Science and Statistical Committee Report

Steve Cadrin, SSC Chair

April 2009

SSC Report Components

1. Scallop Amendment 15
   - Methods for socio-economic impact analysis.
   - Recommendations to Council (April 7)
   - Technical feedback to Scallop PDT (April 7)

2. Monkfish Amendment 5
   - Methods for determining Acceptable Biological Catch
   - Recommendations to Council (March 30)

3. Habitat Omnibus Phase II
   - Methods for evaluating effect of fishing on habitat
   - Recommendations to Council (March 26)
   - Technical feedback to Habitat PDT (March 26)

March 17-18 SSC Agenda

- Wednesday March 17
  - Opening
    - Eleven of fifteen SSC members in attendance
      - plus temporary member Dr. Robert Whitlach (UConn)
    - Annual Agenda
      - April 30-May 1
        - » Monkfish ABC recommendations
        - » Herring ABC methods
        - » Groundfish ABC methods
      - Ecosystem-Based Fishery Management Workshop
  - Scallop Socio-Economic Impact Methods
  - Monkfish ABC Methods
- Thursday March 18
  - EFH – methods for evaluating effects of fishing

Scallops – Methods for Socio-Economic Impact Analysis

- The SSC was asked to review the methods for the assessment of economic and social impacts for Scallop Amendment 15, including alternatives to address excess capacity in the limited access scallop fishery and provide more flexibility for efficient utilization of the resource through various stacking and leasing alternatives.

Scallops – Methods for Socio-Economic Impact Analysis

- Although much of the SSC's agenda is focused on providing acceptable biological catch recommendations associated with National Standard 1, National Standard 8 is no less important: "*Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities by utilizing economic and social data, in order to provide for the sustained participation of such communities, and to the extent practicable, minimize adverse economic impacts on such communities*."

Scallops – Fishing Power

1. Differences in fishing power among vessels should be considered in effort consolidation alternatives (e.g., permit stacking or leasing).

GRT	HP-GRT Group	Number of vessels	11	12	13	14	22	23	24	33	34	43	44	53	54	64
<50	11	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1
50-99	12	7	0.96	1	1	1	1	1	1	1	1	1	1	1	1	1
100-149	13	20	0.94	0.97	1	1	1	1	1	1	1	1	1	1	1	1
>=150	14	6	0.94	0.97	1	1	1	1	1	1	1	1	1	1	1	1
50-99	22	3	0.93	0.96	0.99	0.99	1	1	1	1	1	1	1	1	1	1
100-149	23	19	0.91	0.95	0.97	0.97	0.99	1	1	1	1	1	1	1	1	1
>=150	24	13	0.90	0.94	0.96	0.96	0.97	0.99	1	1	1	1	1	1	1	1
100-149	33	22	0.89	0.92	0.95	0.95	0.96	0.98	0.99	1	1	1	1	1	1	1
>=150	34	50	0.87	0.91	0.93	0.93	0.94	0.96	0.97	0.98	1	1	1	1	1	1
100-149	43	4	0.87	0.90	0.93	0.93	0.94	0.95	0.96	0.98	0.99	1	1	1	1	1
>=150	44	23	0.86	0.89	0.92	0.92	0.93	0.94	0.95	0.96	0.98	0.99	1	1	1	1
100-149	53	5	0.85	0.88	0.91	0.91	0.92	0.93	0.94	0.96	0.97	0.98	0.99	1	1	1
>=150	54	25	0.84	0.87	0.89	0.89	0.90	0.92	0.93	0.94	0.96	0.96	0.98	0.98	1	1
>=150	64	7	0.82	0.85	0.88	0.88	0.89	0.90	0.91	0.92	0.94	0.95	0.96	0.97	0.98	1
>=150	74	9	0.81	0.84	0.86	0.86	0.87	0.88	0.89	0.90	0.92	0.93	0.94	0.95	0.96	0.98

Scallops – Fishing Power

- The proposed fishing power adjustments are <u>conditional on the recent suite of regulations</u> that affect fishing power.
- If a reduction in fishing capacity is desired, fishing power adjustments should be re-estimated under alternative sets of regulations under consideration in Amendment 15.

GRT	HP-GRT Group	Number of vessels	11	12	13	14	22	23	24	33	34	43	44	53	54	64
<50	11	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1
50-99	12	7	0.96	1	1	1	1	1	1	1	1	1	1	1	1	1
100-149	13	20	0.94	0.97	1	1	1	1	1	1	1	1	1	1	1	1
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100-149	23	19	0.91	0.95	0.97	0.97	0.99	1	1	1	1	1	1	1	1	1
>=150	24	13	0.90	0.94	0.96	0.96	0.97	0.99	1	1	1	1	1	1	1	1
100-149	33	22	0.89	0.92	0.95	0.95	0.96	0.98	0.99	1	1	1	1	1	1	1
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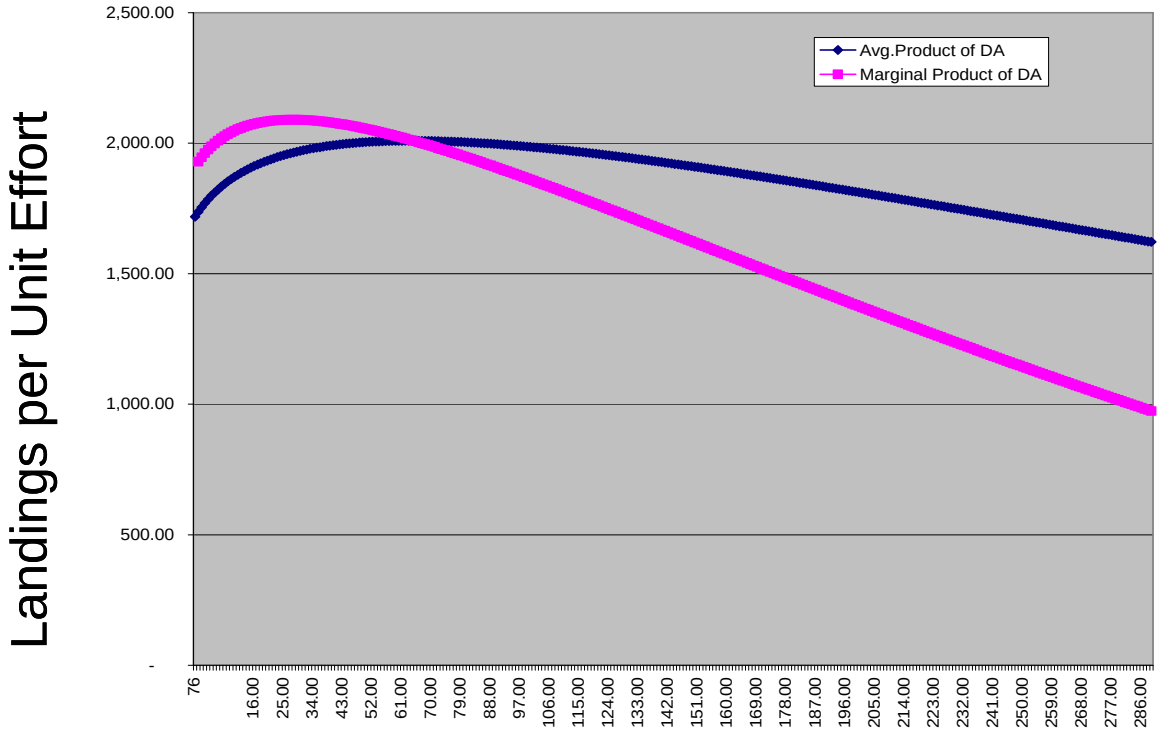
Scallops – Fishing Power

2. The positive relationship between catch rate and days-at-sea allocation should be further explored before incorporating the proposed ‘increased returns’ adjustment.

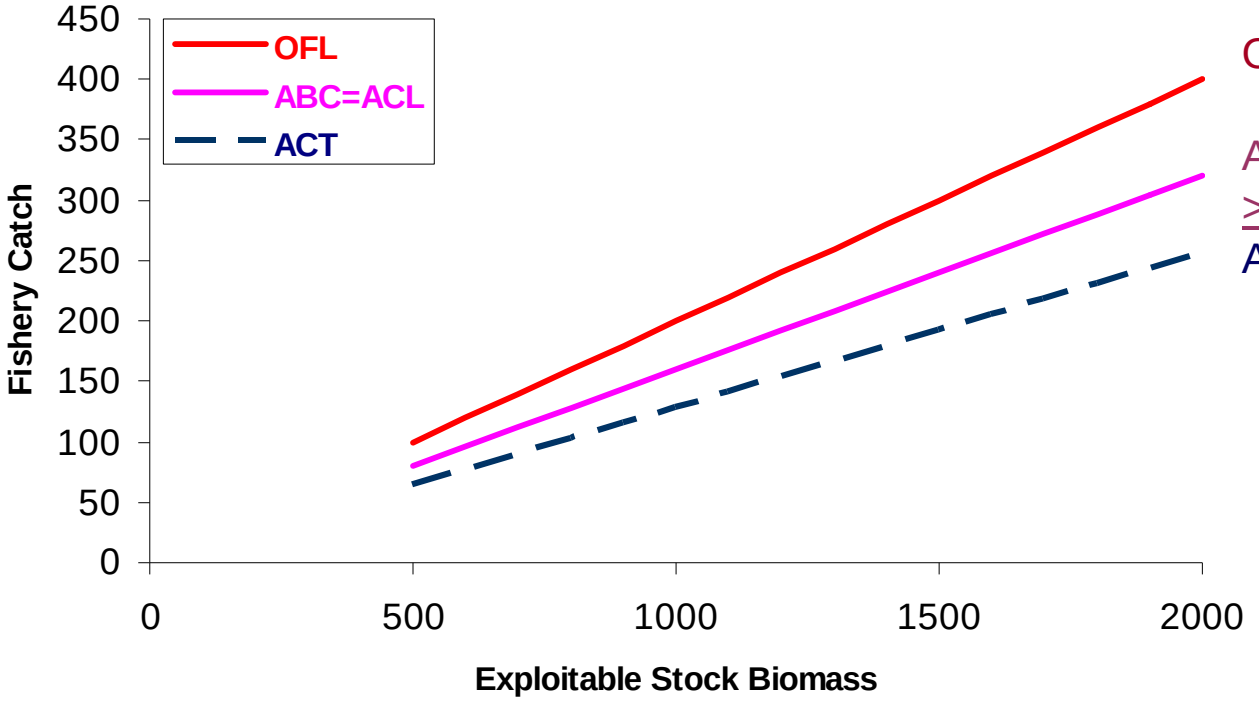


Scallops – Social Impacts

3. The scope of the social impact assessment should address several general issues, including:
   - preservation of traditional and cultural values,
   - cultural diversity,
   - community stability, and the livelihood of fishermen;
   - equity among user groups;
   - diversity among recreational and commercial users; and
   - the role of the fishing community in American culture and tradition.

Monkfish – ABC Methods

- Each Council shall develop annual catch limits for each of its managed fisheries that may not exceed the fishing level recommendations of its scientific and statistical committee or the peer review process.



OverFishing Level

Acceptable Biological Catch
≥ Annual Catch Limit
Annual Catch Target

Monkfish – ABC Methods

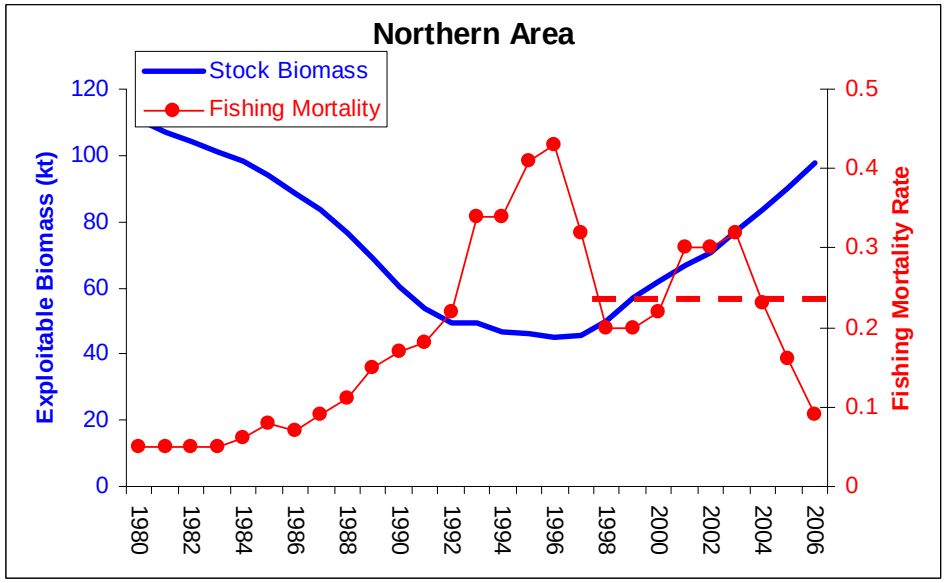
- The SSC was asked to review the Monkfish Plan Development Team's proposed methods for determining Annual Catch Limits according to three terms of reference:
  1. Review and provide guidance on the PDT's approach to setting reference points, including MSY, OFL, ABC and ACL.
  2. Review and provide guidance on the use of proactive and reactive accountability measures. In particular, the Council seeks SSC input on consideration of management uncertainty in setting the AMs.
  3. The Council seeks the SSC's guidance on an appropriate and reasonable range of assessment results that could be used to address the issue of the timing of the assessment.

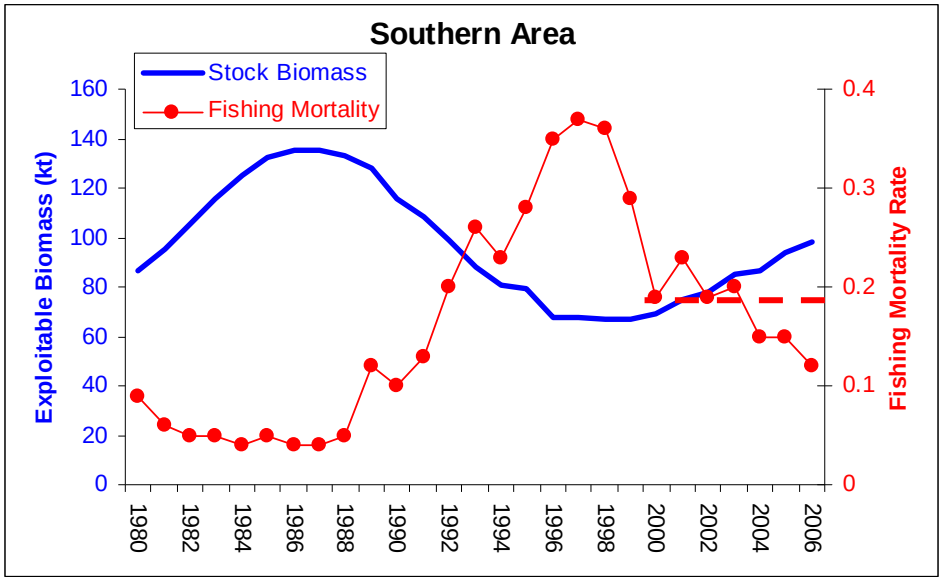
Monkfish – ABC Methods

- The 2007 Data Poor Stocks Workshop advanced the monkfish stock assessment as a basis for fishery management by developing an analytical model.
- Substantial uncertainty in the assessment influence both components of OverFishing Level of catch (OFL): the F_{MSY} proxy and stock biomass projections.
- Therefore, the SSC concludes that the information currently available for monkfish <u>does not support a conventional approach to determining OFL and Acceptable Biological Catch (ABC).</u>

Monkfish – ABC Methods

- The SSC recommends an interim method for determining Acceptable Biological Catch based on average exploitation rate during the recent period of increase in both management units and the most recent estimate or index of exploitable biomass.





Monkfish – ABC Methods

- The data-poor default method for determining interim ABC produces catch advice that is substantially less than the nominal OverFishing Level, but is not directly associated with overfishing.
- OFL is approximately 23,000mt for the north and 28,000mt for the south.
- The proposed method produces Acceptable Biological Catch of approximately 18,000mt for the north (78% of OFL) and 15,000mt for the south (52% of OFL).
- Although the interim ABCs are not derived as a function of scientific uncertainty, the reductions from OFL are consistent with data-poor situations.

Monkfish – ACL and ACT

- The PDT's proposal for Annual Catch Limit (ACL)=ABC is consistent with the National Standard 1 guidelines.
- A buffer between ACL and the Annual Catch Target (ACT) would help to avoid exceeding the ACL and reactive accountability measures.
- The magnitude of recent catch has low risk of exceeding the OFL or the proposed interim ABC.
  - In 2006, total catch was 7,187mt in the north (32% of OFL) and 9,561mt in the south (34% of OFL).
  - In 2007, total catch was ~5,400mt in the north (24% of OFL) and ~8,800mt in the south (31% of OFL).
- Any reduction in the magnitude or rate of discards would reduce both scientific and management uncertainty.

Monkfish – ABC Methods

- **SSC Recommendations:**

1. The SSC endorses the proxy reference points for F_{MSY} and B_{MSY} as well as the estimate of stock size derived by the 2007 Data Poor Stocks Workshop. However, considerable uncertainties in the assessment model preclude its use to determine probability of exceeding the projected OverFishing Level of catch (OFL).

2. An interim Acceptable Biological Catch should be derived as the product of the average exploitation rate during the recent period of stable or increasing trend in biomass for each management unit and the most recent estimate of exploitable biomass. Therefore, the method of determining ABC should be considered an interim proxy until Overfishing Level of Catch and its uncertainty can be projected.

3. Catch targets should be less than the interim ABC to avoid reactive accountability measures.

EFH – Fishing Impact

- *Evaluate the sufficiency of the Fishing Gear Seabed Impact (FiGSI) model as a basis for crafting and analyzing alternatives to minimize to the extent practicable the adverse effects from fishing on essential fish habitat. Specifically, provide the Council with commentary on the adequacy of the following components:*

1. *Vulnerability Assessment*
   - *Is the literature review comprehensive and well developed?*
   - *Matrix-based evaluation*
     - *Is the assessment's matrix-based structure appropriate to its intended use?*
     - *Are the assessment results consistent with the published literature? In cases where results are extrapolated are these cases treated appropriately?*
     - *Are sources of uncertainty adequately carried forward from the literature review?*
2. *Swept Area Seabed Impact (SASI) Model*
   - *Is the model structure appropriate for its intended use?*
   - *Are the data inputs (fishing effort) characterized appropriately?*
3. *Spatial Model*
   - *Is the Critical Shear Stress Model appropriate for its intended use?*
   - *Are the substrate data inputs characterized appropriately?*
4. *Fishing Gear Seabed Impact (FiGSI) Model*
   - *Do the model results make sense in the context of fishery management decision making?*
   - *Are the uncertainties previously noted adequately addressed?*

EFH – Fishing Impact

- The SSC recognizes the challenges associated with the evaluation of adverse effects from fishing on essential fish habitat.
- The Habitat PDT includes members with diverse backgrounds and expertise, and we commend them for the compilation of information and methodological developments.
- Given the need for expertise in habitat impacts and recovery, Dr. Robert Whitlach (University of Connecticut) was invited to serve as a temporary SSC member for this review.
- The SSC will continue to correspond with the Habitat PDT on methodology for the EFH Omnibus 2 Phase II Analytical Tool.

EFH – Fishing Impact

- The Council's request was to focus on Phase II of the EFH Plan, the evaluation of adverse effects from fishing on essential fish habitat.
- The appropriateness of how EFH or Habitat Areas of Particular Concern (HAPC) are defined was not reviewed.
- The SSC felt that the PDT's general methodological approach to Phase II was consistent with Phase I in that it potentially includes all habitats within the Northeast U.S. EEZ for the evaluation of fishing effects.
- However, given the different objectives and methods used for Phase I and Phase II, results of vulnerability and sensitivity analyses may be different than HAPC determinations.
- The SSC also recognizes that the proposed methodology may not be appropriate for evaluating non-fishing impacts, because recovery expectations will vary according to the nature of the impact.

EFH – Fishing Impact

1. Vulnerability Analysis:

Gear type: trawl_generic_otter							
Features					**Recon**		
Dominant substrate class	Substrate subclass	Features		Effects	Literature considered	Mean S	Mean R high energy	Mean R low energy
Mud	Clay-Silt	featureless clay-silt		*resuspension, compression, geochem, excavation, mixing*	17, 92, 97, 119, 236, 277, 333, 335, 336, 338, 372, 406	2	1	1
		biogenic depressions	*fish, crab, lobster , scallop depressions*	*filling*		2	0	1
		biogenic burrows	*fish, crab, lobster burrows*	*filling, crushing*		2	0	0
		special case biogenic burrows	*clay pipes, tilefish burrows*	*filling, crushing, displacement*		2	2	2
		bedforms	*ripples*	*smoothing*		3	1	2
	Muddy Sand	featureless muddy sand		*resuspension, compression, geochem, excavation, mixing*	35, 97, 119, 236, 247, 313, 320, 330, 336, 360	2	0	1
		biogenic depressions	*fish, crab, lobster, scallop depressions*	*filling*		2	0	1
		biogenic burrows	*fish, crab, lobster burrows*	*filling, crushing*		2	0	1
		special case biogenic burrows	*clay pipes, tilefish burrows*	*filling, crushing, displacement*		2	2	2
		bedforms	*megaripples, waves*	*smoothing*		2	0	1
Sand		featureless sand		*resuspension, compression, excavation, mixing*	35, 43, 71, 92, 97, 120, 128, 141, 158, 225, 247, 291, 325, 330, 336, 360	2	0	1
		biogenic depressions	*fish, crab, lobster, scallop depressions*	*filling*		2	0	1
		bedforms	*megaripples, waves*	*smoothing*		2	0	1
	Granule-Pebble	granule-pebble		*burial, mixing, homogenization*	43, 71, 158, 225, 247, 336	2	1	2
		pebble pavement		*burial, mixing*		2	1	2

EFH – Fishing Impact

1. Vulnerability Analysis:

- While the literature review may not be comprehensive, it is an adequate basis for the development of analytical tools for evaluating adverse effects of fishing and associated uncertainty.
- The general matrix-based structure is appropriate for evaluating vulnerability, includes information on uncertainty and is consistent with the literature review.
  - The approach presented to the SSC only included the geophysical component of habitat.
  - The biological components of habitat, which have yet to be addressed, are essential elements for the evaluation of vulnerability, and they are necessary for implementation in the Omnibus Amendment.

EFH – Fishing Impact

2. The analytical approach of swept area of fishing effort is appropriate for evaluating seabed impact, but some modifications to the characterization of fishing effort should be considered to refine the method.

5.1.1.1. Demersal otter trawl

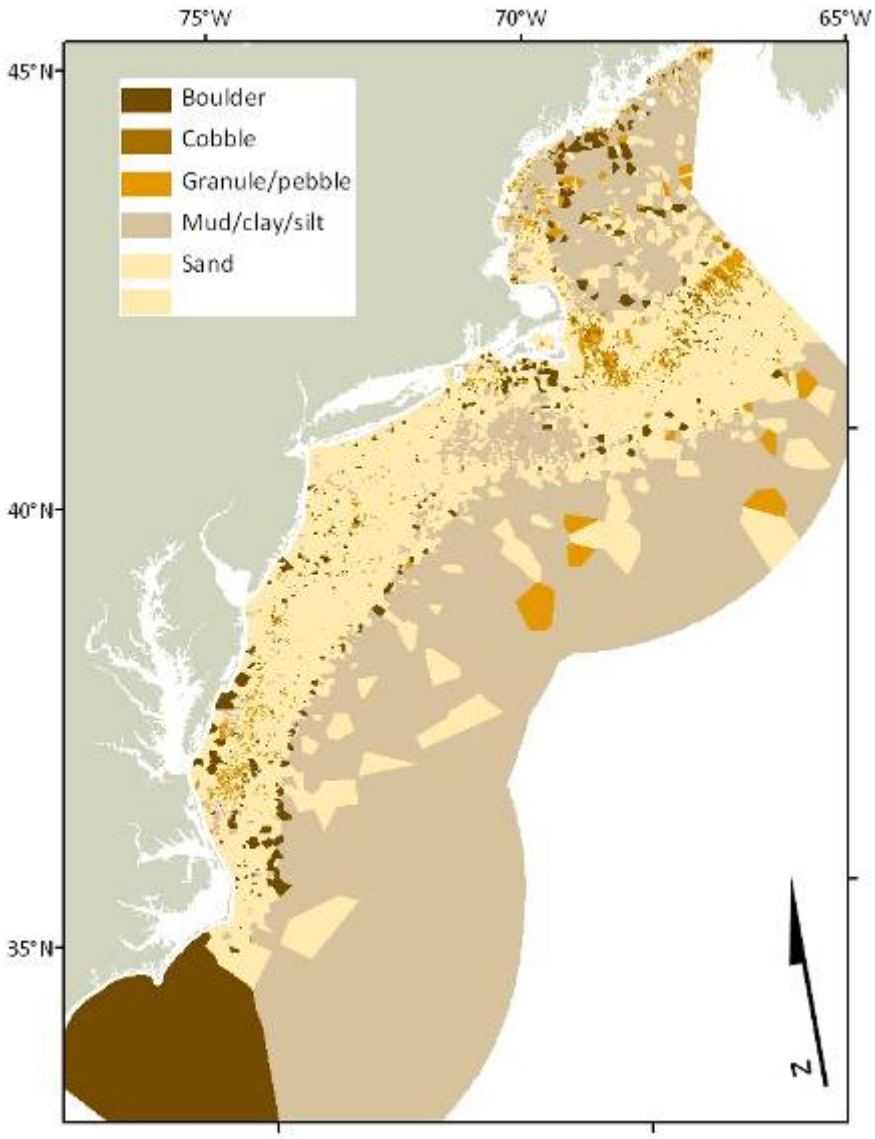
Swept Area Seabed Impact

$SASI\ (m^2) = d_t[(2 \cdot w_o \cdot c_o) + (2 \cdot w_c \cdot c_c) + (w_s \cdot c_s)]$

d_t	=	distance towed in one tow (m)
w_o	=	effective width of an otter board (m), which equals otter board length (m)·sin (α_o), where α_o = angle of attack (ranging from 30^o to 50^o)
c_o	=	contact index, otter board
w_c	=	effective width of a ground cable (km), which equals ground cable length (m)·sin(α_c), where α_c = angle of attack (ranging from 10^o to 20^o)
c_c	=	contact index, ground cables
w_s	=	effective width of sweep (m)
c_s	=	contact index, sweep

EFH – Fishing Impact

3. The general approach to the spatial analysis is appropriate to overlay habitat and fishing effort, but several methodological refinements are needed to more accurately characterize habitat, including analysis of heterogeneous data and the inference of energy levels from shear stress.

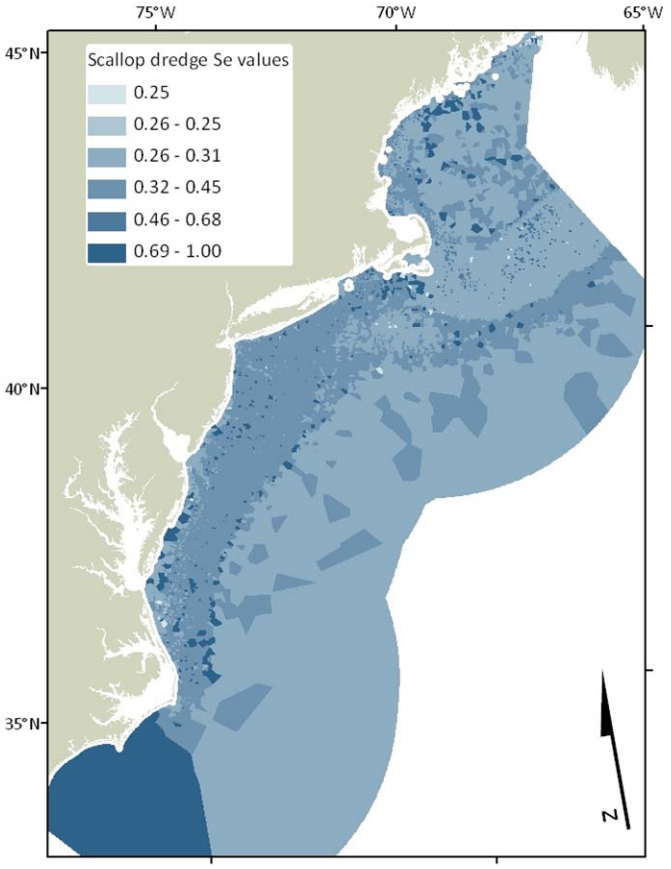


EFH – Fishing Impact

- Relative habitat effects can be evaluated for management alternatives:
  - Area swept of contact (‘*AS*’)
  - Sensitivity adjusted area swept (*AS* x *s*; *s* ranges 0 to 1)
  - Preliminary example of annual impact of the scallop dredge fishery.

	scallop dredge		
	Contact-Adj AS	*Sens. Ajd AS*	*Hrs Fished*
YEAR	22,247	7,959	347,088
1996			
1997	19,049	6,778	309,652
1998	19,456	6,916	300,829
1999	17,521	6,149	268,482

Figure 14 - Spatially-defined sensitivity (Se) values for scallop dredge gear.



EFH – Fishing Impact

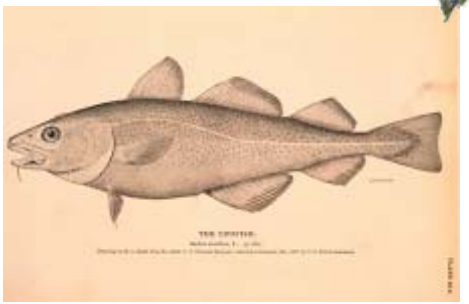
4. The proposed method for evaluation of impact of fishing on habitat has the potential to provide sensitivity-adjusted fishing areas for specific management alternatives.
   - A more formal and transparent method is needed for the derivation of the sensitivity criterion used by the model and its uncertainty as a function of susceptibility and recovery.
   - Higher spatial resolution of fishing effort is also needed.

EFH – Fishing Impact

5. The SSC concludes that the PDT's general approach provides the best available approach to assessing the impacts of fishing on habitat.
   - However, critical elements of the analysis need to be revised and the method needs to incorporate biological components before the methodology can be used to evaluate fishery management decisions.
   - A revised methodology should be reviewed by the SSC or an external peer review before being applied as the analytical tool for the EFH Omnibus 2, Phase II.

April 30-May 1 SSC Meeting

- Monkfish ABC recommendations
- Herring ABC methods
- Groundfish ABC methods



	Monkfish	ABC recommendations	J. Annala
	Herring	ABC Methods	L. Kaufman
30Apr-1May	***Groundfish***	ABC Methods & TMCG TACs	V. Crecco
	Monkfish	ABC recommendations	
22-Jun	***Herring***	ABC Methods	
Portland	***Groundfish***	ABC Methods & TMCG TACs	S. Cadrin
Jul	***Ecosystem-Based Management***		R. O'Boyle
		SSC Workshop & 'white paper'	