Oyster-Dominated, Placed-based EBFM Work Plan

Project components:

Operationalizing the principles of ecosystem-based fisheries management (EBFM) to achieve tangible, on-the-ground implementation has proven challenging nation-wide. Since certain conditions, such as bounded placed-based strategies and more sedentary organisms (e.g., scallops), have shown more success, we wish to consider how synthesis of natural and social scientific information on a placed-based, species-focused perspective might help inform EBFM in the Chesapeake Bay.

Indicator development

For example, oysters play complex, multiple roles in the coupled social-natural ecosystem, given the commercial and recreational wild harvest from reefs, growing spat-on-shell reef-based and caged/bag aquaculture activities, utilization of oyster reef sanctuaries and understanding of larval dispersal and source reefs in an river system, and the broader and varied ecosystem services supplied by each type of oyster function in an ecosystem (e.g., role in nitrogen budget, habitat for other organisms, etc.)—just to name a few. Thus, how do we assess the health of the oyster complex in an ecosystem, or set targets for their ideal abundance while taking into account their multiple roles in the coupled social-natural ecosystem? How do we account for socioeconomic and natural benefits, and represent that understanding in a manner that informs decision-making and helps stakeholders understand the inherent trade-offs in the oyster complex.

In many cases, each perspective on oyster's function in a coupled social-natural ecosystem, have developed their own indicators of health and success. Do some of these indicators cross sectors or can we create some new ones that do while utilizing existing data sources? Using these, can we create a small checklist of indicators that monitors social and natural ecosystem function and resilience in oyster-dominated ecosystems?

- Jan 29th 2015: VA SeaGrant Participants Symposium breakout session established a list of existing relevant data sources and priority indicators
- From the literature on EBM: What are indicators of ecosystem function that others have used?
- Survey: Once a draft list of indicators is developed, create a short survey to distribute to researchers, industry leaders, oyster managers, and other stakeholders to provide input and prioritize these indicators as well as get feedback on their feasibility and/or data availability, as well as existing attitudes towards management and science.

Identify first steps towards EBM

This part of the project maintains the practical, applied side of the research through taking a pragmatic approach to EBM. While EBM might be applied closest to the theoretical ideal through restructuring governance institutions, this is not a realistic expectation. So what are a few suggestions that are feasible within existing management structures (e.g. oyster fishery management plan or restoration

Amy Freitag, aefreitag@vims.edu

plan)? First, I will determine the existing state of ecosystem thinking within oyster management and then focus on developing future inroads, including where the indicator checklist can play a role.

- Network analysis: Determine the interconnectedness of the four main groups of oyster people: sanctuary proponents, restoration efforts, commercial wild harvest, and aquaculture. Find key nodes who might facilitate broadening the discussion or places where new links might easily be created (e.g. with seed funding for joint projects). Map on this network where ecosystem-based fishery management has already emerged in the conversation and the related concept of ecosystem services.
- Policy analysis: In documents regulating oysters in some way, determine how oysters are treated (e.g. as food, habitat, or both) and if ecosystem services are part of the decision-making process. Consider the contribution of EBFM indicators to existing policies that might form the policy base of an ecosystem-based approach in the future and where small amendments might help an ecosystem-based approach to be put in place.
    - Identify at which political scale ecosystem-based management might take root within existing policies (local, state, or regional).
    - Identify areas where our newly developed coupled natural-social indicator list might be applied as either the informing science base or adaptive management monitoring framework
    - Develop a decision analytic tool to help policymakers use the indicators within existing or slightly amended adaptive management structures utilize the indicator list and think about tradeoffs. This could be paired with existing geospatial tools (e.g. VA's Coastal GEMS, inVEST, or MarZones).

Small-scale test of oyster EBM:

Since ecosystem-based management is inherently place-based, the best place to test our new approaches are small pieces of a larger ecosystem. In this case, these smaller areas should be river basins that contain aquaculture, wild harvest, and restoration activities to represent the full range of oyster stakeholders. These rivers should also be ones with a fair amount of research attention so that there is existing data to work with. After a fair amount of scouting, good rivers are the Rappahannock in Virginia and the Choptank River in Maryland, with an option for the Lynnhaven as a third if time permits.

- Find data sources that speak to the priority indicators as developed in the first stage of this research and combine them in a map. This might be through an existing platform or just using their layers through ArcGIS.
- Evaluate how well the indicators do at capturing natural and social ecosystem condition. Figure out if they will capture shifts in ecosystem condition (i.e. if an invasive species moves in or if a watermen heritage tourism industry grows, will we be able to detect it?) that have happened through history or are projected for the future. Potential here to contribute social parameters to Tom Idhe's ecosystem models.
- Present this work in the community of each river (town-hall meeting style) to get feedback about the methods and ecosystem-based approach. Are we missing anything that is locality-

specific and adequately addressing community concerns? Use this meeting as a means of evaluating our process as it might be expanded to other rivers. The first of these will be at the oyster summit for the Choptank, which is currently under development.

Summary analysis:

At the end of the process, we should reflect on our experiences taking an incremental approach to EBFM at a moment in time. What would a roadmap look like if we continued this effort for the next decade? Until EBFM is completely implemented throughout the Chesapeake? We will determine if there is an opportunity and willing community for a visioning exercise for what "completely implemented" will look like. In addition, we will describe the steps it would take to institutionalize the developed indicators and expand them geographically to other rivers and other key species.

The outcomes of the process will including:

- Coupled natural-social ecosystem indicators
- Application of the indicators in two oyster-dominated river systems (one in Virginia and a second in Maryland) through a map-based data integration tool.
- Development of decision-support tools and protocols for using the indicators, including suggested strategies for implementing a long-term monitoring system for the indicators on a broader basis.
- Policy suggestions for further science integration and synthesis as well as management actions to further implement EBFM.

Potential Advisory Group

Troy Hartley – VA Sea Grant
Peyton Robertson – NOAA CBO
Bruce Vogt – NOAA CBO
Fredrika Moser – MD Sea Grant
TBD – practitioner/manager

Calendar:

Month	**Tasks**	**Key dates**	**Deliverables due**
Dec 2014	Finalize project Plan Symposium session Read literature on EBM	Dec 12th feedback due on project	Work plan Symposium process agenda
Jan 2015	Advisory group call Establish list of stakeholders for survey Identify oyster policies and future public meetings	Jan 29th – Symposium	
Feb	Design network analysis and who		Draft survey for indicators

	will be part Explore existing data visualization tools Establish advisory group		and network analysis
Mar	Deploy survey Plan interaction with Choptank stakeholders		
Apr	Do additional network analysis interviews/followups		
May	Network analysis		
June	Write up indicator development	13-18 ISSRM Charleston	Draft paper/talk on indicators
July	Write up network analysis Find & download existing data for indicators		Draft paper on networks
Aug	Policy analysis GIS analysis	9-14: ESA Baltimore	
Sep	Write up policy analysis GIS analysis		Draft paper on policy
Oct	Policy analysis tool development Town hall meeting – Rappahannock		Draft tool
Nov	Plan policy tool evaluation Town hall meeting - Choptank		
Dec	Policy tool evaluation		Final tool report
Jan 2016	Incorporate town hall meeting into GIS analysis		
Feb	Collect/add additional data for rivers		
Mar	Collect/add additional data for rivers		
Apr	Write up the GIS analysis		Tool presentation/packet of how-to-use
May	Summary analysis		Roadmap for expanded EBFM
June			
July			
Aug		? – IMCC Newfoundland	
Sep			
Oct			
Nov			