

eFEP Options for Supporting EBFM through Catch monitoring, ecosystem data collection, and research

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Fishery-dependent data from required reports for Northeast Multispecies (O'Keefe et al., 2015)

Data Type	Vessel Trip Report (VTR)	Vessel Monitoring System (VMS)	Dealer Report	Observer Reports (NEFOP)	At-Sea Monitoring (ASM)	Dockside Monitoring
Vessel Permit	X	X	X			X
Operator Permit	X	X				
Area Fished (statistical area)	X					X
Area Fished (lat/lon)		X		X	X	
Time Fished	X	X		X	X	
Landed Species (for sale)	X		X	X	X	X
Landed Species (not sold)				X	X	
Discarded Species	X			X	X	
Species Disposition				X	X	
Landing Date			X	X	X	X
Landing Port			X	X	X	X
Dealer Demographics			X			
Market Category			X			
Landed Species Price			X			
Tow Duration		X		X	X	
Steaming Time		X				
Vessel Characteristics				X	X	
Gear Characteristics				X	X	
Target Species				X	X	
Biological Information				X		

Fishery-independent data

- Bottom trawl, dredge, and acoustic surveys
- Cooperative surveys
- Protected species surveys
- Ecomon plankton and larval surveys

Ecosystem data

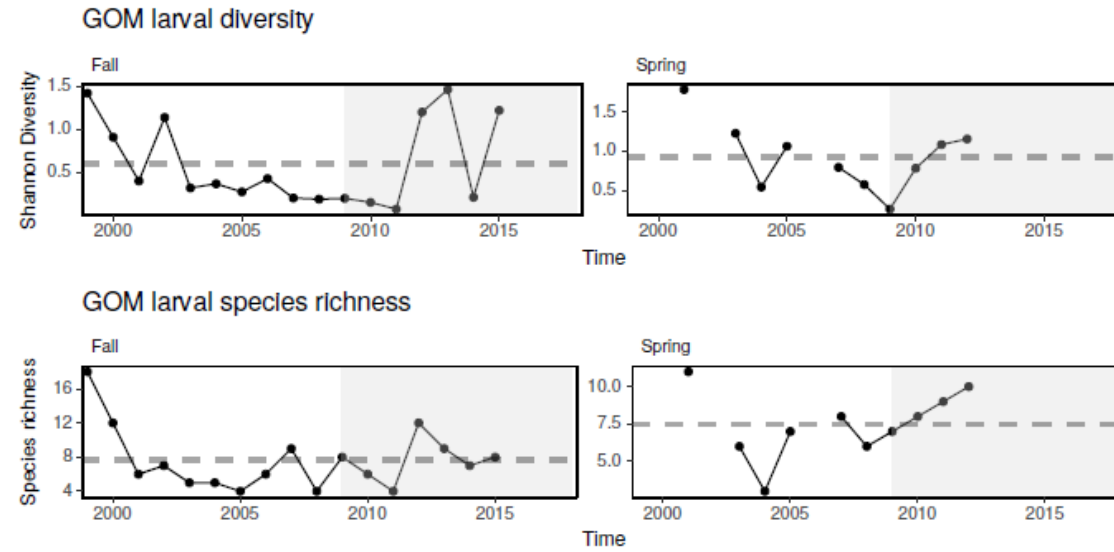


Figure 24: Larval diversity indices from ECOMON surveys in the Gulf of Maine.

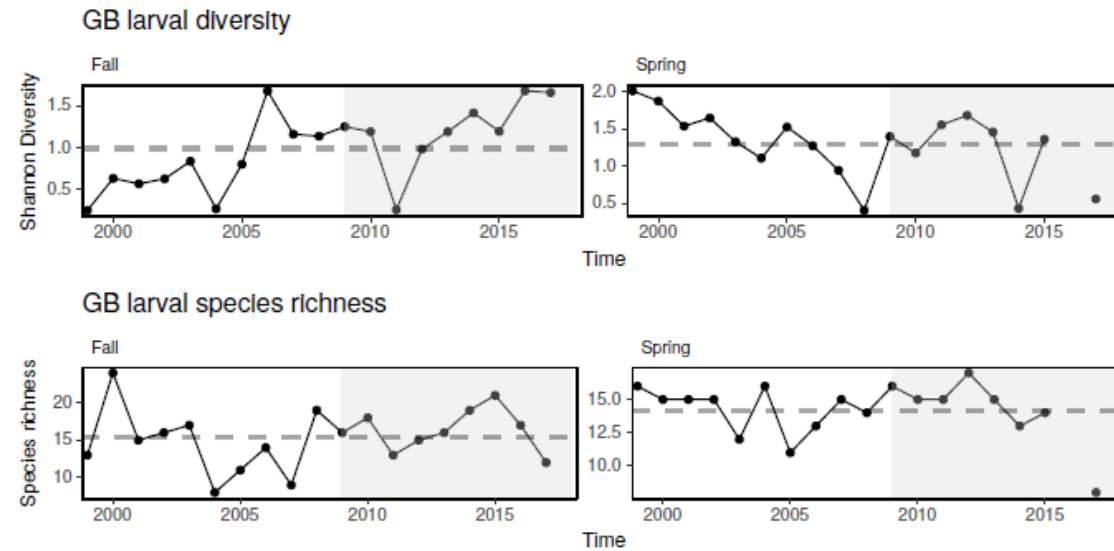


Figure 25: Larval diversity indices from ECOMON surveys on Georges Bank.

Research

- Consumption to parameterize predator-prey relationships in food-web models
- Habitat role and function, effects on prey productivity
- Continued improvement in socio-economic indicators

PDT discussion document

Catch monitoring, data collection, and ecosystem research

- Current data collection can support EBFM modelling, assessment, and management
- Verifiable data that accurately identifies what is happening in and on the water is essential for long-term sustainable management
- Increased participation by fishermen (and others) to enhance fishery, survey, and research data can increase capacity and improve transparency

Enhancements

Catch monitoring, data collection, and ecosystem research

- Modernize fishery dependent data collection
 - Real-time, verifiable, reliable
- Catch monitoring
 - Hotspots
 - Accountability
- Ecosystem data
 - Sampling a wider variety of habitats and spatial scale
 - Socio-economic indicators
 - Habitat and gear effects data

Enhancements

Catch monitoring, data collection, and ecosystem research

- **Ecosystem research**
 - Catchability studies
 - Food habits data and consumption estimates
 - Stock movement, mixing, and migration
 - Changes in habitat and the effect on stock productivity
 - Linkages between primary productivity, energy transfer, and biomass of higher trophic levels

Enhancements

Catch monitoring, data collection, and ecosystem research

- Ecosystem research (addition to 4e)
 - Fishery production is directly related to the amount of energy coming in at the base of the food web through phytoplankton production. Phytoplankton production is estimated using satellite observations and is calibrated using direct shipboard sampling when possible. Estimates of small- and large-celled phytoplankton production are currently used directly in the NEFSC Fishery Production Potential (FPP) model and in Ecopath with Ecosim (EwE). The FPP model uses externally-derived estimates of energy transfer efficiency. EwE production estimates can be used to internally estimate transfer efficiencies. Currently and EWE model is under development for Georges Bank and when available, these new estimates of transfer efficiency can be used in the FPP model.

Committee consensus

- 1) Accurate catch monitoring is important, regardless of whether stocks are managed singly or as an ecosystem, but there are no novel issues to be addressed in the eFEP. Removals by stock will still be needed to assess stock condition and evaluate the biological/energetic relationships among them.
- 2) Unbiased and accurate landing reports and discard estimates for commercial and recreational fishing will be needed and should be improved.
- 3) Maximum retention policies could improve catch estimation, but could come at a cost which may be mitigated through developing markets.

Committee consensus

- 4) Understanding the relationship between the survey abundance indices and stock trends is important and should be improved.
- 5) The use of catch and survey data in assessments and in management should be streamlined and transparent. Operating models should account for a range of time lags between data collection, assessment, and management response.
- 6) New or expanded types of environmental monitoring could improve our understanding and management of the ecosystem in a more adaptive and responsive way, but collecting these data have costs (which may be offset in other ways, such as less frequent sea sampling).

Committee reconciliation

- The EBFM Committee agrees with the PDT view that "While all monitoring and research programs have room for improvement, the Fishery Ecosystem Plan (FEP) can be implemented with the current data collection and analysis systems in place today on the US NE Shelf." It supports this view in the sense that shortcomings and limitation of current monitoring programs are risk factors that degrade the quality of stock assessments and monitoring under the current management regime, and these risks are not necessarily exacerbated by EBFM.
- However, in the process of formulating EBFM and evaluating it using MSE, the Committee expects specific data problems that are worsened by applying EBFM to be identified along with proposals for mitigating the problems. MSE is also a tool that might identify management approaches that are more robust to uncertainties in monitoring data than current management approaches.

Catch monitoring, ecosystem data, and research

- PDT draft –presented June 10
- Ecosystem management is achievable with existing data sources and sampling (catch monitoring, bottom-trawl surveys, economon, remote sensing, etc.)
- Improving precision, reducing bias, and improving timeliness promotes better estimation and adaptive management
 - But comes at a cost
 - Potential for cost tradeoff – electronic monitoring and sensing
- Active participation by fishermen and other marine activity participants
- Diet information for marine mammals, birds, and turtles
 - Factored into operating models and assessments