NEW ENGLAND FISHERY MANAGEMENT COUNCIL

Draft Example Fishery Ecosystem Plan for Georges Bank

prepared by the

Ecosystem Based Fishery Management Plan Development Team

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1.0 Executive Summary and Overview

This document describes a management approach, or operational framework, to conduct an evaluation of potential ecosystem management strategies using one or more operating models. The purpose of the document is to support evaluation of management procedures through Management Strategy Evaluation, described in Section ??? . This document describes the concept of ecosystem-based fishery management (EBFM) applied to a Georges Bank Ecosystem Production Unit (EPU). It defines the scope of what can be managed under a FEP, including the spatial extent, the species and stocks that can be managed, and the management jurisdiction of stocks and fisheries included in the FEP. The document gives examples of management procedures (i.e. a framework of catch limits for stock complexes, floors to prevent depletion of stocks, and allocations to fishery functional groups defined by fisheries that have specific characteristics and that catch co-occurring fish) that may be used to manage the EPU, as well as the scope of technical measures that can be utilized. The document also describes some operating models that can be used to evaluate candidate management procedures, as well as the model inputs (e.g. growth, survival, recruitment, trophic interactions, movement, etc.) that describe the potential states of the ecosystem.

For purposes of further analysis and discussion, this document lays out a description of an analytical framework for a Fishery Ecosystem Plan for the Georges Bank Ecosystem Production Unit as a proof of concept. It provides core elements of a Fishery Ecosystem Plan to set the stage for full development of an FEP. Further guidance from the council with respect to its objectives for EBFM will be required to enter the next phase of FEP development.

The approach is centered on developing management strategies for providing multispecies catch advice and explicitly testing those strategies on a simulated Georges Bank Ecosystem through a process of Management Strategy Evaluation (MSE). MSE comprises one or more operating models, candidate assessment methods, and potential management procedures for the system. Given a set of objectives defined by the NEFMC and interested parties and/or advisors, MSE can be used to compare the probable success of alternative management procedures.

This document provides details about the systems, models, management process, and context/rationale for the development of an ecosystem plan. The document is intended to be a starting point for further discussion and performance analysis. It sets the stage for the process to be followed in the development of the FEP based on the principles noted above. To prepare for the start of this process, the PDT has assembled existing information on the Georges-Bank Fishery Ecosystem and has worked with one candidate operating model to conduct exploratory analyses. Changes and adjustments to the operating model and how catch advice under the FEP are generated is to be expected based on essential stakeholder engagement meetings that will start this process.

The overall approach is to assign species to Species Complexes using a combination of feeding guilds, technical interactions with fisheries and other ecosystem components, as well as biological characteristics. The strategy would employ an overall Ecosystem Production Unit (EPU) catch cap based on the estimated energetics of the system and observed primary productivity (Section 5.1). Catch limits by Species Complex would be allocated to Fishery Functional Groups, but in aggregate should not exceed the EPU catch cap that would define overfishing (Section 5.2). Biomass ‘floors’ for stocks and stock complexes would be established to protect species from becoming unacceptably overfished or depleted (Section 5.2). These floors could be developed using survey information and could be based on a low percent of maximum stock size, considering the effect on risk and economic return.
The key elements of the approach described in this document include the objective specification of the spatial domain [Ecological Production Unit (EPU)] to be managed, the identification of Fishery Species Complexes defined by trophic interactions, with Fishery Functional Groups defined by co-occurrence in fishing gear within the EPU, and the critical role of management strategy evaluation in evaluating management options under consideration. It further requires the identification of Ecosystem Reference Points establishing limits and targets for management and methods for determining catch levels in an ecosystem context (See figure below)).

Consideration of energy flow and constraints on overall production in the system provide the foundation for the approach. Constraints related to patterns of energy flow and utilization and biological interactions within and between Fishery Species Complexes contributes to greater stability at higher levels of ecological organization.

**Elements of the proposed hierarchical process for specifying Acceptable Biological Catch levels for species within defined Fishery Species Complexes.**

Seventy-four species are commonly found in the Georges Bank EPU and have been assigned to Species Complexes (Section 4.3 and Table 17). In many cases, a catchability-adjusted swept-area biomass was estimated, but many species are also not well selected and sampled by trawl survey gear, but are trophically related.

This document describes three operating models, or ecosystem simulations, that have been applied to Georges Bank species (Section 6.0). The Hydra model is well developed and has been parameterized to include 10 most common species. The Atlantis and Ecosym/Ecopath (EwE) models are also described. They are more comprehensive and complex, but can potentially provide results for a broader range of objectives.
There are also several sections (Section 8.0, 9.0, and 10.0) toward the end of the document that focus on potential strategies for using the operational models and applying viable management procedures in this framework. They include a description of performance metrics and analysis including risk assessment, management strategy evaluation, and other related Fishery Ecosystem Plan (FEP) components.

Finally, Section 11.0 includes a summary and description of the Georges Bank EPU. In total, this document describes an operating framework and potential management strategies, but it is not the Fishery Ecosystem Plan itself. The latter would include additional features like strategic goals and objectives, as well as some broad management approaches. Much of this latter work raises questions when finished will help with the dialogue with and between fishermen, stakeholders, and managers.
2.0 Table of Contents

1.0 Executive Summary and Overview................................................................................................... 1
2.0 Table of Contents.............................................................................................................................. 4
2.1 List of Figures ................................................................................................................................... 6
2.2 List of Tables ................................................................................................................................ 7
3.0 Introduction ....................................................................................................................................... 9
4.0 Goals and objectives ....................................................................................................................... 12
4.1 Goals – measurable or desirable outcomes ...................................................................................... 12
4.1.1 Overarching Goal ..................................................................................................................... 12
4.1.2 Strategic Goals (Derived from Magnuson definition of OY as in Risk Policy Document): 13
4.1.3 Objectives - General description of how the FEP is designed to achieve goals ..................... 13
4.1.4 Strategic Objectives ............................................................................................................. 13
4.1.5 Operational Objectives (SMART: Specific, Measurable, Achievable, Relevant, Time-bound) 13
5.0 Overview of FEP framework .......................................................................................................... 14
6.0 Scope............................................................................................................................................... 15
6.1 Ecological Production Units .......................................................................................................... 15
6.2 Fishing Patterns in Relation to the Georges Bank Ecological Production Unit.......................... 16
6.3 Management Unit (or subunits) (MU) ........................................................................................ 22
6.4 Fishery Species Complexes ........................................................................................................ 22
7.0 Operational Framework .................................................................................................................. 26
7.1 Ecosystem Reference Points ........................................................................................................... 28
7.2 Catch Limits ................................................................................................................................ 29
7.2.1 Flexible allocation recommendations amongst MUs (accommodate effects of climate change) 30
7.2.1.1 Jurisdictional authority, cooperation and coordination ................................................... 30
7.2.1.2 Resource Sharing Among Management Units in an EPU............................................... 32
7.3 Overfished species and stocks..................................................................................................... 32
8.0 Management Strategy Evaluation................................................................................................... 35
8.1 Candidate Operating Models – strengths and weaknesses .............................................................. 37
8.1.1 Ecopath – mass balance ........................................................................................................ 37
8.1.2 Hydra ................................................................................................................................... 37
8.1.3 Kraken ................................................................................................................................ 37
8.1.4 Atlantis ............................................................................................................................... 37
9.0 Prototype Ecosystem-Based Management Strategy for Georges Bank .......................................... 37
9.1 Ecosystem reference points, control rules, and catch limits .......................................................... 38
9.1.1 Catch limits for total ecosystem removals and for stock complexes .................. 38
  9.1.1.1 Ecosystem Catch Cap ................................................................. 40
  9.1.1.2 Catch advice for stock complexes .................................................. 41
  9.1.1.3 Matching advice and methods to FEP goals and objectives ............... 45
  9.1.1.4 References .................................................................................. 46
  9.1.1.5 Methods Glossary ................................................................. 47

9.1.2 Overfished species and stocks ............................................................. 48

9.1.3 Special priority management ............................................................. 55
  9.1.3.1 Forage fish .................................................................................. 55
  9.1.3.2 Incentive-based measures ........................................................... 56
  9.1.3.3 Landings prohibition (e.g. thorny skate, smooth skate) .................... 56
  9.1.3.4 Area or gear restrictions ............................................................. 56

9.1.4 Estimate desired target and trophic balance (spectrum, forage needs); optimized species mix based on bio-economic portfolio analysis ................................. 56

9.2 Limited Access and Authorization to Fish .............................................. 56

9.3 Fishing impacts on ecosystem and spatial management ......................... 59
  9.3.1 Spatial management approaches ....................................................... 60
  9.3.2 Research needs ................................................................................ 61
  9.3.3 References ....................................................................................... 61

9.4 Non-fishing impacts on ecosystem .......................................................... 63

10.0 Performance metrics and analysis (unfinished material placeholder) .......... 63
  10.1 Management objectives ......................................................................... 63
  10.2 Risk assessment, participatory modeling .............................................. 64

11.0 Other Components of a FEP Performance Review (unfinished material placeholder) ........................................................................ 64
  11.1 Environmental Impact Statement (EIS) ................................................ 64
  11.2 Biological and environmental sampling .............................................. 64
  11.3 Research evaluation and prioritization ................................................ 64
  11.4 Cooperative and gear effects research ................................................ 64
  11.5 Complete catch accounting (including all fish, mammals, reptiles, and invertebrates) .............................................................. 64

12.0 Description of the Georges Bank Ecosystem .......................................... 65
  12.1 Benthic Habitats .................................................................................. 65
  12.2 Oceanographic Setting ......................................................................... 67
  12.3 Climate Considerations ........................................................................ 68
  12.4 Production Characteristics .................................................................... 70
  12.5 Georges Bank Food Web ....................................................................... 71
  12.6 Historical Fishing Patterns ..................................................................... 72
  12.7 Summary of characteristics and management status of species with the Georges Bank EPU ............................................................. 74
2.1 List of Figures

Figure 1. NEFMC managed species connected by predator-prey interactions based on Northeast Fisheries Science Center diet composition studies (see Smith and Link 2010 for a summary of methods and results). Connections between predators (red node) and their prey (green nodes) are shown for species pairs in which any predation interactions were recorded. .............................. 11

Figure 2. Proposed ecological subunits of the Northeast Continental Shelf including (1) Western-Central Gulf of Maine (GoM) (2) Eastern Gulf of Maine-Scotian Shelf (SS), (3) Georges Bank-Nantucket Shoals (GB) and (4) Middle-Atlantic Bight (MAB). White lines indicate boundaries between areas, including the designation of special areas at the edge of the continental shelf and in the immediate nearshore areas of the Middle-Atlantic Bight and the Gulf of Maine. .......... 16

Figure 3. Operational Otter Trawl fisheries encompassing part or all of Georges Bank: (a) Operational Trawl Fishery 1; (b) Operational Trawl Fishery 5; (c) Operational Trawl Fishery 8. For further information on these designated operational fisheries, see Lucey and Fogarty (2010) and Table 4.1 for dominant species in the catch of each operational fishery. .............................. 18

Figure 4. Operational Longline fisheries encompassing Georges Bank: (a) Operational Longline Fishery 1; (b) Operational Longline Fishery 2; (c) Operational Longline Fishery 3. For further information on these designated operational fisheries, see Lucey and Fogarty (2010) and Table 3.1 for dominant species in the catch of each operational fishery. .............................. 19

Figure 5. Operational Pot fisheries encompassing Georges Bank: (a) Operational Pot Fishery 1; (b) Operational Pot Fishery 2; (c) Operational Pot Fishery 4. For further information on these designated operational fisheries, see Lucey and Fogarty (2010) and Table 4.1 for dominant species in the catch of each operational fishery. .............................. 20

Figure 6. Operational Dredge Fishery 1 encompassing Georges Bank. For further information on these designated operational fisheries, see Lucey and Fogarty (2010) and Table 4.1 for dominant species in the catch of each operational fishery. .............................. 21

Figure 7. Potential Georges Bank EPU boundaries including special shelf, deeper water management areas north (yellow) and south (blue) of Georges Bank and Canada (purple). The data include observed bottom trawl commercial tows (2009, 2014) by port of landing and interpolated distribution of bottom trawl commercial landings revenue (2014). .............................. 22

Figure 8. Landings by Species Complex of species on Georges Bank 1964-2015. The vertical red line indicates the implementation of extended jurisdiction in 1977. The inset shows the landings from 1977-2015. .............................. 25

Figure 9. Estimated Species Complex biomass based on NEFSC fall bottom trawl surveys on Georges Bank, adjusted by the area swept by the trawl and corrected for survey catchability using estimates reported by Brodziak et al. (2008). .............................. 26

Figure 10. Elements of the proposed hierarchical process for specifying Acceptable Biological Catch levels for species within defined Fishery Species Complexes .............................. 26

Figure 11. Estimates of primary production (gC m-2 yr-1) for microplankton and nano-picoplankton on Georges Bank (Kimberly Hyde, NEFSC, personal communication) .............................. 29

Figure 19. Topography of Georges Bank and the Gulf of Maine .............................. 65

Figure 20. Sediment distribution on the Northeast US Continental Shelf. .............................. 66
Figure 21. Principal circulation features on the NES LME and adjacent offshore regions showing equatorward flow of shelf and slope waters and poleward flow of the Gulf Stream with a warm core ring depicted.................................................................67

Figure 22. Satellite image of fall surface water temperature patterns on the Northeast U.S. continental shelf. Cooler temperatures are represented by darker colors shading to blue. Warmer temperatures, such as those associated with the Gulf Stream are represented by the warmer colors shading to red. ...........................................................................................................69

Figure 23. Long-term mean annual sea surface temperatures on Georges Bank from the ERSSTv3b dataset..........................................................................................................................70

Figure 24. Annual mean primary production (gC m-2d-1) from microplankton (left) and nano-pico-plankton (right) ................................................................................................................71

Figure 25. Depiction of Georges Bank food web employed in the Link et al. (2008)........................................72

2.2 List of Tables

Table 1. Proportional species contribution to the identification of operational otter trawl, longline, pot and dredge fisheries encompassing Georges Bank. Black boxes represent a large contribution (>20%), grey boxes represent a medium contribution (~5-20%), light grey boxes represent a medium contribution (~1-5%).............................................................................................................17

Table 2. Key attributes derived from operating models of Georges Bank for the FEP ........................................36

Table 3. Summary of ABC control rules used in NEFMC Fishery Management Plans........................................49

Table 4. List of existing limited access permits and their characteristics that currently apply to fishing within a Georges Bank EPU........................................................................................................58

Table 5. Biological and trophic characteristics of Georges Bank EPU species..................................................74

Table 6. Species Complexes of Georges Bank EPU species..............................................................................80

Table 7. Summary of Georges Bank EPU biomass estimates (average of catchability-adjusted swept area biomass for the 2015 spring and fall bottom trawl surveys) for species often caught in the bottom trawl fishery.................................................................85

Table 8. Summary of Georges Bank EPU biomass estimates (average of catchability-adjusted swept area biomass for the 2015 spring and fall bottom trawl surveys) for species often caught in the mid-water trawl fishery. ........................................................................................................86

Table 9. Summary of Georges Bank EPU biomass estimates (average of catchability-adjusted swept area biomass for the 2015 spring and fall bottom trawl surveys) for species often caught in the sink gillnet fishery. ...........................................................................................................86

Table 10. Summary of Georges Bank EPU biomass estimates (average of catchability-adjusted swept area biomass for the 2015 spring and fall bottom trawl surveys) for species often caught in the bottom longline fishery.................................................................87

Table 11. Summary of Georges Bank EPU biomass estimates (average of catchability-adjusted swept area biomass for the 2015 spring and fall bottom trawl surveys) for species often caught in the pelagic longline fishery...............................................................................................................87

Table 12. Summary of Georges Bank EPU biomass estimates (average of catchability-adjusted swept area biomass for the 2015 spring and fall bottom trawl surveys) for species often caught in the pot fishery.................................................................................................................................88

Table 13. Summary of Georges Bank EPU biomass estimates (average of catchability-adjusted swept area biomass for the 2015 spring and fall bottom trawl surveys) for species often caught in the seine fishery ........................................................................................................................................88

Table 14. Summary of Georges Bank EPU biomass estimates (average of catchability-adjusted swept area biomass for the 2015 spring and fall bottom trawl surveys) for species often caught in the dredge fishery........................................................................................................89
Table 15. Summary of Georges Bank EPU biomass estimates (average of catchability-adjusted swept area biomass for the 2015 spring and fall bottom trawl surveys) for species often caught in the demersal recreational fishery. ................................................................. 90

Table 16. Summary of Georges Bank EPU biomass estimates (average of catchability-adjusted swept area biomass for the 2015 spring and fall bottom trawl surveys) for species often caught in the pelagic recreational fishery. ................................................................................................................... 91

Table 17. Summary of Georges Bank EPU biomass estimates (average of catchability-adjusted swept area biomass for the 2015 spring and fall bottom trawl surveys) for species often consumed by protected species. ................................................................................................................................. 91