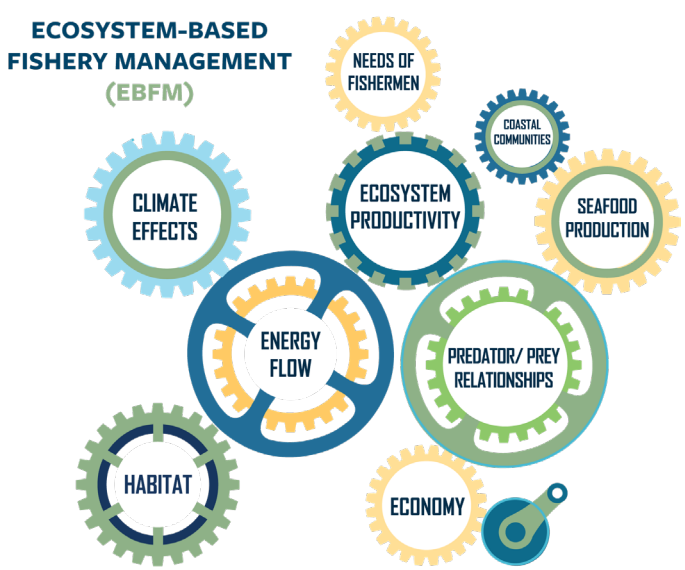
A Guide to the Example Fishery Ecosystem Plan for Georges Bank

New England Fishery Management Council

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.

What are the Goals and Objectives of the eFEP?

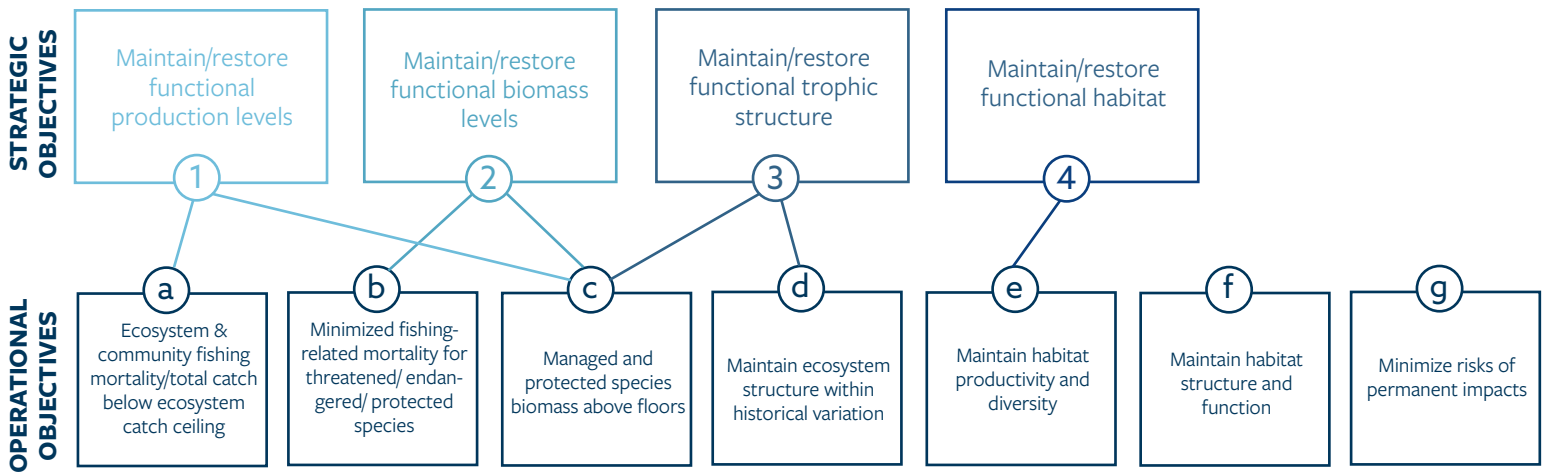
The New England Fishery Management Council has developed a set of draft goals or outcomes they hope to achieve via the eFEP. They have also set a series of example objectives or actions that will help achieve those goals. These goals and objectives (*page 18 of the eFEP*) were developed for the eFEP to spark discussion, debate, and prioritization. The Council anticipates that stakeholders will refine and possibly modify them during the public outreach workshops and during the Management Strategy Evaluation process to follow public outreach workshops. MSE is described at the end of this brochure and beginning on page 40 of the eFEP.The overarching goal of the eFEP is:

To protect the ecological integrity of US marine resources as a sustainable source of wealth and well-being for current and future generations.

There are six supporting goals as well:

1. Optimize Food Provision through targeted fishing and fishing for species for bait
2. Optimize Employment
3. Optimize Recreational Opportunity
4. Optimize Intrinsic (Existence) values
5. Optimize Profitability
6. Promote stability in both the biological and social systems

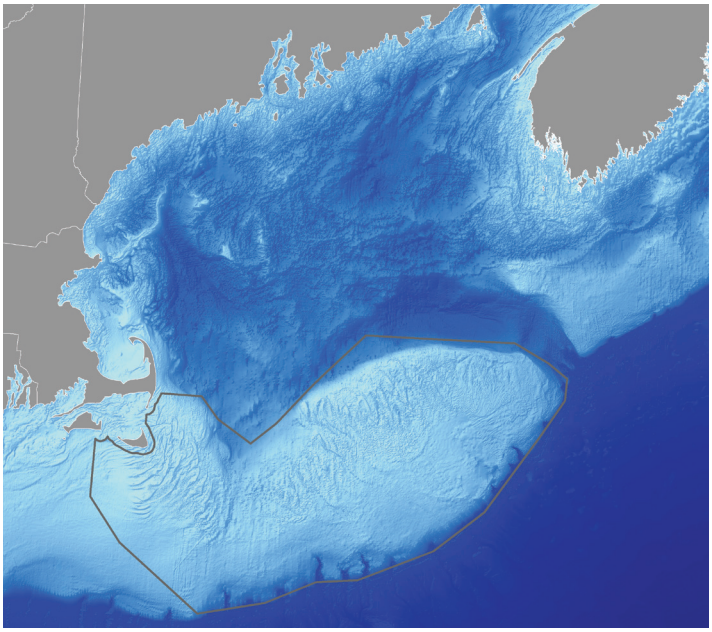
To meet these goals, some long term strategic objectives and shorter term operational objectives have been outlined. These objectives are illustrated in the figure below. Lines indicate where operational objectives support strategic objectives.



What is a Fishery Ecosystem Plan and what can it offer?

A Fishery Ecosystem Plan can address existing management problems in several ways. Integrated ecosystem fishery management can offer:

- Compared to a traditional Fishery Management Plan (FMP) an FEP offers a broader consideration of non-fishing benefits that arise from the ecosystem, recognizing the various tradeoffs that exist and the values of different types of stakeholders.
- Sets a limit on total ecosystem catches that consider system-wide primary productivity and net import of energy from neighboring ecosystem production units.
- Harvest control rules for stock complexes (that limit the amount of catch) that take into account interactions amongst predators and prey. This framework is thought to be more stable and robust than those associated with singles species control rules designed to achieve a static target biomass.
- An FEP may be more adaptive and flexible, allowing vessels to catch and land a suite of species in a stock complex. Thus, it has the potential to reduce inefficiencies, such as catching fish that cannot be retained because of permit or regulatory limitations. We call these 'technical interactions'.
- Because the FEP accounts for the biological interactions among related stock in an EPU, the productivity of an individual stock is understood to vary with changes in relative abundance of both predators and prey. As a result, maximum sustainable yield (MSY) is no longer thought of as a static value as it is with single-species management.



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

What are the boundaries of the eFEP?

EBFM by definition takes into account the entire ecosystem when making management decisions. For the eFEP, the ecosystem is Georges Bank and its boundaries are defined by the Georges Bank Ecological Production Unit (EPU).

EPUs are geographically specific areas on the continental shelf that have unique combinations of depth, bottom sediments, temperature, salinity, and primary production from phytoplankton. As a result, many fish stock boundaries are consistent with the proposed EPU. Stocks that span across adjacent EPUs will be managed according to the biomass that falls in each EPU and migration of fish will be taken into account. Other EPUs in the northeast include the Scotian Shelf, Gulf of Maine, and Mid-Atlantic Bight. *More information about EPUs can be found on page 21 of the eFEP.*

It is the intent to manage fisheries across the entire EPU. However, it may be necessary to subdivide the EPU into management units (for example Eastern and Western Georges Bank) to recognize sub-EPU differences in physical characteristics and fishing methods. *More information about this can be found on pages 28, 35, and 77 of the eFEP.*

How it all comes together

In addition to defining the geographical boundaries of EBFM for Georges Bank and describing the catch limits, the eFEP also offers advice on how this will come together in a final FEP. This includes options for determining catch ceilings and biomass floors, special priority management for certain fish such as forage fish, consideration the role that habitat plays in productivity of juvenile fish, how to address jurisdictional and permitting/limited access issues, incentive-based measures, and ecosystem research (with participating fishermen) to understand the status, dynamics, and function of the ecosystem.

Harvest Management

A unique feature of EBFM is that fish are not managed individually but in Stock Complexes. These complexes share similar life histories and play similar roles in the ecosystem. The purpose of a stock complex is to manage stocks as an interrelated group because they have similar productivity characteristics and are often caught together. Examples of stock complexes include: bottom dwellers (benthos), bottom feeders (benthivores), filter feeding fish (planktivores), large plankton eaters (macroplanktivore), fish eaters (piscivore), and top carnivores (apex predators). *More information on stock complexes can be found on page 29 of the eFEP*.

For the EBFM framework NEFMC is considering, the eFEP details how harvest limits or catch ceilings will be used in management. These limits will help protect ecosystem productivity, stock complexes, and individual species. Floors, or lower biomass limits, will be set to protect individual stocks from becoming overfished, based on their role in the ecosystem.

Ecosystem Catch Cap - The total amount of fish that can be sustainably removed from the ecosystem or ecological production unit (EPU). This cap includes the catch of both managed and non-managed species and depends on available energy within an ecosystem or EPU, a relatively stable quantity. Total catch is limited to allow enough energy from primary production to remain and support the ecosystem or EPU. *More information on the Ecosystem Catch Cap can be found on pages 37, 44, and 46.*

Stock Complex Ceiling - The total catch that can be sustainably removed from each of the stock complexes. The ceiling takes into account estimates of predator and prey interactions within an ecosystem. This helps ensure that there is balance between predator and prey populations. The goal of stock complex catch ceilings is to keep the ecosystem in balance - i.e. healthy numbers of predators vs prey and vice versa and produce an optimum, sustainable yield. *More information on Stock Complex Catch Ceilings can be found on pages 37, 44, and 47.*

Stock Biomass Floors - The total amount or biomass of an individual fish stock below which the stock is not allowed to drop. Biomass levels below the floor would put the stock at risk and the Magnuson Stevens Act considers the stock status to be 'overfished' and in need of biomass rebuilding.

Floors are designed to protect individual stocks and are determined by the best scientific evidence and Council policies. *More information on Stock Biomass Floors can be found on pages 37, 44, 52 and 55.*

Biomass floors for individual stocks would serve as reference points to trigger action to prevent further depletion and/or being overfished. Although their catch would be part of a stock complex limit, special catch limits or measures would apply when stock biomass is less than a specified threshold. [EK1] Strategies for applying special catch limits is provided in Section 9.1.2. Also, incentive-based measures (described in Section 9.2) and spatial management measures (Section 9.6) could apply to protect stocks that are more vulnerable to fishing due to high value and/or low productivity, or low resilience to recovering from low biomass.

Special priority management for forage and other species

Collectively, forage species provide an important supporting ecosystem service. The primary ecological role of forage species is energy transfer; they eat very small prey , and are themselves eaten by larger animals in the ecosystem. Forage species tend to be highly productive relative to larger predatory fish, marine mammals, and birds.

Some other stocks have very low productivity and need added protection from fishing. In some cases, spawning and/or specific habitat types need additional conservation.

Special priority management options are considered and discussed beginning on page 60 of the eFEP

Incentive-base Measures

The development of an appropriate incentive program for a multi-species fishery requires a good understanding of management objectives. Once goals and objectives

identifying desired management outcomes have been developed, the management system can be designed to reinforce fishing behavior which supports these goals and objectives.

A discussion of incentive-based measures that could improve effectiveness and lower regulatory cost begins on page 59.

Fishing impacts on the ecosystem and spatial management

The eFEP describes strategies to sustain and restore habitat quality to achieve an ecosystem management goal of sustaining and improving productivity of managed and protected species resulting in increased survival of new recruits and optimal conditions for feeding and reproduction.

This eFEP management strategy component is not intended to duplicate or replace the Omnibus Habitat Amendment 2 measures. Instead, the goal is to broaden the scope of considering spatial effects of fishing as they relate to ecosystem function. This includes effects on juvenile survival and growth, energy flow through the system, and abundance and availability of prey for apex predators and protected species.

Four spatial management strategies to improve ecosystem function and health and identify research needs are discussed beginning on page 90.

Jurisdictional and Permit/Limited Access Issues

One of the issues that is addressed in the eFEP is that two thirds of the fish species caught on Georges Bank are not managed by the Council. There are three different options presented for how this may be handled.

1. Only set catch ceilings for species managed exclusively

or jointly by the New England Fishery Management Council.
2. Develop a cooperative and collaborative approach with other management entities and set ceilings for the portion of stocks that are caught on Georges Bank.
3. Petition for sole management of the portion of all stocks caught on Georges Bank.

Permitting and access to the fishery are often fragmented, based on historic participation instead of current circumstances. For example, some vessels that fish for skates or monkfish do not have a permit to fish for and retain groundfish or summer flounder, or vice versa. As a result, many biological and technical interactions are ignored or are problematic, creating fewer opportunities and higher costs for fishermen.

More information about the options being considered can be found on page 78 to 89 of the eFEP.

Data

The main reason why Georges Bank was chosen for the eFEP is the large amount of data and research that already exist about this ecosystem. This has facilitated the progress the council has made to date in developing the eFEP framework. With ecosystem and stock complex catch ceilings as well as stock biomass floors, the proposed framework will require a lot of data to put it into action.

With the intention of improving the information upon which management decisions are made, the Council has developed a list of additional monitoring and research priorities. These include:

1. Develop a modernized data system - This is essentially taking all of the data that currently exists and putting it together in the same location for easier access and faster analyses.
2. Catch monitoring - Increased communication, real time monitoring, and increased observer/electronic monitoring
3. Ecosystem data collection - Oceanographic, biological, and socio-economic data related to estimating and projecting productivity and ecosystem structure
4. Ecosystem research - With participation by fishermen, research will be conducted to understand the status, dynamics and function of the ecosystem, as well as distribution/migration and stock structure.

More information about the priorities being considered can be found on page 94 of the eFEP.

The Management Strategy Evaluation

An MSE is a process used to determine if a proposed fishery management strategy meets the goals and objectives of managers. There are two important things that you need to be aware of. First, the MSE requires input from stakeholders such as fishermen, seafood processors, and environmental groups. Second, MSE is an ongoing process. It occurs before a new management strategy is implemented and then periodically thereafter to ensure that goals are being met.

The core components for the operational framework of the eFEP are a set of strategic objectives defined by managers and interested parties, coupled with a set of mathematical assessment models that provide tactical advice about the management approach. A linked management strategy includes the process for setting and adjusting catch limits based on the assessment model outputs that are intended to meet the ecosystem objectives. To test potential management procedures prior to implementing them in reality, MSE is proposed. The MSE contains a feedback loop from the management actions through to fishing a simulated Georges Bank ecosystem. The simulated Georges Bank ecosystem is called the operating model. The MSE, thus, provides a test bed for adjusting the parameters of the management tools to quantify tradeoffs among the objectives with the goal of determining which management procedures and tools provide robust outcomes across uncertainty and objectives.

There are three parts to an MSE.

1. The goals and objectives are developed. The goals are what managers want to achieve and are described near the beginning of this document. The objectives are steps needed to achieve these goals and are developed in cooperation with stakeholders.
2. Models are developed that represent the ecosystem and the fish populations within them. Some of these models that may be used are summarized on page 42 of the eFEP.
3. Management procedures like harvest control rules (catch ceilings) and strategies are developed. These harvest control rules are tested using the models developed in step 2 to compare if the goals and objectives developed in step 1 are met across the different strategies. Adjustments to the management procedures and objectives may be needed to clarify the trade-offs between the different strategies being simulated and ultimately identify those that best meet the goals and objectives identified by stakeholders and managers.

More information about the MSE can be found on page 40 of the eFEP.

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