



To Strengthen Fishery Management, RFMOs Should Use Science-Management Dialogue Groups

By meeting early and often, scientists, managers and stakeholders help fish stocks and industry

Overview

Traditionally, fisheries management has relied on advice from scientists making educated assessments to predict the present and future size of a fish population. Fisheries managers then use that advice when establishing fishing regulations. Unfortunately, because these scientific assessments can be fraught with uncertainties, or because managers opt not to follow them, this traditional process has too often led to overfishing—and subsequent turbulent times for the fishing industry and seafood markets.

For decades, this has been particularly true among regional fisheries management organizations (RFMOs),¹ where it is all too common for politics and increased demand for fish from consumers and fishers, rather than sustainability, to drive policy. When politics drives decision-making, important stakeholders can be shut out of the process, and management can vary widely from year to year.

But RFMOs are increasingly turning to a better management approach that allows for greater transparency, predictability and long-term effectiveness. Harvest strategies, also known as management procedures, are science-based, precautionary decision-making frameworks that use benchmarks and associated rules—pre-agreed among RFMOs and their members—that determine when changes in catch limits and other fishing regulations will kick in.

Harvest strategies are carefully tested using a computer simulation called management strategy evaluation (MSE), designed to achieve and sustain the long-term health of the stock and fishery. Scientists develop the MSE

while fishery managers determine the long-term vision, such as the target population size and the number of fish that will ideally be caught each year. As a result, development of a harvest strategy relies on scientists to advance the technical work, managers to specify elements that inform the MSE—such as management objectives²—and other stakeholders, such as industry and nongovernmental observers, to offer expertise and visions that RFMOs can consider as they set the rules. Because the technical components of the MSE are guided by management decisions, this process requires scientists and managers to work together and communicate consistently throughout the development process. This iterative exchange is a hallmark of the harvest strategy approach and requires serious investment from all players.

To ensure the efficiency of the harvest strategy development process, RFMOs must establish fora for scientists, managers and stakeholders to exchange views when determining the crucial components of a harvest strategy. The best option for achieving this is through science-management dialogue groups (SMDs), which provide the opportunity for scientists and managers to discuss decisions needed to advance a harvest strategy. These groups should also include a broad array of stakeholders, from fishing operations to conservation groups to members of the seafood supply chain, which in turn will help the RFMO set a transparent, collective vision for the harvest strategy and future of the fishery.

Goals of a dialogue group

The fundamental role of an SMD is to provide a place for iterative exchange between scientists and managers to guide decision-making while familiarizing participants with the harvest strategy approach. Neither scientists nor managers can complete their work without multiple rounds of feedback from one another, so it is critical that they can rely on an SMD to meet and discuss their progress throughout the development process. SMDs should work per a set of guidelines, called a terms of reference. The assigned meeting chair develops the terms of reference with feedback from members—well before the SMD's first meeting—to lay out ground rules, objectives and tasks (Figure 1).

Experts laud the harvest strategy approach because of its inclusive nature, with each participant bringing expertise from their sector of fisheries work.³ Including stakeholders early in the process provides a diverse range of views on how a fishery should be managed. Stakeholders—from industry representatives to environmental groups—may have differing visions and priorities for a fishery that should be reflected in the MSE. For example, uncertainties considered in the MSE should reflect fishers' on-the-water knowledge. Such upfront collaboration increases buy-in to the harvest strategy approach and promotes better outcomes during final negotiations of RFMO measures, and their ultimate implementation on the water.

Although the SMD's main role is to develop stock-specific harvest strategies, the group also provides a chance for capacity building and education among participants. SMDs frequently offer instructive sessions—for example, on MSE and other concepts, and real-life examples of successful harvest strategies—during meetings at RFMOs aiming to adopt their first harvest strategy. These sessions often explore interactive MSE simulation tools and include hands-on demonstrations of how the elements of a harvest strategy individually and collectively can influence trade-offs—for example, between increased catch and the health of the stock.

In addition, managers and scientists can discuss other administrative priorities that are often left unaddressed during regular RFMO meetings, such as how to secure funding for harvest strategy development, hire MSE experts and external reviewers, and establish and adhere to timelines for development and adoption. Developing harvest strategy timelines with managers and scientists present helps ensure feasibility and consistency among the SMD and the larger-scale workplans of an RFMO and its subsidiary bodies, including scientific committees. A well-organized development process that ensures that all stakeholders are well-informed and aware of the latest developments is crucial to the ultimate success of any fisheries policy.

Figure 1
SMD Tasks and Terms of Reference

Administrative	
✓	List priority species for which a harvest strategy will be developed.
✓	Appoint working group chairs.
✓	Identify meeting schedule and determine whether sessions will be held in conjunction with other subsidiary body meetings.
✓	Note those who should participate, including but not limited to: scientists, managers, fishing industry representatives, conservation groups and other accredited observers.
✓	Specify how the RFMO will review the SMD's recommendations and requests.
State the SMD's objectives	
✓	Enhance communication, foster understanding and build capacity on harvest strategies and MSE among scientists, managers and stakeholders.
✓	Promote collaboration among scientific staff, MSE developers and external reviewers to ensure that MSE construction follows best scientific practices.
✓	Foster discussion to facilitate development of candidate harvest strategy elements and eventual final selection thereof.
List specific tasks	
✓	Determine workplan and associated timelines for MSE development and harvest strategy adoption.
✓	Identify funding sources for the MSE.
✓	Identify initial management objectives.
✓	Develop other elements, including candidate performance indicators, reference points and harvest strategies for testing by MSE developers. ⁴
✓	Present preliminary and final MSE results for review and feedback.
✓	Recommend management objectives, performance indicators, reference points, exceptional circumstances protocol and final harvest strategy. ⁵
✓	Oversee peer reviews of MSE framework and/or development process.

Dialogue groups at RFMOs

Science-management dialogue groups have been implemented at all tuna-RFMOs (tRFMOs), either formally or informally (see Table 1). Not all tRFMOs rely exclusively on a singular science-management dialogue group to advance their harvest strategy priorities. For example, the International Commission for the Conservation of Atlantic Tunas (ICCAT) uses its Standing Working Group to Enhance Dialogue Between Fisheries Scientists and Managers (SWGSM) and various species-specific groups, called panels, to progress its intersessional work. The panel meetings have prioritized harvest strategy dialogue, proving integral, for example, to the development of a harvest strategy for Atlantic bluefin tuna. SMD groups have also been indispensable to the development and adoption of harvest strategies for a variety of stocks, including Southern bluefin tuna, Greenland halibut (see Figure 2), and North Atlantic albacore.

SMDs work best when formalized by an RFMO, as a recurring working group will guarantee that participants can build on a prior SMD's progress. RFMOs such as the Western and Central Pacific Fisheries Commission, which has yet to permanently establish its SMD, and the Inter-American Tropical Tuna Commission, whose workshops on MSE should be converted into an official SMD, must formalize these groups to ensure consistent progress on harvest strategy development. Other RFMOs, such as the North-East Atlantic Fisheries Commission, need to establish these groups to guide their harvest strategy development processes.



Table 1

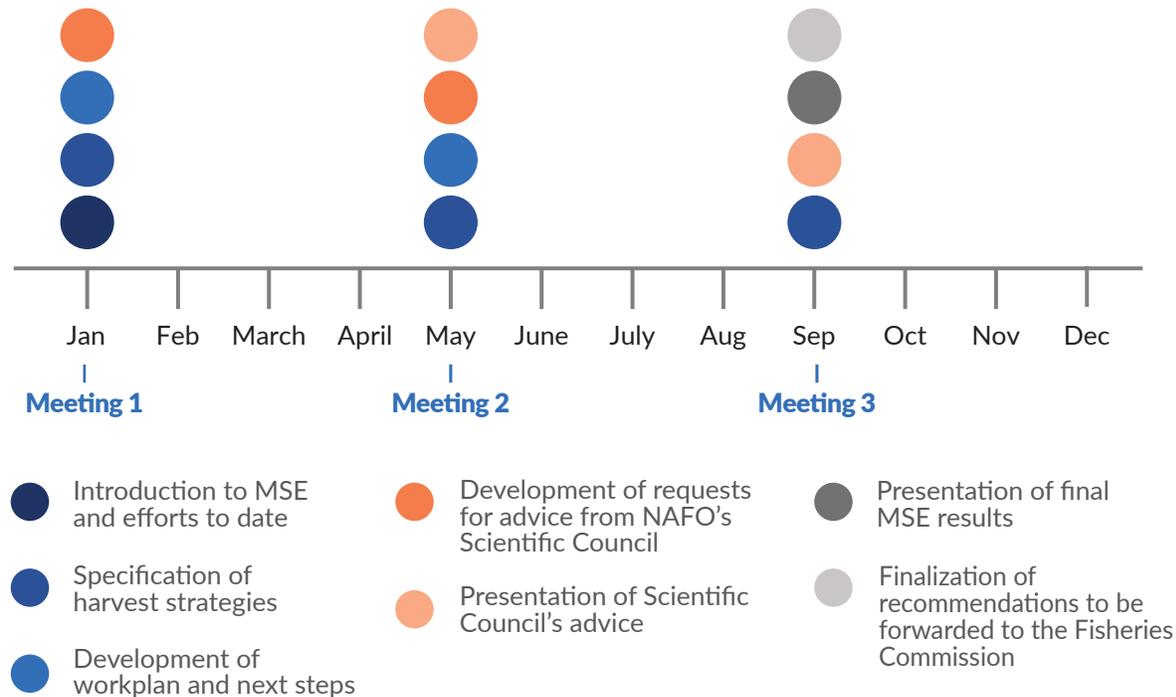
Science-Management Dialogue Groups at 7 RFMOs

RFMO	SMD group	Year established	Primary focus and progress
Commission for the Conservation of Southern Bluefin Tuna (CCSBT)	Strategy and Fisheries Management Working Group Meeting (SFMWG) ⁶	2008	Established, and later refined, a harvest strategy for Southern bluefin tuna
Northwest Atlantic Fisheries Organization (NAFO)	a) Working Group on Greenland Halibut Management Strategy Evaluation (WGMSE) ⁷ b) Working Group on Risk-based Management Strategies (WG-RBMS) ⁸	a) 2009 b) 2013	a) Developed a harvest strategy for Greenland halibut in less than a year b) Advance harvest strategy work across all stocks
International Commission for the Conservation of Atlantic Tunas (ICCAT)	a) Standing Working Group to Enhance Dialogue Between Fisheries Scientists and Managers (SWGSM) ⁹ b) Panels	a) 2013 b) Various years	a) Capacity building and advance harvest strategy development for priority stocks b) Advance intersessional work for specific stocks, prioritizing harvest strategy dialogue (e.g., developed a harvest strategy for North Atlantic albacore)
Indian Ocean Tuna Commission (IOTC)	Technical Committee on Management Procedures (TCMP) ¹⁰	2016	Build capacity and make recommendations to the Commission regarding stock-specific harvest strategies that are under development (e.g., developed a harvest control rule for skipjack)
Inter-American Tropical Tuna Commission (IATTC)	Workshop on Management Strategy Evaluation (WSMSE) ¹¹	2019	Build capacity and develop harvest strategies for tropical tunas (e.g., drafted initial management objectives and reference points for bigeye)
North Pacific Fisheries Commission (NPFC)	Small Working Group on Management Strategy Evaluation for Pacific Saury (SWG MSE PS) ¹²	2021	Tasked with developing a harvest strategy for Pacific saury
Western and Central Pacific Fisheries Commission (WCPFC)	Science-Management Dialogue ¹³	2021	Discuss capacity building, advance the work on specific harvest strategies and develop pathways for decision-making

Figure 2

How NAFO Used an SMD to Expedite a Greenland Halibut Harvest Strategy (2010)

Tight schedule and agenda helped produce measures in under a year



Pathways to success

An SMD is at the heart of the harvest strategy process. Structures that enable cooperation among scientists, managers, and stakeholders can be the key to timely development and the successful implementation of the harvest strategy approach. In fact, in 2018, a group of fishery scientists, managers, MSE developers and other experts who study harvest strategy development recommended the creation of these dialogue groups to all fisheries bodies.¹⁴ And SMDs are proving their worth: For example, ICCAT's SWGSM has been critical to the advancement and adoption of a fully specified harvest strategy for North Atlantic albacore. This investment in the approach has paid off, with the harvest strategy allowing an increase in catch over every management period from 2017 to the present. In the Southern Ocean, CCSBT's harvest strategy, established with help from the SFMWG, has seen similar success, allowing stable or increased catch through every three-year management cycle since 2011 for the once heavily depleted Southern bluefin tuna.

There are many ways to structure an SMD but, generally, holding multiple meetings provides a path to success because that allows ample opportunities for the group to meet its goals, from capacity building to the development of specified components of a harvest strategy. Convening regularly also helps the groups meet ambitious timelines without sacrificing stakeholder input and rigorous testing, reducing the likelihood that decision makers will be surprised by progress or results. As the above graphic shows, NAFO used multiple meetings of the WGMSE SMD—which set ambitious timelines and goals—to successfully develop a harvest strategy for Greenland halibut in less than a year. WGMSE prioritized capacity building in early sessions and then

turned to more technical discussion and recommendations during the final meetings. NAFO's dialogue groups set the standard for how to conduct these meetings and should be a model for other RFMOs structuring and scheduling their own dialogue groups.

Some RFMOs have seen success through the establishment of informal SMD meetings to complement more formal agendas, which provide less-constrained settings that are conducive to open discussion and opportunities for participants to learn and question as experts, rather than as official representatives of their governments. By providing a unique and informal venue for conversation, an SMD allows for continued collaboration and modifications after the meeting has ended, as all decisions coming out of the group are advisory. Delegates at annual RFMO meetings are ultimately the final decision makers when formally adopting a harvest strategy or any element thereof.

Conclusion

Harvest strategies have become the gold standard of fisheries management and are helping to replace short-term—and often short-sighted—reactive decision-making with a process that pursues longer-term sustainability and profitability for commercial fish stocks. Across oceans, the approach has shown its worth, helping stocks to recover to healthy population levels while increasing catch. Although developing a harvest strategy requires significant effort by RFMOs, the upfront investment in the approach unquestionably pays off. And as the above examples from the Atlantic and Southern oceans make it clear, science-management dialogue groups are critical to efficiently and effectively moving harvest strategies forward.

Endnotes

- 1 Regional fisheries management organizations (RFMOs) are bodies tasked with protecting the long-term sustainability of international fish stocks.
- 2 Management objectives are formally adopted, specific and measurable goals for a stock and fishery. Operational objectives should include associated timelines and minimum required likelihood that they can be achieved.
- 3 D.S. Butterworth, "Why a Management Procedure Approach? Some Positives and Negatives," *ICES Journal of Marine Science* 64, no. 4 (2007): 613-17, <https://doi.org/10.1093/icesjms/fsm003>. Punt AE et al., 2016. *Management strategy evaluation: best practices*, Fish and Fisheries 17:303-334.
- 4 A performance indicator is a quantitative expression of a management objective used to evaluate how well the objectives are being achieved by determining the proximity of the current value of an indicator to the objective, often a reference point. Reference points are benchmarks in relation to indicators that are used to compare the current status of a fishery management system with a desirable or undesirable state.
- 5 Exceptional circumstances protocols are provisions that provide guidance on what to do in situations in which the MSE did not test or that go beyond the scenarios that a harvest strategy was designed to manage.
- 6 Commission for the Conservation of Southern Bluefin Tuna, "Terms of Reference of the Strategy and Fisheries Management Working Group" (2018), https://www.ccsbt.org/sites/default/files/userfiles/file/docs_english/basic_documents/terms_of_reference_for_subsidary_bodies.pdf.
- 7 Northwest Atlantic Fisheries Organization, "Report of the FC Working Group on Greenland Halibut Management Strategy Evaluation (WGMSE)" (2010), <https://www.nafo.int/Portals/0/PDFs/mp/2010-11/wgmse-sep10.pdf?ver=2016-02-16-122246-883>.
- 8 Northwest Atlantic Fisheries Organization, "Terms of Reference of the Proposed Joint Fisheries Commission-Scientific Council Working Group on Risk-Based Management Strategies" (2013), <http://archive.nafo.int/open/fc/2013/fcdoc13-18.pdf>.
- 9 International Commission for the Conservation of Atlantic Tunas, "Report of the Fourth Meeting of the Standing Working Group to Enhance Dialogue Between Fisheries Scientists and Managers (SWGSM)" (2018), https://www.iccat.int/Documents/Meetings/Docs/2018/2018_SWGSM_ENG.PDF.
- 10 Indian Ocean Tuna Commission, "Resolution 16/09 on Establishing a Technical Committee on Management Procedures" (2016), <https://www.iotc.org/cmm/resolution-1609-establishing-technical-committee-management-procedures>.
- 11 Inter-American Tropical Tuna Commission, "Terms of Reference for Management Strategy Evaluation Workshops, Resolution C-19-07" (2019), https://iaffc.org/PDFFiles/Resolutions/IATTC/_English/C-19-07-Active_Management%20Strategy%20Evaluation%20workshops.pdf.
- 12 North Pacific Fisheries Commission, "1st Meeting of the Joint SC-TCC-COM Small Working Group on Management Strategy, NPFC-2022-SWG MSE PS01-MIP02" (2022), <https://www.npfc.int/sites/default/files/2022-04/SWG%20MSE%20PS01%20Report.pdf>.
- 13 Western and Central Pacific Fisheries Commission, "Provisional Outcomes, WCPFC18-2021-Outcomes," <https://meetings.wcpfc.int/node/15029>.
- 14 S.K. Miller et al., "Improving Communication: The Key to More Effective MSE Processes," *Canadian Journal of Fisheries and Aquatic Sciences* 76, no. 4 (2019): 643-56, <https://cdnsiencepub.com/doi/abs/10.1139/cjfas-2018-0134>.

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