Integrating Ecosystem-Based Fisheries Management and Co-Management Workshop Report

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Workshop Summary | October 2017
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Purpose

Ecosystem-based fisheries management (EBFM) has been widely touted as the future of fisheries conservation and stewardship, appearing prominently in an array of highly visible policy documents in the United States and internationally. The shift towards EBFM parallels growing interest in coastal and marine spatial planning, and recognition that single-species management consistently fails to sustain living marine resources, and that marine systems are highly complex and dynamic. In an effort to transition from EBFM in theory to practice, a multitude of technical challenges and persistent misconceptions that range from concerns about the cost of data collection to uncertainty about regulatory authority have been made. Despite progress, however, limited attention has been devoted to assessing the theoretical and practical linkages between EBFM and co-management, even though there are potential theoretical and applied connections. The primary purpose of the workshop, *Integrating Ecosystem-Based Fisheries Management and Co-Management*, was to bring clarity to this connection by exploring the following questions: To what extent are these concepts in marine conservation and management linked? How does co-management facilitate (or impede EBFM)? Is EBFM possible without co-management and local feedback (and vise versa)?

Setting the Stage

This workshop was motivated by multiple factors: (1) At the federal level, there is an ongoing push for ecosystem-based approaches to fisheries management. Most notably, NOAA Fisheries' new EBFM policy and roadmap directs Regional Fishery Management Councils to develop Fishery Ecosystem Plans. (2) Simultaneously, there is continued dissatisfaction with the state of management in some regions that casts doubt on the science that supports it and puts pressure on managers and policymakers alike to develop new and collaborative management strategies with the fishing industry. (3) Many marine systems are experiencing unprecedented socioeconomic and environmental changes, which makes it increasingly difficult to anticipate how marine resources including fisheries will respond to both environmental and anthropogenic pressures. (4) While this workshop could have been hosted anywhere, hosting the meeting in Maine is both fitting and timely. Maine has a long history of co-management and is currently an epicenter for environmental change in the marine environment. In addition, NOAA Fisheries, the Maine Department of Marine Resources, and the Maine Center for Coastal Fisheries are in the process of launching a new cooperative research and development agreement (CRADA) to create a science framework for ecosystem based fisheries management. One of the core principles of the CRADA is collaboration, and a commitment to engaging the commercial fishing industry and coastal community stakeholders as active partners.

Format

This 2-day workshop brought together a small group of creative thinkers with expertise in the theory and practice of EBFM and co-management (see participant list below). Each of the participants was invited to contribute a short (10-15 minutes) presentation reflecting on either: 1) What are the theoretical and applied linkages between EBFM and co-management, or (2) How – from a community, science, management, or technology perspective – how can/are/should these ideas integrated in practice? In addition, presenters were invited to prepare a short (less than 3 page) white paper summarizing their presentation in advance of the meeting. In total, ten presentations and three white papers were prepared for the workshop and these papers/presentations served as the starting point for facilitated discussion with the group about the linkages between EBFM and co-management.

Participants

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Summary Report

A common objective of fisheries management is to sustain the form, function, and productivity of marine systems, while also maintaining harvest and use opportunities long-term. The failure to achieve this goal consistently through conventional science and management approaches based on assumptions of linearity and spatial homogeneity has catalyzed a shift towards alternative modes of management. Interest in forwarding alternative approaches has been further driven by uncertainty created by climate-drive change in the marine environment, budget constraints that limit the capacity to conduct research, and public discontent. Two key concepts that are being promoted as alternatives to the current system are EBFM and co-management. While these are not new ideas, continued interest in both warrants reflection on if, how, and to what extent they are interconnected in theory and practice.

This interplay has not been dealt with in the literature previously, but efforts to describe and clarify EBFM and co-management provide useful insights. Indeed, numerous efforts have been waged to better define and forward the implementation of EBFM. These efforts tend to coalesce around a set of general attributes and principles[1]. To summarize, EBFM is often described as an adaptive and

[1] Coincidently, one of the principles is co-management (Arkema et al. 2006).

participatory management framework that integrates biological, ecological, and socioeconomic factors to sustain the composition, structure, and function of a discrete place or system. Definitions of EBFM and ecosystem-based management more generally place particular emphasis on 'holistic' and 'integrated' management, recognizing the importance of food web dynamics, non-target species, habitat, and human-natural interactions in a discrete system (e.g., Pikitch et al. 2004, McLeod and Leslie 2009). We can see this, for example, in NOAA Fisheries' definition of EBFM, which describes it as "a systematic approach to fisheries management in a geographically specified area that contributes to the resilience and sustainability of the ecosystem; recognizes the physical, biological, economic, and social interactions among the affected fishery-related components of the ecosystem, including humans; and seeks to optimize benefits among a diverse set of societal goals" (NOAA 2016). This expanded view of management emphasizes the interconnectedness of all of the components of a system, including the human dimension. While some argue that EBFM represents a sharp departure from traditional, single-species management regimes, Link (2002:19) challenges this viewpoint by arguing that there is a "gradient of approaches" along the continuum of management decisions that exist.

The relationship between co- and conventional management is similarly thought to exist on a continuum, with elements of co-management regularly appearing in conventional management regimes (and vice versa) (Wilson 2013). One of the central features of co-management is thought to be power sharing between public and private sectors that leads to distributed rights and responsibilities for governing common pool resources (Plummer and Gibbon 2004, Pinkerton et al. 2014). The theory that underlies this scholarship is closely linked to the notion of polycentricity, which asserts that governance systems that are composed of multiple and interconnected centers of decision-making tend to be particularly well situated for dealing with complex and large-scale challenges (Ostrom 2010). There is some ambiguity here about which stakeholders get to be involved in this type of decision-making process, but the literature tends to focus on local communities, resource users, non-profit interests, and government authorities under this umbrella. Other common features of co-management include being place-based, long-term, flexible, and based on a combination of experimental and experiential learning (Armitage and Berkes 2010, Olsson et al. 2004, Ruitenbeek and Cartier 2001). Taken in aggregate, then, co-management can be described as an iterative process in which stakeholders at multiple-scales share the authority and responsibility for governing a set of common pool resources in a particular geography long-term.

From these descriptions, emerge a range of potential connections between these concepts and their practice. These connections related to drivers (i.e., why they are being championed), attributes (i.e., characteristics), and intended outcomes (i.e., what do they seek to accomplish). We briefly outline these in Table 1 below. What is important to note here is that there is definitional overlap in the literature. For example, one of the key drivers of both EBFM and co-management is the real and/or perceived failure of conventional fisheries management (Table 1. Row 1). There are also potential synergies. For example, feedback loops are an important attribute of co-management (Table 1. Row 11), while a focus on interactions is a key attribute for EBFM (Table 1. Row 10). Theoretically, these attributes could be synergistic since tight feedback loops created through co-management could facilitate knowledge about system interactions at the local level.

		EBFM	Co-management	Key overlaps and interplay
1	Drivers	Management failure	Management failure	Shared drivers
2		Recognition of complexity	Recognition of complexity	
3		Changing environmental conditions	Marginalization	
4		Trend towards ocean and coastal planning	Constrained budget environment	
5	Attributes	Adaptive	Adaptive / Flexible	Shared attribute
6		Systematic	Collaborative	
7		Geographically based	Geographically based	Shared attribute (Note: The scales of implementation to date have tended to be different. Co-management often occurs at a local level and matches political boundaries, while EBFM is envisioned at a larger spatial scale and spans multiple jurisdictions.)
8		Multi-scaled	Involves power sharing and decentralization	In co-management arrangements that are single-species focused, incentives may focus narrowly on particular fisheries, potentially limiting actors' interests in the whole system (11-EBFM)
9		Fisheries-focused	Enables shared learning (experimental / experiential)	
10		Attentive to system interactions	Inclusive of multiple sources of knowledge	
11		Holistic (human/natural)	Facilitates feedback of information	Feedback in a complex adaptive system can enable adaptation (5-EBFM) and attentiveness to system interactions at a fine-scale (10-EBFM)
12		Long-term	Long-term / continual	Shared attribute
13	Outcomes	Sustained ecosystem services	Sustained ecosystem services	Shared outcome
14		Increased system-level resilience	Increased and balanced accountability	
15		Sustained system function	Empowered communities	
16		Optimized benefits / trade offs	Produces collective good	

Table 1. Key drivers, attributes, and outcomes commonly described in defining EBFM and co-management. Examples of overlap and interplay between the two concepts are noted.

Food for thought

One of the primary motivations for holding this workshop was the observation that different people appear to have different perspectives about the interplay between EBFM and co-management. This insight was reinforced during our 2-day discussion. What is particular striking is that some see the concepts as being nearly synonymous, while others consider the connection tenuous at best (Fig 1.). This difference in opinion raises the question why.

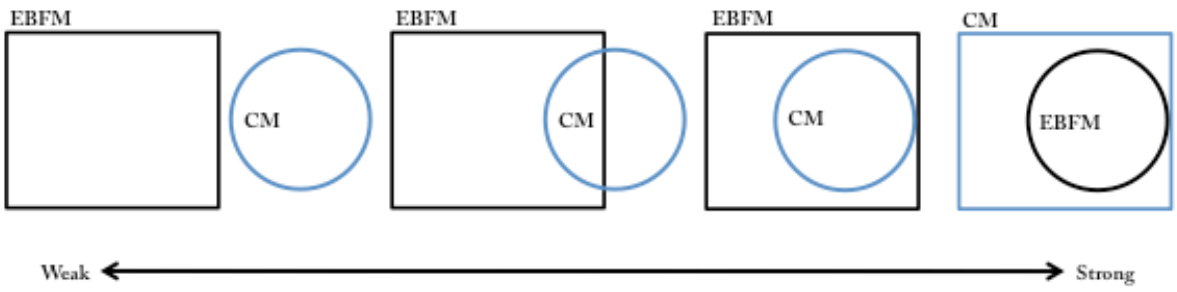

Figure 1. Simplified depiction of the conceptual overlap between ecosystem-based fisheries management (EBFM) and co-management (CM).

One potential explanation relates to how EBFM and co-management are defined. In both cases (as previously noted) the concepts exist along continuums. This means that in practice, starkly different efforts can be labeled as EBFM and co-management respectively. This definitional flexibility creates a situation where one person can argue that very conventional approaches to management have ecosystem-based and/or co-management undertones and another individual can make a case for how seemingly strong cases of EBFM or co-management are actually not good examples of either concept. Such ambiguity confuses efforts to rigorously evaluate the theoretical and applied connections between the concepts.

This dynamic is evident with the NOAA Fisheries policy on EBFM. In 2016, NOAA Fisheries released a policy on EBFM that was subsequently accompanied by a supporting roadmap. As part of this effort, the roadmap directs Regional Fishery Management Councils to create Fishery Ecosystem Plans to support EBFM. In simple terms, the objective of this effort is to increase the degree of ecosystem-related thinking guiding fisheries management. When conceived, this effort was very much about improving the existing management framework and had nothing to do with altering governance. Those involved, therefore see relatively little connection between EBFM and co-management. Indeed, even if you view the council system as a type of co-management, the connection is limited, since the ecosystem information that will be generated to support the Fishery Ecosystem Plans are decoupled from the council decision making processes. Thus, the diagram on the left in Figure 1 above might best represent the relationship between the two concepts. However, this view changes as we consider the following questions:

- What information is needed to effectively manage a system in an integrated, ecosystem-based manner (and at what spatial scales)?
- What does it require to collect, maintain, interpret, and use such information in decision-making?

Those managers who focus on understanding the interactions and interconnectivity of a marine system demand fine scale and localized knowledge. This requirement brings the two concepts closer together (i.e., moving us to the right in Figure 1).

To bring these ideas together in a coherent way will require a deeper engagement in the idea of conceptual continuums. Indeed, this work would be useful for a range of concepts in marine and ocean conservation and management. Taking this approach represents an alternative to defining singular definitions of these concepts, and perhaps eliminates the need for creating new alternative concepts in the future.

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