Ecosystem-Based Fishery Management Communication tools

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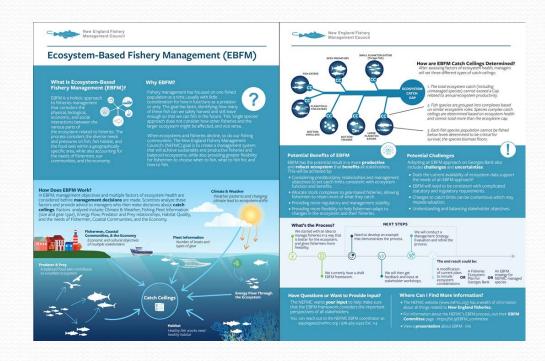
EBFM Plan Coordinator

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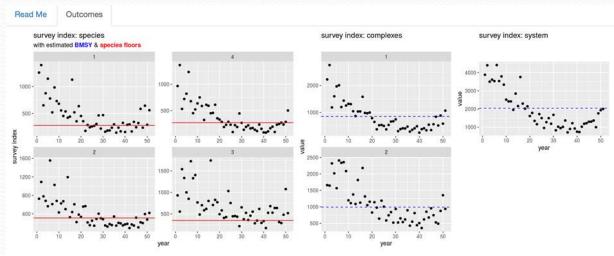
EBFM Communication Green Fin Studio

- Summary of stakeholder perspectives
 - 11 groups
- Brochures
 - 3 stakeholder focused, 1 guide to eFEP, 1 Glossary
- Two Infographics
 - Summary of EBFM and the Georges Bank Ecosystem
- Four presentation
 - An Introduction to EBFM, EBFM Science, the eFEP and Worked Examples, Catch Management Framework
- Introductory Video
 - Stakeholder Perspectives



EBFM Communication Worked Example Tools

- Description of Hydra Operation Model with Example Scenarios
- Kraken Visualization Tool
 - Example effects of biological interactions
 - Runs interactively
- Catch Framework
 Demonstration Tool
 - Application of floors and ceilings approach
 - Stock complexes
 - Runs interactively



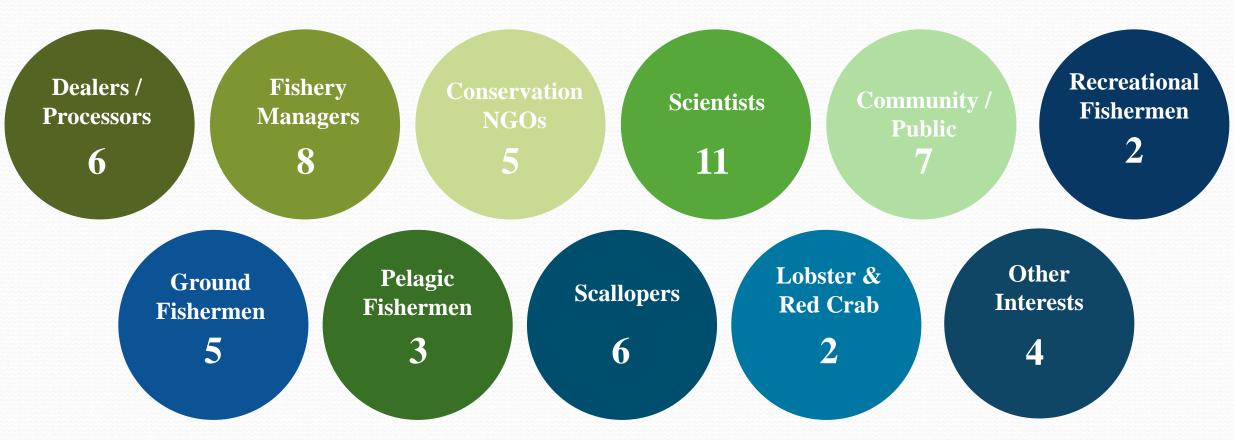
Neither stock complex has species assessed to be below the biomass floor, so F is not reduced.

| Complex | FMSY | BMSY | B_final | F/FMSY | B/BMSY | Catch a | t FMSY Floor I | multipl | ier | F | Catch at F | Ceiling | Advice |
|---------|----------|-------|------------|------------|--------|---------|----------------|---------|-----|-----------|------------|----------|--------|
| 1 | 0.15 | 1,786 | 1,523 | 0.68 | 0.85 | | 226 | | 1 | 0.11 | 170 | 474 | 170 |
| 2 | 0.14 | 1,122 | 1,100 | 0.48 | 0.98 | | 149 | | 1 | 0.10 | 111 | 474 | 111 |
| , | Assessme | | | | | | | | | | | 4.7.4. | |
| | Species | FMSY | BMSY | B_final | F/FMSY | B/BMSY | Catch at FMSY | E | C | atch at F | Ceiling | Advice | |
| | 1 | 0.15 | 983 | 913 | 0.73 | 0.93 | 141 | 0.12 | | 106 | 474 | 106 | |
| | 97. | | | | | | | | | | | | |
| | 2 | | 727 | 510 | 0.72 | 0.70 | 62 | 0.09 | | 46 | 474 | 46 | |
| | | 0.12 | 727 406 | 510 520 | 0.72 | 0.70 | 62 | | | 46 64 | | 46 64 | |

EBFM Communication

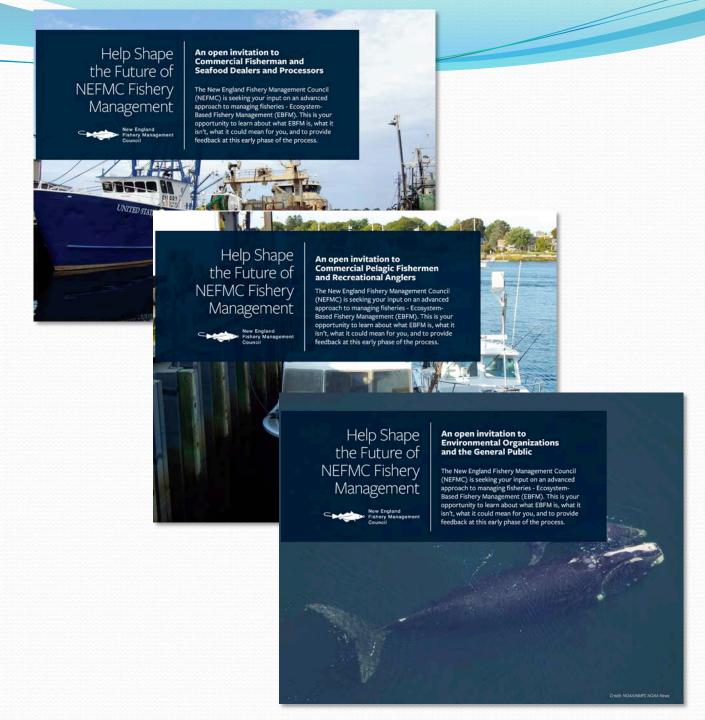
11 Stakeholder Groups Interviewed

Stakeholder categories and the number of individuals interviewed per category are shown below



Brochure-**EBFM Process**

- Written as an invitation to participate in the process.
- Three different versions:
 - Fishermen and Seafood Dealers & **Processors**
 - **Commercial Pelagic Fishermen &** Recreational Anglers
 Conservation NGOs & the Public
- Differences based on a "What does it mean for me?" section.
 - Potential benefits and concerns
 - Introduction to the other stakeholders.



BrochureGuide to the eFEP

- A description of the important parts of the eFEP
 - Why the eFEP was developed
 - Goals and objectives
 - Boundaries of the EPU
 - Harvest Management
 - How it comes together
 - Setting ceilings
 - Special priority management
 - Incentive-based measures
 - Fishing impacts and spatial management
 - Jurisdictional and limited access issues
 - Data
 - The MSE process

A Guide to the Example Fishery Ecosystem Plan for Georges Bank



The New England Fishery Management Council has developed a Draft Example Fishery Ecosystem Plan (eFEP) for Georges Bank to explain Ecosystem-Based Fishery Management (EBFM) for this region. We have prepared this Guide to the eFEP. It provides a review of the most important elements of the eFEP and will also refer you to relevant sections of the eFEP for additional information.

Why was the eFEP developed?

Scientists, managers, fishermen and stakeholders have long realized the problems associated with single species management, where harvest control rules are specified for a stock often ignoring the role of that stock as a predator or prey. Often the focus of management is to achieve Maximum Sustainable Yield as an attainable goal for a stock and simultaneously for all other stocks in the region. This approach may not be optimizing the non-fishing benefits to be achieved from the ecosystem or take into account how energy moves through the ecosystem in terms of impacts to the food web.



The process takes into account the diverse needs and pressures on fish, fish habitat, and the food web within a geographically specific area, while also considering the needs of fishermen, our communities, and the economy.

Why Georges Bank?

Georges Bank was chosen because a considerable amount of ecological science and modeling has focused on this distinct area. Scientists already know a lot about the Georges Bank ecosystem and fisheries and therefore have much of the information they need to understand how the system will respond to EBFM.

The New England Fishery Management Council is exploring the development and application of a new type of management for Georges Bank, commonly known as Ecosystem-Based Fishery Management, or EBFM. It is intended to be a more inclusive approach than standard fishery management. One that considers a variety of goals while taking into account factors including the physical, biological, economic, and social interactions between the various parts of the ecosystem that are related to managed fisheries.

Because EBFM is a new concept, the Council has chosen to start in a specific area where we have a lot of data and existing ecosystem models. The eFEP is therefore focused specifically on Georges Bank. The intent of the eFEP is to identify viable management approaches to achieve a range of goals and objectives. We will then work through a Management Strategy Evaluation (MSE) process with the goal of these management approaches becoming an approved Fishery Ecosystem Plan (FEP) for Georges Bank. If successful, similar FEPs could be developed elsewhere by the Council.

Brochure-**Glossary**

- 44 terms and phrases.
- Intended for a broad audience.
- Highly visual



EBFM Glossary of Terms



A group of simple photosynthetic organisms that are typically aquatic. Algae can range from single-celled organisms to seaweed. Also called phytoplankton.



Allowable Biological Catch (ABC)

The amount of fish, or catch, that may be safely harvested from a stock or stock complex. It is set by the Council through its Scientific and Statistical Committee.



Aggregate Production Model

Used to estimate production for stock complexes. These models are informed by catch and biomass or abundance estimates for the stock complexes. They do not directly account for the size or age of fish, but can be used to estimate maximum sustainable yield (MSY).



Apex Predator

Top level of the food chain. In the ocean, sharks, tunas and other billfish, whales and other marine mammals, and seabirds are often classified as an apex predator. People find abundant amounts of apex predators desirable for sport (recreational catch) and recreation (e.g. seabird and whale watching). Because they catch many species of fish and do not generally serve as prey in the oceans (although there are infrequent exceptions), humans are also considered to be apex predators in an ecosystem sense.



Benthic

Refers to the bottom habitat of the ocean and the animals that live there. For example, haddock and lobsters live on the bottom of the ocean and are therefore benthic species. Benthic species typically eat organisms buried in or on the seafloor, such as worms and mollusks. species that are considered as 'Benthos'.

o Related terms - demersal, pelagic



The total weight of living matter, generally measured within a specific area or volume. Biomass is usually calculated by species, stock, or other grouping. For example, the total biomass of cod or the total biomass of a stock complex.



Bycatch

Fish and/or other marine creatures caught by gear in addition to the target species of that gear and discarded, either dead or alive. Bycatch is often comprised of unmarketable or illegal fish, but also includes other animals such as dolphins, whales, sea turtles, and seabirds that become hooked or entangled in fishing gear.



Climate

Refers to the long-term minimums, averages, and maximums of temperature and precipitation that are characteristic of a particular region or area of water. This is different from weather which refers to the conditions of temperature and precipitation experienced on a day-to-day basis. In the ocean, we track trends in climate as averages of temperature, pH (acidity), salinity, and currents.



Catch

The total number of fish caught in a fishery in a given period of time. Catch is given in either weight or number of fish and may include landings, unreported landings, discards, and incidental deaths. Note that catch, harvest, and landings have different definitions.

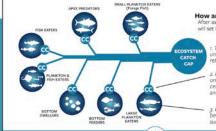
EBFM Communication Swhat is Ecosystem-Based Fishery Management (EBFM)? Infographics

- Defines EBFM and why it is being explored.
- Explains the main components of EBFM.
- Timeline for the process.
- Defines the boundaries of the EPU and why it was chosen for the eFEP.
- Management considerations
- What is being fished, how, and where?



Ecosystem-Based Fishery Management (EBFM)





How are EBFM Catch Ceilings Determined? After assessing factors of ecosystem health, n will set three different types of catch ceilings:

> . The total ecosystem catch (including anaged species) cannot exceed a Cap related to annual ecosystem productivity

on similar ecosystem roles. Species complex catch ceilings are determined based on ecosystem health and cannot total more than the ecosystem cap.

 Each fish species population cannot be fished below levels determined to be critical for survival, the species biomass floors.

Potential Benefits of EBFM

EBFM has the potential result in a more **productive** and **robust ecosystem** that **benefits** all stakeholder. This will be achieved by:

Stock complexes and gear types*

New England Fishery Management Council

allocated by fishery, defined by gear and/or other characteristics.

Atlantic Cod

Silver Hake

Summer Flounder

Winter Flounder

Witch Flounder

Yellowtail Flounder

American Plaic

Long-finned Squid Atlantic Herring

Haddock

Sea Scallop

Jonah Cral

American Lobster

Where are the stock complexes found?

The maps below show where the fish eater, bottom feeder, and plankton eater stock

comlexes (see table above) are found during spring on Georges Bank. These distribution

Mankfish Pollock Spiny Dogfish Winter Skate

Potential Challenges

WHAT? The table below shows some commonly caught species of fish on Georges Bank, sorted by stock complex, and the type of gear used to catch them. Target and bycatch (and non-target) species are indicated. WHY IS THIS IMPORTANT? In an EBFM framework, acceptable Biological Catch limits would be set by stock complex and



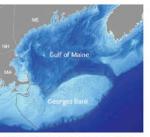
New England Fisher

The Georges Bank Ecological Production Unit (EPU)

Why Georges Bank?

Ecological Production Units are areas on the continental shelf that have unique characteristics of: bathymetry, bottom sediments, temperature, salinity, and primary production from phytoplankton. The boundaries of the Georges Bank EPU are defined by these unique characteristics and extend to the continental shelf on its east and south edges, to Nantucket Shoals on the west, and to the southern edge Gulf of Maine on

Georges Bank was chosen for the example Fishery Ecosystem Plan (eFEP) because a large amount of data has been collected and research conducted about the physical environment and fish and other animals that live there. In addition, computer models of the ecosystem have been researched and developed. Because managers and scientists are familiar with the ecosystem, it will be easier for them to predict how it will respond to a FEP.



The Georges Bank EPU is indicated by the grey outline on the map.

Management Considerations

Fisheries management on Georges Bank is complex due to vulnerable habitats, variety of fishing gear types used, and the fact the fish species caught there are managed by a multitude of agencies.



While the goal is to manage stock complexes at the EPU level, there may be a need to subdivide the EPU into smaller management sub-units based on vulnerable habitats and/or

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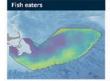
Jurisdictional Only 1/3 of species commonly caught on Georges Bank are managed by NEFMC. However, this accounts for 2/3 of the total finfish landings from

Management Options

Only set catch ceilings for species naged exclusively or jointly by

Develop a cooperative and ollaborative approach with other management agencies and set ceilings for the portion caught on

Petition for sole management of all stocks on Georges Bank.





*For a complete fit of the 78 species crugitt on Georges Bank, please see table 15 of the Draft Example Fishery Ecosystam Plan for Georges Back.
*Gand allow stocks are than other have misleral previously by on a other film stocks in an IPFU. Allowing their cereb, celling may be see forspecial completes, filmers that target stand ables stocked in where stock may be completed. Enforces that target stand allow stocked in havings.



Target O Bycatch



Working with existing limited access programs for commercial vessels, stock complex catch limits would be allocated to vessels that have existing fishing permits and a history of fishing in the Georges Bank EPU.

EBFM Communication Presentations

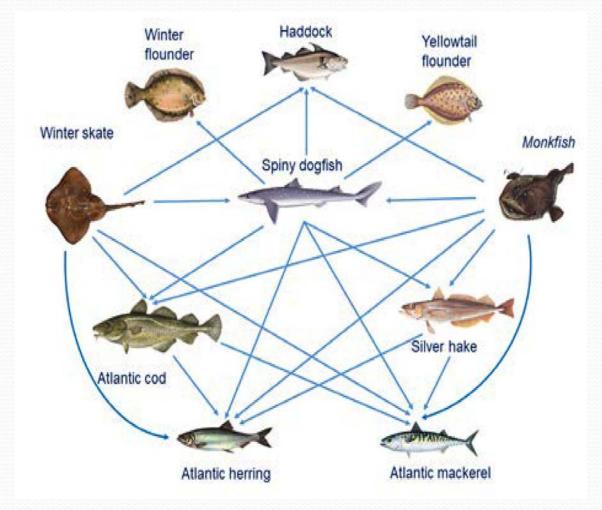
- Introduction to EBFM
- Science supporting EBFM
- An Introduction to the eFEP and Worked Example tools
- Catch ceilings and how they are determined





Phase III Worked Example tools

Description of Hydra Operating Model with example scenarios

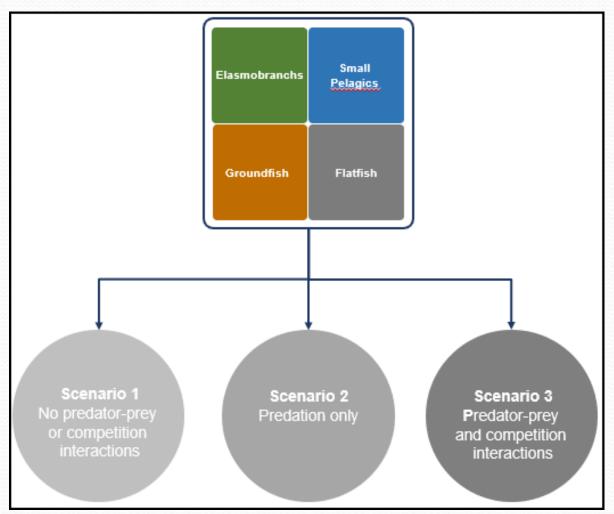


Phase III Worked Example tools

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Kraken visualization tool
Effect of biological
interactions

Catch frame work
domenstration tool
Application of floors and
cellings approach
Stock complexes



Phase III Worked Example tools

Descriptions of Hydra: Operating Model with example scenarios

Kraken visualization too Effect of biological interactions

Catch framework demonstration tool

Application of floors and ceilings approach
Stock complexes

