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New England Fishery Management Council
50 WATER STREET | NEWBURYPORT, MASSACHUSETTS 01950 | PHONE 978 465 0492 | FAX 978 465 3116
John Pappalardo, *Chairman* | Paul J. Howard, *Executive Director*

MEMORANDUM

DATE:	December 1, 2009
TO:	Scientific and Statistical Committee (SSC)
FROM:	Council
SUBJECT:	Review of EFH Omnibus 2, Phase II, Analytical Tool (SASI) at 8-9 December SSC meeting

The Council is currently developing, in two phases, its Essential Fish Habitat (EFH) Omnibus Amendment 2. Phase 1 of this Amendment described and identified EFH for each managed species, reviewed the prey species consumed by each managed species, and reviewed non-fishing impacts to EFH. Phase 2 will include alternatives to minimize, to the extent practicable, the adverse impacts of fishing on EFH. To meet this goal, The Council's Habitat Plan Development Team has created an analytic tool, the Swept Area Seabed Impact (SASI) model, which integrates fishing threats with fish habitats so that the Council can better understand the severity of threats and vulnerability of habitats.

The SSC previously reviewed the SASI (then called the FiGSI) model on 18 March 2009, and generally concluded that the model represents the "best available approach to assessing the impacts of fishing on habitat", but that "critical elements of the analysis need to be revised" prior to use for alternatives development. They suggested that a revised methodology be reviewed by the SSC or other outside group prior to application. Thus, the Council requests that the SSC complete a second review of the SASI model during its 8-9 December meeting, according to the following term of reference, and provide feedback to the Council during the January 2010 meeting.

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Term of Reference for SSC review of the Omnibus Phase II analysis:

Evaluate the ways in which the Swept Area Seabed Impact (SASI) model can be used as a basis for crafting and analyzing alternatives to minimize to the extent practicable the adverse effects from fishing on Essential Fish Habitat.

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Adverse effects minimization is indicated when impacts to EFH are "more than minimal" and "not temporary in nature". As specified in the EFH final rule, the types of alternatives available to minimize the adverse effects of fishing on EFH include time/area closures, fishing effort reductions, and fishing equipment restrictions. These types of management alternatives are discussed in detail in Chapter 6 of the National Research Council's 2002 report entitled "Effects of Trawling and Dredging on Seafloor Habitat".

Because the SASI model allows for comparison between various gear types and its outputs are spatially referenced, it can be used to assess the vulnerability of current and proposed spatially specific management areas to particular gears. The SASI model allows for a review of past estimates of area swept, by gear type, in order to indicate the scale of recent effort reductions. Hypothetical fishing effort scenarios can also be evaluated using SASI, given assumptions about fishing location and number of tows and trips. Specifically, impacts on area swept resulting from changes to the degree in which particular gear types interact with the seabed can be predicted by modifying the contact indices.

The SASI methods and results document provides a full description of the model. The changes made to the model since March in the context of previous SSC concerns include the following:

1. Vulnerability assessment
    a. Literature review. In addition to the fishing impacts studies that were formally reviewed and coded in the database, various works related to the life histories and distributions of biological features were referenced.
    b. Matrix based evaluation of vulnerability
        i. Integrating biological habitat components into the model. At the time of the March review, only geological feature susceptibility and recovery was included in the model. Since then, structural biological features have been added to the vulnerability assessment matrices, and their susceptibility to and recovery from particular gear effects have been evaluated based on the results of the literature review. Geological and biological features are inferred to particular substrate and energy environments based largely on literature survey, informed by empirical data when possible.
        ii. Method for estimating feature-level susceptibility and recovery scores. As an interim approach for the March review, individual PDT member's susceptibility and recovery scores were averaged to obtain a single S and R score for each feature. This approach was replaced with a consensus-based approach, where small groups of 3-4 PDT members per gear type evaluated S and R for each feature, decided on a consensus value, and then brought these values forward to the entire team for approval.
2. Area swept models

a. Models for fixed gears were updated, and contact indices were refined with input from the Habitat Committee and Advisory Panel. Information about buoyancy and hydrodynamic lift, as well as information about footrope types, was considered when assigning both susceptibility values and contact indices, but neither were formally incorporated. Vulnerability and effort are both assessed at a tow-by-tow level, and the impact of multiple tows is assumed to be additive. While the PDT recognizes that cumulative impacts may be either greater or less than this additive approach, this fundamental assumption of SASI remains unchanged.

3. Spatial model

   a. Updates to model grids. The SSC had concerns about combining substrate data from different sources in a single unstructured grid cell when multiple data points feel within the previously specified minimum cell size of 3 km^2. The model grid has been updated such that substrate data are represented by the smallest unstructured cells possible, given the spatial distribution of sampling. Rather than assigning fishing effort to these small, unstructured grid cells, it is assigned to regular, 100 km^2 grid cells. Substrate- and energy-specific S and R parameters are then applied to fishing effort in the 100 km^2 grid cells in proportion to the area of the unstructured grid cells that fall within each 100 km2 cell. The previous approach relied on specifying a minimum unstructured cell size and did not employ a regular grid for fishing effort data. In addition, a 60 meter depth threshold was selected to distinguish between high and low energy environments. This is deeper than the 20 m threshold employed previously. Trawl survey hangs are no longer being used as a proxy for boulder habitat. Finally, additional substrate data have been added to the Gulf of Maine region of the model.

   b. Applying feature-level scores to scale and decay area swept estimates. Previously, S and R scores for each feature were combined into a single sensitivity parameter, which was then used to scale area swept. The current approach keeps S and R separate, using the S value to initially scale fishing effort and the R value to determine the number of years over which that effort decays. Both the percentage reduction and number of years are drawn from a distribution of values consistent with the S and R definitions.

Documents:

1. Memo
2. Swept Area Seabed Impact Model document