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Best practices for providing scientific recommendations in regional fisheries management organizations: Lessons from bluefin tunas



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ABSTRACT

Bluefin tunas are iconic trans-ocean species; both their management and their science attract much attention. While outside input to the management of these species can advance international fisheries discussions, mis-leading criticism of management process can confuse already complex discussions. The focus lately has been on Pacific bluefin tuna (*Thunnus orientalis*, PBF) as stocks of the other two bluefin tunas are apparently recovering. Recently, the International Union for Conservation of Nature (IUCN) cast doubts on the scientific process behind scientific advice concerning PBF. In response, this study was designed to evaluate and compare factors contributing to the quality of scientific recommendations by international bodies conducting stock assessments of bluefin tunas, including the transparency issue highlighted by the IUCN. The relationship between the underlying factors and the indicators of the quality of scientific recommendations was also investigated. The results show comparable transparency in the scientific processes for the three bluefin tunas, whereas other factors vary. Overall, the scientific processes for all the three bluefin tunas are not problematic, but can be improved. In addition, transparency appears unrelated to the indicators of the quality of scientific recommendations studied here. The issue of transparency of scientific processes in tuna regional fisheries management organizations (RFMOs) and their scientific recommendations should therefore be discussed separately, although transparency is important for ensuring outside confidence in the management process. The objective comparisons presented here will hopefully improve scientific processes in tuna RFMOs by promoting further transparency.

1. Introduction

In fisheries management, stock assessments provide the information that forms a basis for decision-making (Hilborn and Walters, 1992). Thus scientific information is fundamental to sound fisheries management. In international fisheries management, however, the various countries and stakeholders have diverse interests and objectives, leading to the problem of management organizations not following the advice of their scientific advisory bodies. The International Commission for the Conservation of Atlantic Tunas (ICCAT) is probably one of the most prominent examples of this. From the late 1990s to the late 2000s, ICCAT failed to follow the reduction in catch of Atlantic bluefin tuna (*Thunnus thynnus*; ABF) recommended by its scientific body, the Standing Committee of Research and Statistics (SCRS), and thus the ABF stock remained low for some years (Fromentin et al., 2014). An independent performance review of ICCAT publicized in 2009 noted that ABF management by ICCAT was “widely recognized as an international disgrace” (ICCAT, 2009). In addition, the lack of progress in the management of ABF at ICCAT led to a proposal to list ABF in Appendix I of the Convention of International Trade in Endangered

Species of Wild Fauna and Flora (CITES) (Monaco, 2010), which would have essentially banned its commercial trade if adopted. The CITES listing proposal was eventually defeated, but it was only after all of these events that ICCAT finally reduced the ABF catch limit substantially, fully implementing the scientific advice (Fromentin et al., 2014).

Regional fisheries management organizations (RFMOs) managing tunas, such as ICCAT, are becoming more respectful of the advice provided by their scientific bodies. For example, in ICCAT, the total allowable catch of bigeye tuna (*Thunnus obesus*) (ICCAT, 2015c) was set at the exact level to achieve the target, according to the recommendations from SCRS (ICCAT, 2015b), although some tuna RFMOs are still struggling to follow scientific advice (Inter-American Tropical Tuna Commission ([IATTC], 2016b,c). In RFMOs where the decisions are made in front of various stakeholders including conservation groups, it is becoming almost impossible to make decisions other than as recommended by the scientific body. Thus, there is an increasing responsibility on scientists to provide the best available scientific advice.

Under such circumstances, the integrity of the scientific process is

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critically important both to provide the best available scientific information for discussions at RFMOs and to earn the confidence of stakeholders in the science as well as science-based management. It is therefore beneficial to have an outside perspective, as an RFMO must rectify its scientific process if it is compromised. On the other hand, if criticism of the scientific process is not factually correct, an outside perspective may unnecessarily confuse an already complex decision-making process in RFMOs (Nakatsuka, 2017), waste the time and money of member countries, and even worse, jeopardize the sustainability of stocks to be managed. Uncertainties in stock assessments can be to strengthen or weaken the management measures and support stakeholder positions (Fromentin et al., 2014), thereby complicating the discussions.

There are three bluefin tuna species—ABF, Pacific bluefin tuna (*Thunnus orientalis*, PBF), and Southern bluefin tuna (*Thunnus maccoyii*, SBT)—and they are probably among the most heavily harvested and hotly debated fish species in the world. Bluefins are the largest of the tuna species, with a relatively coastal nature, and thus they have been targeted for several centuries (ABF and PBF, in particular) and intensively caught in recent decades because of their high price (Nakatsuka et al., 2017; Ravier and Fromentin, 2001). As a result, all bluefin tuna stocks have declined substantially, and their management has become the most important task for some tuna RFMOs. Unfortunately, these species became typical examples demonstrating the challenges of international fisheries management, as that of ABF management by ICCAT highlights. In the Commission for the Conservation of Southern Bluefin Tuna (CCSBT), the RFMO that manages SBT fisheries, scientists could not agree on stock status and therefore the catch limit, leading to international litigation (Kurota et al., 2010). However, both organizations have learned lessons; after inconclusive international litigation, the CCSBT successfully developed a management procedure that automatically decides the total allowable catch on the basis of fishery-dependent as well as fishery-independent information, resolving the long-standing scientific deadlock (Hillary et al., 2015). After the listing proposal to CITES by Monaco was defeated, ICCAT agreed to a rebuilding plan for ABF, which included a substantial cut in ABF catch (Fromentin et al., 2014). Both species are now on the track to recovery (CCSBT, 2016a; ICCAT, 2015a) and ICCAT management of ABF is now considered a success even by conservation group (<https://www.nytimes.com/2016/12/04/opinion/save-the-pacific-bluefin-tuna.html?ref=opinion&r=0>). Also, to further the efforts and discussions concerning the management of bluefin tunas, international discussions overarching the three species are being organized (Allen et al., 2016).

The story of PBF has not yet turned so bright. The latest PBF stock assessment concluded that its current (2014) spawning stock biomass is about 2.6% of its estimated unfished status (ISC, 2016a). The Western and Central Pacific Fisheries Commission (WCPFC), the RFMO that manages tuna fisheries in the western Pacific Ocean, had set the initial rebuilding target for PBF (achieving about 7% of unfished spawning stock biomass with the probability of 60% or more by 2024; WCPFC, 2016a), and the International Scientific Committee for Tuna and Tuna-Like Species in the North Pacific Ocean (ISC) reported that the measures currently implemented by the WCPFC and IATTC will lead to this goal being achieved (ISC, 2016a). Furthermore, the members of the WCPFC are now debating how high and how fast the stock should be increased after the initial rebuilding target is achieved (WCPFC, 2017). Under such circumstances, inputs from civil society may help to move the situation forward, as in the case of ICCAT (Fromentin et al., 2014), and many non-governmental organizations are voicing their opinions at WCPFC and IATTC meetings.

Recently, one of the world's most prominent non-governmental organizations, the International Union for Conservation of Nature (IUCN), weighed in on the discussion by submitting a letter regarding PBF management (“the IUCN letter”) to the commission meetings of the WCPFC and IATTC, co-signed by several dozen scientists (IUCN, 2016).

IUCN is a unique organization, consisting of many governmental agencies and non-governmental organizations and calls itself as “the world's largest and most diverse environmental network (from IUCN website)”; the involvement of such an influential organization together with many scientists may therefore stimulate the discussion for a more robust future management framework for PBF.

The main focus of the IUCN letter was to express concern over the current stock status and management of PBF, and to call for further actions by the relevant RFMOs to ensure the recovery of the stock. However, one paragraph of the letter drew attention, particularly from a scientific point of view, in posing a series of questions on the nature of the scientific advice on which the whole discussion of PBF management depends. It suggested that the process by which the ISC produces scientific advice is exacerbating the situation around PBF management, stating:

Adding to the management failures, there continues to be a lack of transparency in the scientific process that is out of step with standard practices in international fisheries science. The first publically available stock assessment report was not released by the overseeing scientific body, the International Scientific Committee for Tuna and Tuna-Like Species in the North Pacific Ocean (ISC), until 2012. The ISC still does not allow independent observers to attend or participate in their stock assessment meetings, and nongovernment scientists must be invited in order to attend, where their participation is severely limited. Meeting reports can take six months or longer to be approved and released to the public, often delaying needed action

The letter also called for “full transparency in the scientific process, including opening ISC working group meetings to observers and making meeting documents publicly available in a timely fashion.”

Inspired by the IUCN letter, the first objective of this study is to compare the transparency of processes providing scientific recommendations for PBF, ABF, and SBT and to discuss whether they can be improved. However, transparency is not the only element affecting the quality of the products generated through such processes, that is, scientific recommendations. Therefore, this study also evaluates other factors that may contribute to the quality of scientific recommendations for the three bluefin tunas. Finally, how those factors, including transparency, may affect the indicators of the quality of scientific recommendations is discussed. Technical model diagnostics (assessing which model fits best), which are extensively discussed elsewhere, are intentionally avoided as that is not the focus of this study, and it is believed that the scientists participating in any group are trying their best to provide the best available scientific advice. Rather, the focus here is to compare the playing fields of the scientists, or “Ambience”, and to discuss how their differences might have affected the results, or “Product”. Lastly, institutional issues around the scientific bodies, in particular the legal status of the ISC, are briefly touched upon as they are sometimes brought up in relation to its scientific qualification. It is hoped that this study will foster the best practices for providing the best available scientific advice to the tuna RFMOs and contribute to improving the management of tuna species in general.

2. Materials and methods

The latest assessment reports and related meeting reports, meeting documents, and other relevant information were obtained through literature searches for ABF, PBF, and SBT (see Table 1 for a summary of organizations responsible for various aspects of the management of these species). For ABF, information was obtained from ICCAT, which is responsible for the management of tuna and tuna-like species in the Atlantic Ocean. The focus in this study is on the eastern/Mediterranean stock of ABF because it is by far the main stock of this species. For PBF, the documents of the ISC and WCPFC were used, because the ISC is conducting the assessment work while the results are also discussed by

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