




The influence of performance reviews on regional fisheries management organizations

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Regional fisheries management organizations (RFMOs) are key bodies responsible for managing fisheries on the high seas and also in areas of the ocean under national jurisdiction. The performance of RFMOs has, however, become the focus of broad-based criticism in the context of increasing fishing effort, the scale, and sophistication of illegal, unregulated and unreported fishing, and concerns over the wider environmental impacts of fishing activities. In response to these criticisms, the United Nations General Assembly has called on RFMOs to carry out performance reviews (PRs) to assess their record in fisheries management. PRs can provide the opportunity to assess the strengths and weaknesses of past actions by specific RFMOs. There is, however, limited information and analysis available on the progress made by RFMOs after PRs have been carried out. To fill this gap, this paper assesses the performance of five RFMOs that have undergone PRs on two occasions. The paper assesses the performance of these five RFMOs against a scoring system that analyses improvements made after the first PR based on the recommendations made in the second PR. This analysis is encouraging, as all five RFMOs demonstrated significant improvement in their performance in the period after their initial PR, especially in “conservation and management” and “international cooperation” activities.

Keywords: fisheries management, management performance, ocean governance, SDGs

Introduction

The Anthropocene is characterized by significant human impacts on the global environment, including the world's ocean (Crutzen, 2002). During the 2012 Rio Plus 20 conference, many states sought to elevate the crucial role of the oceans in planetary systems and human wellbeing on the global agenda (Cicin-Sain, 2014). The oceans are subject to multiple human-induced stressors. For example, in 2015 it was estimated that 33.1% of all fished stocks were overfished and around 40% of such stocks were fished to their maximum limit (FAO, 2018, p. 6). The management of fisheries plays an important role in marine ecosystems and also for millions of people employed globally in the fisheries sector (i.e. fishing, processing, etc.) (FAO, 2018). Almost 60% of the ocean are high seas areas under the United Nations Convention on the Law of the Sea 1982 (UNCLOS)

(FAO, 2014) and the various regional fisheries management organizations (RFMOs) are the main organizations, which manage the marine living resources in these areas. RFMOs have the competence to establish legally binding measures regarding fisheries management that apply in areas beyond and inside national jurisdiction.

The overarching legal framework governing human activities in the world's oceans is provided by the 1982 UNCLOS, that entered into force in 1994. UNCLOS formalized state jurisdiction over the 12 nautical mile territorial sea extending from the baseline of coastal states and established an exclusive economic zone extending to 200 nautical miles (EEZs) where coastal states have sovereign rights over natural resources (United Nations, 1982). In terms of fisheries management, UNCLOS requires states to cooperate with each other in conservation and management of

living resources in the high seas and establish sub-regional and regional fisheries organizations (United Nations, 1982, Art. 118).

The status of RFMOs was further strengthened by the adoption of the 1995 United Nations Fish Stocks Agreement (UNFSA) that entered into force in 2001. The object of UNFSA is the conservation and management of straddling fish stocks and highly migratory fish stocks (United Nations, 1995). This was a significant development, as many highly economic important species, such as tuna species, either straddle national and high seas areas, or are highly migratory species. The UNFSA promotes the application of conservation principles, such as the precautionary approach, reinforces states' obligations to cooperate on fisheries management through sub-regional or regional fisheries management organizations (see Article 10), and elaborates on the key functions of an RFMO (United Nations, 1995).

RFMOs are important institutions for managing marine living resources in areas beyond national jurisdiction (United Nations, 1995), however, their ability to deal with important issues such as stopping illegal, unreported, unregulated (IUU) fishing or the impact of fishing on the marine environment has been questioned (Hoel, 2010). Thus, in 2006, the United Nations General Assembly (UNGA) called for performance reviews (PRs) of all RFMOs—the assessment of current performance against certain criteria (UNGA, 2007). As a result by 2016, all RFMOs, which had entered into force by 2012 had undergone at least one PR process (SPRFMO, 2017). New RFMOs, formed since 2012, such as the South Pacific Regional Fisheries Management Organization (SPRFMO), also included performance requirements in their treaty texts (SPRFMO, 2015, Art. 30). The idea behind the PR process is that through systematic reviews organizational learning on “best practice” in fisheries management will occur (Hoel, 2010). PRs may provide concrete results on important issues, such as precautionary approach or ecosystem-based approach, which can be adopted and implemented by organizations (FAO, 2007), thereby encouraging improvement of conservation and management standards within RFMOs.

The aim of this paper is to explore the use and impact of PRs in improving fisheries management. We address this aim by analysing the progress of five RFMOs in the period from their first PR until their second PR. In particular, the paper focuses on the Commission for the Conservation of Southern Bluefin Tuna (CCSBT), the International Commission for the Conservation of Atlantic Tuna (ICCAT), the Indian Ocean Tuna Commission (IOTC), the North East Atlantic Fisheries Commission (NEAFC), and the South East Atlantic Fisheries Organization (SEAFO). These five RFMOs were selected as case studies because they have already undergone a second PR. They thereby offer rich publicly available data as to the actions that were undertaken after their first PR. These five RFMOs were selected to provide a cross-section of cases in terms of species coverage, number of participating parties, number of developing country members, but also due to their broad geographical range. These results may therefore also apply for other RFMOs. We argue that PRs can positively influence RFMO performance and lead to improvements in key criteria for fisheries management.

This paper begins by providing an overview of RFMOs and describes the evolution of PR and their key properties in fisheries management. We then look at the second PR of the five selected RFMOs and assess the progress of these bodies since the first PR. Finally, we assess the extent to which the PR process can assist in addressing emergent issues and realize the aims of wider policy

objectives, such as the United Nations Sustainable Development Goals (SDGs).

Regional fisheries management organizations

RFMOs play an essential role in fisheries governance and achieving cooperation between fishing nations. They are the institutional interface between the goals of global agreements and the interests of states (Hoel, 2010). RFMOs are distinguished from other international fisheries organizations through their ability to agree on legally binding measures for their members (FAO, 2019). Despite common responsibilities, RFMOs may differ in their institutional structure, such as in the presence or absence of an integrated scientific committee or secretariat body. Despite small institutional variations, other contextual factors such as biophysical environmental conditions, species under management, and member composition, make each RFMO unique.

The five selected RFMOs not only cover different geographical areas of the world's ocean but also different species. While the CCSBT manages southern bluefin tuna through its range, ICCAT and IOTC manage tuna and tuna-like species within specific areas, and NEAFC and SEAFO have more general objectives and manage a number of non-tuna species in their defined geographical area (Figure 1).

The oldest organization of the five is ICCAT, that entered into force in 1969. SEAFO is the youngest institution, established in 2004 (Table 1). SEAFO is the only organization that was established after the entry of the force of the UNFSA (SEAFO, 2016).

RFMOs are highly influenced by the number of member states since it is more difficult to agree on certain topics with a larger

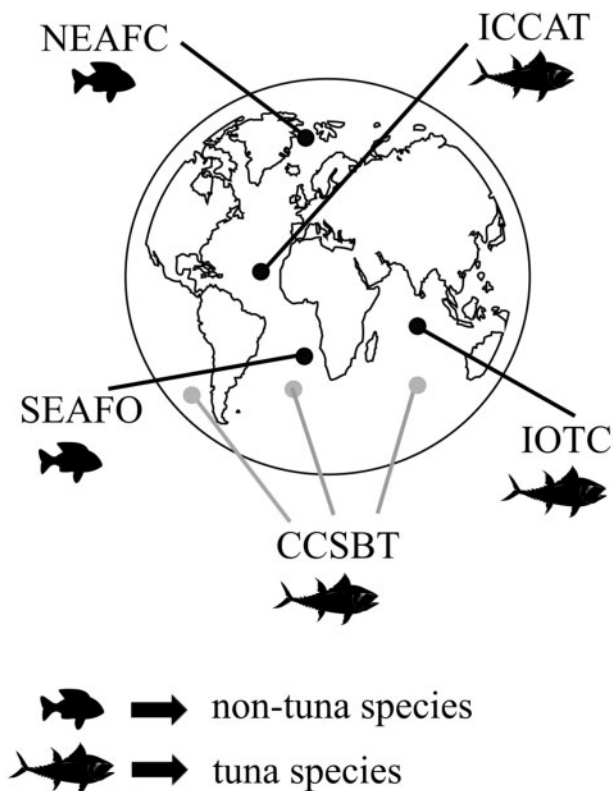


Figure 1. Geographical area and managed species of the five selected RFMOs.

Table 1. Overview of the five RFMOs.

RFMO	Entry into force	Nr. Members	Nr. of developing countries	Year of first PR	Year of second PR	PR panel of second PR
Commission for the Conservation of Southern Bluefin Tuna (CCSBT)	1994	7	3	2008	2014	Independent
International Commission for the Conservation of Atlantic Tuna (ICCAT)	1969	52	36	2008	2016	Independent
Indian Ocean Tuna Commission (IOTC)	1998	32	23	2009	2014	Mixed
North-East Atlantic Fisheries Commission (NEAFC)^a	1982	5	0	2006	2013	Independent
South-East Atlantic Fisheries Organizations (SEAFO)	2004	7	3	2010	2016	Mixed

^aSuccessor of an earlier commission.

number of parties (ICCAT, 2009; Pons *et al.*, 2018). ICCAT is not only the oldest RFMOs but also has the highest number of members (50), followed by IOTC with 32 members. In comparison, CCSBT and SEAFO have seven while NEAFC has only five members. On the basis of the number of participants, it is not surprising that ICCAT and IOTC also have the highest number of developing countries as members, with 36 and 23, respectively. The number of developing countries also impacts the way an RFMO functions (Ceo *et al.*, 2012; Pons *et al.*, 2018). SEAFO and CCSBT each have three developing country parties out of seven members, while NEAFC has no developing country members.

PRs

Development of PRs

PRs emerged first from the experiences in domestic state-centered administrative reforms, that address the expectations concerning the operation of public organizations and second the rising critiques of international organizations (Victor *et al.*, 1998; Geri, 2001; Hoel, 2010). RFMOs are important for fisheries management, however, a study by Cullis-Suzuki and Pauly (2010) revealed that RFMOs have failed to meet their core objectives. This failure to meet objectives was linked to non-compliance of their members with key conservation and management measures (UNGA, 2006; FAO, 2007).

The first call to assess the performance of RFMOs came in the early 2000s from non-governmental organizations (NGOs), such as the World Wildlife Fund (WWF) and the International Union for Conservation of Nature (IUCN) (Hoel, 2010). This was mostly driven by NGOs desire to be part of resource management decisions of RFMOs (Hoel, 2010). Even though NGOs have been strong advocates for PRs of RFMOs, they have rarely been a part of the review process. NGOs have only been involved in one PR of the five assessed RFMOs, for the first and second PR of IOTC (IOTC-PR1OTC01, 2009; FAO, 2015; IOTC-PR1OTC02, 2016).

States have been the primary drivers of the RFMO reviews. In 2006, the Ministerially-led Task Force on IUU Fishing on the High Seas (led by the United Kingdom with Ministers from Australia, Chile, Namibia, and New Zealand) recommended assessing the performance of RFMOs (High Seas Task Force, 2006). This was followed by the 2006 UNGA debate that urged states to strengthen and modernize RFMOs and undertake PRs in a transparent manner and develop guidelines for best practice (UNGA, 2007). In 2007, Chatham House produced a report titled "Recommended Best Practices for Regional Fisheries Management Organizations" (Lodge *et al.*, 2007), which was

supported by the call from the 2006 UNGA resolution, which called for PR for RFMOs (UNGA, 2007; Lodge, 2010). A further important step in establishing PR on the international fisheries management agenda was the first Joint Meeting of Tuna RFMOs organized by the Food and Agriculture of the United Nations (FAO) in Kobe, Japan, in 2007. At this meeting it was agreed that the five tuna RFMOs [the International Commission for the Conservation of Atlantic Tuna (ICCAT), the Commission for the Conservation of Southern Bluefin Tuna (CCSBT), the Inter-American Tropical Tuna Commission (IATTC), the Indian Ocean Tuna Commission (IOTC), and the Western and Central Pacific Fisheries Commission (WCPFC)] would conduct PR, based on common criteria and elements of the tuna RFMO charters (Tuna-org, 2007).

Conducting PRs

The process of carrying out PR is complex and time-consuming. It takes approximately one year to complete the task. It is also expensive, for instance, the budget for the second PR of CCSBT was US\$75 000 (CCSBT, 2013). RFMOs must, therefore, decide if the PR should be carried out by an internal panel, external panel or mixed panel of reviewers. While expert knowledge regarding the organization is one of the advantages of the internal or mixed model, the external model may benefit from an independent and more objective viewpoint (Hoel, 2010). The importance of transparency was repeatedly emphasized by the UNGA (UNGA, 2006) or the FAO (FAO, 2007) as an important aspect of PRs. Experts nominated from external institutions help to address this criterion (Ceo *et al.*, 2012). RFMOs usually request the FAO and the United Nations Division for Ocean Affairs and the Law of the Sea (UNDOALOS) to nominate experts who will be part of the PR panel (FAO, 2015). Three of the five selected RFMOs have chosen an independent panel of reviewers for their second PR, namely, CCSBT, ICCAT, and NEAFC (Garcia and Koehler, 2014; NEAFC, 2014; ICCAT, 2016). IOTC and SEAFO had a mixed panel assessing their performance (IOTC-PR1OTC02, 2016; SEAFO, 2016) (Table 1).

Another important aspect is the choice and scope of the assessment criteria underpinning the PR. The categories generally used for a PR are: "(i) legal analysis of the Agreement; (ii) conservation and management; (iii) compliance and enforcement; (iv) decision-making and dispute settlement; (v) international cooperation; and (vi) financial and administrative issues" (Ceo *et al.*, 2012, p. 10). These categories are relevant to consider concerning the idea of a best practice framework and have been influential

and considered during almost all PRs (ICCAT, 2009; Garcia and Koehler, 2014). To assess these criteria, PR panels rely on official documents, interviews, and questionnaires (FAO, 2015). These criteria were also used in the “Balton list,” a list of criteria to assess the tuna RFMOs (IATTC, 2008), and which mostly formed the basis for the PR for other RFMOs. The former US Ambassador established this list after the Kobe meeting, in consultation with the UNFSA, and suggested that these criteria should be used to assess the performance of RFMOs (IATTC, 2008).

PRs summarize the current weaknesses and strengths of an RFMO and the recommendations can help the organization deal with these issues that might otherwise remain unresolved. RFMOs have shown different ways of addressing the recommendations, from PRs. For example, the CCSBT established a tracking system to follow the progress of implementing the recommendations of the first PR (Garcia and Koehler, 2014). The ICCAT established an internal working group to address the panel’s recommendations (ICCAT, 2016) and the IOTC adopted a resolution (Resolution 09/01—*On the performance review follow-up*), to establish a process to implement the recommendations from the first PR (IOTC-PRIOTC02, 2016).

Methods

To assess the progress of the five selected RFMOs since their first PR, we looked at the recommendations made at the time of their second PR. These recommendations are a good indicator of the progress that had been made since the first review and impact of PRs in effecting change. In particular, our analysis draws on one of the objectives in the second PR that each of the five RFMOs included, to assess progress since their first PR. In this way, our analysis is useful to provide early cross comparisons and learnings from the PR process across a range of RFMOs. The sections of the PR are divided into five overall categories, which were supported by criteria for which the panel gave recommendations (Table 2).

We conducted a scoring system to compare the progress of the five RFMOs. The scoring system is based on Garcia and Koehler (2014), who scored the evolution of CCSBT management system (none—basic—improving—advanced). We followed this approach and added a fifth category (“fulfilled”) to better capture the state of the progress (Table 3).

To apply the different scores, we analysed the recommendations and the actions, which were taken by the RFMO, for example implementing new measures, for each category and criteria. We also analysed criteria, which were not part of the first PR, because the second PR panel stated the progress of these “new” criteria since the first PR. However, criteria which were only used for the first PR were not considered, since no in-depth analyses regarding their implementation progress were provided. The aim of this analysis is to provide an overview of the progress RFMOs have made since their first PR. The results were then further linked to the number of new or updated conservation and management measures and resolutions and the status of the managed stocks.

Results of the analysis

We analysed the progress of the five selected RFMOs since their first PR (Supplementary Appendix A1). Overall, the scoring

Table 2. Overview of all categories and criteria used by the different PRs of the five RFMOs.

Categories	Criteria
Conservation and management	Status of living marine resources Data collection and sharing Quality and provision of scientific advice Adoption of conservation measures Capacity management Compatibility of management measures Fishing allocations and opportunities Non-target species Ecosystem approach Flag state duties Port state measures Monitoring, control, and surveillance Follow-up in infringements Cooperative mechanisms to detect and deter non-compliance Market-related measures Reporting requirements
Compliance and enforcement	Decision making Transparency Dispute settlement Confidentiality
Decision-making and dispute settlement	Relationship to cooperating non-members Relationship to non-cooperating non-members Cooperation with other organizations Special requirements of developing states Participation and capacity building Availability of resources of RFMO activities
International cooperation	Efficiency and cost-effectiveness Financial and administrative issues Staff regulations and staff remuneration
Financial and administrative issues	

Table 3. Scoring system used to analyse the progress since the first PR.

Scoring system	Description
None	No progress, the RFMO has not even started to address the recommendation.
Basic	The RFMO has started to deal with this recommendation, mostly in the form of discussions, but no concrete measures have been adopted so far.
Improving	The RFMO has already invested a lot of time in this recommendation and has implemented actions to address the problem. However, there is still more which can be done.
Advanced	The recommendation is almost fulfilled, but a few more things could be done to address the issues.
Fulfilled	The recommendation has been fully addressed.

category “improving” had the highest number of recommendations among all five RFMOs ($n=79$), followed by “fulfilled” ($n=32$) and “basic” ($n=31$). “Improving” had the highest count by all RFMOs except SEAFO, which had most recommendations listed under “fulfilled” ($n=8$) (Figure 2). The scoring category with the lowest overall count was “none,” with only 12 recommendations among all RFMOs.

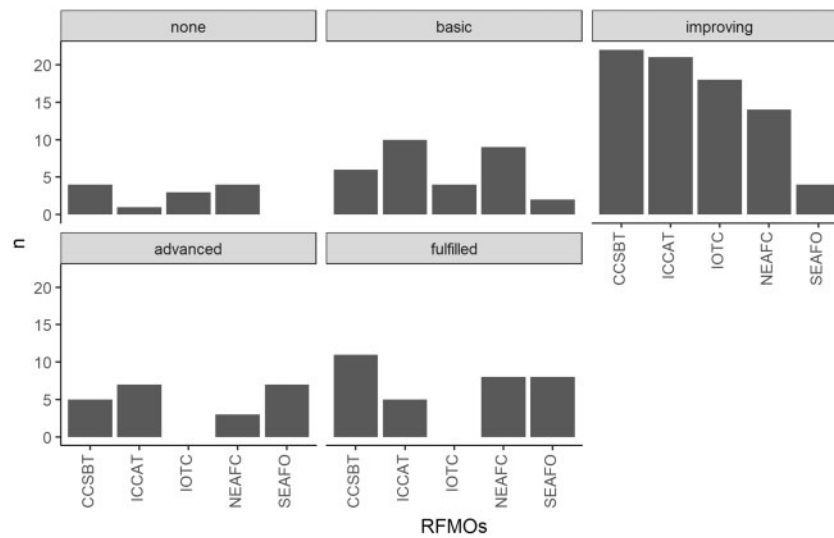


Figure 2. Summary of scoring categories among all RFMOs, with “n” as the number of recommendations listed under the specific scoring category.

Table 4. Number of new or updated measures and resolutions since the first PR.

RFMOs	New Res since first PR	New Res since second PR
CCSBT	6	12
ICCAT	15	0
IOTC	21	26
NEAFC	3	37
SEAFO	3	0

Each of the five categories, “compliance & enforcement,” “conservation & management,” “decision-making & dispute settlement,” “financial & administrative issues,” and “international cooperation,” had several criteria, which differed among the RFMOs. The category “conservation & management” had the highest number of criteria, while “financial & administrative issues” and “decision-making & dispute settlement” had the lowest number of criteria (mostly two) (Figure 3), leading to the differences of “n” in Figure 3. Most of the RFMOs recommendations were listed under “improving,” except for the two categories “decision-making and dispute settlement” and “financial and administrative issues.”

The high number of recommendations showing improvement is also underpinned by the number of new or updated conservation measures and resolutions. Of all five analysed RFMOs, IOTC had the highest number of new or updated measures since the first PR (21 measures since the first PR and 26 measures since the second PR) (Table 4), followed by NEAFC with an overall of 40 measures, however, only three measures were updated or newly implemented after the first PR, whereas 37 measures were count after the second PR. SEAFO had the lowest number of newly enforced or updated conservation measures, namely, “Total Allowable Catches—2017 [CM32-16],” “Measure on Bottom Fishing Activities and VMEs in the SEAFO CA [CM30-15],” and “Reducing Incidental By-catch of Seabirds [CM25-12]” (SEAFO, 2019). The measures implemented by the IOTC covered a broad spectrum of different topics, with key issues such as the

regulation of catching devices, transshipment, harvest control roles, or the conservation of target and non-target species (IOTC, 2019). The same applied to the NEAFC, which targeted areas such as amending the NEAFC Scheme and the conservation of target and non-target species (NEAFC, 2011).

Since the first PR, a number of stocks have improved, and the fishing mortality declined notably for species such the southern Bluefin tuna (under the management of CCSBT), however, the health of other stocks such as haddock (under the management of NEAFC), had declined (Supplementary Appendix A2). Overall, the number of stock assessments available for different species has increased since the first PR.

Discussion

PRs have the potential to positively influence RFMO performance, but only if the subsequent recommendations are implemented within the organization (Ceo *et al.*, 2012). This paper aimed to analyse the progress regarding the recommendations of five RFMOs, namely CCSBT, ICCAT, IOTC, NEAFC, and SEAFO, since their first PR. The results show that these organizations have done considerable work to implement the recommendations of the first PR. All analysed RFMOs, except SEAFO, had the highest amount of recommendations under the scoring category “improving,” meaning that they have already been working on the recommendations (Figure 2). Compared with the other four RFMOs, SEAFO had the greatest share of its recommendations already “fulfilled” ($n=8$) or the recommendations at an “advanced” level ($n=7$) (Figure 2). The results of SEAFO might be linked to low fishing effort (only Patagonian toothfish and deep-sea red crabs are targeted) and low commercial interests (SEAFO, 2016). Overall, the scoring category “none” had the lowest number of linked recommendations, which means that the RFMOs have addressed at a certain level almost all recommendations.

The PR is divided into five categories, which have several criteria. The five RFMOs had in three out of five categories the highest amount of recommendations listed under “improving” (Figure 3). These three categories were “compliance and

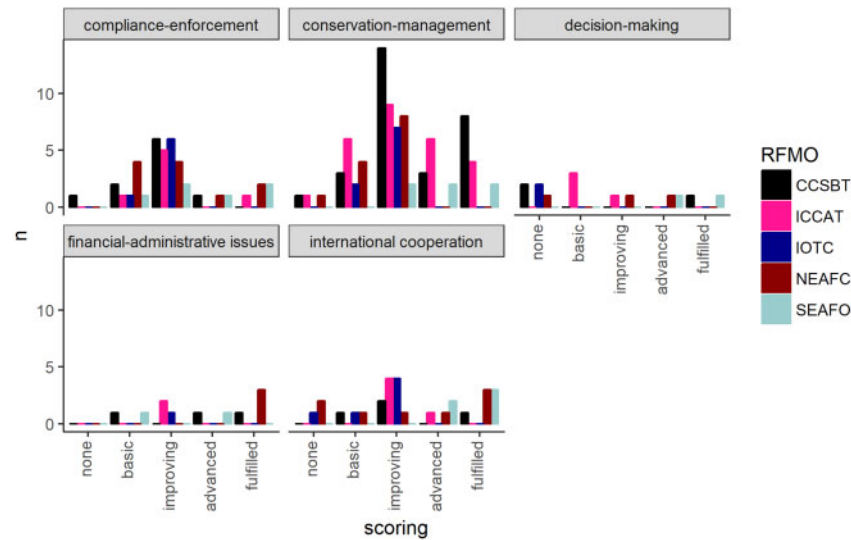


Figure 3. The number of recommendations (n) for each scoring category and each performance process category.

enforcement,” “conservation and management,” and “international cooperation.” The remaining two categories were “decision-making and dispute settlement” and “financial and administrative issues.” Most of the RFMOs had only two criteria under these categories, leading to a higher variety of scoring. Furthermore, the category “decision-making and dispute settlement” had the highest number of scores under “none,” despite the small number of criteria. The highest number of “fulfilled” recommendations in the category “conservation and management” had CCSBT, however, it had also the highest number of criteria under this category. The low variety of the scores in the category “decision-making and dispute settlement” and “financial and administrative issues” might be because most of the decisions in RFMOs are made by consensus and it is difficult to reach consensus on fundamental changes (Pentz and Klenk, 2017).

Generally, the five categories cover important issues for RFMOs, such as “data collection and sharing strategies” or “transparency” (Table 2). For example, the CCSBT, which had a history of using inaccurate data through significant under-reporting of catches (Schiffman and MacPhee, 2014), made notable progress since the first PR in this criterion and had almost fulfilled the first recommendation (Garcia and Koehler, 2014). Also, transparency plays an important role for RFMOs and should become standard practice, especially to scientific and observer data (Willock and Lack, 2006; Clark et al., 2015). SEAFO had the highest number of fulfilled recommendations under this criteria, and the panel particularly highlighted the work done by SEAFO and noted that “transparency is a hallmark of this organization” (SEAFO, 2016, p. 48).

The progress RFMOs have made from their first PR is also reflected by the number of new or updated conservation measures and/or resolutions. IOTC and NEAFC had the highest number of new or updated measures, while SEAFO had the lowest number with only three newly established measures (Table 4). This might be linked to the age of the RFMOs, as Cullis-Suzuki and Pauly (2010) found that newer RFMOs often perform better

than older bodies. The IOTC and NEAFC’s are considerably older than SEAFO, with the IOTC convention entering into force in 1998 and the NEAFC convention in 1982. SEAFO was the only RFMO in this study that was established after the enforcement of the United Nations Fish Stocks Agreement and thus its objectives and general principles are based on the requirements of this agreement (SEAFO, 2016). However, there might be also other reasons affecting performance. ICCAT was one of the older RFMOs (established in 1969) in this analysis. It had implemented only 15 new or updated measures since its first PR and no measures since its second. The case of ICCAT may be affected by the high number of members (50 parties), which could make it difficult to reach consensus on the establishment of new measures (Pons et al., 2018).

Since their first PR, all RFMOs made progress to establish stock assessments for different species, which form the basis of their management (Supplementary Appendix A2). SEAFO conducted only one stock assessment, for the species southern boarfish, which is linked to high uncertainties due to missing data. Following low-fishing effort and low commercial interests (SEAFO, 2016), limited data are available for the managed stocks, thus, it is not possible to conduct stock assessments. The same might apply for NEAFC, which also had a high number of stocks where no stock assessments were available. Unlike the other RFMOs, the NEAFC does not conduct its own assessments, instead, it requests assessments from the International Council for the Exploration of the Sea (ICES).

Generally, the management of important species such as the southern bluefin tuna had improved and overfishing stopped in the period since the first PR. However, the stock is still overfished, albeit the fishing mortality declined. The same was observed at the management of Atlantic bluefin tuna, where the fishing mortality declined under F_{MSY} . However, other species such as bigeye tuna or haddock have changed to an overfished status. Many different factors influence the RFMOs ability to manage species and to enforce measures, for example, the number of member states, the number of authorized vessels, or the economic dependency

on fisheries (Pons *et al.*, 2018). Besides internal factors, Pons *et al.* (2018) stated that external biological and economic variables highly influence the status of stocks.

These results show that the RFMOs took their first PR seriously and have begun to address recommendations and proposed actions. ICCAT's second PR highlighted the progress made, especially in establishing re-building plans for target species and for the actions taken regarding the management of the Atlantic bluefin tuna (ICCAT, 2016). Pentz *et al.* (2018) have also shown that RFMOs made progress in recent years. We acknowledge, however, that a number of factors may influence these results, such as the different use of language, the different structure of the PR itself, or the different use of independent or mixed panels.

PRs and emergent issues

PR can provide a great opportunity to address new and emerging issues and their importance for the RFMOs, such as the SDGs, which play an important role for RFMOs, especially SDG 14 "life below water," which aims to achieve sustainable management of all marine resources. The SDGs were adopted in 2015, thus, since two of the PR were conducted prior to and three of them shortly after, none of the five organizations considered the SDGs in their PR.

Although the SDGs are not mentioned during PRs, the assessment criteria address areas, which are important to achieve SDG 14. For example, the criteria of the category "conservation and management," are supporting target 14.2 of SDG 14, which calls for sustainable management and the protection of the marine ecosystems (United Nations, 2018). Addressing all the recommendation of this category not only helps to achieve SDG 14 but also supports the resilience of marine ecosystem against climate change. Thus, even if the SDGs are not mentioned in PR protocols, PR processes can be used as vehicles to address emerging issues and increase awareness of new agreements, which are relevant for fisheries organizations. If the categories indirectly address SDG 14, it is necessary that these issues are officially addressed, by RFMOs developing their own criteria for the SDGs (Pentz *et al.*, 2018).

Conclusion

RFMOs are important for the management of highly migratory and straddling fish stocks and indirectly affect the livelihood of millions of people. The performance of RFMOs has been questioned in terms of meeting their mandates and they were encouraged to conduct PRs. Now almost all RFMOs have conducted at least one PR. The aim of this study was to examine the progress of five RFMOs since their first PR. The results showed that the RFMOs have done notable work to address their recommendations. Important categories such as "conservation and management" or "international cooperation" showed high numbers of recommendations under the scoring category "improving." It would be useful to include this scoring system in future PRs to give an overview of the progress made by the RFMO since their former PR. It will, however, be necessary to establish a standardized procedure to conduct PRs, including opportunities to address broader issues such as the SDGs. This will not only help to better compare the outcomes of PRs between different organizations but would also ensure that RFMOs are responsive to emergent issues.

Supplementary data

Supplementary material is available at the ICES/JMS online version of the manuscript.

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