

**New England Fishery
Management Council
Process for Restructuring FMPs
to Build EBFM
CMOD Workshop
Denver, CO**

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November 16, 2022



New England
Fishery Management Council

Ecosystem Plan for Georges Bank

Development strategy

Draft Example Fishery Ecosystem Plan (eFEP)

for Georges Bank

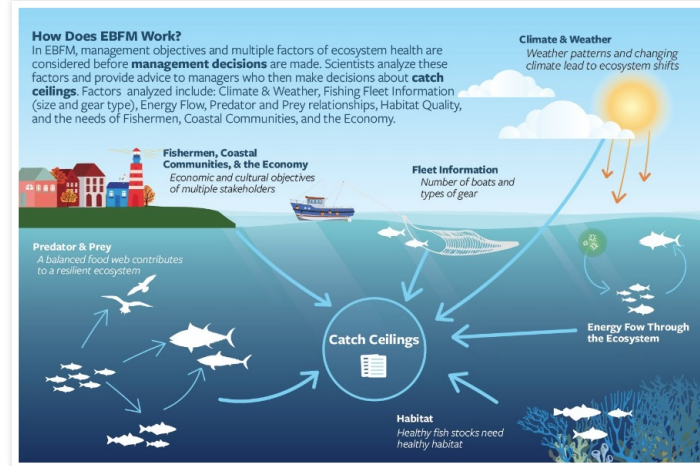
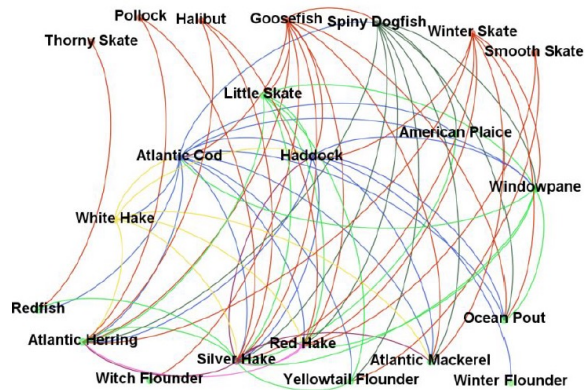
prepared by the

New England Fishery Management Council

and the

Ecosystem Based Fishery Management

Plan Development Team



EBFM Public Outreach Materials

EBFM Workshops – Supporting Documents

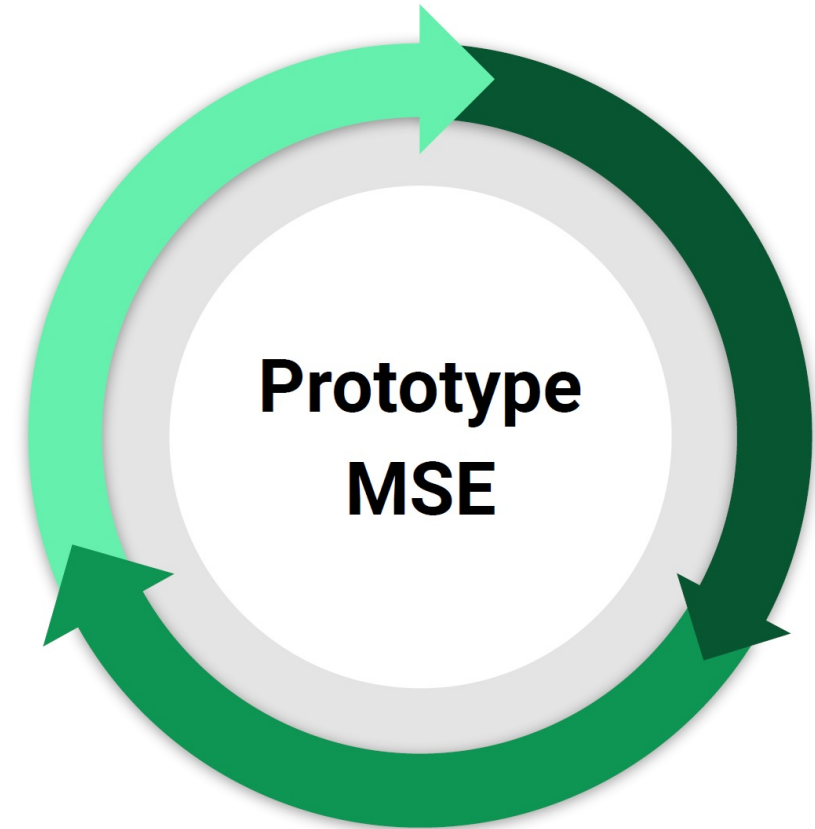
- EBFM Outreach in Support of Upcoming NEFMC Workshops
- Meeting Notice with all Workshop Dates
- Register for the Workshops > [HERE](#)
- EBFM Workshops Press Release

Introductory Video

- EBFM Introductory Video – Stakeholder Perspectives

Infographics

- What is EBFM?
- Georges Bank Ecosystem Production Unit



Developing an Ecosystem Plan for Georges Bank

Approaches considered

SSC White Paper 2010	Council 2015
Incremental approach <ul style="list-style-type: none"> • Omnibus amendment • Extensions to single-species assessment and management 	EAFM policies applied to existing plans
	Develop an Example Fishery Ecosystem Plan' <ul style="list-style-type: none"> • Worked example
Holistic approach <ul style="list-style-type: none"> • Ecosystem level constraints • New management structure 	Develop an FEP
Blended approach <ul style="list-style-type: none"> • Address technical interactions, bycatch 	Blended Fishery Ecosystem Plan via omnibus amendments



EBFM development process

- Process chosen, intended outcome
- Develop framework and concept – eFEP
- Communicate with stakeholders about the EBFM concept
 - Communication tools, worked examples
 - Public information workshops – discuss concept and answer questions
- Evaluate performance of management procedures based on the EBFM framework
 - Prototype MSE (pMSE)
 - Full stakeholder MSE
- Identify how to apply EBFM management procedures, FEP or EAFM



NEFMC Approach

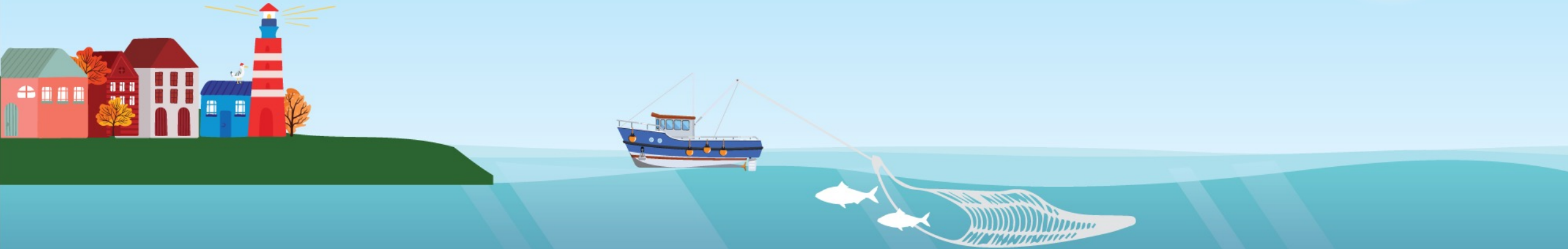
- To prepare:
 1. A policy describing goals and objectives, and approaches, for taking account of ecosystem processes in fishery management, and
 2. An example of a fishery ecosystem plan that is based on fundamental properties of ecosystem (e.g., energy flow and predator/prey interactions) as well as being realistic enough and with enough specification such that it could be implemented. The example should not be unduly constrained by current perceptions about legal restrictions or policies.
 3. With respect to number 2, it is understood that the example might not be implemented, but it should make clear what a fishery ecosystem plan would actually entail and it should focus debate.



eFEP

- **Concept of developing an eFEP was approved by the Council in April 2015**
- **Peer review of a Worked Example was requested by the Council in September 2016**
 - **Results presented to the Council in September 2018**
- **Recommitted to completing the eFEP and initiating MSE development using a Steering Committee in January 2019.**

What Is The Issue?

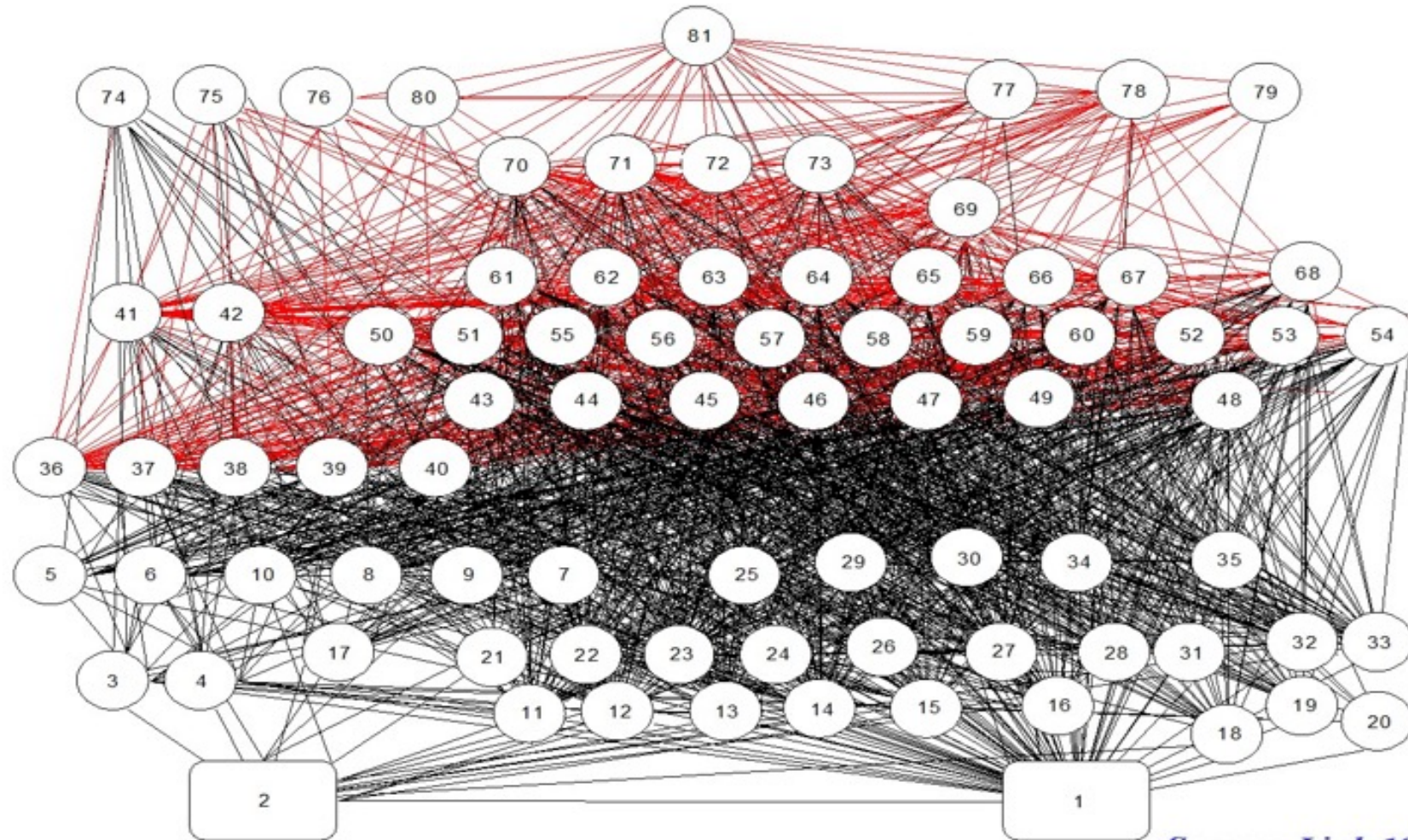


1. Most fishery management focuses on a **single** species, with little consideration for how it functions as a **predator** or **prey**.

2. The **goal has been**, identifying how many of these fish can we safely harvest and still leave enough so that we can fish in the future.

3. This '**single species**' approach does not consider how other fisheries and the larger **ecosystem** might be affected.

Northeast Trophic Relationships



Source: Link 1999

Interacting Species are now Covered by Separate Management Plans

Atlantic Mackerel
Butterfish
Longfin Squid
Shortfin Squid
Alewife
Atlantic Menhaden
American Shad
Blueback Herring
Summer Flounder
Bluefish
Golden Tilefish
American Lobster
Scup
Smooth Dogfish
Striped Bass
Tautog
Weakfish
Black Sea Bass
Surfclam & Quohog

Cod
Haddock
White Hake
Pollock
Yellowtail
Flounder
Winter Flounder
Witch Flounder
Windowpane
American Plaice
Halibut
Redfish
Ocean Pout

Spiny Dogfish

Silver Hake
Red Hake
Offshore Hake

Monkfish

Sea Herring

Winter Skate
Little Skate
Smooth Skate
Thorny Skate
Barndoor Skate
Clearnose Skate
Rosette Skate

Marine Mammals
Sharks
Tunas
Swordfish

Blackbelly Rosefish
Chain Dogfish
Cunner
Cusk
Fourspot Flounder
John Dory
Lumpfish
Northern Searobin
Octopus
Striped Searobin

Interactions also exist among species within management plans

NEFMC Shared

MAFMC
ASMFC

MMPA
HMS

Unmanaged

What is different about a Fishery Ecosystem Plan (FEP)

- Considers a broader range of goals, objectives, and improvements of ecosystem services.
- Sets a limit on total ecosystem catches based on system-wide primary productivity.
- Harvest control rules accounting for interactions amongst predators and prey, given their stock size. Harvest control rules may be more stable and robust
- More adaptive and flexible, allowing vessels to catch and land a suite of species in a stock complex.
- The productivity of an individual stock is understood to vary with changes in relative abundance of both predators and prey.



Purpose of the eFEP

- **Explain how a different type of management system could work**
- **Structure and focus discussion on the possibilities**
- **Starting point for further evaluation**



Example Fishery Ecosystem Plan (eFEP)

- **Describes a high-level framework that we believe is a possible way forward**
- **End result may be somewhat different than the one described**
- **Framework to manage fisheries in a way that is**
 - **More adaptive to changes in the ecosystem production,**
 - **More flexible for fishermen to make better choices about where and how to fish, and**
 - **Sets limits on catch that are more consistent with achieving a broad range of objectives and improved ecosystem services.**
- **Georges Bank was chosen because ecological science and modelling has focused here**

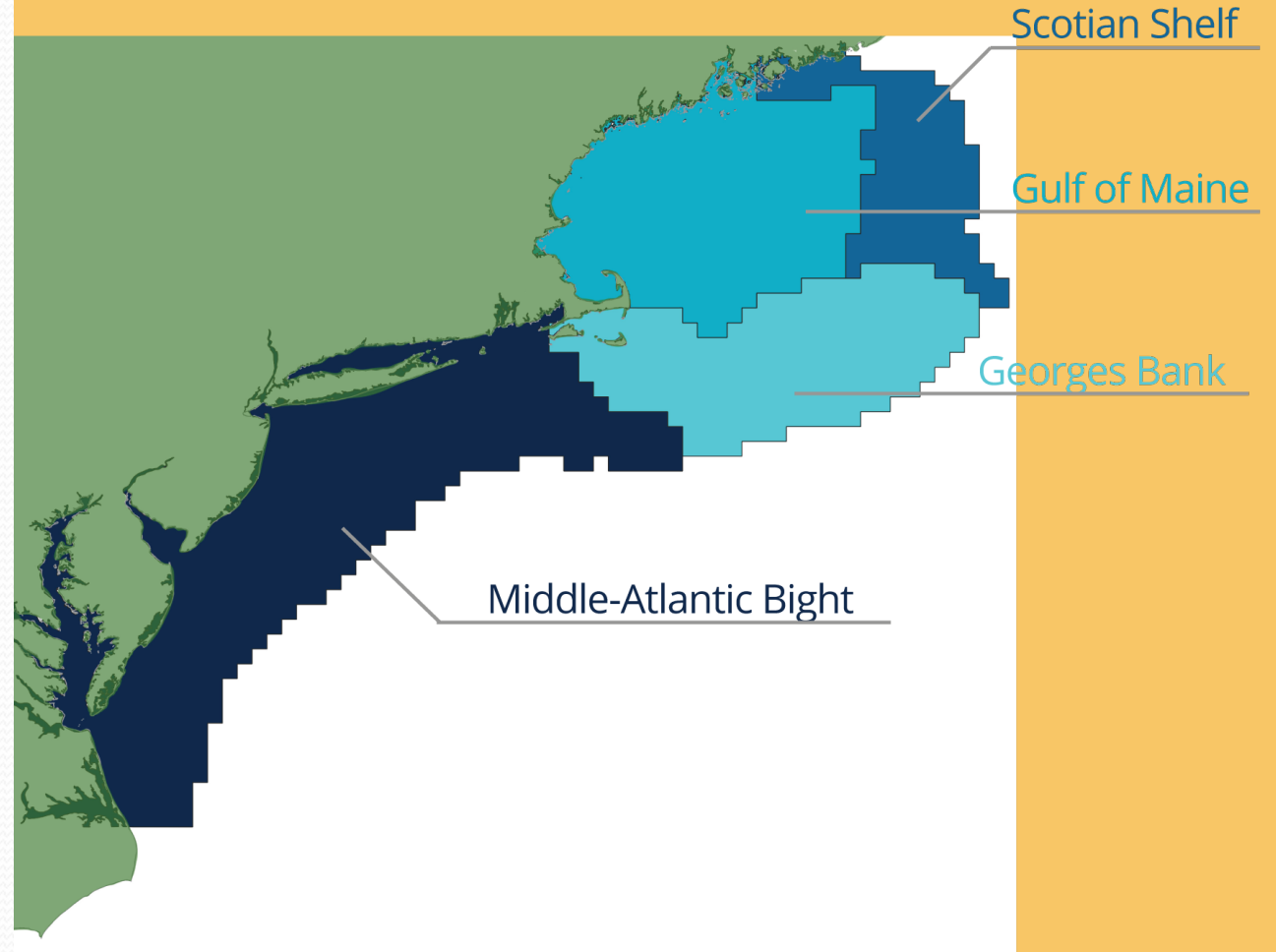




What Is An Ecological Production Unit (EPU)?

Geographically specific area with unique characteristics of:

1. Physical – depth, bottom type, temperature, & circulation.
2. System Energy flow.
3. Biology – distribution of invertebrates, fish, marine mammals, sea turtles, & seabirds.
4. Fishing activity – otter trawl, longline, pot, & dredge.





Our Region: Intensely Studied--Current

Fishery Ecosystem Plan (FEP) can build off existing programs, including:

- Resource surveys- on research vessels and fishing vessels
- Ecosystem monitoring cruises,
- Satellite observations
- Food Habits studies,
- Fishery dependent data: at ports, at sea, including a study-fleet
- Habitat mapping and characterization,
- Protected species research



Not targeted by fishery

Bottom trawl

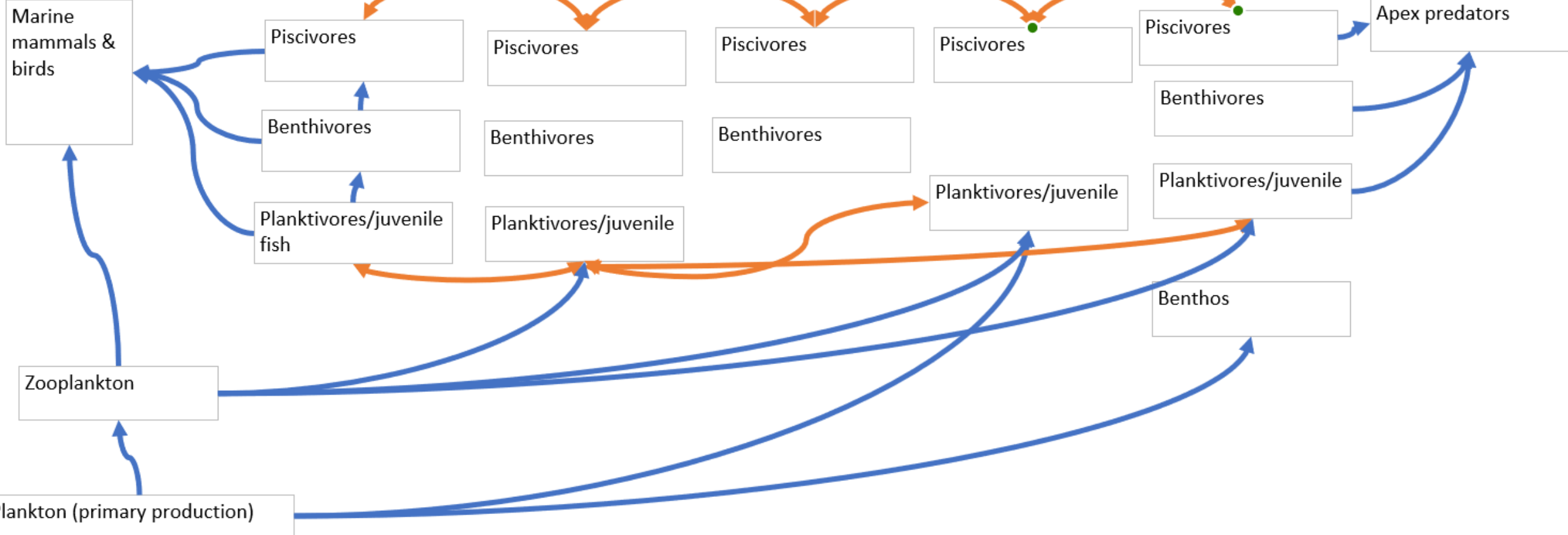
Set gillnet

Longline

Pelagic trawl

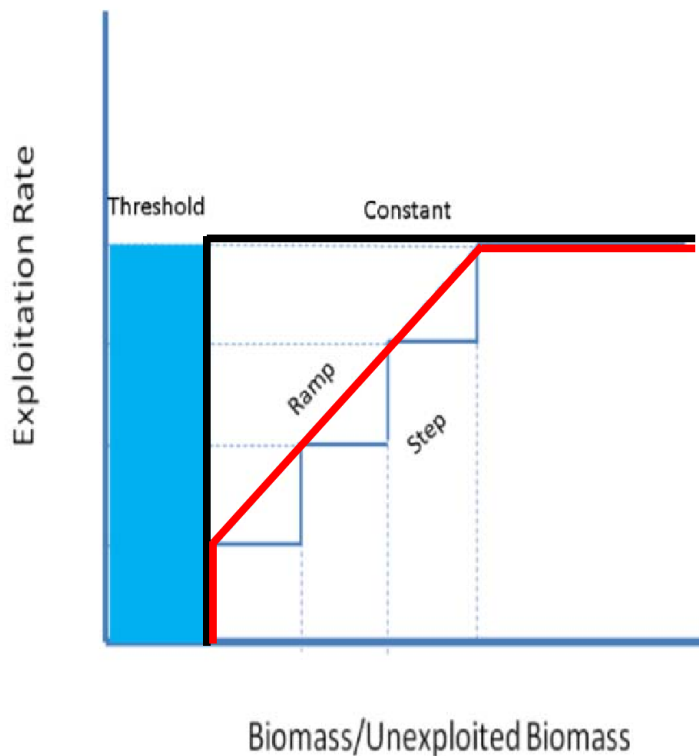
Scallop dredge

Pelagic hook gears
Drift gillnet



Stock complex harvest control rules

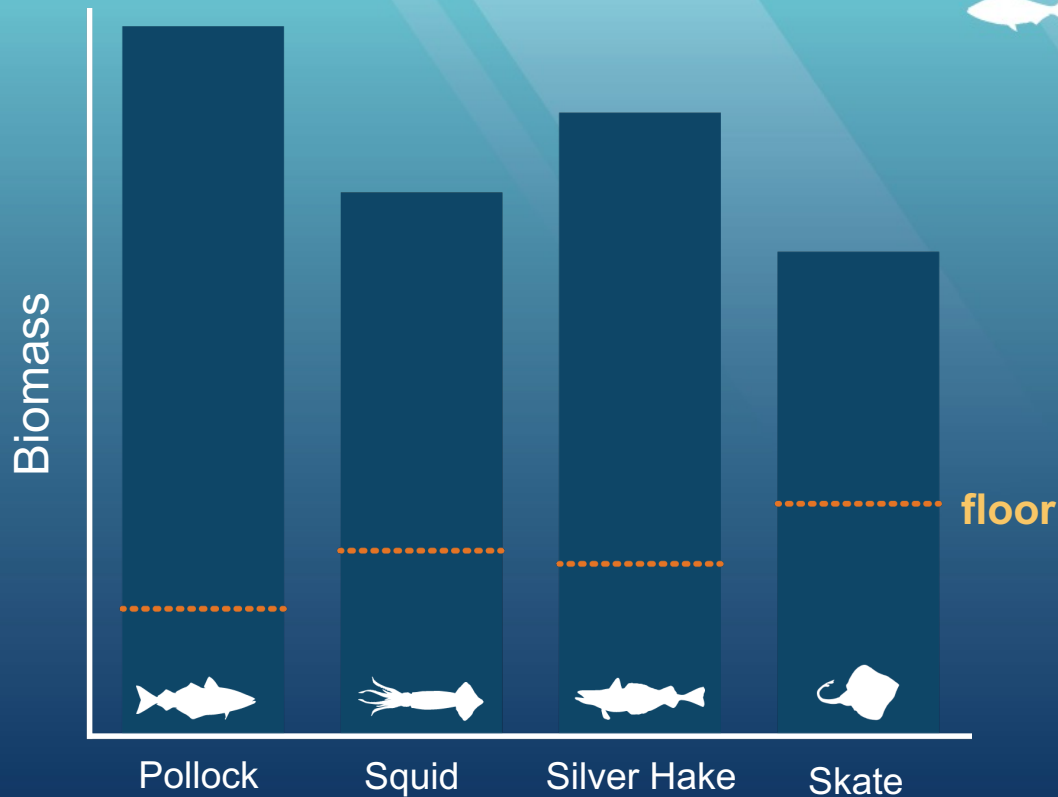
ToR 6: Review harvest control rules embodying the proposed floors and ceilings approach using the ceiling reference points in ToR 5 to cap removals at the Ecological Production Unit and Functional Group levels, while ensuring that no species biomass falls below the single species floor reference points.



- Two main forms of harvest control rules:
 - 1) Threshold exploitation
 - 2) Ramp-down exploitation



Species Biomass Floors



1. The total amount (biomass) of an individual species is not allowed to decline below a set limit, the floor.

2. The floor is different for each species.

3. Floors determined based on the unique characteristics of each species and how many need to remain in the EPU to ensure long term species health.

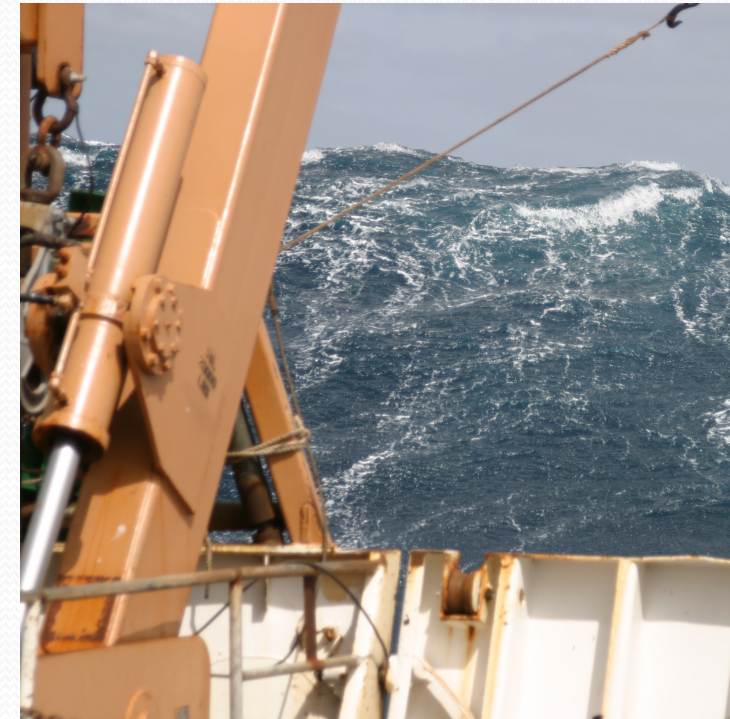
Comparison of Single Species Management and NEFMC's EBFM Approach

Single Species Stock Approach	NEFMC EBFM Approach
<p>Ignore species interactions:</p> <ul style="list-style-type: none"> - Food web - Bycatch 	<p>Species interactions taken into account in grouping of species into species complexes</p>
<p>Driven by reference points (Fmsy, Bmsy, MSST) ignoring species interactions:</p> <ul style="list-style-type: none"> -Highly uncertainty -Moving targets 	<p>Recognizes that reference points are dynamic and accounts for uncertainty</p>
<p>Mixed stock fisheries must cope with imbalance in allowable catches, sometimes choke stocks</p>	<p>Management of aggregations of species that are caught together potentially reduces mixed stock fishery problems</p>
<p>Data intensive stock assessments and control rules based on predictions on achieving targets [recall the NRC's findings]</p>	<p>Potentially simplified assessments and management (e.g., iterative and directional) of aggregations of species</p>

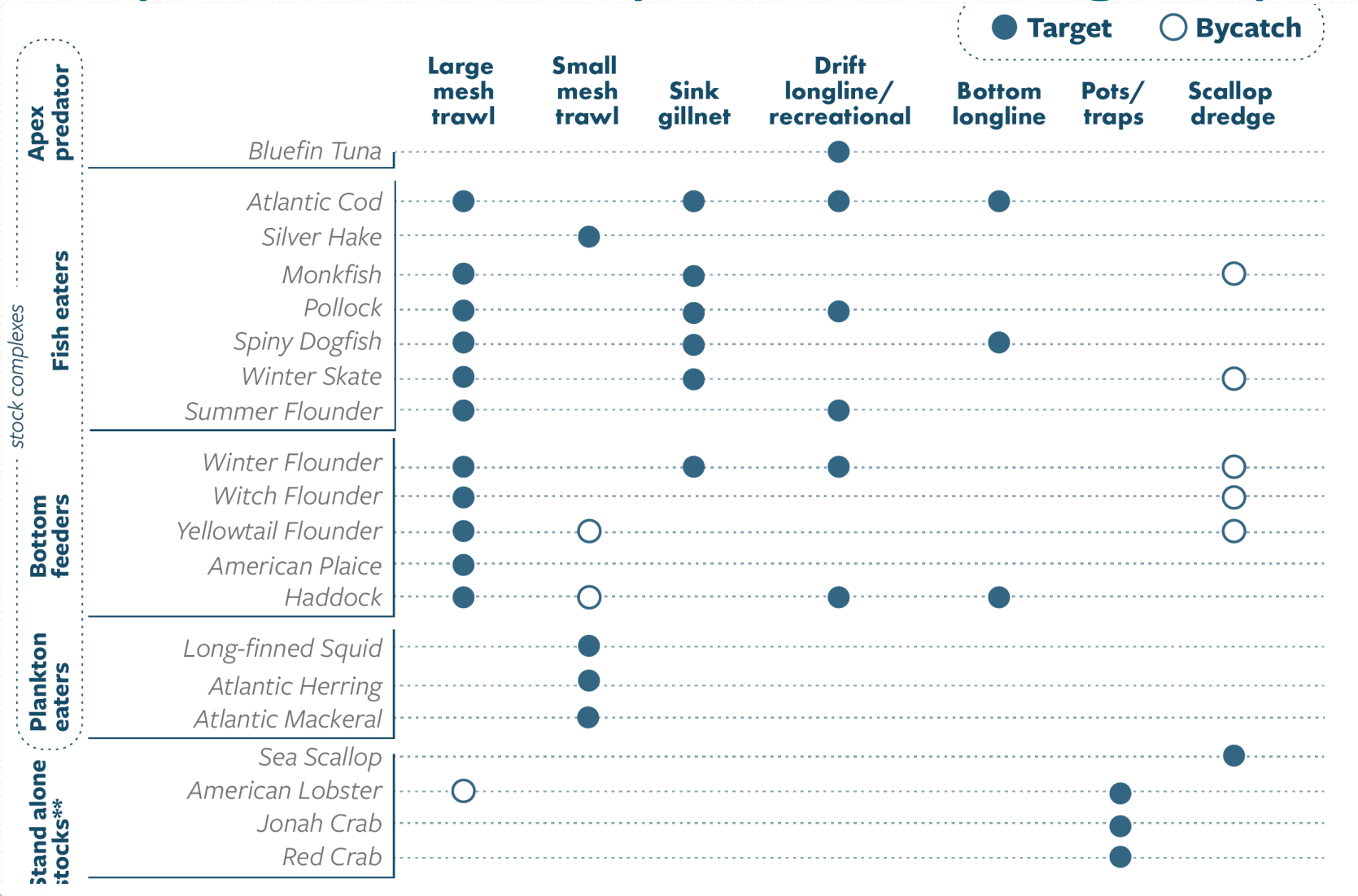


The draft EBFM for Georges Bank* contains information on the following topics:

- Ecosystem reference points, control rules and catch limits
- Incentive-based measures
- Special priority management
- Jurisdictional authority, cooperation, and coordination
- Limited access and authorization to fish
- Fishing impact on ecosystem and spatial management
- Catch monitoring, data collection, and research
- Environmental impact statement



Stock complexes/Fishery functional groups





Worked Example – Stock Complexes

Stock complexes are groups of fish that play similar roles in the ecosystem and are often caught together.

For the worked example, 10 species of fish distributed among three stock complexes that are caught by three different fleets were examined.



		Demersal Trawl	Fixed Gear	Pelagic Trawl
Fish-eaters	<i>Dogfish</i>	●	●	●
	<i>Winter Skate</i>	●	●	
	<i>Goosefish</i>	●	●	
	<i>Silver Hake</i>	●		●
	<i>Cod</i>	●	●	
Bottom-feeders	<i>Haddock</i>	●	●	●
	<i>Yellowtail Flounder</i>	●		
	<i>Winter Flounder</i>	●		
Plankton-feeders	<i>Herring</i>	●		●
	<i>Mackerel</i>	●		●

MSE Steering Committee

- A successful EBFM design requires a co-development from all interested stakeholders.
- An iterative, participatory process that gives stakeholders a voice rather than seeks to persuade towards a specific outcome.



MSE Steering Committee

- Build greater understanding of EBFM as a tool to assess and manage fisheries
- Identify potential opportunities and concerns that different stakeholders see in EBFM
 - What opportunities do you see to use EBFM to improve existing assessment and management systems?
 - What do we stand to lose in shifting towards an EBFM approach?
- Give opportunity to stakeholders to define next steps, building a willingness to continue participation in the process.

Outreach

- Develop examples and communication tools
 - Science communicator – Greenfin Studios, VA
- Conduct outreach public information workshops
 - Facilitator – Oceanvest LLC, Gloucester

Outreach materials

- **5-minute video**
- **2 Infographics**
- **3 Stakeholder brochures**
- **4 Core presentations**
- **3 Worked examples**





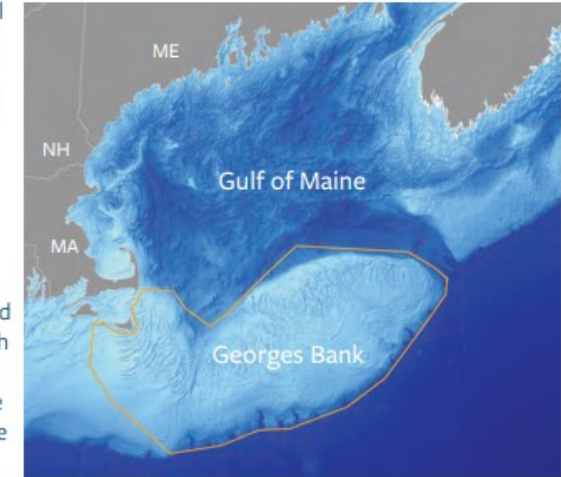
Infographics

The Georges Bank Ecosystem Production Unit (EPU)

Why Georges Bank?

Ecosystem Production Units (EPUs) 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 of the Gulf of Maine on the North.

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 orange 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.



Spatial

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 fishing methods.

SPECIES CAUGHT



SPECIES LANDED



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 Georges Bank.



Management Options

- 1 Only set catch ceilings for species managed exclusively or jointly by NEFMC.
- 2 Develop a cooperative and collaborative approach with other management agencies and set ceilings for the portion caught on Georges Bank.
- 3 Petition for sole management of all stocks on Georges Bank.



How Does EBFM Work?

Factors of ecosystem health

Fishermen, Coastal Communities, & the Economy

Economic and cultural objectives of multiple stakeholders

Climate & Weather

Weather patterns and changing climate lead to ecosystem shifts

Predator & Prey

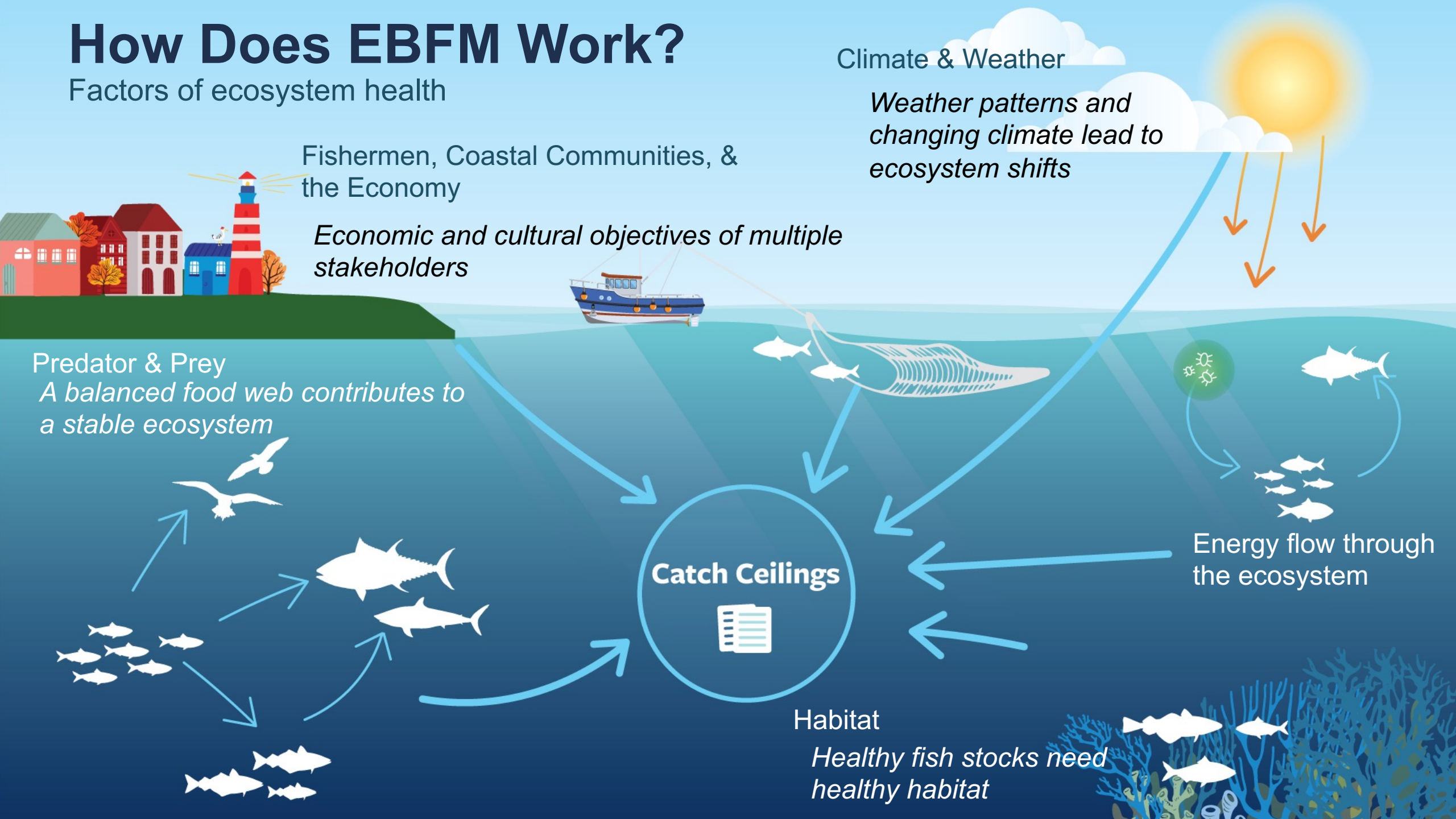
A balanced food web contributes to a stable ecosystem

Energy flow through the ecosystem

Catch Ceilings

Habitat

Healthy fish stocks need healthy habitat



Stakeholder brochures

What is EBFM?

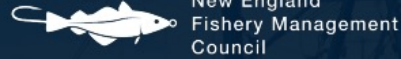
How does it work?

What does it mean for you?

Benefits and concerns



Help Shape
the Future of
NEFMC Fishery
Management



**An open invitation to
Commercial Fishermen and
Seafood Dealers and Processors**

The New England Fishery Management Council (NEFMC) is seeking your input on an advanced approach to managing fisheries - Ecosystem-Based Fishery Management (EBFM). This is your opportunity to learn about what EBFM is, what it isn't, what it could mean for you, and to provide feedback at this early phase of the process.



Core presentations

**An Introduction to
Ecosystem-Based
Fishery Management**

**Science in Support of
Ecosystem-Based
Fishery Management**

**What are Catch
Ceilings and How are
They Determined**

**An Introduction to the
eFEP and Worked
Example**



**What Are Catch
Ceilings and
How Are They
Determined?**



Tangible worked example development

Objective

- Comparison of steps to develop catch advice under EBFM approach vs a single species approach, not the outcome
- Demonstration of concept

Approach

- Start simple, add more complexity as needed to demonstrate the concept

MSE (later)

- Comparison of performance of different output controls to achieve desirable objectives.



Public information workshops

- The purpose of the workshops is to
 - Engage with and educate fishery stakeholders,
 - Using the eFEP and communications materials that have been developed about the concepts of EBFM, and
 - Promote stakeholder participation in further development of EBFM.



Workshop goals

- Identification of objectives for EBFM
- Identification of areas of agreement, disagreement, and confusion/uncertainty
- Identification of people or groups that would be willing to fully participate in an MSE process
- Identification of how, how much should be included and also how broadly focused the Council's EBFM development should be.
- What types of management approaches should the Council pursue?
- Measuring how have perceptions changed, what has been learned, what is still confusing or uncertain



Public information workshops

- Understanding of EBFM in the region, how it could work, its potential benefits and drawbacks
- Understanding of where stakeholders see opportunities for improvement in the management system (e.g., if we could address choke species, I would be able to ...)
- Better understanding of EBFM and gauge whether it would be appropriate for their fishery and how it would be utilized
- Alignment between fishers' understanding of ecosystem processes and how EBFM might be implemented



Intended results

- Understanding of the MSE process and how it might be applied to EBFM
- Opportunity for all voices to be heard
- Identification of key issues/bottlenecks/challenges to moving EBFM forward in the region
- Listening as be key to identifying short-term wins and direction for long-term strategy



Public information workshops

- Generated interest in advancing the EBFM framework
- Interest in a pilot study or experimental fishery
- Generated interest in following MSE and participating in “deep dive workshops
- Develop further interest for deep dive workshops
 - Parallel to pMSE



Public information workshops

- Distinct 'flavors'
 - Initial frustration and skepticism
 - Interest in potential and hope
 - Stability in catch/revenue to fisheries and communities
 - Possible on-the-water pilot
 - Contemplative
 - Questioning
 - How would it be applied?
 - Permitting, sector management, and allocation?
 - Choke stocks?
 - Potential gains or losses?
-

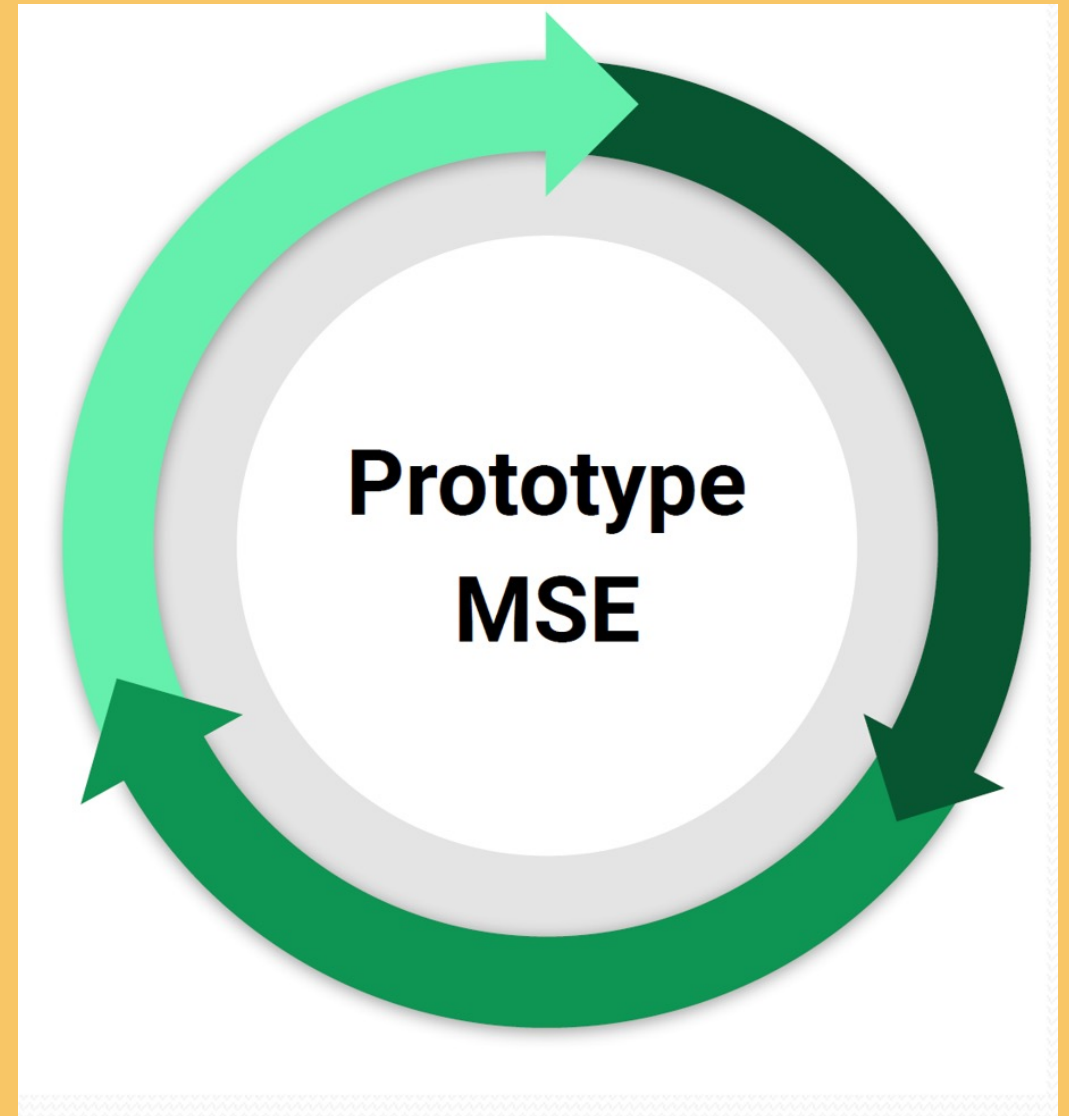
Public information workshops

- **Recognition of problems caused by uncoordinated management and balkanization of the fisheries**
- **But invested capital and fear of loosing access undermines full consideration of a potential solution having economic and societal benefits**



Prototype MSE(pMSE) purpose

- Showcase a simplified prototype MSE framework and demonstrate how MSE will be used to evaluate EBFM management strategies
- Identify supporting data sources and develop the models and analyses that will support a full EBFM MSE
- Not intended to be actionable in a fishery ecosystem plan, but the results should be used as the basis for a full MSE



pMSE intended outcomes

- Act as an educational dry run from both a development and an operational perspective.
- Provide an opportunity for Council and Committee to gain experience with MSE process
- Identify and work through the types of decisions to be made during an MSE



pMSE objectives

- Increase understanding of the eFEP
- Identify management decision points
- Identify data gaps
- Investigate how human behaviors can impact EBFM effectiveness
- Identify management objectives
- Identify and build operating models
- Show consistency with National Standard 1
- Develop scientific support for EBFM/MSE



pMSE objectives

- Apply operating model that includes:
 - Trophic interactions
 - Technical interactions
- Identify and develop MSE summary products for effective communication and understanding



The Process For Considering Change

