monitoring technology, including cameras if practicable; and
- (c) monitoring data obtained pursuant to paragraph 1 of this Article.

### **Compliance**

SEAFO has adopted several measures to combat illegal, unregulated and unreported (IUU) fishing. The Commission has banned at-sea transshipments in the SEAFO convention area, implemented an authorized vessel list, and established an IUU vessel list that incorporates vessels found on NEAFC, NAFO and CCAMLR IUU lists.

SEAFO has developed a comprehensive strategy to monitor survey and control these fisheries. All vessels are required to:

- be formally authorized to fish
- report catches at five-day intervals
- report VMS positions at 2-hourly intervals
- have an independent scientific observer onboard
- comply with port inspection procedures, and
- not make transshipments in the SEAFO Convention Area.

*Observers:* Article 18 states that observers are now required on all commercial fishing vessel operating in the SEAFO Convention Area. These scientific observers are required to:

1. Monitor any set for evidence of the presence of VMEs, and identify coral, sponges and other organisms to the lowest level possible.
2. Record the following information for identification of VMEs on datasheets: vessel name, gear type, date, position (latitude/longitude), depth, species code, trip number, setnumber, and name of the observer.
3. Collect representative biological samples from the entire VME catch.
4. Provide samples to the scientific authority of a contracting party at the end of the fishing trip.

### **Fishery monitoring**

Article 10 requires each contracting party to ensure its vessels maintain a fishing logbook that records:

- catch retained on board by species, in live weight (kg) and an estimation of the amount of fishery resources discarded (kg), by species;
- all non-TAC species discarded, for which the total live weight is less than 10 kg, may be reported using the 3-Alpha Code MZZ (miscellaneous marine species);
- type of gear (trawl, pots, longline, etc.);
- a description of gear (number of hooks, number of pots, size of the trawl, etc.);
- longitude and latitude co-ordinates of shooting and hauling; and
- date and time of shooting and hauling (UTC).

### **Science and assessment**

Scientists from contracting parties contribute to the assessment of marine resources in the SEAFO Convention Area and provide scientific advice to the Commission through the Scientific Committee. Information related to the main SEAFO marine living resources is updated annually, and includes catch and effort information as well as additional information relevant to the stocks, e.g. spatial and temporal distributions of fishing, length–frequency distributions, life history parameters and other

population information, incidental mortality (sea birds, mammals and turtles) in addition to the bycatch of fish and invertebrates.

The stock status reports of the Scientific Committee serve as the primary source of scientific evidence supporting Commission decisions on TACs. The stock status reports conclude with a discussion of current management measures and management advice to the Commission. A number of recommendations relevant to EAF were made through the second SEAFO performance review (2016); these have now been considered by the Scientific Committee and included the identification of criteria for maximum acceptable ecosystem impacts of fisheries.

The SC considered this request and noted that given the limited data and knowledge linked to all (target and non-target) species within the SEAFO Convention Area this task could not be achieved during the 2017 SC meeting, but could be in the future. SC also noted that the concept of “maximum acceptable ecosystem impact” is rather new and it may take time to develop a set of criteria for implementation or evaluation.

The SC should continue its work on updating the stock status reports for stocks targeted by fisheries or where there may be future commercial interest, with an emphasis on species-specific information required for the Commission to fulfil its responsibility for fisheries harvesting target species sustainably in the convention area.

The SC took note of this task and will continue to update all stock status reports on an annual basis. For those potential target species where there are no current fisheries this could be based on a risk assessment rather than attempting to move to a fully-fledged stock assessment in a situation where no data are available from non-existing fisheries.

The SC discussed the issue and agreed to explore potential risk assessment approaches applicable to new or re-emerging SEAFO Convention Area fisheries. In particular members were tasked to look into the experiences of SIOFA and IOTC, where such approaches are being developed and evaluated.

The SC should develop ecosystem status reports regarding the interactions between fisheries and the marine ecosystem within the convention area. This could be one for the convention area, or a set of reports for different subsystems within the area, so as to ensure that fisheries impacts on the marine ecosystem are acceptable. In order to use available resources efficiently for this task a risk-based assessment, as discussed in the context of fish species, could be extended to fisheries and include the wider ecosystem effects of fisheries.

SC noted that this request is dependent on outputs from previous assignments and it will be deferred until results of said assignments are available. The SC will have this on the agenda for the future meetings.

### **Social and economic considerations**

The only specific reference to social and economic considerations related to a number of recommendations by the review panel including that given the small amount of information that developing a protocol for opening parts of the closed areas to fisheries which may have low impact may not be economically impossible.

In addition, they noted that where advice from the SC has important economic, social or political implications for fisheries or Member States, this should be subject to independent peer review to provide trust in the integrity of the advice and recommendation in question.

In the 2017 Commission Meeting report, the address by the Minister for Fisheries Namibia noted that the SEAFO area requires more research and management measures in order to unlock the area's

potential and allow it to be used sustainably by contracting parties for blue economic activities, and ensure their equitable economic participation in the SEAFO Area.

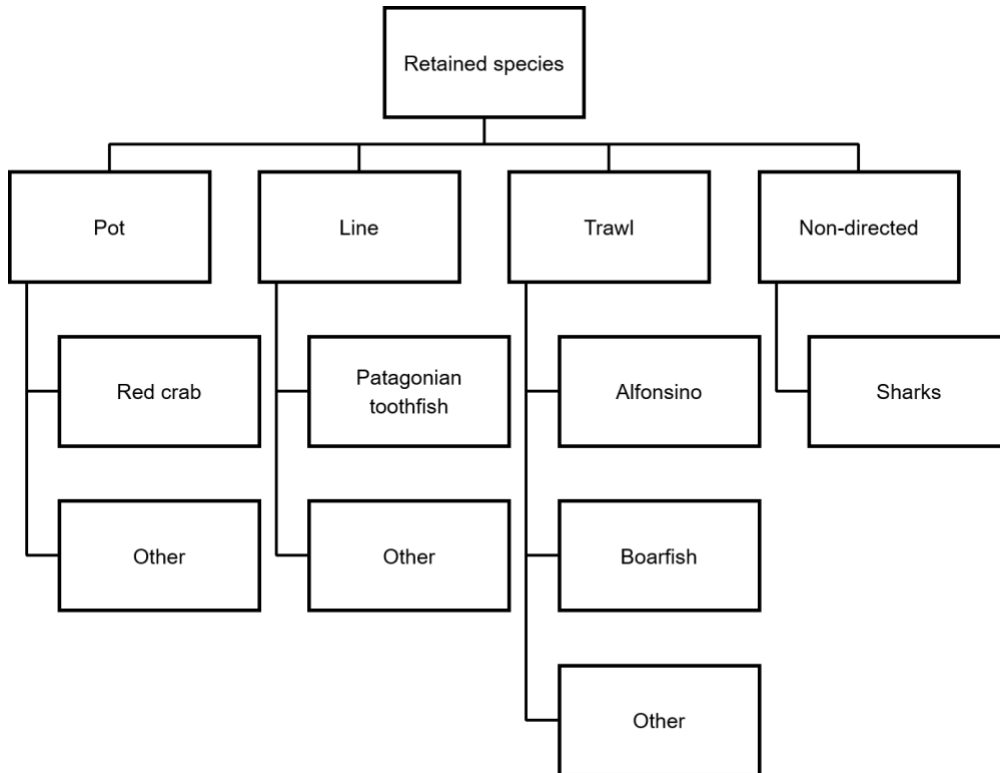
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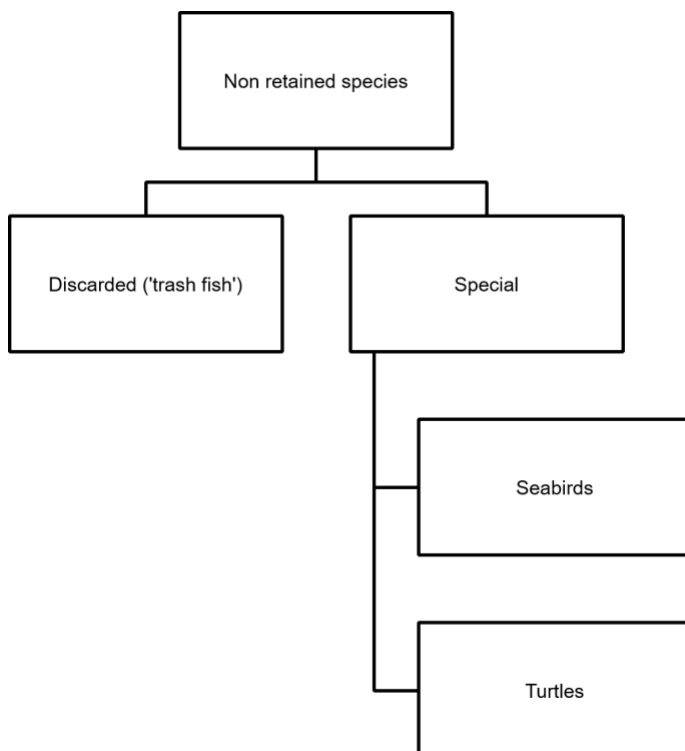
## EAF COMPONENT DESCRIPTIONS SEAFO

*N.B. These identify potential issues – a risk analysis would be needed to determine current risk levels and therefore whether direct management was needed.*

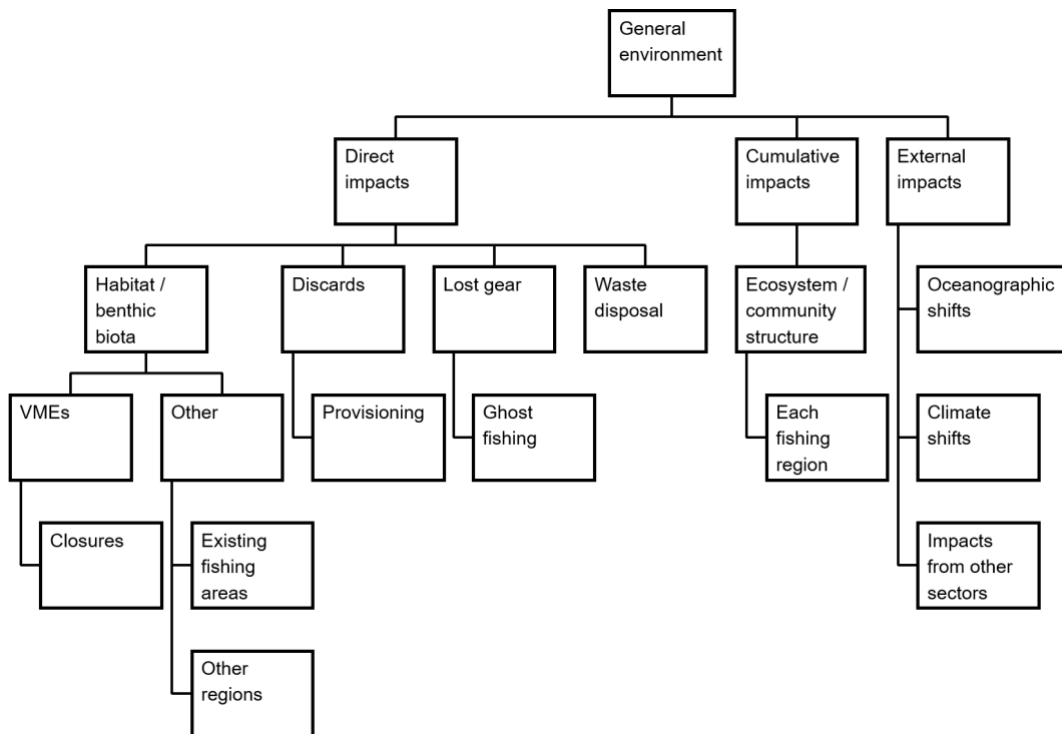
### Retained species SEAFO



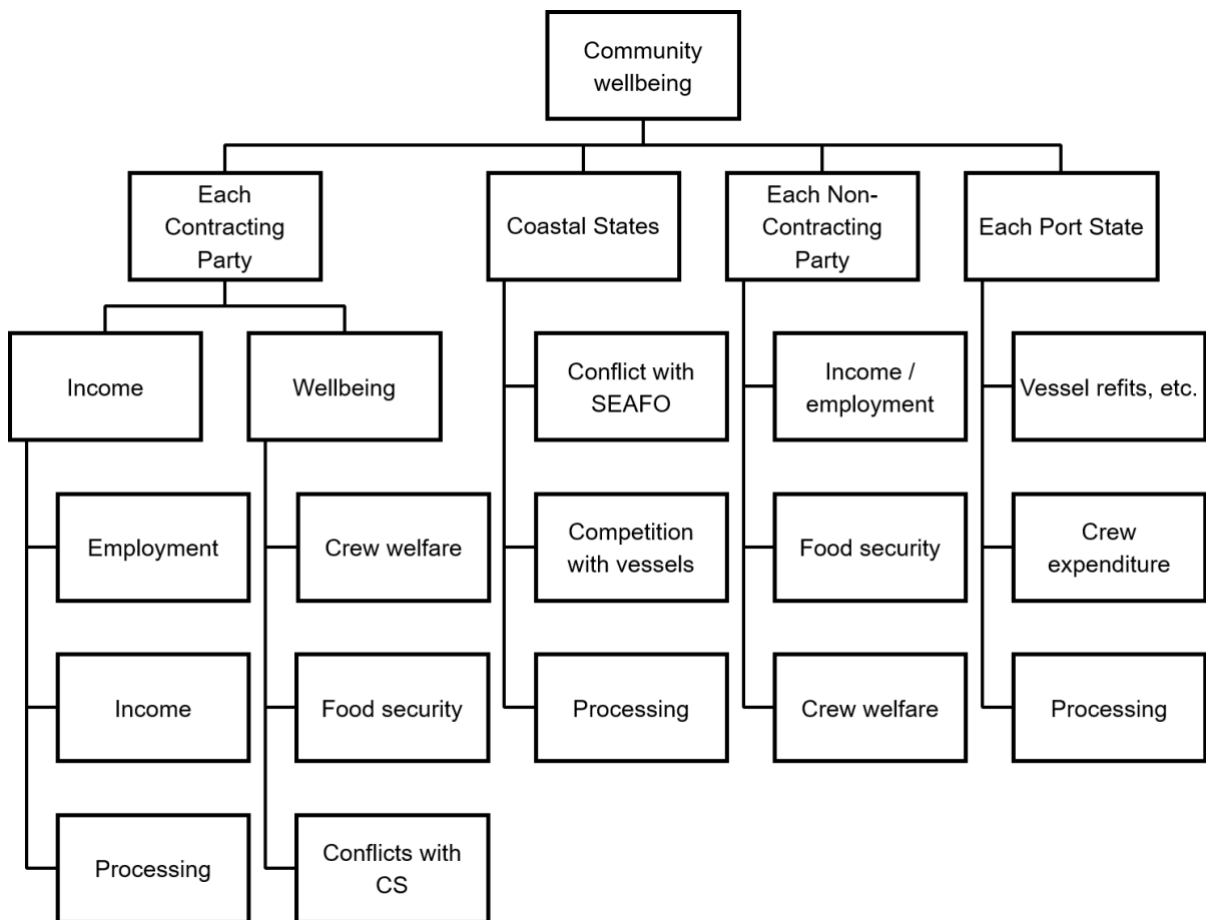
### Non-retained species SEAFO



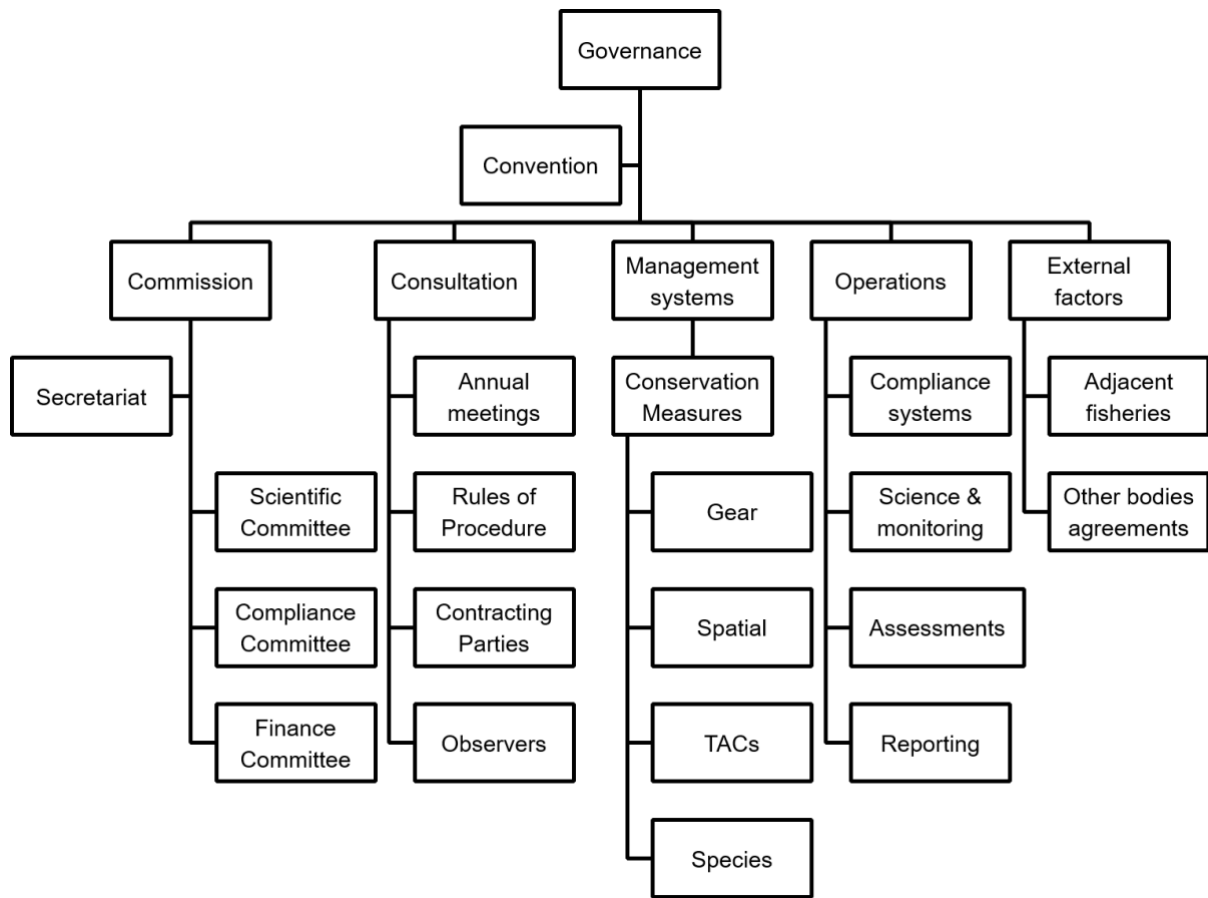
**General environment SEAFO**



**Community wellbeing SEAFO**



**Governance (ability to achieve) SEAFO**



## **A2.7 Indian Ocean - Southern Indian Ocean Fisheries Agreement**

### **EAF BACKGROUND REPORT**

#### **Acknowledgements**

A significant proportion of the material used for this background report was either obtained or summarized from the SIOFA website<sup>26</sup> and the relevant chapter of FAO Technical Paper 595 Sanders & Thomson, 2016). These sources are not referenced individually everywhere in the following text except for tables and figures. The information was last updated in August 2018.

#### **Overview**

The Southern Indian Ocean Fisheries Agreement (SIOFA) was signed in Rome on 7 July 2006 and entered into force in June 2012. The objectives of the agreement are to ensure the long-term conservation and sustainable use of the fishery resources and to promote sustainable development of fisheries in the area, including taking account the needs of parties – particularly the least developed and small island states. The SIOFA area of application covers the southern two-thirds of the Indian Ocean between Africa and Australia. The agreement operates through an annual Meeting of the Parties that is serviced by a Secretariat, Scientific and Compliance Committees and a number of working groups.

The SIOFA is largely a bottom trawl fishery that began in the 1960s; the total number of vessels fishing in the area from 2011 to 2017 ranged from 7 to 65. These vessels fished for toothfish with bottom longlines, orange roughy with bottom trawls, and alfonsino and other species with deep midwater (semi-pelagic) trawls. The catch levels were approximately: 4 000–6 000 tonnes of Alfonsino; 1 500–2 500 tonnes of orange roughy; 1 00 tonnes of sharks; small numbers of toothfish and from 5 to 9 000 tonnes of lizardfish and scads. Recent total annual catches for all species are around the 5 000-tonne level and appear to be stable; targeting mainly alfonsino, with smaller quantities of orange roughy and Patagonian toothfish.

The agreement was signed in 2006 but only came into effect in 2012 with the first meeting of parties held in 2013. There are currently nine contracting parties: Australia, the Cook Islands, the European Union, France (on behalf of its Indian Ocean Territories), Japan, the Republic of Korea, Mauritius, Seychelles and Thailand. SIOFA only became operational in 2016 with the appointment of a secretariat, and is therefore still developing its operations and management.

#### **SIOFA Agreement**

The Southern Indian Ocean Fisheries Agreement (SIOFA) was signed in Rome on 7 July 2006 and entered into force in June 2012. The agreement also includes the need for consideration of non-contracting parties. Those identified as cooperating non-contracting parties (CNCPS) and participating fishing entities (PFEs) are normally subject to the same measures as contracting parties.

#### **Objectives of the agreement**

The objectives in this agreement are to ensure the long-term conservation and sustainable use of the fishery resources in the area through cooperation between the contracting parties, and to promote sustainable development of fisheries in the area, while also taking into account the needs of developing states that border the same. There is a particular focus on the least-developed and small island developing states.

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<sup>26</sup> <http://apsoi.org/>

*General principles:*

- (a) measures shall be adopted on the basis of the best scientific evidence available to ensure the long-term conservation of fishery resources, taking into account the sustainable use of such resources and implementing an ecosystem approach to their management;
- (b) measures shall be taken to ensure that the level of fishing activity is commensurate with the sustainable use of the fishery resource;
- (c) the precautionary approach shall be applied in accordance with the Code of Conduct and the 1995 Agreement, whereby the absence of adequate scientific information shall not be used as a reason for postponing or failing to take conservation and management measures;
- (d) the fishery resources shall be managed so that they are maintained at levels that are capable of producing the maximum sustainable yield, and depleted stocks of fishery resources are rebuilt to said levels;
- (e) fishing practices and management measures shall take due account of the need to minimize the harmful impact that fishing activities may have on the marine environment;
- (f) biodiversity in the marine environment shall be protected; and
- (g) the special requirements of developing States bordering the Area that are Contracting Parties to this Agreement, and in particular the least-developed among them and small island developing States, shall be given full recognition.

**Scope**

This agreement covers fishery resources including fish, molluscs, crustaceans and other sedentary species within the area, but excludes highly migratory species (see Annex I of UNCLOS) and sedentary species that are subject to the fishery jurisdiction of coastal states (see Article 77(4) of UNCLOS).

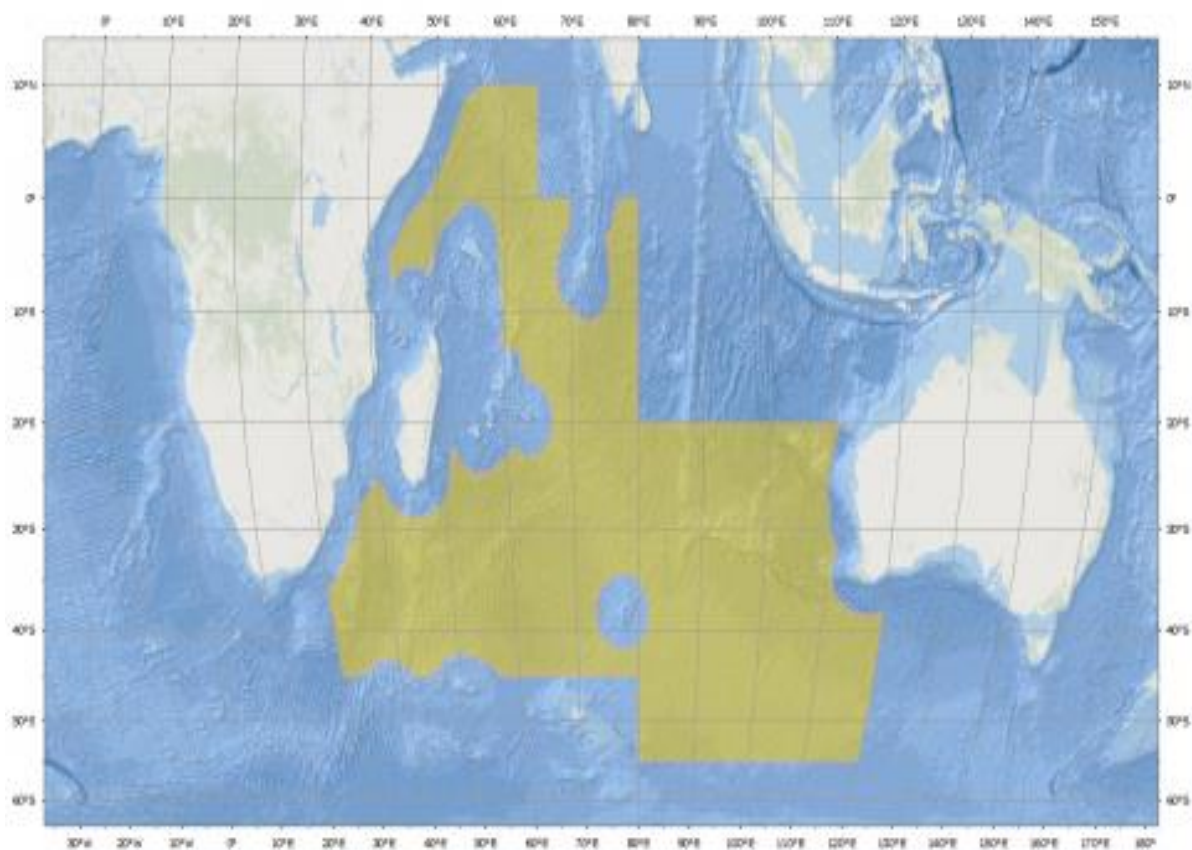
**Contracting parties**

To date, SIOFA has nine contracting parties: Australia, the Cook Islands, the European Union, France (on behalf of its Indian Ocean Territories), Japan, the Republic of Korea, Mauritius, the Seychelles and Thailand. Comoros, Kenya, Madagascar, Mozambique and New Zealand are also signatories to but have not ratified the agreement. There are no CNCPs or PFEs as yet.

**Agreement area**

The SIOFA area of application covers the southern two-thirds of the Indian Ocean between Africa and Australia; it includes parts of FAO Major Fishing Areas 51 and 57, but excludes the Arabian Sea, the Gulf, the Bay of Bengal, and the northeast Indian Ocean. It is bounded to the south by CCAMLR, to the southwest by SEAFO, and to the southeast by SPRFMO (see Figure A2.7.1).





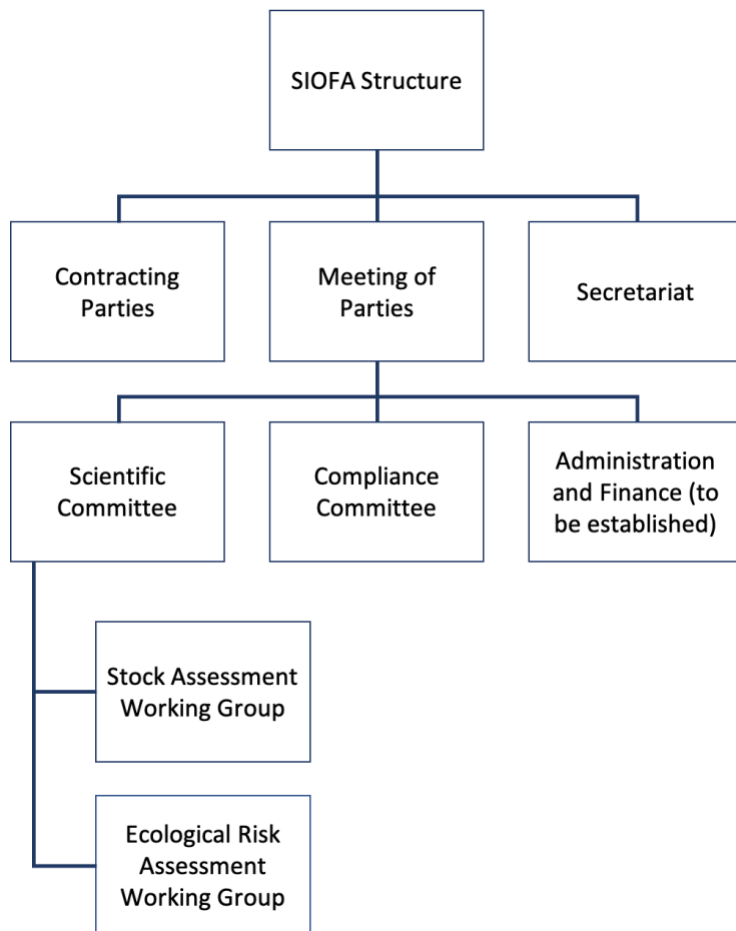
**Figure A2.7.1:** Map of the SIOFA area (Source: <http://apsoi.org/>)

## **Governance and management structure**

### *Meeting of Parties*

The main decision-making body is the Meeting of the Parties. This is required to meet at least annually. Its functions include: reviewing the state of fishery resources, evaluating impacts of fishing, adopting measures to manage the fisheries and protecting biodiversity from any associated impacts, as well as to collect data and promote research necessary for the management of the fisheries, and promote compliance.

The Rules of Procedure state that ordinary meetings shall be convened annually. Each contracting party and participating fishing entity shall be represented at Meetings of the Parties by one designated representative, who may in their turn be accompanied by alternate representatives, experts and advisers. This Meeting of Parties forum has a number of committees that have been established to undertake specific functions and assist with decision-making and operations (see Figure A2.7.2).



**Figure A2.7.2:** Summary diagram of the structure of governance bodies for SIOFA. There is provision for establishing an Administration and Finance Committee (SCAF) but none has been formed to date

### Secretariat

The second Meeting of the Parties, held in Mauritius in March 2015, agreed to base the Headquarters in La Réunion, a French Department and outermost region of the EU, in the Indian Ocean. At the third Meeting of the Parties, held in La Réunion in July 2016 important administrative steps were finalized to enable SIOFA to become fully operational, including the selection of an Executive Secretary, and the selection of Chairperson and vice-Chairperson. Staff regulations, financial regulations and budgets were approved, and a Headquarters agreement was signed between France and SIOFA.

Based on the Rules of Procedure, the Secretariat shall perform such functions and duties as are prescribed by the Meeting of the Parties, including:

- receiving and transmitting the official communications of the Meeting of the Parties;
- facilitating the collection of data necessary to accomplish the objectives of the Agreement;
- making all necessary arrangements for each ordinary and extraordinary Meeting of the Parties and any subsidiary bodies where required;
- preparing administrative and other reports for the Meeting of the Parties, the Scientific Committee and any other subsidiary bodies established;
- having the custody and proper preservation of the documents in the archives of the Meeting of the Parties;
- administering and reporting to each ordinary Meeting of the Parties on financial and staffing resources; and

- preparing a report on the Secretariat's activities for the ordinary Meeting of the Parties.

### **Scientific Committee**

The agreement provides for a scientific committee, whose functions include assessing fishery resources and the impact of fishing on the marine environment, providing advice and recommendations for formulating conservation and management measures, monitoring of fishing activities, and defining standards and formats for data collection. The first meeting of the SIOFA Scientific Committee took place in March 2016, and discussions focused on the development of a work plan and a plan for the long-term research priorities (SIOFA, 2016a). The SIOFA Scientific Committee provides advice and recommendations to the Meeting of the Parties on the status of stocks of principal deep-sea fishery resources targeted, and, to the extent possible, taken as bycatch and caught incidentally in these deep-sea fisheries; by 2019 this should also include straddling fishery resources (for ToR see <http://www.siofa.org/node/8>).

In order to achieve these objectives, the Scientific Committee has two formal working groups with specific terms of reference:

*Stock Assessment Working Group:* This group is tasked with developing a research and review plan for implementation of stock assessments and related processes for progressing the objectives of the SIOFA Scientific Committee and the Meeting of the Parties (for ToR see <http://www.siofa.org/node/64>).

*Ecological Risk Assessment Working Group:* This working group was established under the SIOFA Scientific Committee to progress work related to the ecological risk assessments required to address the potential and current effects of fishing on target stocks, as well as those caught incidentally in SIOFA deep-sea fisheries (for ToR see <http://www.siofa.org/node/65>).

### **Compliance Committee**

The Agreement also provides that, once measures are adopted, a compliance committee shall be established to verify the implementation of, and compliance with, such measures. The Compliance Committee reports, advises, and makes recommendations to the Meeting of the Parties. The functions of the Compliance Committee are to:

- monitor, review and assess the implementation of, and compliance with, the Agreement and all conservation and management measures adopted by the Meeting of the Parties, and to provide advice and recommendations to the Meeting of the Parties thereon;
- give special consideration to reviewing compliance with measures adopted by the Meeting of the Parties that are paramount to the achievement of the Agreement's objectives, such as data reporting obligations, illegal, unreported and unregulated fishing and monitoring, control and surveillance measures;
- to make recommendations to the Meeting of the Parties on new compliance and management measures, including measures to address non-compliance;
- to monitor, review and analyse information pertaining to fishing activity in the Area, and recommend any action to be taken by the Meeting of the Parties to discourage any activities which undermine the objectives of the Agreement; and
- to provide such other information, technical advice and recommendations as it considers appropriate or as may be requested by the Meeting of the Parties.

The full terms of reference are available at [www.siofa.org/node/7](http://www.siofa.org/node/7).

### **The Standing Committee on Administration and Finance (SCAF)**

Although this committee has not yet been established, the functions of the SCAF will be to:

- consider and advise the Meeting of the Parties on any administrative or financial matters;
- provide any other information or advice to the Meeting of the Parties as it considers appropriate or as requested by the Meeting of the Parties;
- fulfil the duties prescribed in the Financial Regulations; and
- perform other tasks as directed by the Meeting of the Parties.

The full terms of reference are available at [www.siofa.org/node/9](http://www.siofa.org/node/9).

### **Decision-making processes**

The Agreement states that decisions will generally be made by consensus and these will be binding on all parties.

Proposals for action, including those related to conservation and management measures, are submitted by contracting parties to the Meeting of the Parties. Advice, recommendations and proposals, including those stemming from the Scientific Committee, are presented at the Meeting of the Parties, where amendments and proposals are adopted, either by consensus or by a simple majority vote of the contracting parties present, depending on the nature of the proposal. The Meeting of the Parties also gives the Scientific Committee any guidance necessary for it to carry out its functions. CMMs become binding 90 days after their transmission to contracting parties, following their adoption at the Meeting of the Parties, subject to this objection period being satisfied.

The Agreement outlines that the Meeting of Parties must impact of fishing on the fishery resources and a marine environment, taking into account the oceanographic and other environmental characteristics, in addition to other human and environmental factors. It must also take into account straddling stocks and fisheries.

### **Relationships with other bodies**

There are other regional fisheries and conservation bodies operating in or adjacent to the SIOFA area of competence, including the IOTC. The Southwest Indian Ocean Fisheries Commission (SWIOFC) is an advisory body promoting the sustainable development and utilization of coastal fishery resources off the shores of East Africa and several island states of the region, as well as the responsible management and regional cooperation on fisheries policy. The Agreement specifically requires contracting parties to cooperate with related organizations having mutual interests, and particularly with SWIOFC and other adjacent organizations managing fisheries in the high seas (SIOFA, 2006).

In accordance with Rule 18 of the SIOFA Rules of Procedure, observers may attend and contribute to SIOFA meetings. One such observer includes the Southern Indian Ocean Deepsea Fishers Association (SIODFA). Established in 2006, a group of fishing companies with longer-term interests in fishing in the Indian Ocean came together to form SIODFA. Their objectives are: to develop an understanding of the deep-sea fisheries in the Indian Ocean, to fish the resources in a sustainable and responsible manner, and to protect the environment in which these harvested species occur. Through their work, they have identified a total of 13 benthic areas, called benthic protected areas (BPAs), where the organization prohibits fishing by its members. SIOFA SC is currently in the process of assessing these BPAs against criteria provided by the SIOFA Standard Protocol for future Protected Areas Designation which was developed at the 2nd Scientific Committee meeting and adopted at the 4th Meeting of the Parties held in 2017 (see Annex H of the SC2 Report <http://www.siofa.org/meeting-reports/Scientific%20Committee%20Meeting>).

Any BPAs adopted by SIOFA will become binding on all contracting parties, CNCPs and PFEs.

## OVERVIEW OF THE FISHERY

### Key target species and fisheries

This Agreement covers fishery resources including fish, molluscs, crustaceans and other sedentary species within the area, but excludes highly migratory species (see Annex I of UNCLOS) and sedentary species that are subject to the fishery jurisdiction of coastal states (see Article 77(4) of UNCLOS).

Fishing fleet: SIOFA is largely a bottom trawl fishery that had its origins in the 1960s/1970s. These fisheries were slow to develop because of the distances to what were the major markets at that time, and the difficulties of fishing poorly charted areas at depths in the 600–1 500 m range. The fishery was intensive during the 1990s, with relatively high catches being pursued by only one to three vessels. The number of vessels increased in the late 1990s and early 2000s, and peaked at 35–53 vessels in 2000–2001.

By 2004 there were only five vessels were left, and the fleet remained at this level up to 2014 (SIOFA, 2016a). These vessels fished for toothfish with bottom longlines, orange roughy with bottom trawls, and alfonsino and other species with deep midwater (semi-pelagic) trawls (Romanov 2003; SIODFA, 2015; SIOFA, 2016a). In the seven years from 2011 to 2017 (the most recent years reported by all parties), from 7 to 65 vessels fished each year in the SIOFA area, across all the parties and one non-contracting party, China.

*Target species:* Initially the fish targeted were mainly alfonsino (*Beryx splendens*), rubyfishes (*Emmelichthys nitidus* and *Plagiogeneion rubiginosum*), butterflyfish (generally *Centrolophus niger* and *Hyperoglyphe antarctica*), and pelagic armourhead (*Pseudopentaceros richardsoni*). Commercial catches of orange roughy (*Hoplostethus atlanticus*) did not occur until the late 1990s, peaking in the early 2000s.

Annex E of the 2018 Scientific Report outlines that the catch of trawl vessels is predominantly alfonsino and orange roughy. Species also caught by trawling include: pelagic armourhead, bluenose warehou, violet warehou, ocean blue-eye trevalla and oreo dories, cardinal fish, hapuku wreckfish. The addition of Thailand's fishery added lizardfish and scads as a major catch from small trawlers from 2015 onwards.

The catch of longline vessels differs between two groups. There are longline vessels (reported by Japan, the Republic of Korea and France's Overseas Territories) that catch Patagonian toothfish and associated species such as blue antimora. The other longline vessels catch hapuku wreckfish and ocean blue-eye trevalla, pelagic armourhead, deepwater sharks (*Squalidae*), alfonsino, rubyfish and common mora.

The catch of gillnet vessels was predominantly deepwater sharks (*Squalidae*), though there is uncertainty as to the species composition within this group.

The Chinese light seining fishery has targeted mackerel and Brama species (such as *Brama japonica*) and its bottom longline fishery has targeted ruby snapper and other species in the Lutjanid family.

*Bycatch species:* There are also 11 bycatch species caught and sold, which include snappers and jobfish (*Lutjanidae*), cardinal fish (*Apogonidae* and *Epigonidae*), warehou (*Hyperoglyphe antarctica*), groupers (*Serranidae*), and bonnetmouths and rubyfish (*Emmelichthyidae*).

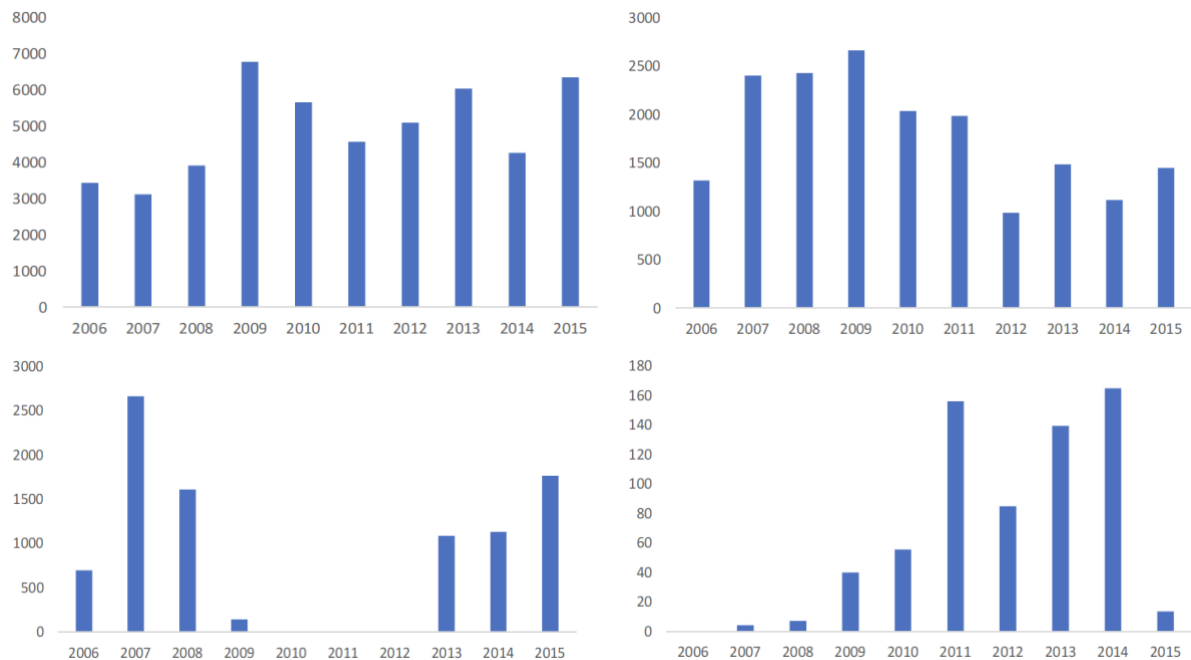
*Catch history:* There are large differences between reported catches in the published sources, and annual catches of many species vary widely. High total catches were recorded in the early 1980s, and again in the 1990s, with annual landings of around 3 000–6 000 tonnes during the peak periods. Alfonsino catches appear to be highest in the late 1990s and again more recently since 2010, often reaching officially reported levels of 2 000–4 000 tonnes per year. Catches of orange roughy were stable at low levels in the 1980s and early 1990s, rising dramatically from 1998 to 2005 to 3 000–7 000 tonnes per

year, and declining again after 2010. While reported catches of toothfish peaked in 2001–2002 at around 7 500 tonnes, there is a suspicion that this is due to misreporting: current catches of about 100 tonnes per year are likely to be part of a shared straddling stock with the Southern Ocean Patagonian toothfish (FAO, 2016).

At the 3rd Meeting of the Scientific Committee (SIOFA-SC 2018) the Chair noted that the reconstruction of catch histories was a key challenge for the SC. The SC discussed the issue of these potentially unaccounted catch (mortalities) and the implications for the reconstruction of catch histories, including those used for stock assessment.

Recent total annual catches for all species are around the 5 000 tonnes level and appear to be stable, targeting mainly alfonsino with lesser components of orange roughy and Patagonian toothfish (FishStat, 2015).

An overview of the SIOFA fishery is presented in Annex E of the Third SC meeting report (SIOFA, 2018). This outlines that in the seven years from 2011 to 2017 (the most recent years reported by all parties), from 7 to 65 vessels fished each year in the SIOFA area, across all the parties and one non-contracting party, China.



**Figure A2.7.3:** Provisional catch time series for 2006 to 2016 for (clockwise from upper left figure): Alfonsino, Orange Roughy, Patagonian Toothfish, and deepwater shark (SIOFA Scientific Committee Report, 2017)

### Target species stock assessments

The SAWG presented the report of the first meeting of the SAWG (SC-03-07.1.1(03)). The main areas of discussion centred around:

- a tiered assessment framework for SIOFA fisheries
- stock assessment for seven orange roughy sub-regions
- future work, including that planned for alfonsino, Patagonian toothfish and other species.

It was noted that the quantity, quality and suitability of data will vary from species to species over space and time and that this variability is likely to influence the parameters that can be estimated, as well as associated uncertainties. The tiered framework for prioritizing stocks for status assessment was proposed based on the parameters that can be estimated given the data available. Such a tiered framework may eventually assist the SAWG and SC to develop transparent decision rules for advice on recommended biological catches and potential buffers (e.g. discount factors) that may be applied to account for assessment uncertainty.

The recommended tiered levels consist of:

- **Tier 1:** Benchmark assessments that utilize catch data from fishery monitoring, ideally in combination with stock abundance from independent surveys, catch rates and biological data, with the purpose of estimating depletion levels and fishing mortality rates.
- **Tier 2:** Data-limited assessments that may utilize catch-only or simple indicators to track status (e.g. CPUE, size composition, Productivity-Susceptibility Analysis).
- **Tier 3:** No assessment necessary.

The SAWG noted the following implications for future work:

- Scoping analysis: this should provide direction to future assessment work on fisheries. The SAWG may wish to consider this as a living document that is updated annually (or as required), as new information becomes available. It could act as a list of data holdings for SIOFA species.
- Tier 2 risk analyses should be included in the SAWG and ERAWG work plans.

A stock assessment was presented for orange roughy. The results of the assessment estimated that in 2017 spawning stock biomass – compared to virgin spawning stock biomass (ss17 (SSB17/SSB0) – was over 50 percent for the base model and all sensitivities evaluated for entire stock.

Work on stock assessments for Alfonsino and toothfish are under way; work on other species is still in the planning phases.

### **Bycatch and special species**

Paper SC-03-07.2.1(01) provides an update for the SIOFA SC on the ecological risk assessment (ERA) regarding the effects of fishing on deepwater chondrichthyans in the SIOFA area, drawing on the Productivity-Susceptibility Analysis (PSA) and Sustainability Assessment for Fishing Effects (SAFE) methods. The assessment identified a number of species categorized at high or extreme risk from fishing using demersal trawl, midwater trawl, demersal longline and gillnet gears. It was noted that it is likely that these results include a number of false positives and false negatives that are yet to be identified. It was also noted that the ERA has prioritized species for which better information is needed, and those for which explicit management actions may be required.

SC-03-10.4 (01) contains a proposal for a Memorandum of Understanding between SIOFA and the Agreement on the Conservation of Albatrosses and Petrels (ACAP). ACAP is a multilateral agreement that seeks to achieve and maintain a favourable conservation status for albatrosses and petrels globally.

### **Vulnerable marine ecosystems**

The importance of identifying and managing VMEs resulted in the preparation of a report on bottom fishery impact assessments in the southern Indian Ocean (Williams et al., 2011) for the Scientific Committee's first meeting. This meeting examined the potential impacts of bottom fisheries on VMEs, including the constraints and opportunities of using habitat mapping and predictive modelling for the

identification of VMEs, and the process that led to delineation of the industry-designated benthic protected areas (BPAs) in the Indian Ocean, and whether these areas contained VMEs. During the meeting, information on fishing effort and the identification of fished areas was also discussed, as the technical basis for impact assessments.

### Cumulative ecological impacts

With regard to assessing the cumulative impact of SIOFA fisheries, the SC identified that it was not possible to provide an assessment of the cumulative impact of all SIOFA fisheries at this time from vessels flying the flag of a contracting party, CNCP or PFE in the agreement area, in accordance with CMM 2017/01. This was due to the differences in approaches and data in the BFAs provided.

## MANAGEMENT

### Regulations and measures

Since SIOFA entered into force in 2012, the majority of actions have related to bottom fishing and VMEs. The measures include the duties of the Scientific Committee (and all parties) to develop the full suite of bottom fishing measures. The CMMs (Table A2.7.1) are binding on members<sup>27</sup>.

**Table A2.7.1:** Current conservation and management measures (SIOFA, 2017)

CMM Number	Binding	Title
2017/10	09.10.2017	CMM for the Monitoring of Fisheries in the Agreement Area (Monitoring)
2017/09	09.10.2017	CMM for Control of fishing activities in the Agreement Area (Control)
2017/08	09.10.2017	CMM establishing a Port Inspection Scheme (Port Inspection)
2017/07	09.10.2017	CMM on Authorisation and Notification to Fish (Vessel Authorisation)
2016/06	08.10.2016	CMM on the Listing of IUU Vessels (IUU List)
2016/05	08.10.2016	CMM regarding the use of large-scale pelagic driftnets and deepwater gillnets in the Southern Indian Ocean Fisheries Agreement Area (Pelagic Driftnets and Deepwater Gillnets)
2016/04	08.10.2016	CMM on Vessels without Nationality (Vessels without Nationality)
2016/03	08.10.2016	CMM for Data Confidentiality and Procedures for access and use of data (Data Confidentiality)
2017/02	09.10.2017	CMM for the Collection, Reporting, Verification and Exchange of Data relating to fishing activities in the Agreement Area (Data Standards)

<sup>27</sup> <http://www.siofa.org/fisheries-management>



CMM Number	Binding	Title
2017/01	09.10.2017	CMM for the Interim Management of Bottom Fishing in the SIOFA Agreement Area (Interim Management of Bottom Fishing)

## Target stock and bycatch management

### Interim Management of Bottom Fishing (CMM 2017/01)

The objective of this CMM is to promote the sustainable management of deep-sea fisheries resources in the agreement area, including target fish stocks and non-target species, and to protect the marine ecosystem including, inter alia, the prevention of significant adverse impacts on vulnerable marine ecosystems.

By 2019 the SC must determine: (a) the status of stocks of principal deep-sea fishery resources targeted, and, to the extent possible, those taken as bycatch and caught incidentally in these deep-sea fisheries, including straddling fishery resources.

Until such time as the Meeting of the Parties has acted in accordance with the advice of the Scientific Committee, each contracting party, CNCP and PFE shall, unless otherwise approved by the Meeting of the Parties, establish and apply specific measures to limit the level and spatial extent of the bottom fishing effort of vessels flying their flag. This includes:

- limits on its bottom fishing effort and/or catch over a 12-month period, up to its average annual level in active years over a representative period, for which reliable data exists;
- constraints on the spatial distribution of its bottom fishing effort, excluding line and trap methods, to recently fished areas, in order to prevent any expansion of such fishing activities;
- provisions to ensure its bottom fishing will not have significant adverse impacts on VMEs; where applicable, these shall take into account its BFIA (prepared and submitted pursuant to paragraph 14) and any areas identified under paragraph 36 where VMEs are known to occur, or are likely to occur; and
- provisions ensuring that any vessel flying its flag is not authorized to fish in any areas that the Meeting of the Parties has decided to close to fishing.

### Bycatch and management of special species

*Gear restrictions:* In 2016, the Meeting of the Parties agreed to prohibit the use of large-scale pelagic driftnets in CMM 2016/05, and to recommend that contracting parties, CNCPs and PFEs do not use deepwater gillnets.

*Effort restrictions:* CMM 2016/01 set out interim measures requesting the establishment and application of specific measures to limit the level and spatial extent of the bottom fishing effort of vessels flying their flag. This includes constraining the spatial distribution of bottom fishing effort, excluding bottom longlines and traps, to recently fished areas and to avoid expansion.

### VME Management

*CMM 2017/01 Bottom Fishing Areas:* The Scientific Committee has been tasked with the following in respect to the areas that have been subject to bottom fishing by contracting parties, CNCPs and PFEs footprint by 2020:

- (a) a SIOFA Bottom Fishing Impact Assessment Standard (BFIAS) which takes account of the latest scientific information available;

- (b) maps of where VMEs are known to occur, or likely to occur, in the agreement area;
- (c) guidelines for evaluating and approving electronic observer programmes for scientific data collection for consideration by the Meeting of the Parties; and
- (d) standard protocols for the designation of future protected areas (areas which should be closed to fishing).

By 2019 the SC must provide advice on:

- criteria for what constitutes evidence of an encounter with a VME, in particular threshold levels and indicator species; and
- the most appropriate response to a VME encounter including, inter alia, closing particular areas to a particular gear type or types.

By 2020 the SC must provide advice on:

- an appropriate SIOFA bottom fishing footprint based on the data provided to the Secretariat by contracting parties, CNCPs and PFEs under paragraph 13; and
- a SIOFA Bottom Fishing Impact Assessment (SIOFA BFIA). The SIOFA BFIA shall take into account the activities of all fishing vessels to which this CMM applies; in other words, vessels that are engaged in, or intending to engage in, bottom fishing within the agreed SIOFA bottom fishing footprint at the time the SIOFA BFIA is prepared.

#### VME closures/benthic protected areas

*CMM 2017/01:* Where the Meeting of the Parties determines, after taking into account advice provided by the Scientific Committee, that bottom fishing may have significant adverse impacts on VMEs in areas where VMEs are known to occur (or are likely to occur, based on the best available scientific information), the Meeting of the Parties may take the decision to close such areas to bottom fishing, either entirely or with respect to bottom fishing by a particular gear type or types.

There are currently no designated VME areas in the high seas areas of the southern Indian Ocean that are managed by international agreement to protect benthic habitats from possible significant adverse impacts from fishing with bottom contact fishing gears. There are also no regional measures identifying the SIOFA bottom fishing footprint, though the process to develop this has started. A total of 13 benthic areas, called benthic protected areas (BPAs), have been identified where the organization prohibits fishing by its members. There are a set of interim bottom fishing measures developed by each contracting party.

#### Exploratory fishing protocols

*CMM 2017/01:* Where parties are planning to fish in an area not previously fished, either with a different gear or above existing levels, this requires an application to Scientific Committee to assess anticipated impacts according to the SIOFA Bottom Fishing Impact Assessment. The MoP, based on advice from the Scientific Committee, shall decide if the new fishery can go ahead, and attach any conditions necessary.

#### Encounter protocols

*CMM 2017/01:* The interim measures state that vessels should cease fishing upon encountering evidence of a VME with catches above threshold levels within 2 nautical miles of a bottom or midwater trawl track.

### Ecosystem management

CMM 2017/01 is designed to protect the marine ecosystem including, inter alia, the prevention of significant adverse impacts on vulnerable marine ecosystems.

### Lost Gear

*CMM 2017/09 Retrieval of lost or abandoned fishing gear:* Each contracting party, CNCP and PFE shall ensure that:

- (a) vessels flying its flag and operating with any gear on board also have the necessary equipment to retrieve discarded, lost or abandoned gear;
- (b) vessels flying its flag that have lost gear shall not abandon it without making every reasonable attempt to retrieve it as soon as possible;
- (c) no vessels flying its flag deliberately abandons fishing gear, except for safety reasons, notably vessels in distress and/or life in danger.

### Compliance and monitoring

*VMS (CMM 2017/10):* Each contracting party, CNCP and PFE shall ensure that all vessels flying its flag that are fishing in the agreement area are fitted with an operational automatic location communicator (ALC) unit reporting back to its competent authority.

*Port inspection scheme (CMM 2017/08):* Each contracting party is to maintain an effective system of port state control for all vessels that have been engaged in fishing in the agreement area.

*Vessel registration (CMM 2017/07):* The Meeting of the Parties shall establish a SIOFA record of authorized vessels for fishing vessels authorized to fish in the agreement area. Each contracting party, cooperating non-contracting party (CNCP) and participating fishing entity (PFE) shall electronically submit to the Secretariat a list of the vessels flying their flag and authorized to operate in the agreement area.

*IUU List (CMM 2017/06):* Each contracting party is transmitted to the Secretariat a list of vessels presumed to be carrying out IUU activities in the agreement area during the current and previous year, accompanied by supporting evidence.

*Vessels with no nationality (CMM 2016/04)* A vessel with no nationality is a vessel that, under international law, is not entitled to fly the flag of any state.

### Data and scientific programmes

The agreement includes the harvesting of the fishery resource for scientific research as a fishing activity (Article 1(g)(ii)); contracting parties may allocate catch quantities for this (Article 6.3(b) (SIOFA, 2006). The Meeting of the Parties promotes research activities on the fishery resource and on shared stocks (Article 6.1(b); in 2016 it endorsed the work plan enabling the Scientific Committee to provide the necessary information to advise on fishery management (SIOFA, 2016b).

*Data Standards (CMM 2017/02):* In accordance with Article 6 of the Agreement this CMM prescribes the standards for the collection, reporting, verification and exchange of data related to fishing activities by vessels fishing in the SIOFA area of application (the agreement area). These data standards shall assist the Meeting of the Parties to fulfil its objectives under the Agreement, insofar as these relate to assessing the state of the fisheries within the competence of SIOFA, including the status of target and non-target species and the impact of fishing on the marine environment.

### Vessel catch and effort data

Collection of data Contracting parties, CNCPs and PFEs shall ensure that data on fishing activities – including for target, non-target and associated and dependent species such as marine mammals, marine reptiles, seabirds or ‘other species of concern’ – are collected from vessels flying their flag that are fishing in the agreement area in accordance with the relevant sections of Annex A.

Scientific observer data All contracting parties, CNCPs and PFEs shall implement national scientific observer programmes to collect data from activities undertaken by vessels flying their flag, including:

- vessel information, effort and catch data for its fishing activities in the agreement area, including target, non-target and associated and dependent species including marine mammals, marine reptiles, seabirds or ‘other species of concern’;
- biological or other data and information relevant to the management of fishery resources in the Agreement Area, as specified in this CMM, or as identified from time to time by the Scientific Committee or through processes identified by the Meeting of the Parties; and
- relevant scientific information related to the implementation of the provisions of the CMMs adopted by the Meeting of the Parties.

*Logbook programme (CMM 2017/10):* Each contracting party, cooperating non-contracting party (CNCP) and participating fishing entity (PFE) shall ensure that its vessels maintain either an electronic fishing logbook or a bound fishing logbook containing the relevant information for their compliance with the data collection and submission requirements of CMM 2017/02, with consecutively numbered pages.

*Scientific observer programme (CMM 2017/01):* Each contracting party, CNCP and PFE shall ensure that any vessel flying its flag and undertaking bottom fishing in the agreement area: (a) has 100 percent scientific observer coverage for the duration of the trip when deploying trawl gear; (b) has 20 percent scientific observer coverage in any fishing year when deploying any other bottom fishing gear type.

Each contracting party, CNCP and PFE shall ensure that the scientific observers carried by vessels operating in the agreement area and flying its flag are qualified and authorized to perform their tasks and record any requested data (CMM2017/10).

The SIOFA Scientific Committee (SC) Operational Work Plan 2016–2019 contained immediate research priorities that were in progress or planned for the duration of the work plan. The 2016–2019 work plan was replaced with 2018–2021 work plan at SC3.

### **Key references**

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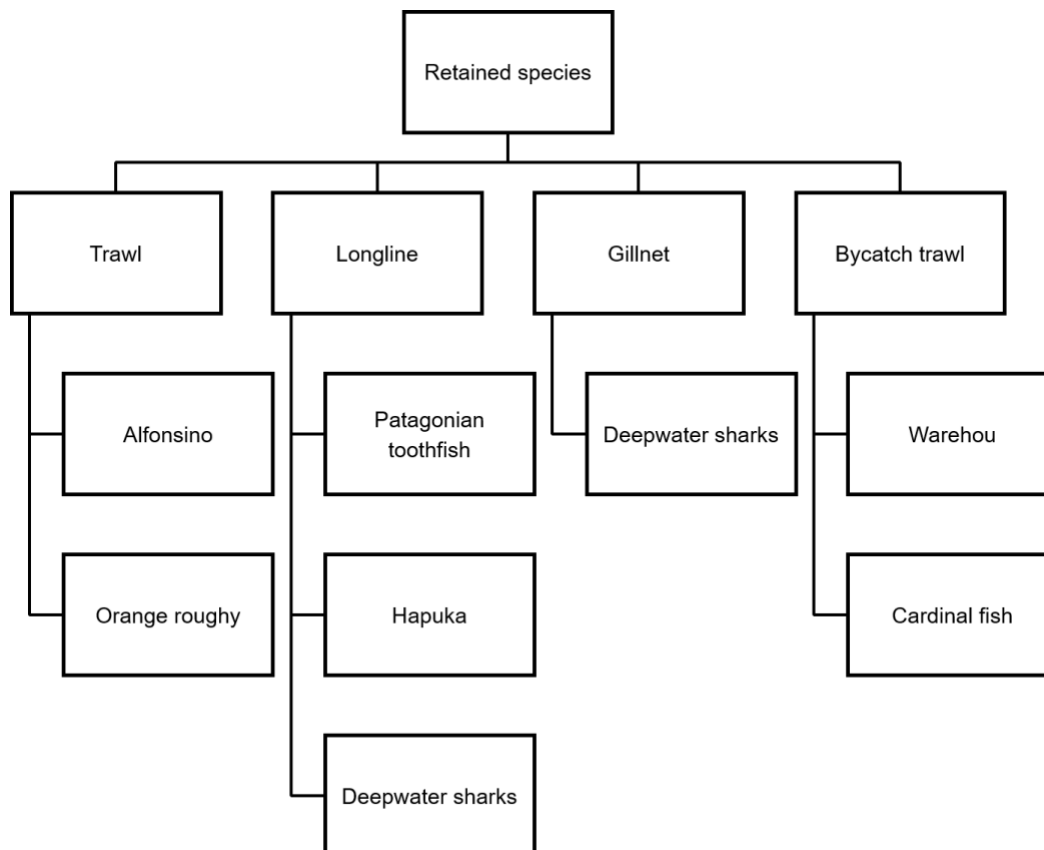
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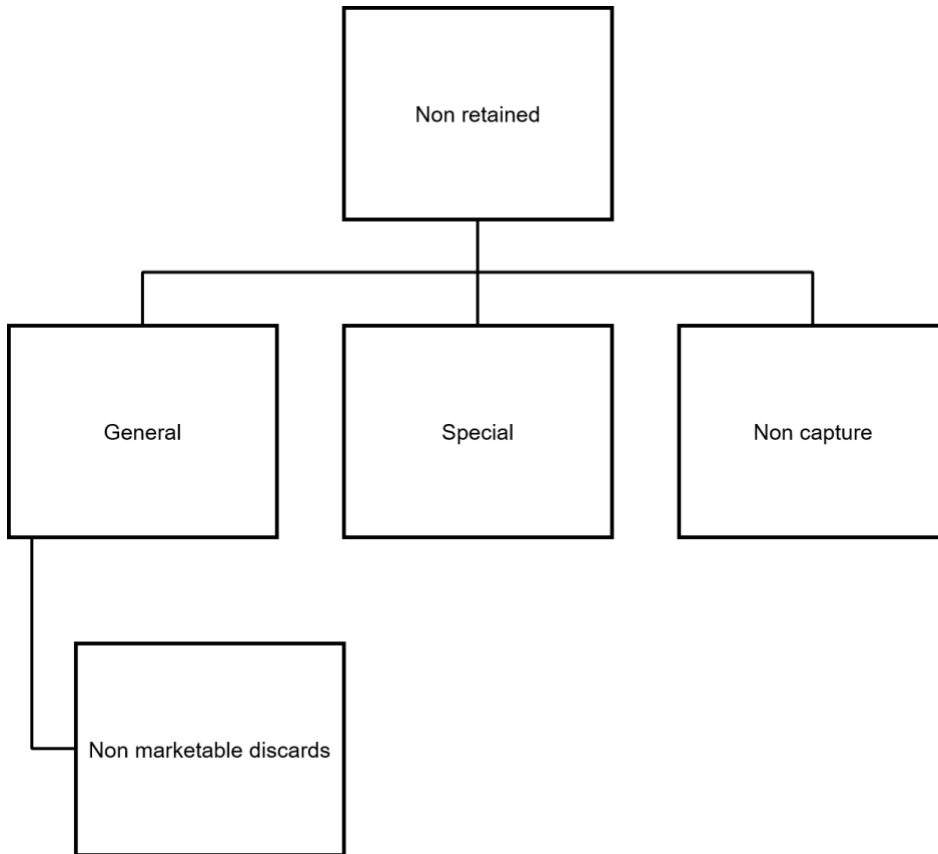
### EAF COMPONENT TREES SIOFA

*N.B. These identify potential issues – a risk analysis would be needed to determine current risk levels and therefore whether direct management was needed.*

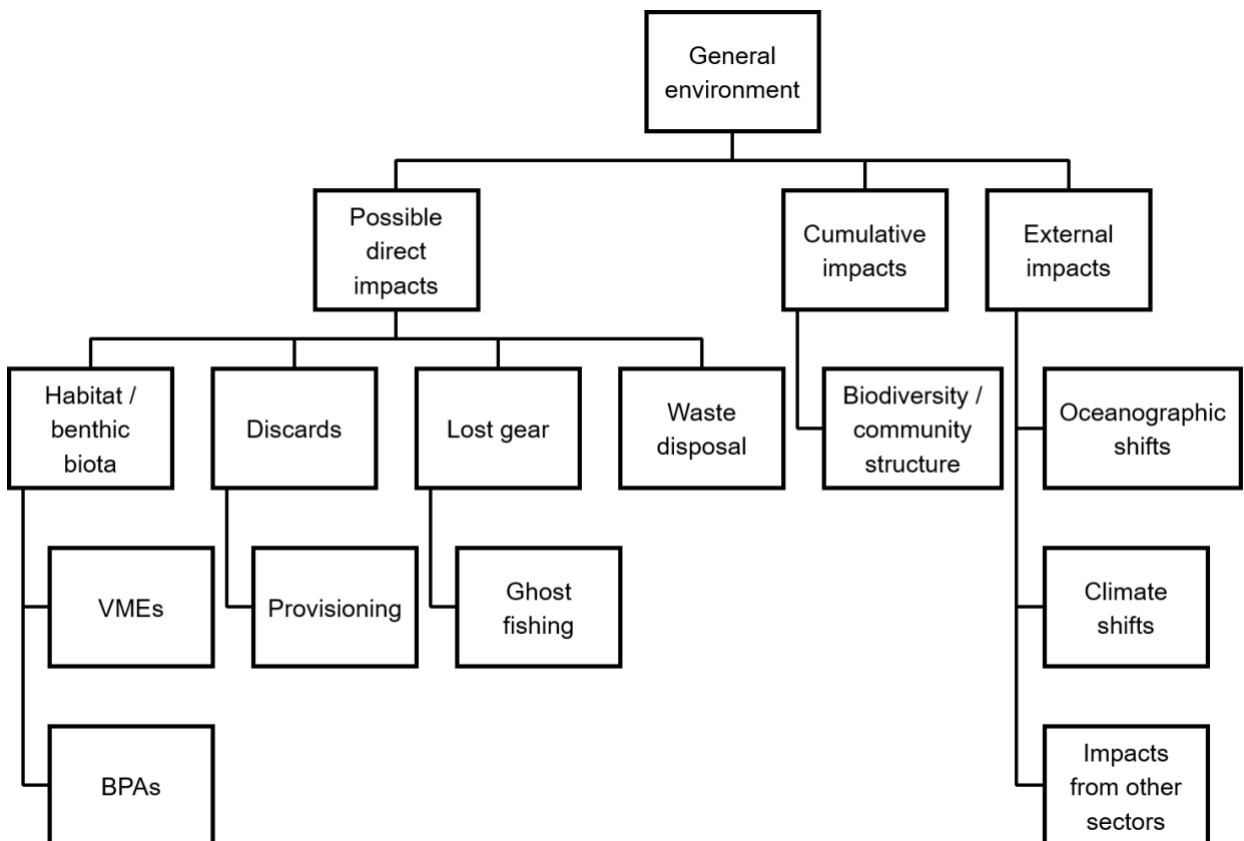
#### Retained species SIOFA



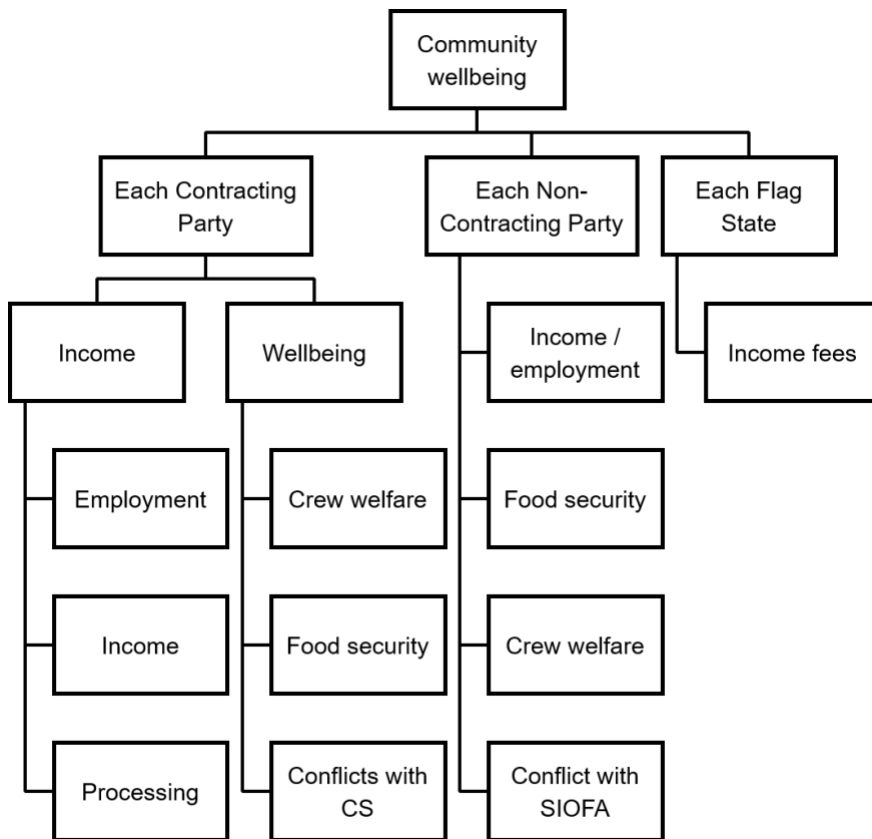
**Non-retained species SIOFA**



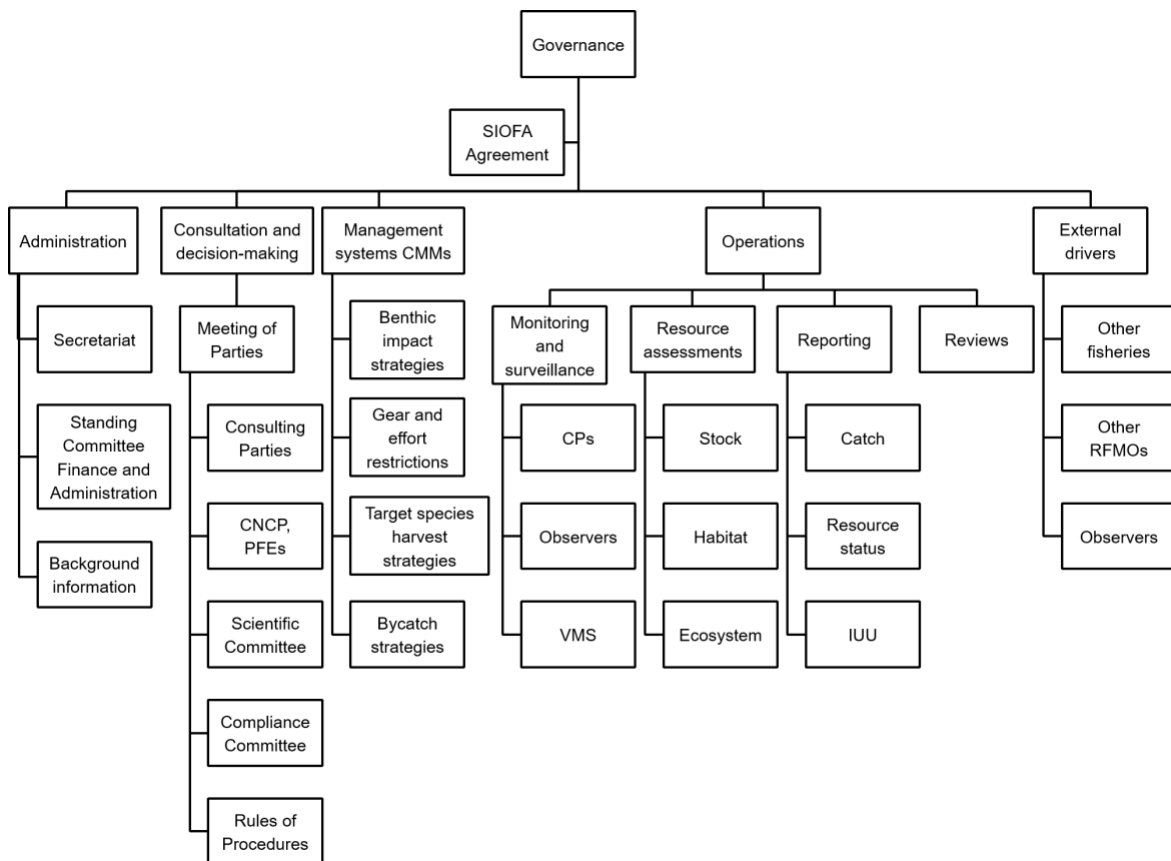
**General environment and ecosystem SIOFA**



**Community wellbeing SIOFA**



**Governance (ability to achieve) SIOFA**



## **A2.8 South Pacific Ocean – The South Pacific Regional Fisheries Management Organisation**

### **EAF BACKGROUND REPORT**

#### **Acknowledgements**

A significant proportion of the material used for this background report was either obtained or summarized from the relevant chapter of FAO Technical Paper 595 (Penney et al, 2016) and the documents and pages available and downloaded from the SPRFMO website. These sources are not referenced individually everywhere in the following text except for tables and figures. All sources are listed in the references. This information was last updated in August 2018.

#### **Overview**

The South Pacific Regional Fisheries Management Organisation (SPRFMO) is an intergovernmental organization committed to the long-term conservation and sustainable use of the fishery resources of the South Pacific Ocean and to safeguarding its marine ecosystems. The SPRFMO Convention applies to the high seas (outside EEZs) of the South Pacific, covering about a fourth of the Earth's high seas areas. This management process was initiated in 2006, with the Convention agreed in principle in 2009 and officially signed in 2012.

Knowledge of the distribution and extent of commercial fishing in the South Pacific Ocean high seas is limited. Exploratory and targeted commercial fishing is thought to have taken place in the area since at least the 1970s. Commercial fisheries tend to have been concentrated in areas of higher productivity where there is an upwelling of nutrients, often associated with seamounts and ridges. Seamounts and ridges are also the only places shallow enough to bottom fish.

Currently, the main commercial resources fished in SPRFMO are Jack mackerel and jumbo flying squid in the southeastern Pacific and, to a lesser extent, the deep-sea species associated with seamounts in the southwestern Pacific. Fishing methods currently used include purse seining, pelagic trawling, bottom trawling, pelagic longlining, bottom longlining and potting. Catches of trawl species such as orange roughy are now small (less than 1500 tonnes) but can exceed 100 000 tonnes for some pelagic species such as jack mackerel. Catches of many of these species are much greater within the EEZ regions.

The SPRFMO consists of a Commission and a number of subsidiary bodies including a secretariat, scientific, compliance and management committees, in addition to working groups.

There are currently 15 contracting parties and four non-contracting parties who are parties to this Commission.

#### **Convention/mandate**

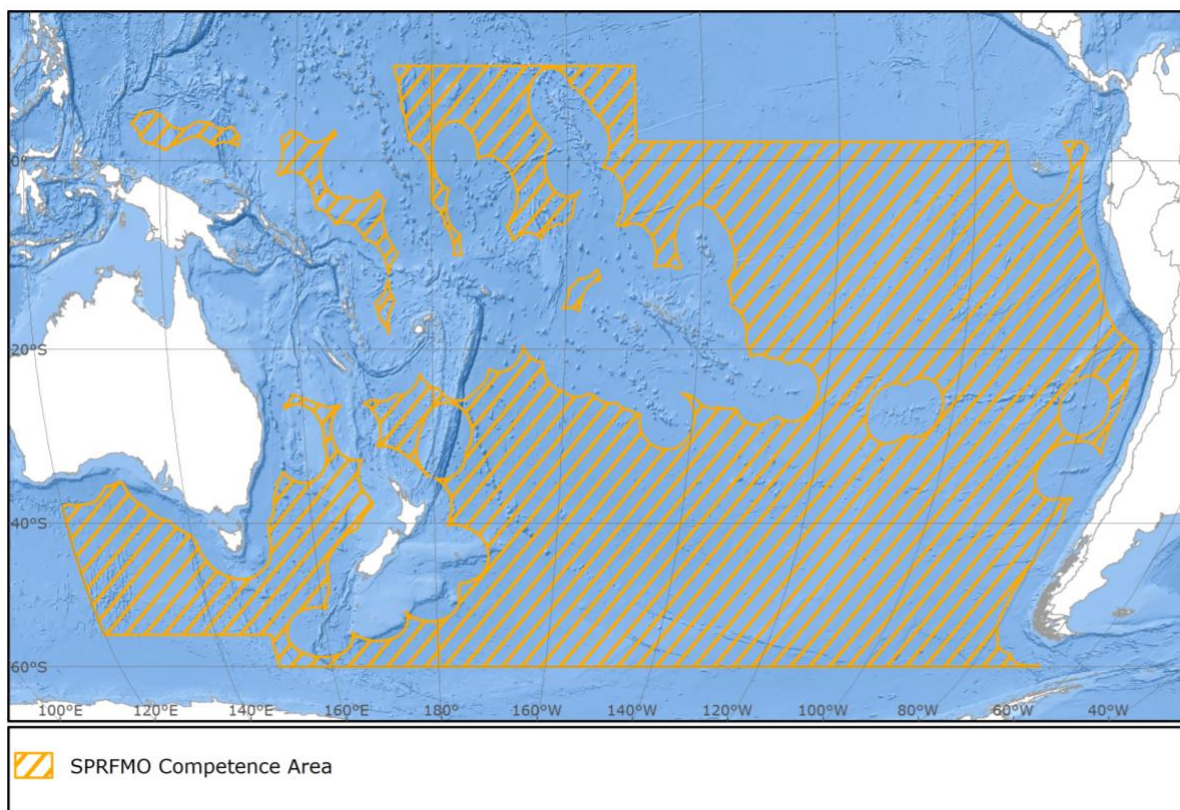
The process to generate effective fisheries management of the marine environment in high seas areas of the South Pacific Ocean began in 2006. The SPRFMO existed as an interim body from 2006 to 2012, when international consultations and preparatory conferences were conducted. The Convention on the Conservation and Management of High Seas Fishery Resources in the South Pacific Ocean (SPRFMO, 2015) was adopted in 2009 and entered into force on 24 August 2012; SPRFMO held its first meeting in 2013.

Since 2013, the SPFRMO has extended an invitation to non-contracting parties with fishing interests in its convention area to become Members or CNCs.



## Convention area

The SPRFMO Convention applies to waters of the South Pacific and small areas of the North Pacific and eastern Indian Oceans beyond national jurisdiction. The extent of the convention area is described in Article 5 of the Convention (see Figure A2.8.1).



**Figure A2.8.1:** SPRFMO Convention Area (Source: Penney et al, 2016)

## SPRFMO CONVENTION

### Convention objective and principles

The objective of this Convention is, through the application of the precautionary approach and an ecosystem approach to fisheries management, to ensure the long-term conservation and sustainable use of fishery resources; in so doing, it aims to safeguard the marine ecosystems in which these resources occur.

Article 3 of the Convention outlines the following principles to achieve the objective; including:

- conservation and management of fishery resources shall be conducted in a transparent, accountable and inclusive manner, taking into account best international practices;
- fishing shall be commensurate with the sustainable use of fishery resources, taking into account the impacts on non-target and associated or dependent species and the general obligation to protect and preserve the marine environment;
- overfishing and excess fishing capacity shall be prevented or eliminated;
- full and accurate data on fishing, including information relating to impacts on the marine ecosystems in which fishery resources occur, shall be collected, verified, reported and shared in a timely and appropriate manner;

- decisions shall be based on the best scientific and technical information available and the advice of all relevant subsidiary bodies;
- cooperation and coordination among contracting parties shall be promoted to ensure that conservation and management measures adopted by the Commission, and conservation and management measures applied in respect of the same fishery resources in areas under national jurisdiction, are compatible;
- marine ecosystems shall be protected, in particular those ecosystems which have long recovery times following disturbance;
- the interests of developing states, and of territories and possessions, in particular those pertaining to the least developed and small island developing states, shall be recognised, as well as the needs of developing state coastal communities;
- effective compliance with conservation and management measures shall be ensured and sanctions for any violations shall be adequate in severity to discourage violations wherever they occur: in particular it shall deprive offenders of the benefits accruing from their illegal activities; and
- pollution and waste originating from fishing vessels, discards, catch by lost or abandoned gear and impacts on other species and marine ecosystems shall be minimised; and
- apply the precautionary approach and an ecosystem approach.

### **Contracting parties to the Convention**

The Commission currently has 15 Members from Asia, Europe, the Americas, and Oceania: Australia, Chile, China, Cook Islands, Cuba, Ecuador, European Union, Denmark (in respect of the Faroe Islands), Republic of Korea, New Zealand, Peru, Russian Federation, Taiwan Province of China, United States of America, Vanuatu.

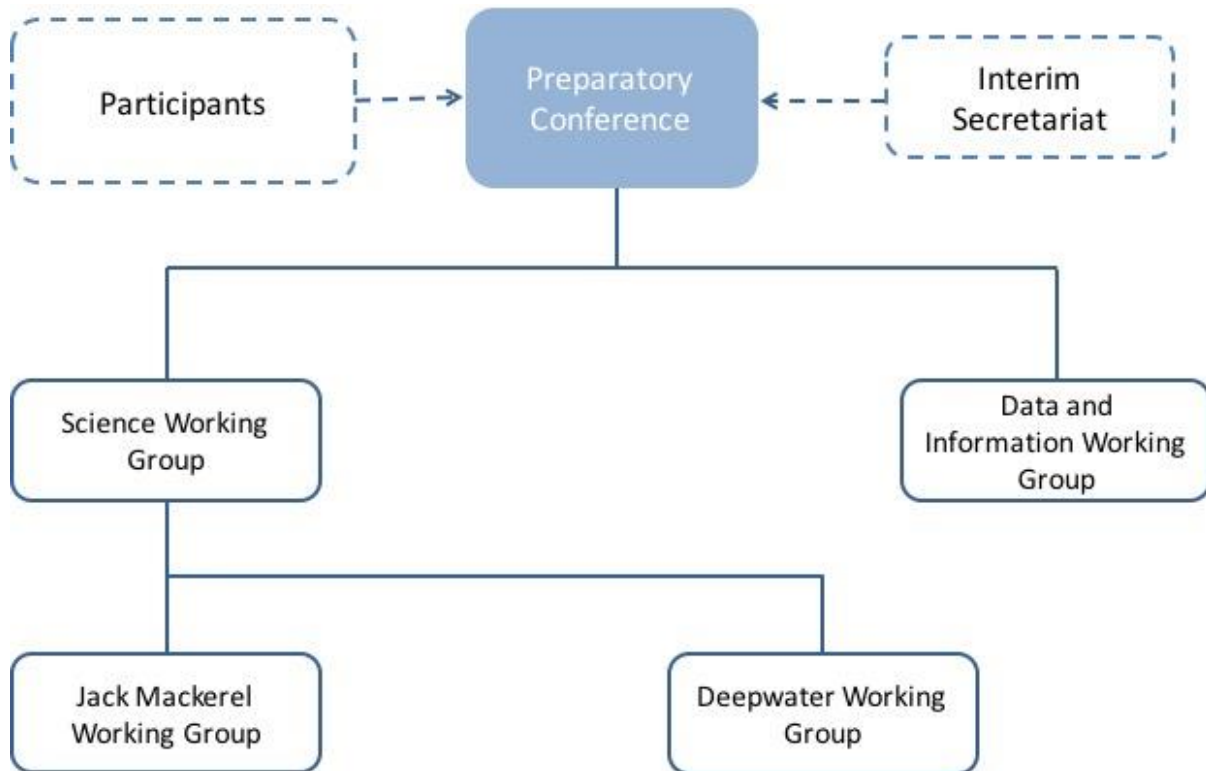
Cooperating non-contracting parties (CNCs) are: Colombia, Curaçao, Liberia and Panama.

### **Governance and organizational structure**

Article 6 of the Convention outlines that the South Pacific Regional Fisheries Management Organisation (“the Organisation”) shall consist of:

- (a) a commission;
- (b) a scientific committee;
- (c) a compliance and technical committee;
- (d) an eastern sub-regional management committee;
- (e) a western sub-regional management committee;
- (f) a finance and administration committee;
- (g) a secretariat.

The SPRFMO has now formalized its structure since the Convention entered into force. Since this time the Scientific Committee has also established two working groups: the Jack Mackerel Working Group and the Deepwater Working Group, to assist it in its duties. The current governance structure is outlined in Figure A2.8.2.



**Figure A2.8.2:** Structure of the SPRFMO (Source: Penney et al, 2016)

## THE COMMISSION

The Commission is the main decision-making body of the SPRFMO. Article 7 outlines that each contracting party shall be a member of the Commission and shall appoint one representative to the Commission who may be accompanied by alternative representatives, experts and advisers.

Article 8 outlines that the Commission exercises the following functions:

- (a) adopt conservation and management measures to achieve the objective of this Convention, including, as appropriate, conservation and management measures for particular fish stocks;
- (b) determine the nature and extent of participation in fishing for fishery resources including, as appropriate, for particular fish stocks;
- (c) develop rules for the collection, verification, reporting, storing and dissemination of data;
- (d) promote the conduct of scientific research to improve knowledge of fishery resources and marine ecosystems in the convention area and of the same fishery resources in adjacent waters under national jurisdiction, and, in collaboration with the Scientific Committee, establish procedures for the conduct of fishing for scientific purposes in the convention area;
- (e) cooperate and exchange data with members of the Commission and with relevant organizations, coastal states, territories and possessions;
- (f) promote compatibility of conservation and management measures in the convention area, adjacent areas under national jurisdiction and adjacent areas of high seas;
- (g) develop and establish effective monitoring, control, surveillance, compliance and enforcement procedures, including nondiscriminatory market- and trade-related measures;
- (h) develop processes in accordance with international law to assess flag state performance with respect to the implementation of their obligations under this Convention and adopt proposals, if appropriate, to promote the implementation of such obligations;
- (i) adopt measures to prevent, deter and eliminate IUU fishing;
- (j) develop rules for cooperating non-contracting party status under this Convention;

- (k) review the effectiveness of the provisions of this Convention and the conservation and management measures adopted by the Commission in meeting the objective of this Convention;
- (l) supervise the organizational, administrative, financial and other internal affairs of the Organisation, including the relations between its constituent bodies;
- (m) guide the Commission's subsidiary bodies in their work;
- (n) adopt by consensus the budget of the Organisation, the financial regulations of the Organisation and any amendments thereto, and its rules of procedure, which may include procedures for taking and recording decisions intersessionally;
- (o) adopt and amend as necessary any other regulations necessary for the exercise of its functions and those of its subsidiary bodies; and
- (p) exercise any other function and take any other decisions that may be necessary to achieving the objective of this Convention.

### **Scientific Committee**

Article 10 of the Convention outlines that the functions of the Scientific Committee shall be to:

- (a) plan, conduct and review scientific assessments of the status of fishery resources;
- (b) provide advice and recommendations to the Commission on stock assessments including reference points, management options including TACs and TAEs as appropriate;
- (c) provide advice and recommendations to the Commission on the impact of fishing on the marine ecosystems in the convention area, including the identification and distribution of vulnerable marine ecosystems, the likely impacts of fishing on such vulnerable marine ecosystems and measures to prevent significant adverse impacts on them;
- (d) encourage and promote cooperation in scientific research;
- (e) provide such other scientific advice as needed.

### **Compliance Committee**

Article 11 of the Convention outlines the functions of the Compliance and Technical Committee shall be to:

- (a) monitor and review the implementation of, and compliance with, conservation and management measures adopted under this Convention and provide advice and recommendations to the Commission;
- (b) provide such other information, technical advice and recommendations as it considers appropriate or as may be requested by the Commission relating to the implementation of and compliance with the provisions of this Convention and the conservation and management measures adopted, or under consideration, by the Commission; and
- (c) review the implementation of cooperative measures for monitoring, control, and surveillance and enforcement adopted by the Commission, and provide advice and recommendations to the Commission.

*Management Committees:* Article 20 outlines that there will be management committees that are tasked with developing and making recommendations to the Commission on conservation and management measures and on participation in fishing for fishery resources, in accordance with Article 21.

*Secretariat:* Article 14 of the Convention outlines that the Secretariat shall perform the functions delegated to it by the Commission. The Executive Secretary shall ensure the effective functioning of the Secretariat, that it is cost-effective, and where appropriate, take into account the capacity of existing regional institutions to perform certain technical secretariat functions and more specifically the availability of services under contractual arrangement.

### **Interactions with other fisheries, regional bodies and international treaties**

The SPRFMO is committed to collaborating with other organizations on matters of common interest. The contracting parties recognize the need to ensure compatibility of conservation and management measures established for fishery resources that are identified as straddling under the national jurisdiction of a coastal state contracting party and the adjacent high seas of the convention area and acknowledge their duty to cooperate to this end. This includes attending meetings of other organizations attended by SPRFMO officials or staff drafting Memoranda of Understanding (MoUs) and links to relevant organizations.

Article 31 of the Convention also states that the Commission shall cooperate, as appropriate, with other regional fisheries management organizations, FAO and other specialized United Nations agencies, and with other relevant organizations on matters of mutual interest. The Commission must take account of the conservation and management measures or recommendations adopted by other regional fisheries management organizations and other relevant intergovernmental organizations or management of shared or dependent stocks/species. It shall endeavour to ensure that its own decisions are compatible with, and supportive of, such conservation and management measures or recommendations.

The Commission shall also seek to cooperate with other relevant organizations with the aim of reducing and eventually eliminating IUU fishing.

### **Consultation and decision-making processes**

As a general rule, decisions of the Commission are made by consensus, but it now has a voting procedure for cases where consensus cannot be reached. Decisions become binding 90 days after notification with an objection period of 60 days; this period is only admissible on the grounds of unjustifiable discrimination or legal inconsistencies with the Convention or international law. The SPRFMO Conservation and Management Measures (CMMs) are binding on Members, and CNCPs must cooperate fully with the implementation of CMMs.

## **OVERVIEW OF FISHERY**

### **Geographic scope and fisheries activities**

Knowledge of the distribution and extent of commercial fishing in the South Pacific Ocean high seas is limited. Exploratory and targeted commercial fishing is thought to have taken place in the area since at least the 1970s. Commercial fisheries are concentrated in areas of higher productivity or the seamounts and ridges where it shallow enough to bottom fish. The main areas fished have been the Lord Howe Rise, the South Tasman Rise and the Louisville Ridge.

The fisheries are either benthic (mainly invertebrate species that live on the seafloor), demersal (mainly fish, close to the seafloor), and pelagic (mainly fish and prawns, at the surface and in the midwater). Pelagic fishing tends to be associated with upwelling of nutrients. The dominant pelagic species fished commercially is jack mackerel and to a lesser degree squid.

Fishing methods currently used include purse seining, pelagic trawling, bottom trawling, pelagic longlining, bottom longlining and potting.

### **Bottom fisheries**

There have been sporadic high seas bottom fisheries in the South Pacific Ocean since the late 1970s, which only became commercially important in the 1990s. Virtually every feature within fishable depths is thought to have been explored, but fisheries have concentrated on major seamounts, ridges, and plateaus, which are often areas of nutrient upwelling and higher productivity. The prominent features that have been substantially fished are the South Tasman Rise, Lord Howe Rise, Challenger Plateau,

West Norfolk Ridge, Three Kings Ridge, the seamount chain of the Louisville Ridge, and the Salas y Gomez and Nazca ridges. Commercial fishing for benthic and demersal species is restricted to a depth of about 1 500 m. Dominant demersal finfish fished commercially include orange roughy, oreos, alfonsino and bluenose, with most fishing by bottom and midwater trawls and longlines. Some catches of Patagonian toothfish (*Dissostichus eleginoides*) were taken previously with no catches recorded in many years.

**Table A2.8.1:** Summary of Bottom Fishing Activities (Source: Penney, 2016)

Deepwater species	South Pacific Distributions	Fishing Depths	Fishing gear
Orange rough ( <i>Hoplostethus atlanticus</i> )	Shelf edge south of Tasmania, on ridge and hill features in the Tasman Sea between Australia and New Zealand, on the Louisville seamount chain and other ridges and hill features east of New Zealand, and within the Chilean EEZ	Seldom <500m, most commonly 700–1 100m	Catch mainly taken by trawlers using bottom trawls designed to cope with rough ground using bobbins and rockhopper gear. Use of increasingly sophisticated fish-finding and net-monitoring electronics
Morwongs ( <i>Nemadactylus</i> spp.)	Continental Plateau and shelf edge features on th Challenger Plateau, West Norfolk Ridge, and Three Kings Ridge	Down to depths of 400m	Various lining methods
Bluenose warehou ( <i>Hyperoglyphe antarctica</i> )	Shelf edge south of Tasmania, on ridge and hill features in the Tasman Sea between Australia and New Zealand, on the Louisville seamount chain east of New Zealand and possibly on the Foundation seamounts in the mid-south Pacific	200–750m	Mostly caught by lining methods
Wreckfish ( <i>Polyprion oxygeneios</i> , <i>P. americanus</i> )	Plateau and shelf edge features on the Challenger Plateau, West Norfolk Ridge, and Three Kings Ridge	200–600m	Various lining methods
Oreos – smooth, black, and spiky ( <i>Oreosomatidae</i> )	Black and Spiky oreos are found close to seabed in deepwater. Adults form large shoals over rough ground near pinnacles and canyons. Smooth oreos inhabit deep continental slopes, with adults occurring near the bottom, often in large schools near pinnacles and canyons	600–1 000m, ith smooth oreo down to 1 400m	Bottom trawls (bycatch in orange roughy fishery)
Alfonsino ( <i>Beryx</i> spp.)	On ridge and hill features in the Tasman Sea between Australia and New Zealand, on the Louisville seamount chain and other ridges and hill features east of New Zealand, Juan Fernández off Chile	Seldom <200m, most commonly 300–700m	Historically, about 85% of catch by bottom trawl and 15% by mid-water trawl. Some experimental longlining has been tried. Now targeted by mid-water trawls fished close to the seabed
Toothfish – mainly Patagonian ( <i>Dissostichus eleginoides</i> )	A minor fishery on Hjort trench and the Southwest Pacific Basic, and possibly other sites towards the southern boundary of FAO Area 81	500–1 500m (possibly exploratory fisheries to 2 500m)	Mainly longlines, possibly some bottom trawling in the 1990s

## Catch and effort history

### Bottom fisheries

High seas demersal fisheries started at different times in different areas, with fishing initially concentrated closer to what are now EEZ boundaries near Australia and New Zealand (Figure A2.8.3). It is also difficult to determine whether the early catches come from the EEZ or what is now the SPRFMO.

*Orange roughy*: high seas catches peaked at just over 11 000 tonnes in 1995 before declining steadily to current levels of less than 1 500 tonnes.

*Oreo*: the catches reported to SPRFMO may include catches within current EEZs; these peaked at around 28 000 tonnes in 1978, declined to around 100 tonnes by 1990 and are now below 50 tonnes. This is now largely taken as bycatch in the orange roughy fishery.

*Alfonsino*: catches were concentrated in the western South Pacific and probably include catches within current EEZs; they peaked at about 11 000 tonnes in 1979. No alfonsino catch were reported for the 1986–1991 period, after which a small high seas fishery targeting alfonsino developed in the Tasman Sea, peaking at about 1 500 tonnes in 2008, and currently producing about 250 tonnes annually.

### Stock assessments

*Historical data (CMM 02-2017)*: Members and CNCPs are to collate pre-2007 data on fishing activities in the convention area and provide these to the SPRFMO Secretariat by 30 September 2007, in sufficient detail to facilitate effective stock assessment.

*CMM 03-2017* states that the SC must undertake stock assessments of principal deep-sea fishery resources targeted, and, to the extent possible, those taken as bycatch and caught incidentally in these fisheries, including straddling resources.

There are species profiles for each of the key species<sup>28</sup> these include the available data and biological associations of each key species. Only the Jack Mackerel report has been updated since 2007, in 2014.

While no current stock assessments are available there are a number of processes in place to address this. The Science Plan now includes the following initiatives, to conduct stock assessments for Orange Roughy, Squid and Jack Mackerel that include:

- exploring alternative stock assessment models
- estimating stock status
- providing advice on sustainable catch levels.

### Bycatch and special species

#### *Fish bycatch*

The Science Plan now includes initiatives to:

- complete quantitative risk assessment of DW sharks caught in SPRFMO bottom fisheries;
- perform a scoping analysis of stocks to be assessed (categorizing by tiers in assessment framework);
- complete risk assessment of teleost stocks;

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<sup>28</sup> [www.sprfmo.int/science/species-profiles/](http://www.sprfmo.int/science/species-profiles/)



- recommend relevant reference points and/or management rules for all assessed DW stocks.

Seabirds (CMM 09- 2017): Require vessels flying their flag and using trawl gear to implement seabird mitigation measures, as described in Annex 2.

Members and CNCPs are encouraged to adopt measures aimed at ensuring that seabirds captured or entangled alive during any fishing operations in the convention area are released alive, in as good condition as possible. Research into the survival of released seabirds is encouraged.

The Science Plan now includes evaluating available observer data on seabird interaction rates and determining where estimates can be improved. It will also analyse observer-collected seabird interaction data to inform risk assessment(s).

### **Other potential direct impacts**

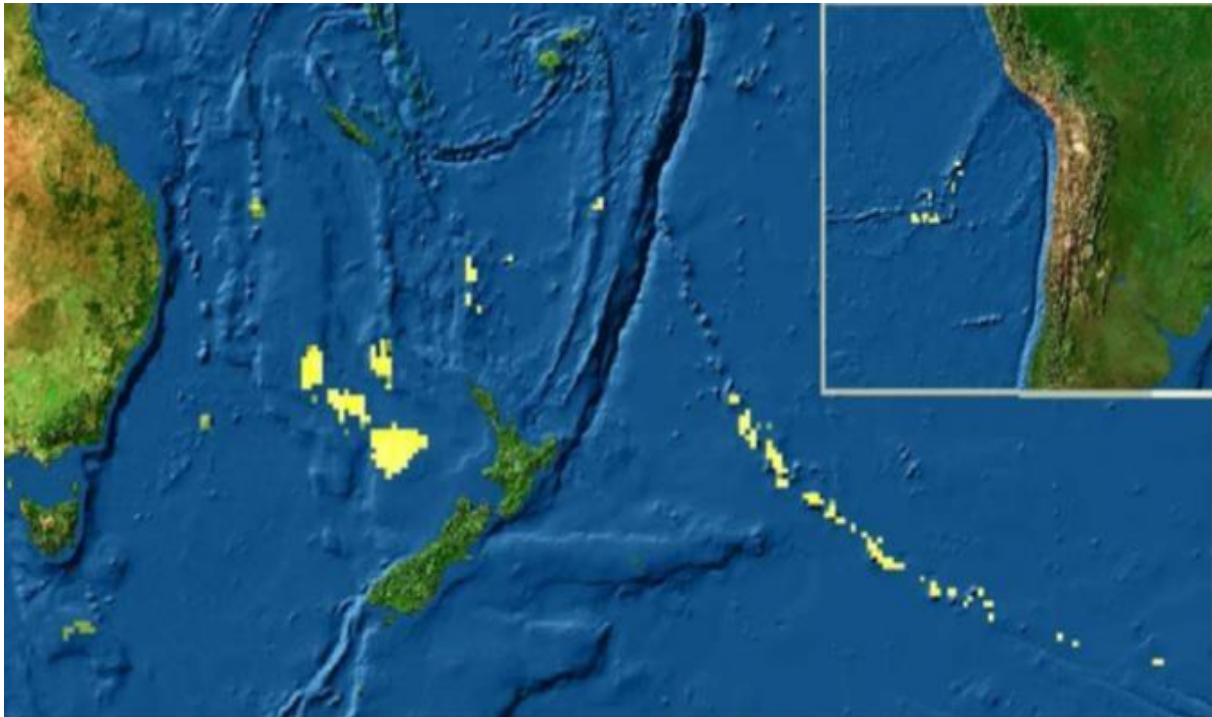
No information was found that specifically related to the identification and risk assessment of other ecological elements impacts of waste disposal and gear loss, discarded species or interactions with other species of specific interest such as mammals, sharks, etc.

New data standards (CMM 02-2017) now require the collection of such information, to enquire whether any marine mammals, seabirds, reptiles or other species of concern have been caught.

The Science Plan now includes progressing southern hemisphere quantitative risk assessment (SEFRA).

### **Bottom impacts/VMEs and impact assessments**

In 2011, the Secretariat produced a joint bottom-trawl fishing footprint map, presented as an information document for the 10th Meeting of the Scientific Working Group (SPRFMO, 2011), using trawl data for the 2002–2006 period provided by Australia, Chile, the Republic of Korea, and New Zealand (See Figure A2.8.7).



**Figure A2.8.7:** Map of bottom fished areas from Australia, NZ and EU (Source: SPRFMO, 2011)



Protocols for new or exploratory fishing outside the footprint (or above the 2002–2006 catch levels) were in place from 2014, updated to CMM 13–2016. Members and CNCPs are required to submit proposals for expanding a fishery 60 days before an SC meeting.

The Science plan includes a number of initiatives including:

- review proposed VME encounter protocol thresholds
- annual review of VME encounters
- collect and review VME catch and other benthic sampling data
- update and re-assess VME and habitat suitability modelling as appropriate
- review of the current BFIAS
- mapping the spatial–temporal population density distribution of jack mackerel using a combination of existing acoustic survey data and acoustic information as obtained from/by industry vessels.

### Cumulative and other environmental assessments

No information was available on cumulative impacts on ecosystems, but the Science Plan now prescribes the review of ecological risk assessment methods and the evaluation of the impacts of fishing activities.

### Social and economic assessments

The only reference to social and economic components of EAF is that the Convention guidelines state that when developing management systems/arrangements the interests of developing states, and of territories and possessions, in particular those pertaining to the least developed and small island developing states, shall be recognised, as well as the needs of developing state coastal communities.

### Management

*Current management measures (SPRFMO 2018)*

**Table A2.8.2:** Current set of management measures (SPRFMO, 2018)

Measure Number	Title
01-2018	<i>Trachurus murphyi</i>
02-2018	Standards for the collection, reporting, verification and exchange of data
03-2018	Bottom fishing in the SPRFMO Convention Area
04-2017	Establishing a list of vessels presumed to have carried out IUU fishing activities in the SPRFMO Convention Area
05-2016	Establishment of the Commission record of vessels authorized to fish in the SPRFMO Convention Area
06-2018	Establishment of the vessel monitoring system in the SPRFMO Convention Area
07-2017	Minimum standards of inspection in port
08-2013	Gillnets in the SPRFMO Convention Area
09-2017	Minimising bycatch of seabirds in the SPRFMO Convention Area
10-2018	Establishment of a compliance and monitoring scheme in the SPRFMO Convention Area

Measure Number	Title
11-2015	Boarding and inspection procedures in the SPRFMO Convention Area (Effective from 24 August 2015)
12-2018	Regulation of transshipment and other transfer activities
13-2016	Management of new and exploratory fisheries in the SPRFMO Convention Area
14b-2017	Exploratory fishing for toothfish in the SPRFMO Convention Area
15-2017	Vessels without nationality in the SPRFMO Convention Area
16-2018	SPRFMO Observer programme (to be implemented in 2019)

## Target stock management

### *Bottom fishing*

CMM 03-2018 is designed to promote the sustainable management of bottom fisheries, including target fish stocks and bycatch. Limits the areas where fishing activity occurs to historical levels.

CMM 13-2016 aims to: evaluate the long-term potential of new and exploratory fisheries; to assist in the formulation of management advice; to evaluate the possible impacts on target stocks to ensure new and exploratory fishery resources are developed on a precautionary and gradual basis; and to promote the sustainable management of new and exploratory fisheries.

CMM 14-2017 aims to provide for exploratory bottom longline fishing for toothfish in the convention area for the purpose of obtaining scientific data, and to enable evaluation of the long-term potential of a toothfish fishery.

### *Pelagic fishing*

CMM 01-2018 (Jack mackerel): limits effort by restricting tonnage of *Trachurus murphyi* to those vessels engaged in such fishing activities in 2007 or 2008 or 2009 in the convention area; limits catch – total catch limited to 443 000 tonnes, with specific allocations to each member (see Table A2.8.3 below); includes an annual review of the TACC and other parts of this measure.

**Table A2.8.3:** TACC by member country (SPRFMO, 2018)

Member	CNCP Tonnage
Chile	371 887
China	36 563
Cook Islands	0
Cuba	1 285
Ecuador (HS)	1 377
European Union	35 186

<b>Member</b>	<b>CNCP Tonnage</b>
Faroe Islands	6 386
Republic of Korea	7 385
Peru (HS)	11 684
Russian Federation	18 907
Vanuatu	26 921
<b>Total</b>	<b>517 582</b>

## **Bycatch management**

### *Bottom fishing*

- CM 03-2018 is designed to promote the sustainable management of bottom fisheries, including bycatch stocks;
- CM 08 -2013 prohibits the use of pelagic gillnets;
- CM 09-2017 (Seabird management) requires additional measures to be adopted if rates of capture or death by vessels exceed limit.

### *Pelagic fishing*

CM 08 -2013 prohibits the use of pelagic gillnets.

### *VME Management*

CMM 03-2018 is designed to promote the sustainable management of bottom fisheries including target fish stocks and non-target species taken as bycatch, and to protect the marine ecosystems in which these resources occur including, inter alia, the prevention of significant adverse impacts on vulnerable marine ecosystems.

The SPRFMO has not yet formally closed or otherwise protected particular VME areas (in accordance with Article 20 of the Convention and CMM 03-2017 on bottom fishing). This requires Members to not fish outside of their historical areas of operation without making an application to the Commission.

Currently, the SPRFMO has not adopted uniform thresholds that define evidence of encounters with VMEs: each of the parties have their own criteria, but the SC will be providing advice and recommendations on developing such thresholds in due course.

Vessels must cease bottom fishing activities within five (5) nautical miles of any place where evidence of a VME is encountered above threshold levels established for their flag and to report the encounter to the Secretariat.

## **Ecosystem management**

CMM 08 -2013 prohibits the use of pelagic gillnets.

## Compliance and monitoring

### *Compliance monitoring (CMM 10 -2018)*

The Commission shall evaluate Members' and CNCPs' compliance with their obligations arising from the Convention at each annual meeting, with the assistance of the Compliance and Technical Committee (CTC). The Commission shall also review Compliance action plans and other recommendations on compliance adopted by the Commission.

Observers (CMM 3-2018 and CMM 16-2018) Members and CNCPs are to develop, implement and improve observer programmes to achieve the following objectives:

- (i) collect vessel information, effort and catch data for all fisheries and fished species in the convention area including target, bycatch and associated and dependent species.
- (ii) collect biological or other data and information relevant to the management of fishery resources in the convention area, as specified in these standards, or as identified from time to time by the Scientific Committee or through processes identified by the Commission.
- (iii) collect relevant scientific information related to the implementation of the provisions of the conservation and management measures (CMMs) adopted by the Commission.
- (iv) collect representative data, including length–frequency and biological samples, across the convention area, distribution of fishing effort, seasons, fishing fleets and fleet types.

CMM 03-2018 states that pending development of the formal observer programme, participants are required to ensure 100 percent observer coverage for vessels using trawl gear, and at least 10 percent coverage in each fishing year for each other bottom fishing gear type.

All SPRFMO Members and CNCPs should provide annual observer implementation reports, which should include sections covering: observer training, programme design and coverage, type of data collected, and any problems encountered during the year.

CMM16-2018 states Members and CNCPs shall ensure that all applicable fishing vessels flying their flag carry observers from a national observer programme or service provider accredited under the SPRFMO OP while operating in the convention area; this is in order to to meet the minimum level of observer coverage consistent with the CMMs in force and follow the requirements established in this CMM.

For fisheries where 100 percent observer coverage is not in effect, Members and CNCPs shall ensure that the method of observer coverage is representative of the fishery, subject to practical constraints relating to Members and CNCPs with a small number of vessels or trips.

VMS (CMM 02-2018) Members and CNCPs are to develop, implement and improve systems to ensure that all of their vessels fishing in the convention area are fitted with fully operational Automatic Location Communicators (ALC) reporting back to the flag state.

CMM 06-2017 establishes the Commission VMS system.

### *IUU (CMM 04-2017)*

A list of IUU vessels is maintained.

### *Vessel Lists (CM 05-2016)*

- only authorize fishing vessels flying their flag that will meet their responsibilities to fish in the convention area
- not authorize vessels with a history of IUU

- each Member and CNCP is to maintain a register of fishing vessels entitled to fly its flag.

*Port inspections (CMM 07-2017)*

Each Member and Cooperating non-contracting party (CNCP), in its capacity as a port state, shall apply this CMM for an effective scheme of port inspections in respect of foreign fishing vessels carrying SPRFMO-managed species caught in the SPRFMO convention area.

*Transshipments (CMM 12- 2018)*

Transshipments at sea and in port shall only be undertaken between vessels included in the Commission Record of Vessels.

**Data and science**

*Data recording (CMM 02-2018)*

Members must:

- collate annual catch totals raised to “live” weight for all species/species groups caught during that year;
- ensure that data on fishing activities are collected from vessels in accordance with the operational characteristics of each fishing method;
- ensure that data to assess the impacts of fishing on non-target and associated or dependent species are collected from vessels (see Annexes 1–5);
- ensure that data on landings and transshipment are collected from vessels, as per Annex 11 and Annex 12;
- compile data on fishing activities and the impacts of fishing, and provide these to the Secretariat in a timely manner.

The annexes include catch and effort data but also biological data including length–frequency data and collection of tissue, otolith and/or stomach samples, according to pre-determined specific research programmes implemented by the Scientific Committee or other national scientific research.

**Scientific Committee activities**

The SC is also tasked with the following:

- to undertake an assessment of the likely impact of specific gear types – particularly trawl – on VMEs, to further inform the definition of bottom fishing;
- undertake stock assessments of principal deep-sea fishery resources targeted and, to the extent possible, those taken as bycatch and caught incidentally in these fisheries, including straddling resources;
- develop and provide advice and recommendations to the Commission on criteria for what constitutes evidence of an encounter with a VME, particularly threshold levels and indicator species;
- develop and provide advice and recommendations to the Commission on the most appropriate response to a VME encounter including, inter alia, closing particular areas to a particular gear type or types;
- review and streamline the SPRFMO Bottom Fishery Impact Assessment Standard (SPRFMO BFIAS) agreed by the Scientific Working Group in 2011 to take account of the latest scientific information available;
- provide advice on the appropriate spatial resolution and time period for footprint mapping; and
- develop maps of VME distribution in the convention area.

The Science Committee also now has a work plan (SC-SPRFMO, 2018) that covers deepwater, stock assessments, ecosystems and other aspects.

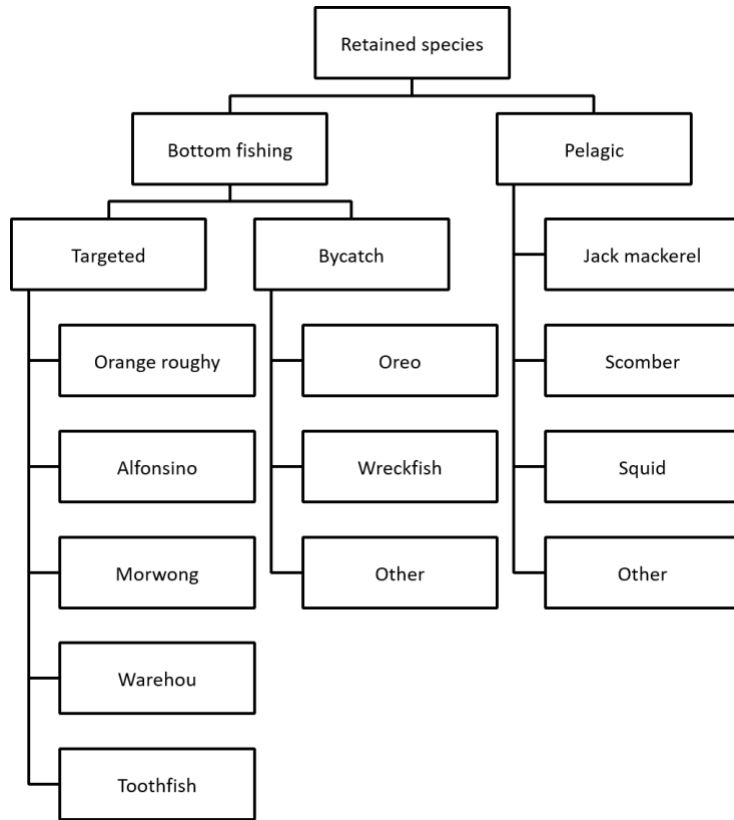
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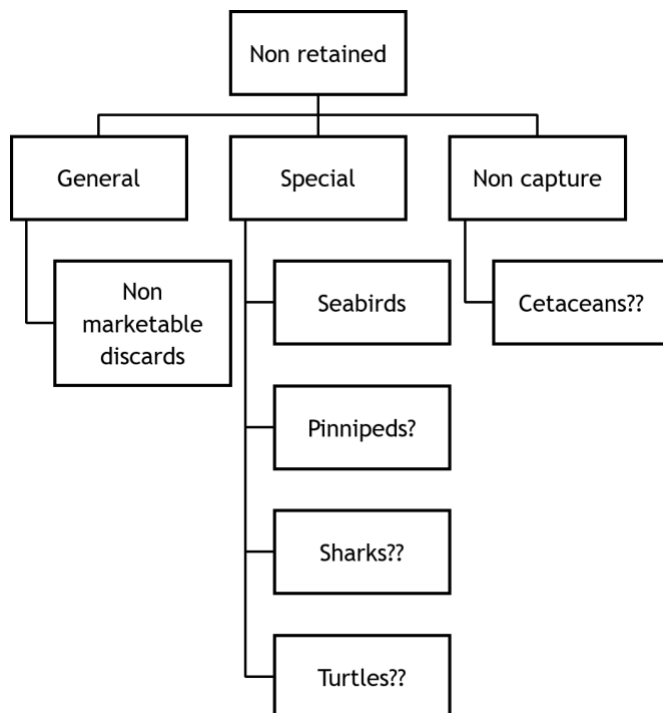
**EAF COMPONENT ANALYSIS SPRFMO**

*N.B. These identify potential issues – a risk analysis would be needed to determine current risk levels and therefore whether direct management was needed.*

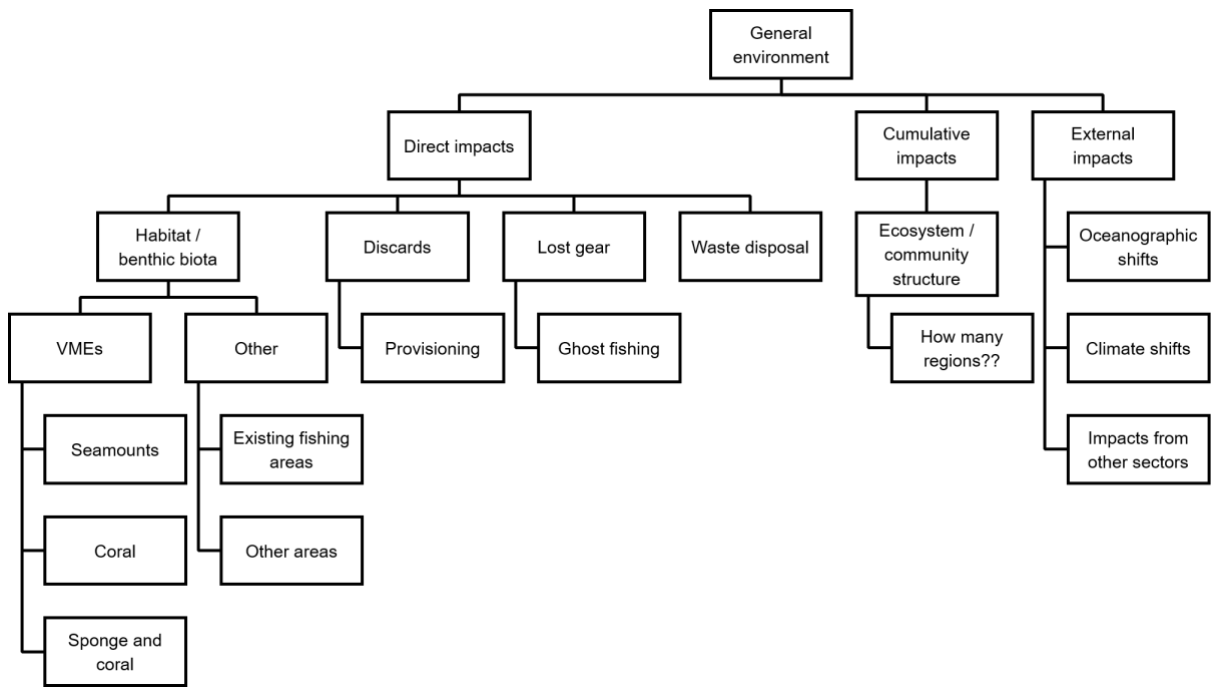
**Retained species SPRFMO**



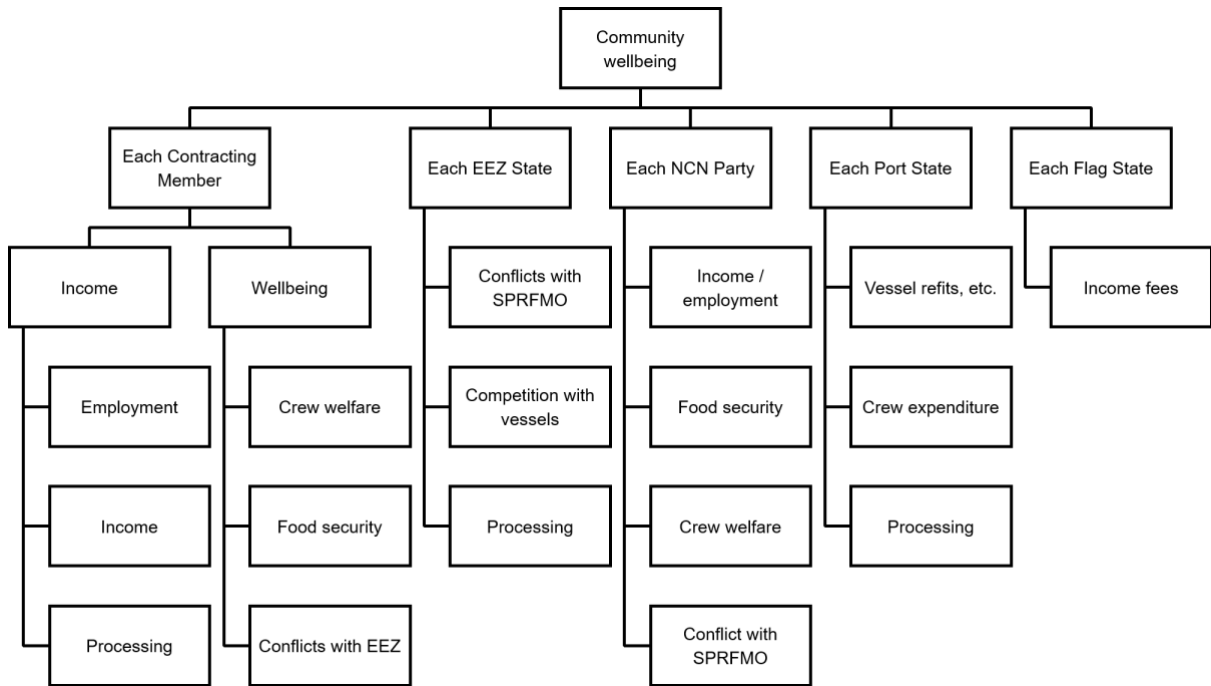
**Non-retained species SPRFMO**



**General environment SPRFMO**

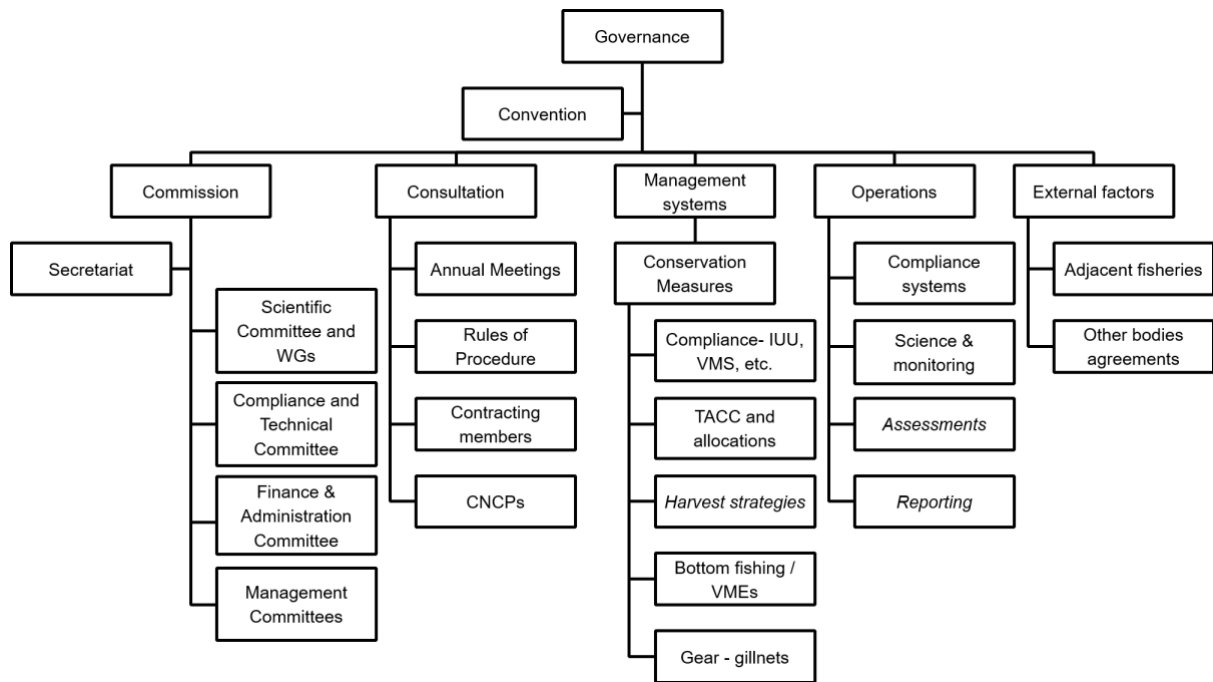


**Community wellbeing SPRFMO**





**Governance (ability to achieve) SPRFMO**





The *Sustainable Fisheries Management and Biodiversity Conservation of Deep Sea Living Resources in Areas Beyond National Jurisdiction* Project (ABNJ Deep Seas Project for short) is a five year project supported by the Global Environment Facility, and implemented jointly by the Food and Agriculture Organization of the United Nations, and the United Nations Environment Programme. The UNEP project component is executed through the UNEP World Conservation and Monitoring Centre.

The Project is designed to enhance sustainability in the use of deep-sea living resources and biodiversity conservation in the ABNJ through the systematic application of an ecosystem approach. It brings together over 20 partners who work on deep-sea fisheries and conservation issues in the ABNJ globally. The partnership includes regional organizations responsible for the management of deep-sea fisheries, Regional Seas Programmes, the fishing industry and international organizations. The Project aims to:

- strengthen policy and legal frameworks for sustainable fisheries and biodiversity conservation in the ABNJ deep seas;
- reduce adverse impacts on VMEs and enhanced conservation and management of components of EBSAs;
- improve planning and adaptive management for deep sea fisheries in ABNJ; and
- develop and test methods for area-based planning.

The ABNJ Deep Seas Project started in September 2015 and is one of four projects under the GEF Common Oceans Programme. More information is available from [www.commonoceans.org](http://www.commonoceans.org)

