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HARVEST STRATEGIES AND ALLOCATION - A CHICKEN AND EGG SCENARIO?

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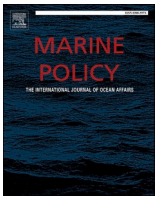

Harvest strategies and allocation – A chicken and egg scenario?

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A B S T R A C T

International fisheries organisations are moving away from reactionary management to proactive harvest strategies management. However, unresolved discussions on allocation complicate the transition away from the status quo, with member states unable to assess just how big their slice of the pie will be. The question is therefore posed: Can harvest strategies (or management procedures) be adopted without first agreeing on an allocation process? This paper investigates this question and presents an argument that even without an agreed allocation process, there are significant benefits to be gained in the adoption of a harvest strategy for stock management, including by facilitating allocation discussions since future total catches will be more predictable.

1. Introduction

A harvest strategy, or management procedure (MP) [2] is a modern approach to fisheries management that involves a pre-agreed framework for decision-making, which can effectively automate many of the processes that are currently negotiated (often extensively), such as levels of total allowable catch (TAC). The framework includes multiple elements including management objectives, indicators of stock status with associated reference points, a monitoring program, a methodology to assess the indicators and a harvest control rule (HCR) or rules that determines fishing opportunities. When an MP is backed-up by a robust compliance regime, it should provide both ecosystem and economic benefits via transparent, science-based, predictable fisheries management, and will ultimately be more effective at achieving stakeholders' multiple objectives for the fishery.

While traditional fisheries management may include many or even all these MP elements, they are not integrated as they are in MPs, and the links between them are open to negotiation. This in turn can open the door to political influence over what should, according to their conventions, be science-based management decisions. In an MP, however, there is an established relationship among the elements (see Fig. 1), with an agreement for a) what data will be collected and how it will be processed; b) how that data will be evaluated to determine fishery and population status, as well the reference points to which that status is compared; and c) how that status determines allowable fishing according to the HCR. This formulaic relationship among the elements is what increases the efficiency and effectiveness of management and leads to predictable future catches.

One of the most significant success stories involving MPs in Regional Fishery Management Organisations (RFMOs) is that of southern bluefin tuna (*Thunnus maccoyii*) [9]. At its 8th annual meeting in 2011, the Commission for Conservation of Southern Bluefin Tuna (CCSBT) agreed to use an MP to guide rebuilding of the overfished stock and the MP has thus far successfully done so, increasing the spawning stock by 100% between 2009 and 2020 [3], while simultaneously increasing catch limits in all but the most recent management cycle, where it was kept constant. The extraordinary pace of recovery of southern bluefin tuna is likely a combination of both management and fortune and while it should be acknowledged that having a precautionary MP in place will not guarantee such a rapid rebuilding of a depleted stock, the CCSBT example does provide evidence that it can.

The success of the CCSBT MP has seen it frequently cited as a basis for other tuna RFMOs to move to the adoption of management procedures for their respective stock management. An HCR was adopted for North Atlantic albacore in 2017 [10], with similar success in population growth and TAC increases since implementation and now all the tuna RFMOs are now implementing or developing MPs for their priority stocks, with about 20 active MPs expected for tunas and tuna-like stocks within the next few years. There is, however, one barrier that exists in all these other RFMOs: Allocation.

2. The allocation hurdle

Allocation of fishing rights in international fisheries management is a highly complex and often contentious issue that is not easily resolved [8,21,22]. It suffers from a combination of issues including the tragedy of

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the commons [7], the rights of coastal states, special considerations for developing states and historical fishing effort that pre-dates the Convention on the Law of the Sea [15] and the subsequent establishment of exclusive economic zones.

Tropical tuna fisheries pose one of the most challenging allocation discussions, with dozens of countries - developed and developing, coastal and distant water - vying for rights to these resources worth billions of dollars [16] and comprising almost all the gross domestic product (GDP) of some island nations (e.g., [23]). The Indian Ocean Tuna Commission (IOTC), for example, has had dedicated allocation negotiations for over a decade, and significant barriers still exist that must be resolved [22]. Similar issues in the northeast Atlantic have seen failures to manage change in the mackerel fishery [18]. Although allocation isn't necessary for the development of a management procedure, unless it has already been agreed, it can become a hindrance to the success of full implementation.

While all the of the tuna RFMOs have committed to move to MPs for their respective stocks, progress has generally been slow and the uncertainty that stems from unresolved allocation negotiations often appears to be one of the root causes for the lack of progress.

A difficulty faced by many RFMO members in moving from the status quo management arrangement to an MP-based one is understanding the individual implications when allocation has not yet been agreed. This can make members nervous about agreeing to a mechanism for setting the "size of the pie" (i.e., the overall TAC) when they do not know how big their slice will be (i.e., their nation's percent allocation). If there is any risk of a party's relative slice size changing due to lack of an agreed allocation scheme, that manager might prefer to have the flexibility to increase the overall size of the pie in order to secure the end tonnage they seek. Although, it should be noted that the MP implemented by CCSBT for example, has effectively allowed the size of the pie to grow since implementation and therefore alleviated pressure by members to increase their slice of the pie.

In this way, MPs and allocation can be considered two sides of the same coin, where the MP uses science and input from stakeholders to determine the size of the pie and the allocation determines how that pie is sliced. To date, negotiations at RFMO meetings around catch limits have been frequently dominated by political factors that can result in TAC levels being agreed that deviate from the scientific recommendations [6]. The political and time-consuming nature of these negotiations can also result in the diversion of much of the meeting time away from other pressing agenda items that RFMOs are mandated to address. A recent example of this challenge was demonstrated at the 2021 annual meeting of the IOTC when an updated yellowfin rebuilding measure was negotiated [13]. Although an MP for yellowfin has not yet been agreed, there was a TAC ceiling recommendation from the IOTC Scientific Committee [12]. This negotiation dominated the meeting to such an extent that other agenda items were not addressed due to a lack of time (compounded by the virtual nature of the meeting). The protracted negotiations were a combination of disagreement on what the overall level of catch reductions that were required (i.e. the size of the pie) and the individual member outcomes (i.e. how the pie was to be sliced) (pers obs the authors).

It should be noted that there is an alternative to agreeing on an allocation scheme and that is opting for an Olympic style fishery where there is a race to fish until the TAC is reached, at which point the fishery is closed. Such a system is in operation in the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) [5], however, this approach to fishery management is generally undesirable in the world's tuna RFMOs (e.g. [1]).

3. Benefits of management procedures without agreed allocation

If allocation and MPs are considered two sides of the same coin, then it is logical to ask if there is a benefit to adopting one without the other. While it is straightforward that there are benefits to agreeing to allocation without an agreed MP, the opposite is perhaps not as obvious, although there are many benefits to be gained in doing so.

The benefits of MPs are well documented [2,9,17,19,20] and many are equally valid with or without an agreed allocation scheme. Among others, these include:

- Transparent decision-making in TAC setting and other stock management measures;
- Stability of healthy stocks – potentially allowing higher catch levels;
- Predictability in catch levels, which translates into predictability of market supply and business planning as well;
- Science-based decisions rather than politically determined;
- Swift and appropriate management response to both population growth and decline;

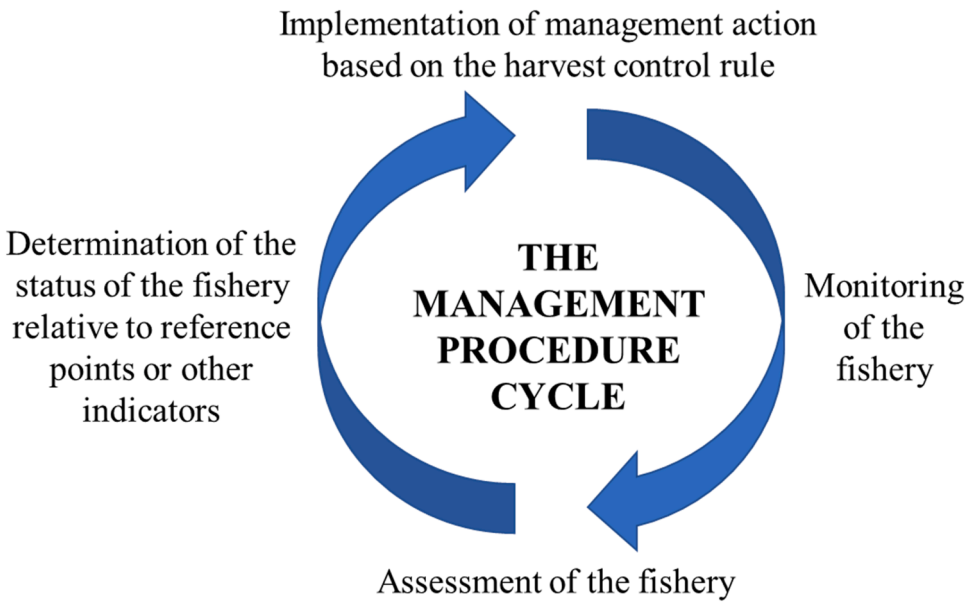

Fig. 1. The feedback loop of the elements of an MP upon implementation.

- Management that is robust to uncertainty and natural variability; and
- Management that is resilient in the face of climate change.

A well designed MP will accommodate TAC exceedances that may result from a lack of agreed allocation and can also be designed to stabilize changes in TAC, which can in turn aid in allocation discussions. The cyclical nature of MPs (Fig. 1) also allows for modifications to the process as new information becomes available. This allows for updating of the MP in scenarios such as agreement of allocation that may result in a change to the management objectives or MP performance against the objectives, should for example, allocation change the size composition of the fishery.

4. Management procedures can catalyze resolution of allocation debates

The argument that moving to an MP will not solve the issue of protracted negotiations and that therefore there is no benefit to doing so until allocation is agreed is a somewhat narrow view of the benefits of MPs. While MPs alone are not a "silver bullet" to fisheries management issues, they do resolve some of the problems that are repeatedly raised and renegotiated at RFMO meetings. In fact, automating these decisions, based on pre-agreed and scientifically robust frameworks, will free up time to enable government members to negotiate those remaining issues that do not fall within the MP framework, including allocation itself. Indeed, decoupling MPs from allocation also allows for negotiations on each to be more focussed, without the issues of one muddying the waters of the other.

The importance of this is emphasized as a result of the changes to RFMO decision-making caused by the Covid-19 pandemic. The shift to virtual meetings has resulted in overall discussion times being approximately halved, and this in turn increases the value of mechanisms that automate any management decisions. For example, the north Atlantic albacore TAC was increased in 2020 despite there being no formal meeting of the International Commission for the Conservation of Atlantic Tunas [11].

Furthermore, by providing a much more certain prediction of future catches, active MPs provide valuable information to governments that are engaging in allocation negotiations. Having more confidence in future catches can give managers the security to agree to an allocation scheme since they will better understand the longer-term implications of that scheme and the case of southern bluefin tuna has demonstrated that individual allocations can be grown under management via an MP [4]. This is in contrast to current practices, where TACs move unpredictably up and down based on political negotiations and can sometimes effectively be sanctioned overfishing followed by rebuilding attempts, a scenario which makes established allocations unattractive since allowable catches could become significantly reduced to the point of being unviable for some fleets.

Allocation discussions are also becoming increasingly challenging and time consuming given the pressure on stocks and the increasing – and important – voice of developing coastal States in the debate. MP's provide a pathway to long-term sustainability of fisheries, thereby easing at least some of the complexities associated with allocation discussions.

There is also an opportunity to evaluate various allocation schemes within the harvest strategy development process using management strategy evaluation (MSE). MSE can be used to explore allocation methods based on geographic distribution of the stock and/or size composition in various regions. For example, the International Pacific Halibut Commission (IPHC) is using MSE for the former application, exploring the impacts of different options for area allocations based on geographic differences in abundance, fishery characteristics, and even biological traits [14].

5. Conclusion

When both allocation and an MP have been agreed it is an effective and transparent approach to fisheries management as demonstrated by the example of southern bluefin tuna management and adoption of an MP is arguably much less contentious if allocation is already established. However, as outlined here, there are still significant benefits to the adoption of MPs even without an agreed allocation framework, not least of which is the freeing up of negotiation time to deal with allocation issues.

CRediT authorship contribution statement

Both authors made equal contributions to the conceptualization, investigation, writing and editing of the manuscript.

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References

[1] Agnew, D.J., Aldous, D., Lodge, M., Miyake, P. and Parkes, G., 2006. DISCUSSION PAPER: Allocation issues for WCPFC tuna resources. A Report for the WCPFC Secretariat, Marine Resources Assessment Group Ltd, London, United Kingdom.
[2] D.S. Butterworth, Why a management procedure approach? Some positives and negatives, Ices. Mar. Sci. 64 (2007) 613–617, https://doi.org/10.1093/icesjms/fsm003.
[3] CCSBT 2021a. Report of the 26th Scientific Committee for the Commission for the Conservation ofSouthern Bluefin Tuna, held via video conference, August 31, 2021.
[4] CCSBT 2021b. Total Allowable Catch - Commission for the Conservation of Southern Bluefin Tuna. ⟨https://www.ccsbt.org/en/content/total-allowable-catch⟩, accessed 31 August 2021.
[5] A. Constable, Lessons from CCAMLR on the implementation of the ecosystem approach to managing fisheries, Fish Fish 12 (2011) 138–151, https://doi.org/10.1111/j.1467-2979.2011.00410.x.
[6] G. Galland, A. Nickson, R. Hopkins, S. Miller, On the importance of clarity in scientific advice for fisheries management, Mar. Pol. 87 (2018) 250–254.
[7] G. Hardin, The Tragedy of the Commons, Science 162 (1968) 1243–1248.
[8] E. Havice, The environmental geopolitics of allocation: State power and institutional stability in Eastern Atlantic bluefin tuna management, Pol. Geo. 88 (2021), 102395.
[9] R.M. Hillary, A.L. Preece, C.R. Davies, H. Kurota, O. Sakai, T. Itoh, A.M. Parma, D. S. Butterworth, J. Ianelli, T.A. Branch, A scientific alternative to moratoria for rebuilding depleted international tuna stocks, Fish Fish 17 (2) (2016) 469–482, https://doi.org/10.1111/faf.12121.
[10] ICCAT, Recommendation by ICCAT on a Harvest Control Rule for North Atlantic Albacore Supplementing the Multiannual Conservation and Management Programme (Rec 16–16), ICCAT,, Madrid, 2017.
[11] ICCAT, Report for biennial period, 2020-21, Part I (2020) Vol 1 (2021) 341. ⟨https://www.iccat.int/Documents/BienRep/REP_EN_20-21_I-1.pdf⟩.
[12] IOTC. 2020. Report of the 23rd Session of the IOTC Scientific Committee, held via video conference, December 7–11, 2020.
[13] IOTC. 2021. Report for the 25th session of the Indian Ocean Tuna Commission, held via video conference, 7–11 June, 2021.
[14] IPHC, Development of a framework to investigate fishing intensity and distributing the total constant exploitation yield (TCEY) for Pacific halibut fisheries, IPHC-2020-MSAB015 (2020) 08. ⟨https://www.iphc.int/uploads/pdf/msab/msab015/iphc-2020-msab015-08.pdf⟩.
[15] LOSC 1982. United Nations Convention on the Law of the Sea. Agreed on 10 December 1982. Entered into Force on 16 November 1994. (LOSC).
[16] McKinney, R., Gibbon, J. Wozniak, E. and Galland, G. 2020. Netting Billions 2020: A Global Tuna Valuation. The Pew Charitable Trusts, Washington DC, USA.
[17] S.K. Miller, A. Anganuzzi, D.S. Butterworth, C.R. Davies, G.P. Donovan, A. Nickson, R.A. Rademeyer, V. Restrepo, Improving communication: the key to more effective MSE processes, Can. J. Fish. Aquat. Sci. 76 (2018) 643–656.
[18] A. Østhagen, J. Spijkers, O.A. Totland, Collapse of cooperation? The North-Atlantic mackerel dispute and lessons for international cooperation on transboundary fish stocks, Marit. Stud. 19 (155–165) (2020) 2020, https://doi.org/10.1007/s40152-020-00172-4.
[19] A.E. Punt, D.S. Butterworth, C.L. de Moor, J.A.A. De Oliveira, M. Haddon, Management strategy evaluation: best practices, Fish Fish 17 (2) (2016) 303–334.
[20] R.A. Rademeyer, E.E. Plaganyi, D.S. Butterworth, Tips and tricks in designing management procedures, ICES J. Mar. Sci. 64 (2007) 618–625.

[21] K. Seto, G. Galland, A. McDonald, A. Abolhassani, K. Amzi, H. Sinan, T. Timmiss, M. Bailey, Q. Hanich, A global analysis of allocation in transboundary tuna fisheries, Ambio 50 (2021) 242–259.

[22] H. Sinan, M. Bailey, Understanding Barriers in Indian Ocean Tuna Commission Allocation Negotiations on Fishing Opportunities, Sustainability 2020 (**12**) (2020) 6665.

[23] P. Terawasi, C. Reid, Econ. Dev. Indic. Stat.: Tuna Fish. West. Cent. Pac. Ocean 2017 (2017).