Ecosystem-Based Fishery Management by the NEFMC Development and Progress

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New England
Fishery Management Council

Ecosystem-Based Fishery Management (EBFM)

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

New England Fishery Management Council
EBFM - Early Development

- Scientific and Statistical Committee white papers (2011)
  - Holistic or Incremental Approach
- Formed EBFM Committee (2014)
- Examined EBFM strategies – Other Councils and Countries
  - Ecosystem Approach to Fisheries Management
  - Ecosystem-Based Fishery Management
- Debated and approved a strategy for developing EBFM (April 2015)
  - Council chose a wholistic, comprehensive approach that could replace existing management plans
- Defined the NEFMC approach (2016-2017)

NEFMC Approach

- To prepare:

1. A policy describing goals and objectives, and approaches, for taking account of ecosystem processes in fishery management, and
2. An example of a fishery ecosystem plan that is based on fundamental properties of ecosystem (e.g., energy flow and predator/prey interactions) as well as being realistic enough and with enough specification such that it could be implemented. The example should not be unduly constrained by current perceptions about legal restrictions or policies.
3. With respect to number 2, it is understood that the example might not be implemented, but it should make clear what a fishery ecosystem plan would actually entail and it should focus debate.

NEFMC Approach

- The Council is pursuing a fundamentally different EBFM approach relative to other Fishery Management Councils and management authorities.

- Unlike other EBFM approaches, the NEFMC is focused on place-based management and trophic guilds (i.e., energy production units) as management units rather than managing fish stocks using independent harvest control rules.

- The new approach addresses the implications of both biological interactions (i.e., predator/prey) and fishery interactions (bycatch and mix species fisheries).

EBFM
Reshaping management

1) Recognize and incorporate trophic interactions amongst related species
   - Managed and unmanaged
   - Maximum Sustainable Yield for a stock is a function of the state of the ecosystem, not a constant
   - Multispecies simulation and assessment

2) Reduce technical interactions that prevent achievement of optimum yield
   - Species caught together, at the same time but managed inconsistently

3) Recognize tradeoffs among goals and broaden objectives, evaluate management strategies
   - Stakeholder engagement

New England Fishery Management Council EBFM Development

- NOAA Fisheries EBFM Policy – May 2016
- Worked Example Independent Peer Review
  - Requested September 2016
  - Results presented September 2018
- Develop example Fishery Ecosystem Plan (eFEP) for Georges Bank
  - Final draft presented September 2019
- Formed MSE Steering Committee
  - Recommended public outreach workshops (December 2019)
    - Science communication tools
    - Stakeholder engagement
- Develop public outreach communication tools (2020)
  - Hired science communication specialist – Green Fin Studio
  - PDT developed Worked Example tools to demonstrate concepts in eFEP

Phase II
example Fishery Ecosystem Plan

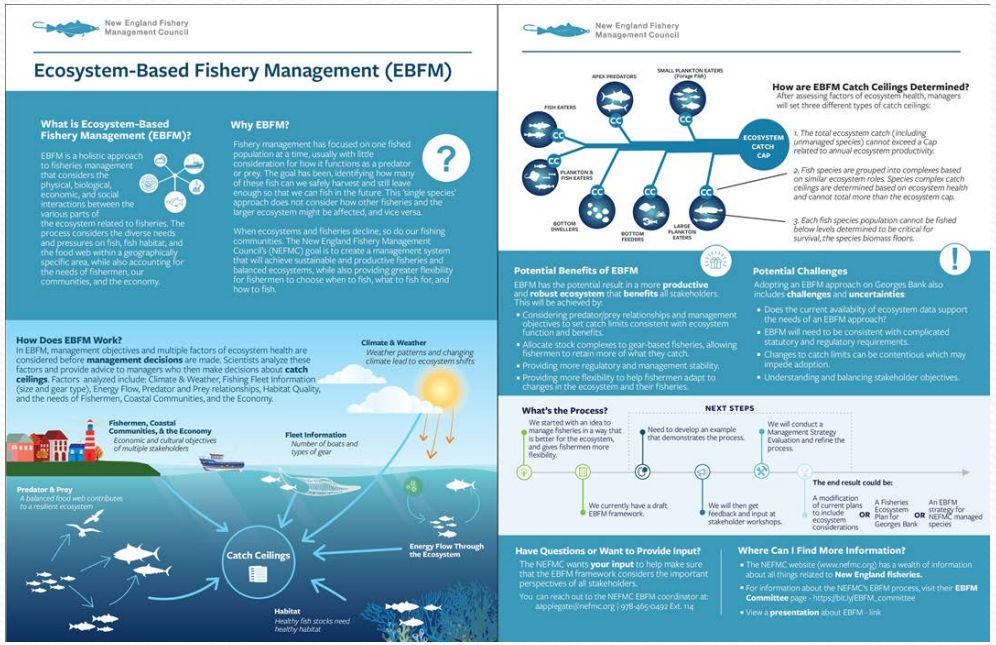
- Phase II-B: Develop example Fishery Ecosystem Plan (eFEP)
  - Discussion document to outline a framework for how fisheries could be managed with EBFM
  - Does not specify methods or exact details
  - Lays out concepts and describes framework for fitting them together
  - Sep 2019: Final draft approved by Council in September 2019

Phase III
Stakeholder Engagement

- Phase III-A: MSE Steering Committee recommendations
  - Public Outreach Workshops
  - Hire science communicator to develop workshop materials
    - Document, pamphlets, video, presentations, news releases, webinar, social media etc.
    - Design materials to be used in small and large format information workshops
    - Match up presentations with stakeholders expected at workshops
    - Use visually rich orientation presentations, create visual material. A visual storybook may be very effective
  - Develop Tangible Worked Example(s)

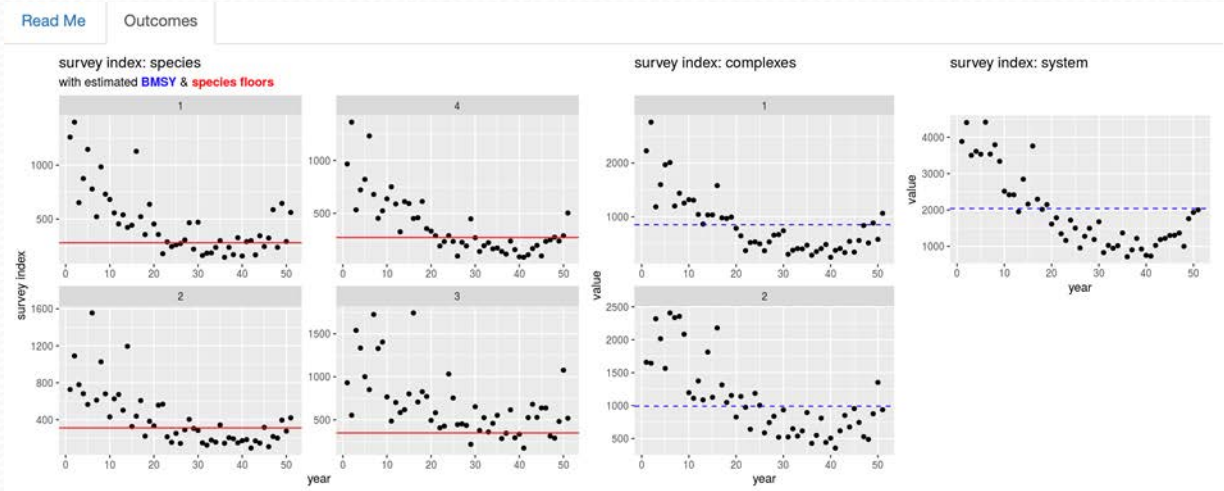
EBFM Communication
Green Fin Studio

- Summary of stakeholder perspectives
  - 11 groups
- Brochures
  - 3 stakeholder focused, 1 guide to eFEP, 1 Glossary
- Two Infographics
  - Summary of EBFM and the Georges Bank Ecosystem
- Four presentation
  - An Introduction to EBFM, EBFM Science, the eFEP and Worked Examples, Catch Management Framework
- Introductory Video
  - Stakeholder Perspectives



EBFM Communication Worked Example Tools

- Description of Hydra Operation Model with Example Scenarios
- Kraken Visualization Tool
  - Example effects of biological interactions
  - Runs interactively
- Catch Framework Demonstration Tool
  - Application of floors and ceilings approach
  - Stock complexes
  - Runs interactively



Neither stock complex has species assessed to be below the biomass floor, so F is not reduced.

Assessment results & catch advice

Complex	FMSY	BMSY	B_final	F/FMSY	B/BMSY	Catch at FMSY	Floor F multiplier	F	Catch at F	Ceiling	Advice
1	0.15	1,786	1,523	0.68	0.85	226	1	0.11	170	474	170
2	0.14	1,122	1,100	0.48	0.98	149	1	0.10	111	474	111

Assessment results & catch advice

Species	FMSY	BMSY	B_final	F/FMSY	B/BMSY	Catch at FMSY	F	Catch at F	Ceiling	Advice
1	0.15	983	913	0.73	0.93	141	0.12	106	474	106
2	0.12	727	510	0.72	0.70	62	0.09	46	474	46
3	0.16	406	520	0.31	1.28	85	0.12	64	474	64
4	0.10	991	669	0.70	0.67	69	0.08	52	474	52

Phase III
Stakeholder Engagement

- Phase III-A: MSE recommendations for workshop objectives
  - Build greater understanding of EBFM as a tool to assess and manage fisheries
  - Identify potential opportunities and concerns that different stakeholders see in EBFM
    - What opportunities do you see to use EBFM to improve existing assessment and management systems?
    - What do we stand to lose in shifting towards an EBFM approach?
  - Give opportunity to stakeholders to define next steps, building a willingness to continue participation in the process.

Phase III
Stakeholder Engagement

- Phase III-B: Management Strategy Evaluation
  - Develop objectives
  - Identify performance metrics
  - Identify potential management procedures, harvest control rules
  - Evaluate relative performance against a simulated system with known characteristics against stated objectives

Phase III
Stakeholder Engagement Strategy

- Workshop gateway – web deployment and mailings
  - EBFM communication tools
- Partnering
  - GMRI, UMass Dartmouth, State agencies, Sea Grant, Industry associations
- Social media engagement
- Effective workshop format and facilitation

Phase III Challenges

- Develop simulations and evaluate management procedures
  - Objectives and tradeoffs
- Show how eFEP catch management approach and appropriate management procedures comply with the law
  - Preventing overfishing, preventing overfished stocks
- Work out jurisdictional and permitting issues

Phase IV and V
Develop and implement FEP

- Phase IV-A: Council decides on how to apply MSE management procedures
  - Develop and implement a Fishery Ecosystem Plan (FEP) or
  - More incremental approach within existing plans
- Phase IV-B: From viable MSE strategies, develop management alternatives for final FEP, analyze effects and conduct public hearings
- Phase V: Submit final plan, implement regulations, measure effects and make adjustments