New England Fishery Management Council
Habitat/MPA/Ecosystems Oversight Committee Meeting Summary

April 1 and 2, 2010
Boston, MA

Committee members:	David Preble (chair), David Goethel, Jim Fair, Doug Grout, Gene Kray, Terry Stockwell
Advisory Panel members:	David Wallace (chair), Gib Brogan, Ben Cowie-Haskell, Greg DiDomenico, Allyson Jordan, Geoff Smith, Ron Smolowitz, Richard Taylor, John Williamson
PDT members:	Michelle Bachman, Jennifer Anderson, Chad Demarest, Kathryn Ford, Brad Harris, Tom Hoff, Mark Lazzari, David Stevenson
Council staff:	Michelle Bachman (PDT chair), Chris Kellogg
NMFS staff:	David Stevenson (PDT), Jennifer Anderson (PDT)
Others:	Rick Robins (MAFMC Chair), < 10 additional audience members

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April 1

The meeting commenced at 9:30 a.m. with an introduction from the Chair, who noted that the SASI model is an enhanced decision-making tool, and that the goal of the meeting was to come away with a suite of alternatives for minimizing the adverse effects of fishing on EFH. Before a staff presentation on current EFH measures, everyone at the meeting briefly introduced themselves.

Review of existing EFH-related management measures

The first topic was a review of the MSA and EFH Final Rule requirements, and also the current measures directly or indirectly intended to reduce the adverse effects of fishing on EFH (see Document 5). Measures that were developed more or less directly for habitat benefits include various habitat closure areas, and restrictions on roller gear. Indirect measures include other area closures, overall reductions in fishing effort, and rotational scallop management. The concept of levels of closure was introduced. Whether or not the specific levels nomenclature is useful, it is worth remembering that restrictions in a particular spatial management area may apply to one or more gear types, or for different gear configurations within gear types. The status quo will be more clearly defined by staff in the short term for the omnibus EIS, and may include measures implemented by the MAFMC, such as the tilefish GRAs.

In thinking about the status quo, advisors Ron Smolowitz and Richard Taylor emphasized that there might be unintended consequences of area closures. Mr. Taylor acknowledged two broad

goals of the habitat process, habitat protection and maximization of production, and emphasized that we need to consider what our baseline conditions are, that it is difficult to know when we have done enough, and also that it is difficult to measure whether our actions are successful. He also noted that at the time (during development of Amendment 13), the Council 'did what it had to' regarding EFH, given the existence of the groundfish closures, but that some of these areas may not be ideally suited as habitat closures due to their substrate composition, and wondered if increased flexibility is possible now. Staff responded that updating habitat closures as warranted based on new data was certainly the goal.

Next, individual habitat closure areas were presented via a series of slides. Staff clarified that elimination of the scallop habitat closure areas is being proposed in Scallop Amendment 15.

Staff outlined the four goals of the omnibus EFH amendment:

- Identify all major fishing threats to the EFH of those species managed by the Council
- Identify and implement mechanisms to protect, conserve, and enhance the EFH of those species managed by the Council to the extent practicable.
- Define measurable thresholds for achieving the requirements to minimize adverse impacts to the extent practicable
- Integrate and optimize measures to minimize the adverse impacts to EFH across all Council managed FMPs

Audience member Greg Cunningham (Conservation Law Foundation) asked for clarification about the third point, and committee member David Goethel responded that one way to think about the issue of thresholds is in relation to natural disturbance, i.e., if adverse effects due to fishing do not exceed those due to natural disturbance on a particular time scale, then you are below the threshold.

Staff reminded the group about how adverse effects are defined, which relates directly to the question of thresholds. From the EFH final rule, "Councils must act to prevent, mitigate, or minimize any adverse effects from fishing, to the extent practicable, if there is evidence that a fishing activity adversely affects EFH in a manner that is more than minimal and not temporary in nature."

Area closures, gear modifications, and effort reductions are three tools that can be used to address the impacts of fishing on EFH. In relation to the use of effort reductions as a management tool, Greg DiDomenico wondered whether previous effort reductions in NEFMC-managed and other fisheries will be counted towards meeting adverse effects minimization goals. Staff and the PDT responded that past and future shifts in effort will certainly be considered, and that non-NEFMC-managed bottom tending gear types are modeled in SASI. This is one of the purposes of putting fishing effort in like terms of area swept between gear types in the SASI model.

There was a brief discussion of the final rule language that adverse effects may be "individual, cumulative, or synergistic consequences of actions". SASI can be used to model cumulative effects in the sense that adverse effects for all gear types are represented in the same units (km^2), and can be added together. The cumulative effects can be decomposed by location, year, gear type, etc, to answer particular questions. However, the science is uncertain regarding the additivity of effects resulting from multiple (possibly spatially and/or temporally overlapping) fishing events, such that the cumulative effects determinations are inherently uncertain.

Regarding potential future updates to the model, someone asked what is meant by 'new data'. The PDT responded that this might include substrate data; information on fishing effects, susceptibility, and recovery; information on the type or distribution of structural habitat features; and new or more highly resolved fishing effort data.

Mr. Taylor asked what functional value is; i.e. what makes a particular area useful habitat for a particular species, and noted that this is probably the key question. Mr. Goethel wondered if the discussion was already getting too political. Staff responded that this is an important question, and emphasized that a primary assumption of the model is that the removal of structural habitat features by fishing gear constitutes an adverse effect to EFH. Unfortunately, at this time, we are unable to make more specific links between most species and the functional value of particular habitats.

Review of SASI model structure and inputs

Next, staff presented a review of the Swept Area Seabed Impact model (document 6), starting with the vulnerability assessment (detailed in document 1). During the presentation of the susceptibility/recovery scoring methods, Advisor John Williamson asked if there is a simple way to understand how the PDT made determinations about functional value/loss of functional value. PDT member David Stevenson explained that the structural value of habitat relates to shelter for smaller fish, shelter for the prey of larger fish, structure for egg laying, etc. PDT member Chad Demarest noted that the metric evaluated as the team was filling in S/R matrices was not functional value per se, but rather, loss of structure. He noted that susceptibility could be more accurately defined to be the percentage of features encountered by a pass of a particular type of fishing gear that have their functional value reduced.

Mr. Taylor questioned the lack of difference in S/R scores between scallop dredges and otter trawls, and questioned whether this was the correct assumption to be making, even if a difference between the two was not supported by the literature. Mr. Demarest emphasized that, given the same S/R scores, contact indices can be used to differentiate between gears. He also noted that the review was designed to be traceable. The team spent an extensive amount of time discussing how gear interacts with the bottom, and how this might affect susceptibility scores and contact indices. Also, it should be noted that the S/R scores for trawls average across the doors, ground cables, and sweep. The hope is that pointing out these deficiencies will lead to further research.

Mr. Goethel noted that fishing with a particular gear type can be excluded from a particular substrate/energy type as appropriate, such that the S/R scores for that substrate/energy are not applied.

Across the board, the team found few differences in susceptibility and recovery between features/gears/energies etc. Advisor Ben Cowie-Haskell wondered about the general lack of difference between susceptibility and recovery in high vs. low energy environments, as he would have expected a larger difference in the scores. PDT member Jon Grabowski noted that the team was not saying with the vulnerability assessment analysis that such a difference couldn't exist, but only that the literature did not provide much support for such a difference. Mr. Goethel reiterated an earlier statement that different sets of structural organisms would occur in high vs. low energy areas, and noted that the statement about differences between high and low energy may be misleading, and should be explained more clearly in future documents/presentations.

After lunch, the group discussed the methods for integrating vulnerability assessment results with effort and substrate/energy data in the spatial SASI model (this is detailed in document 2). One specific question related to the estimation of area swept for fixed gears. This was calculated as the length of the gear (gillnets stretched out) multiplied by one meter. The one meter measurement was intended to account for any and all gear movement across the seabed during setting, soaking, and hauling. There is substantial room for improvement in these models, but there was no empirical data on which to base the gear movement assumptions.

The process of modifying fishing effort by S and R is described in section 7 of document 2. Briefly, the area swept for each fishing trip is reduced initially according to the contact index, and then further reduced according to the appropriate susceptibility scores, with the greatest reduction for low S scores. Scores are taken from the appropriate gear/substrate/energy matrix. In a given 100 km^2 cell, if multiple substrate and/or energy types are present, the S scores are used on an area-weighted basis according to the underlying unstructured grid. As each S score corresponds to a range of % reductions in the feature, the actual % incorporated into the model was chosen at random from an appropriate distribution of values. Starting in the second year, the area swept corresponding with that fishing trip is reduced at a rate corresponding with the appropriate set of recovery scores. Again, random values are selected from within a range. This decay may occur over up to ten years if R=3 recovery scores are inferred to some portion of that grid cell.

Advisor Geoff Smith reiterated an earlier question about how the recovery rates are implemented in the model. The PDT emphasized that the annual amount of recovery occurs instantaneously. Mr. Taylor wondered if tows are overlapping, how you get to the real patchiness of fishing effort in a grid cell. Mr. Demarest noted that this can be addressed by linking VTR, VMS, and observer data (this won't be done comprehensively as part of the SASI model analysis, however). In response to a question from Mr. Williamson, he also pointed out

that because tows are additive, more than 100 km^2 of area swept can accumulate in a 100 km^2 grid cell.

The presentation continued with a review of assumptions, strengths, and weaknesses of SASI. Related to one of the listed limitations, Mr. Smolowitz raised the concern that the model does not consider seasonal differences. Also related to the time step at which the model is run, Mr. Goethel wondered how outputs might not accurately reflect pulse fishing events. Staff responded that outputs may be biased somewhat. For example, take two fisheries with the same spatial distribution and magnitude of effort, but in one fishery all fishing occurs in January, and in the other fishery, effort is spread out throughout the year. For the pulse (January) fishery, assuming no additional effort in the area, recovery will, in reality, start in February. However, the area swept values associated with that fishery won't begin to decay in the model until the following January. Thus, for a pulse fishery that occurs early in the year, the duration of any adverse effects may be overestimated.

Mr. Goethel also wondered what size of difference in two Z outputs is meaningful. Mr. Demarest noted that we have not really defined 'more than minimal' and 'not temporary', and that this is a policy call, given scientific advice. He noted further that fishing, and resulting adverse effects on EFH, are going to accumulate somewhere – the important thing is to identify where it should occur, given EFH and other considerations. He stated that one difference between this process and the A13/A10 process is that the current analyses will attempt to identify the best areas to close, using the simulation models. However, one important consideration external to the model and its inputs is how much harvestable resource is in a particular cell. This will be reflected to some extent in the realized area swept and Z outputs. Mr. Smolowitz noted that given a fixed catch, the question is what is the best way to harvest that catch, and that answering this question requires consideration of bycatch, yield per recruit, economics, habitat, etc. He noted further that, with the exception of unusually vulnerable areas, habitat benefits will be greatest when catch per unit of effort is high.

Review of SASI model outputs

Next, the group reviewed Swept Area Seabed Impact model outputs (documents 4 and 7). The group started with a rather protracted discussion of the simulated maps. The simulated maps show the interplay between the S and R scores and the underlying distribution of substrate and energy, specifically the percentage of the total Z that accumulates after 11 years in each cell. Advisor Gib Brogan asked whether it was inappropriate to compare between simulated maps for different gear types. Mr. Demarest responded that you can compare the magnitudes of the simulated outputs, because there is 100 km^2 of swept area in every grid cell, however, it is important to keep in mind that 100 km^2 of trap effort means something different than 100 km^2 of trawl effort. However, because the maps prepared for the meeting show the percentage of total Z, and not absolute Z, and the range of values is not the same for all gear types, such that the percentage color ramps don't mean the same thing for all gears. It was noted that for trawl gears, there is a difference of roughly 35 percentage points between high and low Z accumulating grid cells.

Next, the group moved on to the realized maps. These maps (currently available for all trawl gears combined, and scallop dredge gear) show the magnitude of both area swept and adverse effect in annual time steps. The map for any year shows both area swept from that year, as well as decaying area swept from previous years. Mr. Taylor wondered why the realized maps/layers start with 1996, and Mr. Demarest explained that this is because the VTR data were partial for 1994, and variable and acknowledged to be problematic for 1995. There was some discussion of the usefulness of VMS data, but it was emphasized that there is error associated with this data source as well, and that it is cumbersome to work with. At this time, given the resolution of the model outputs in general, the PDT recommends focusing on VTR data. Some of the advisors expressed concerns about the use of VTR over VMS data, noting that in some cases there have been issues with assigning VTR spatially, even at the statistical area level, and that if VMS data are available, they should be used as substantial expense was incurred to collect that data.

In terms of Z accumulating in closed areas in the realized maps, it was noted that this can result from both the averaging of VTR-based area swept over statistical areas, such that area swept is inferred to cells within closed areas. Also, this may result from adverse effects that do not recover within a year due to the inference of features with longer recovery times. It was also noted that some trips' location data placed them outside of the model domain entirely. These trips were averaged across the entire domain, such that all areas end up with some low level of area swept and thus adverse effect. This was determined to be preferable to excluding these data points entirely.

Finally, there was some discussion about next steps. Mr. Smith asked whether the model will be used to both estimate the impacts of future measures proposed in other contexts, i.e. in other plans, as well as to evaluate alternatives in the omnibus amendment. This dual purpose was confirmed by the committee chair.

The meeting adjourned for the day at approximately 4:30 p.m.

April 2

The meeting commenced at 9:00 a.m. with an introduction from the Chair. In the morning, the group discussed the application of model results to alternatives development. Document 3 (memo from the PDT to the committee and advisory panel) was used as a starting point for the discussion. This document presented the PDT's understanding of the committee's tasking from last October in terms of questions that could be addressed using SASI model outputs.

Question 1 from this document outlined one approach to evaluating the vulnerability of seabed within and outside current EFH closures. This work was not ready in time for the meeting, but the intention is to use the simulated outputs (i.e. independent of past fishing effort distributions) to estimate how effective the current EFH closed areas are in terms of

encompassing vulnerable habitats. The group wondered how the realized fishing effort information would be incorporated into the analyses, and the PDT responded that the first step will be to assess theoretical vulnerability, independent of actual fishing, and then layer realized or predicted levels of fishing effort/area swept onto the analysis in order to assess practicability of any proposals. It was discussed that the use of data layers that predict fishing will require assumptions to be made about the location of fishing and the amount of area swept that would occur, and that such assumptions would likely be made in conjunction with the species PDTs.

The PDT emphasized also that the adverse effects values (Z) can be analyzed statistically, which will help to inform the committee's decisions and reduce the need to evaluate map products visually. The PDT also reminded the group that the vulnerability assessment estimates whether seabed structural features in various substrate and energy environments are susceptible to particular gear impacts, and what is their expected rate of recovery; it is not appropriate to make wider inferences based on model results, for example, that the outputs can tell us something about the links between habitat and fish production rates. The PDT also emphasized that, thus far, one of the findings of the model is that the magnitude of area swept appears to have a greater influence on the resulting adverse effect values than the type of habitat being fished.

These comments led to a discussion of the relationship between high CPUE and habitat impacts. There were some concerns from the group that treating Z (adverse effect estimates) as a tradable quantity between different areas of the model domain might be inadvisable. In other words, additional information about particularly vulnerable habitats, and about catch rates, should be incorporated, and decisions should balance the two goals of protecting vulnerable areas while allowing for efficient capture of target species, while acknowledging the uncertainty and limitations associated with the model/analyses.

The Committee Chair reiterated that the PDTs first task should be to use the simulated model outputs to identify vulnerable areas, independent of realized fishing or current area boundaries. Mr. Brogan suggested that this analysis be used as a 'base map', onto which additional information would be overlaid. Dr. Stevenson noted that additional information, primarily economic information, will be incorporated into the process as required to assess practicability, once area-based alternatives are identified using the simulated outputs.

Since questions 2 and 3 were covered by the discussion summarized above, the group skipped ahead in the document to question 4, which was related to the development of alternatives intended to improve recruitment. Mr. Goethel asked whether or not there is a documented relationship between seabed structures and recruitment, noting that this information was probably not available. He wondered, for example, if you wished to protect spawning SNE winter flounder, how you might evaluate what their ideal habitat might be. Mr. Brogan reiterated the importance of considering recruitment issues, but reminded the group that the Council has limited ability to effect factors such as water quality, etc, outside of a consultative/advisory role.

Question 5 in the document and the related discussion related to the question of whether fishing is more efficient under one spatial management scenario than another. As noted in the document, efficiency could be an area closure scenario that allows for higher CPUE, higher catch value/revenue, or it could mean the smallest area that encompasses the most vulnerable habitat. Mr. Goethel agreed that efficiency was certainly a goal, but that other factors should be considered as well, such as the avoidance of spawning aggregations, or the relationship between vessel size and the fishing locations available to them.

Question 6 related to the relationship between features that are vulnerable and features that represent key features for certain managed species. While this question can be addressed using the model given some (large) assumptions about the features that are most important to particular species of fish, it seems unlikely that this analysis will be very productive in term of informing alternatives development.

Question 7 related to modifying the boundaries of area closures, given some management objective. Advisor Allyson Jordan emphasized the need to examine actual habitats to groundtruth whether or not modeled effects of fishing represent reality. Mr. Demarest emphasized that any changes to area boundaries should be viewed as an important research opportunity, and Mr. Preble agreed that this was a primary goal of the amendment. Mr. Cowie-Haskell suggested the SBNMS/WGOM area as a case study, as substantial scientific information about the area is already available, including comparisons of fished and unfished locations.

Finally, the group discussed gear restricted areas, question 8. (It is worth noting that all of the habitat closed areas are actually gear restricted areas, as none of them are closed to all gear types.) Representatives from the Mid-Atlantic Council noted that there are two sets of GRAs in their region related to tilefish and scup. There was further discussion about the assumptions you might make related to the inability of scallop dredges to fish in some substrates, and an explanation of how that would be implemented in the model. There was also some discussion about an anecdotal observation that ground cable lengths have increased in recent years – Mr. Goethel noted that this is expected to have some herding benefits for fish closely associated with the seabed, including flatfish and skates. Such lengths could potentially be capped, thus decreasing area swept, and presumably the associated adverse effects to EFH, for trawl gear.

Motions

After lunch, the committee made a series of motions to task the PDT. The analyses produced will be used by the committee at their next meeting to develop specific alternatives to minimize the adverse effects of fishing on EFH to the extent practicable.

Motion 1 (Grout/Stockwell). Evaluate the appropriateness of the current boundaries of the closed areas in obtaining the goals of the amendment[1] using the SASI model simulated runs 6/0/0

Notes on motion 1: Areas would be evaluated with respect to all gear types, using the appropriate simulated SASI outputs, as described in Document 3, Question 1. The intention of the motion was to examine all three sets of EFH closures (groundfish, scallop, monkfish), as well as the year-round groundfish closed areas, in terms of whether or not they encompass vulnerable EFH.

Motion 2 (Grout/Stockwell). Provide the committee with any suggested modifications to the boundaries of the existing closed areas that would better meet the goals of the amendment[1]. This includes suggestions of any new closed areas and elimination of any closed areas. 6/0/0

Notes on motion 2: The motion was intended to include gear restricted areas. As above, methods would be based on the approach outlined in Document 3, Question 1. As required, the PDT should use other information in forming their recommendations.

Motion 3 (Grout/Stockwell). Evaluate boundaries of existing or proposed HAPCs in obtaining the goals of the amendment. 6/0/0

Notes on motion 3: It was noted that some of the HAPCs are not within the SASI domain.

Motion 4 (Grout/Stockwell). Provide committee with any suggested modifications of the boundaries of the existing or proposed HAPCs that would better meet the goals of the amendment. This includes suggestions of any new HAPCs and elimination of any HAPCs. 6/6/0

Notes on motion 4: There was some discussion about the goals related to HAPCs, as listed in the final rule, which include importance, sensitivity, exposure, and rarity of the area. The status quo HAPCs, as well as those HAPCs proposed and approved by the Council in Phase 1, should each have been designated with respect to these goals, which may differ somewhat from those

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"Goals of the amendment", were specified prior to Phase 1:

- Identify all major fishing threats to the EFH of those species managed by the Council
- Identify and implement mechanisms to protect, conserve, and enhance the EFH of those species managed by the Council to the extent practicable
- Define measurable thresholds for achieving the requirements to minimize adverse impacts to the extent practicable
- Integrate and optimize measures to minimize the adverse impacts to EFH across all Council managed FMPs

goals related to habitat closed areas. Also, it is important to note that the HAPCs do not have fishing restrictions associated with their designation (although in practice, some of the proposed and existing HAPCs overlap in their entirety with some of the habitat closed areas). However, the areas will be evaluated as habitat closures under Motion 1.

There was debate as to whether it would be necessary/useful to retain an HAPC designation if the area were also designated as an area closure/gear restricted area, or as a coral protection zone. Mr. Cunningham recommended keeping the HAPC designation in such cases.

Motion 5 (Grout/Stockwell). In existing or potential closed areas use fisheries independent and fisheries dependent data to provide the committee with an analysis of areas of potential high abundance of harvestable size target species, such as scallops, cod, haddock, and flounders, or other species, where the benefits of fishing might greatly exceed the habitat costs.

Notes on motion 5: The PDT noted that this amounts to a practicability analysis, which would need to be completed in any event. Data such as catch weights and values were discussed; it was noted that an advantage of value is that it is fungible between gear types/fisheries, and also that value information is already compiled in the realized effort data layers. Mr. Williamson cautioned the group about associating dollar values with habitat. Rick Robins suggested that it might be more appropriate to ask the PDT to develop practicability metrics.

The following motion was substituted for motion 5:

Motion 5a (Grout/Stockwell). In existing or potential closed areas, provide the committee with an analysis of metrics to characterize the tradeoffs between habitat impacts and fisheries benefits 6/0/0

Mr. Demarest emphasized that this metric with involve Z (adverse effect) and value information, because this is the information available to the PDT. Committee member Doug Grout acknowledged this, but emphasized that he would like to understand what species/fisheries are driving value estimates, if this is the metric that is used.

Motion 6 (Goethel/Stockwell). Provide a list of potential appropriate sites to protect deep-sea corals. 6/0/0

Notes on motion 6: There was a brief discussion of whether this should be a joint action between the MAFMC and NEFMC. It was also noted that this motion was intended to include corals in the Gulf of Maine. Mr. Brogan expressed support for a precautionary approach.

The meeting adjourned at approximately 4:00 p.m.