

**Report of the Peer Review Panel:  
Evaluation of Potential EFH Designation Methodologies in the Northeast Region of the U.S.  
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**Purpose:**

The purpose of the workshop was to provide an independent peer review of the science supporting potential EFH designation methods evaluated by the Habitat Evaluation Working Group (HEWG). The peer review panel evaluated the methods, conclusions, and recommendations provided in the HEWG reports and the individual presentations on the various methods given during the workshop. The peer review panel evaluation was based upon the terms of reference provided by the HEWG. This report addresses those terms of reference and provides responses with a focus that had three temporal levels of consideration: (1) methods that could be implemented in a very short (3-6 months) time period; (2) intermediate (6-18 months); and, (3) in the longer-term (18+ months).

**Terms of Reference**

At present, EFH as presented in the workshop is viewed in rather static, somewhat inflexible terms (i.e. 40-year averages of fish distribution and abundance). However, knowledge of both inter- and intra-annual variation in biological and physical processes indicates EFH can be dynamic in time and space; thus, the management focus will need to be adaptive.

**General Questions:**

*1. Were the methods evaluated a reasonable representation of potential EFH designation tools, considering that there are more tools than can be evaluated in a short period of time?*

The panel consensus was that the range of methods presented at the workshop were a reasonable representation of the methodologies currently available. The HEWG presented a succinct representation of the methods for delineating EFH and their potential performance. Given the short period of time the peer review group had to evaluate the methods, it was not possible for us to do an objective assessment of the relative performance of the methods. However, the panel feels that this does not present a constraint on moving forward. Our recommendations will provide a roadmap for the short, intermediate, and longer time periods. The hierarchy of methods offered presented a range of options depending on the data required and the amount of intellectual and physical effort to implement and interpret the methods relative to the needs of management for EFH designation.

## *2. Were the criteria for selecting methods/models for evaluation fair and followed?*

The panel feels the appropriate methods were presented, but given the time constraints of the workshop, the greatest difficulty the panel encountered was the lack of objective criteria with which to select candidate methods. As a result of these difficulties, the panel feels this process of EFH method identification is still in the early stages of development. This also applies to delineation of what constitutes habitat for each of the managed species.

### **General Questions for Methods**

In response to the method specific questions, the panel believes:

For the most part the methods were accurately described, but there was a general lack of uniformity in presentation of the methods and data treatments to parameterize each model. For example, in some cases fundamental details on data inputs and model performance were either omitted or not fully discussed due to time constraints. This made it difficult for the panel to objectively assess the relative value of each method for determining EFH, and to compare the performance of one method to another in meeting management goals. Thus the panel feels there is need for a more in-depth analysis of the methods so that an objective comparison of performance can be made.

### **Recommendations for the Roadmap**

#### **General Recommendations**

- Until a thorough cross-calibration exercise is completed with the candidate EFH methods, the panel recommends the application of a method(s) that requires the minimum assumptions for any species or life-stage in order to stay as close to the available data as possible and provide the least ambiguous interpretation.
- The framework for development and use of EFH methods must be consistent across temporal and spatial scales for comparative analyses, visualization and interpretation of processes.
- The focus on methodological development should move from EFH Levels 1 and 2 data to EFH Levels 3 and 4 data as fast as possible to be consistent with the ecosystem-based management mandate.
- Habitat variables could be enriched by expanded exploratory data analyses to include other abiotic (circulation, salinity, rugosity, turbidity, patchiness, etc.) and biotic (primary productivity, prey availability, predation, etc.) covariates.
- Prioritization of methodologies will be based on the number of assumptions (i.e. simple to complex) required to implement them. For example, Status Quo, to HSI, to GAM, to West Coast, etc. Further, the HSI as a concept is appropriate, but not as analytically powerful as other candidate methods. Therefore the panel recommends that methodologies that are quantitatively robust such as the GAMs should replace the HSI approach as soon as reasonable. However, we recognize there are sufficient analytical restrictions on the use of GAM models that some cases might require supplementation by an HSI type approach. In the short term, the West Coast model and bioenergetics methods will be difficult to implement given the apparent lack of available data and analytical requirements. The West Coast method may have greater utility in the longer-term, but the method and results need to be compared and rectified relative to other competing approaches using data of comparable time

and space scales. The panel also feels the spatial optimization methods (e.g. MARXAN) would likely be the downstream recipient of the outputs (e.g. spatial maps of presence-absence, density, and preference) from the comparative analyses and would likely be most useful in the delineation of EFH designations in single or multiple species contexts. The panel does not think GIS should be considered as a stand-alone analytical tool for EFH designation; however, GIS will be a fundamental component of EFH model development, implementation, and visualization.

- To satisfy simultaneous objectives of stock assessment and EFH designation by the fishery-independent survey mechanisms, it would be prudent to develop minimum mapping units for specific habitat types that could also be used as the basis for stratifying the sampling domain in resources surveys conducted by NEFSC and others.
- For each of the short, intermediate, and long-term recommendations, immediate and serious consideration must be given as soon as possible to fiscal and personnel requirements to accomplish these goals.
- The HEWG should continue to provide stewardship role to the iterative process of EFH evaluation and designation in the short and long-term. In the process the stewardship function provided by the HEWG will facilitate development of ecosystem-based methods. This approach would provide an integrated framework that would ultimately lead to ecosystem-based management.

### **Short-Term Recommendations**

- Improve the text descriptions in the Status Quo EFH methodology source documents to be more comprehensive of the habitats that the species utilize.
- The panel believes the utility of evaluating EFH designation for eggs and larval life-stages is questionable at this time and efforts should be focused on EFH designation for juveniles and adults.
- Develop a comprehensive sensitivity analysis strategy to compare the candidate EFH methods that involves the following:
  1. Data: An identification of those species that are sufficiently data rich such that all methods or models could be compared simultaneously in an objective manner (i.e. in space for selected areas, e.g. Eastern Georges Bank, Great Sound Channel, or New York Bight Apex; or in time for selected species, e.g. cod, Atlantic herring, summer flounder, redfish).
  2. Time and space scales: Give high priority to defining the appropriate minimum mapping unit (e.g. at present analyses use 10-minute squares).
  3. Species and life-stages: Develop the appropriate life history and population-dynamic contrasts for method comparisons (e.g., pelagic vs. demersal, fast-growing vs. slow growing, high mortality vs. low mortality).
- Improve the quality of the base maps (“habitat” layers) on which the methods analyses are predicated.
- Develop selection criteria for objectively assessing method performance. This will require a clearer articulation of management needs.

**Intermediate & Long Term Recommendations**

- Attention should be paid to temporal and spatial dynamics of fish distributions and “habitats.” For example, recast the data analyses to focus time on intervals (e.g. decades) in response to trends in climate, fishing impacts, shifting habitat, etc.
- Build a relational database that links data from fisheries, fishery-independent resource surveys conducted by various agencies, and biophysical “habitat” information (e.g. remote sensing, physical oceanography, etc.) across institutions, municipalities, states, and federal jurisdictions.
- Serious attention should be paid to revision of sampling designs based on the concept of EFH maps which provide clear covariates for survey stratification. Develop a strong focus on improving base maps and layers at both local and regional levels.
- Use operations research methods to assist in identifying criteria with which EFH is defined, but also to establish thresholds for management actions. Clarification of these definitions would allow greater flexibility in modeling EFH and management decision-making.
- Develop a strategy for improving methods in order to move from descriptive, statistical-based (collected data) presentations to mechanistic, model-based (parameter estimates) forecasts that support ecosystem-based management.

### **Addendum to EFH Peer Review Report**

Several email messages were exchanged with the peer reviewers at the end of July seeking clarification of their short-term recommendations.

Question:

Is it correct to presume that in the short term you are recommending the development of a strategy to evaluate the relative usefulness of the potential EFH methodologies, and that you are not recommending that we actually try to conduct and complete the intercalibration exercise within the short (3 month) time frame?

Answer:

CORRECT

Question:

In the event that it is not possible to successfully conduct to completion an intercalibration exercise in reasonable time, would you have more specific recommendations regarding the applicability of the methods?

Answer:

STATUS QUO SHOULD BE PURSUED, WITH POSSIBLE INCLUSION OF HSI TYPE INFORMATION, UNTIL INTERCALIBRATION OF MODELS IS COMPLETED.

Question:

Further clarification: do you mean pursue HSI as a stand-alone methodology, along with status quo, or to include "HSI-type information" in a modified/improved status quo, ie use HSI to tighten up the text descriptions? Or some other aspect of SQ?

Answer:

I BELIEVE WE MEANT FOR THE INFORMATION COLLECTED IN DEVELOPING AN HSI TO BE INCLUDED IN THE STATUS QUO APPROACH. WE DO NOT RECOMMEND HSI AS A STAND-ALONE METHOD.