WESTERN PACIFIC REGIONAL FISHERY MANAGEMENT COUNCIL

PLENARY REPORT FOR THE INTERNATIONAL WORKSHOP ON AREA-BASED MANAGEMENT OF BLUE WATER FISHERIES

EXECUTIVE SUMMARY

The Western Pacific Regional Fishery Management Council (Council) hosted the virtual International Workshop on Area-Based Management of Blue Water Fisheries from June 15-17, 2020. The workshop included 34 participants from all over the globe. The panelists and participants included top area-based fishery management experts from Intergovernmental agencies, nongovernmental organizations (NGOs), regional fisheries management organizations (RFMOs), and academia, many of whom bridge the gap between science and policy. The workshop was co-chaired by world-renowned scientists Dr. Ray Hilborn (University of Washington) and Dr. Vera Agostini (United Nations Food and Agriculture Organization).

The workshop, preparatory papers, and resulting documents addressed emerging issues in governance with respect to blue water ecosystems that lie in areas within and beyond national jurisdictions. The workshop had a broad diversity of opinions on the utility of area-based management tools (ABMT). The workshop consisted of three plenary sessions plus two series of regional inter-sessional breakout meetings to correspond with multiple time zones throughout the globe. During the plenaries, participants split into breakout focus groups. Breakout focus groups included: Science-Policy Forum, Objectives and Performance Metrics, Empirical Evidence and Research Needs for ABMT Utility, Design of ABMT Measures, Methods to Evaluate ABMT, and Moving Forward with ABMT Implementation. The format was to allow cross-pollination of disciplines and regional perspectives despite COVID-19 limiting in-person meetings.

Council staff, with members of its Scientific and Statistical Committee (SSC), initiated the idea over the prior year, formulating a plan to develop a high-level peer reviewed document entitled "Road Map to Effective Area-Based Management of Blue Water Fisheries." Participants were tasked to improve and expand upon the conceptual frame of the preparatory papers. The series of preparatory papers, which were drafted ahead of the meeting to serve as a starting point for discussion, included:

1. Introduction to Area-Based Management of Pelagic Fisheries
2. Objectives and Performance Metrics for Area-Based Management
3. Designs of Spatio-Temporal Management Measures for Blue Water Fisheries Empirical and Theoretical Evidence of Ecological Objectives Met by Area-Based Management Measures for Pelagic Fisheries
4. Evidence of Ecological Objectives Met by Spatio-Temporal Management Measures for Pelagic Marine Fisheries Review of Methods to Evaluate and/or Monitor Area-Based Management Measures
5. Research Needs for Area-Based Management in Pelagic Fisheries

6. Evaluating Conservation Intervention Effects Such as MPAs Using Causal Inference when Randomization is Not an Option.
7. Social Impact Assessment for Blue Water Area-Based Management Tools

Oftentimes implementation of ABMTs (such as closures or restrictions) is done without weighing objectives, having a proof-of-concept beforehand to achieve these objectives, or planning on how to evaluate area-based measures thoroughly through time. These planning steps are critical - especially for highly dynamic ecosystems that support blue water fisheries where "set it and forget it" may not be appropriate. Workshop participants discussed several "static" vs. "dynamic" AMBTs and their benefits and limitations. Static implies management an area with fixed area delineation, while dynamic implies managing area(s) that may shift in time and space. In the end, the participants all agreed that ABMTs are not a silver bullet for managing fisheries or their ecosystems. Marine Protected Areas (MPAs) are often most synonymous with ABMTs but are merely a single tool in a vast toolbox of ABMTs that are not strictly about permanent closures.

The workshop consensus agreed that economic, cultural, and social objectives need to be considered more thoroughly prior to implementation of ABMTs, and industry engagement is also critical. Alternative management measures should be explored and evaluated alongside any ABMT considered. The workshop participants identified agreeable general objectives to reach desired goals, regardless of whether the goals are conservation-based, economic, or social in nature. These objectives include: 1) Sustainable food production, both local and global; 2) Employment, both local and global; 3) Economic health and welfare; 4) Communities and culture; 5) Protect endangered, threatened, and protected species (and reduce interaction with non-target species); 6) Protecting specific habitats; 7) Maintaining ecosystem structure and function; and 8) Resilience to climate change and other stressors. Workshop participants agreed that objectives have associated performance metrics, which need to consider the state of knowledge and knowledge gaps that will require research and an improved science-policy dialogue.

After several deliberations, the workshop participants collectively agreed that two papers will emerge. A brief 3,500 word science-policy paper will focus on addressing governance issues, specifically UN Convention on Biodiversity Beyond National Jurisdiction (BBNJ), the Convention on Biological Diversity (CBD), and UN Sustainable Development Goals (SDG). More notably, a comprehensive peer-reviewed resulting document with an agreed-upon scope is in preparation by workshop participants. The paper will be published as a special edition in *Fish and Fisheries* with Dr. Ray Hilborn as the lead author. About two dozen participants volunteered to draft sections of these papers, including Council staff and some SSC members. The *Resulting* document has six chapters: 1) Introduction; 2) Objectives and Performance Metrics for Area-Based Management in Blue Water Ecosystems; 3) Spatial Management Measure for Blue Water Fisheries; 4) Review of Evidence that Objectives Met by Spatial Management Measures and their Research Needs; 5) Review of Methods to Evaluate and Monitor Area-Based Management Measures; and 6) Moving forward in implementation of area based management planning.

The resulting document will also expand upon the utility of general ABMTs, including: 1) Time-area closures; 2) Adaptive real-time closures, dynamic ocean management, 3. Permanent closures; 4) Input/Output controls; 5) Gear and fishing method changes; and 6) Access and tenure rights by area. Workshop participants will continue to collaborate throughout the COVID-19 pandemic in order to have a manuscript for publication.

LESSONS LEARNED FROM WORKSHOP

A summary of what we know about the use of ABMTs in blue water ecosystems and the next steps for the global community in use of ABMT in meeting management objectives is provided in a table below. These are emerging from the workshop's plenary and preparatory papers and to be incorporated in a manuscript to *Fish and Fisheries* (Hilborn et al. in prep)

Fisheries Management Objective	**What We Know**	**Next Steps in Management**
Maintain and enhance sustainable food production.	Area-based catch and effort restrictions have largely worked to maintain stocks in productive condition. Static pelagic closed area ABMTs would need to cover extremely large areas to significantly reduce the risk of capture of an individual pelagic fish throughout its lifetime (Botsford 2003; Le Quesne 2009; Gruss 2011; Dueri 2013) and spatial redistribution of fishing effort may negate perceived benefits (Martin et al. 2011; Kaplan et al. 2014). Theoretical analyses indicate that there will likely be no regional stock-level benefits for stocks that are not overexploited (Le Quesne 2009), which is the case for most target pelagic species as well as for prey of pelagic predators (Olson 2003; Le Borgne 2011; ISSF 2018).	• Catch reductions for species that are currently overfished. • Improve compliance and monitoring by management agencies, aided by emerging technologies • Elimination of IUU fishing • Monitoring impacts of selective exploitation throughout species' ranges.
Protection of non-target species (endangered, threatened, or protected species (ETP))	The major successes have been accomplished by gear and fishing method modification. Where there are fixed breeding sites, seasonal closed areas may be most effective. Concentration around important feeding sites would likely be best managed through dynamic closures around temporary oceanic features. .	• Broad implementation of key technologies shown to reduce bycatch • Analysis of the potential of ABMT to contribute to bycatch reduction, particularly dynamic management options • Expedite regulatory response time to adaptive management

Fisheries Management Objective	What We Know	Next Steps in Management
Protect critical habitats	This is generally not a significant issue with benthos in blue water systems. The benthic communities of concern are typically seamounts. Closure of sensitive bottom habitat to bottom contact gear has been shown to be effective.	• More mapping of benthic systems of concern in blue water ecosystems. • Closure of sensitive benthic habitats • Better understanding if there are critical pelagic habitats (e.g., pelagic spawning or feeding grounds) that could use some form of protection
Maintain ecosystem structure and function	Overall trophic structure of pelagic systems is largely intact and the main impact of fishing is on the highest trophic levels. There is no evidence that the structure and function of the blue water systems is significantly modified by fishing	• No clear ABMT action is thought to benefit maintaining ecosystem structure and function
Increase ecosystem resilience to climate change	Pelagic habitats such as feeding and spawning areas are shifting in space with climate change. It is not clear how ABMT would contribute to this. .	• Where various forms of management are appropriate for specific habitats, those need to change adaptively
Provide employment (both local and global)	Mostly results from allocation of tenure and access rights and governance.	• Employment issues are very fishery and fleet specific and no general policy guidance can be given.

Fisheries Management Objective	What We Know	Next Steps in Management
Facilitate economic benefits	Substantial economic benefits result from commercial tuna and tuna-like species fisheries in blue water ecosystems. Zone-based management of tuna fisheries (e.g., WCPFC vessel day schemes) are used to generate revenues for coastal states from distant water fishery access fees.	• If management agencies have specific objectives re where benefits occur management actions can be taken to direct those benefits • Ensure facilitation of economic benefits do not impede sustainability objectives
Support Communities and Culture	Fishing communities and cultures in many parts of the world depend on fisheries prosecuted in blue water ecosystems for food security, livelihoods, traditions and cultural activities. There is very little information on how management actions impact communities.	• Ensure reduction in defined disproportionate burden to coastal states