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# What Are Catch Ceilings and How Are They Determined?



New England  
Fishery Management  
Council

# New England Fisheries Management Council

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- The NEFMC conserves and manages fisheries through science, public participation and balancing competing interests.
- We are considering a new management model, Ecosystem Based Fishery Management (EBFM), to better support healthy and sustainable fisheries and resources.



# Why Are You Here?

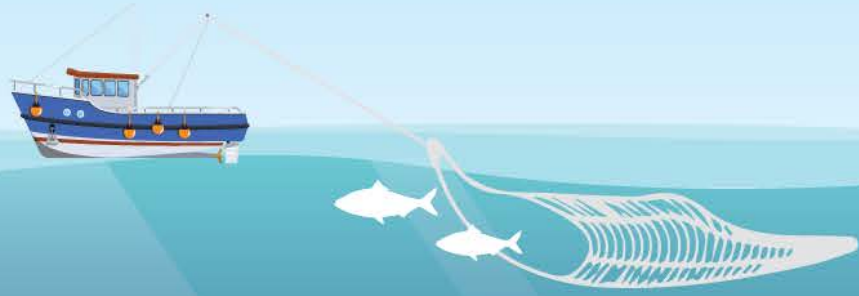
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- To learn how EBFM differs from current management.
- To find out how catch ceilings would be determined.
- Get an overview of the components used in setting catch limits.
- To discover the benefits of an EBFM approach

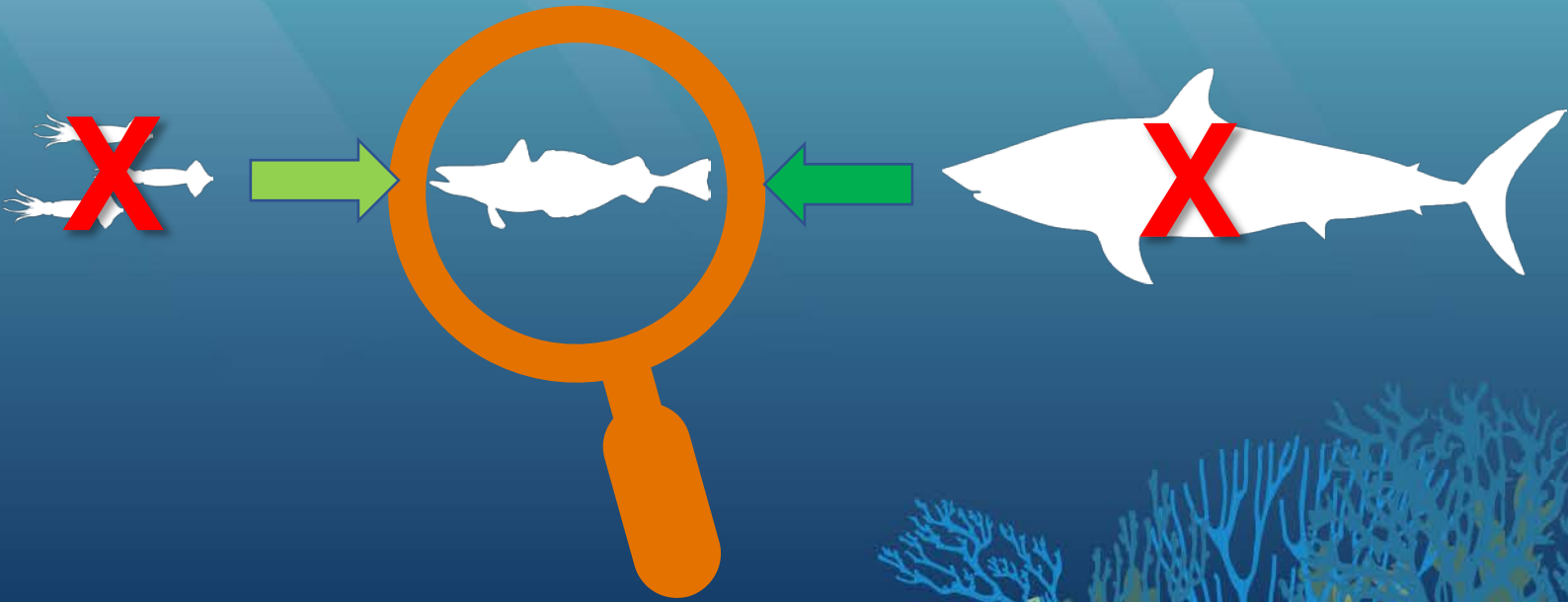


Photo: NOAA

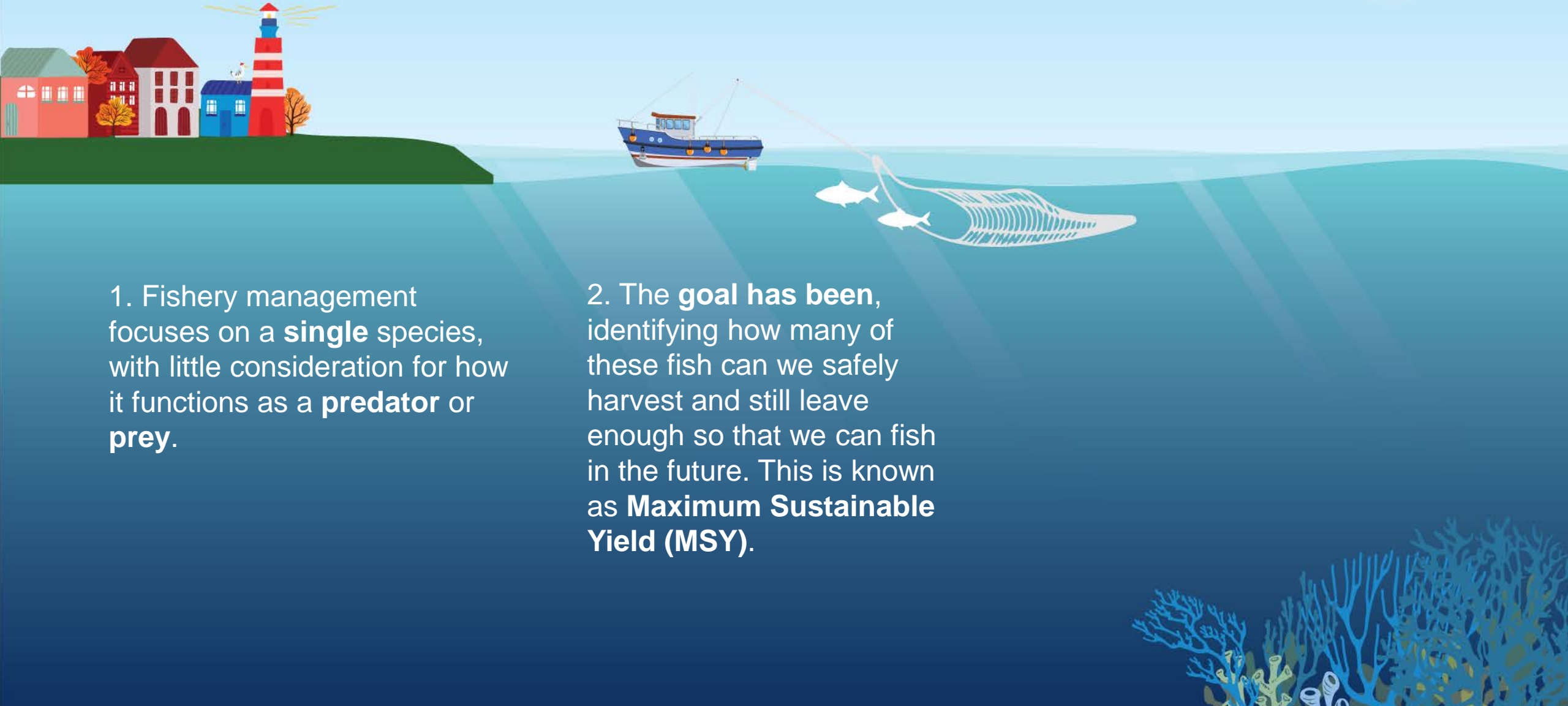
# How Are Catch Limits Currently Determined?



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



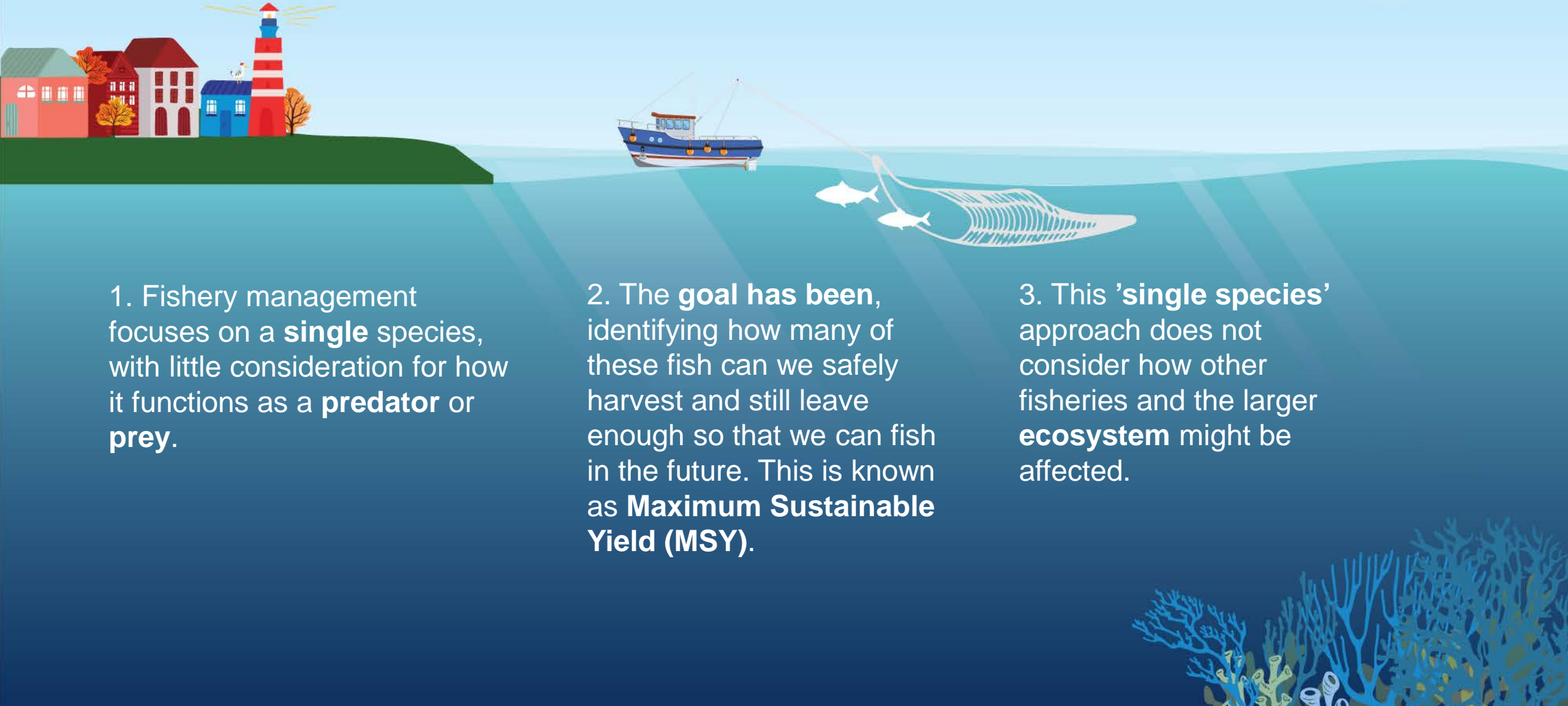
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2. The **goal has been**, identifying how many of these fish can we safely harvest and still leave enough so that we can fish in the future. This is known as **Maximum Sustainable Yield (MSY)**.

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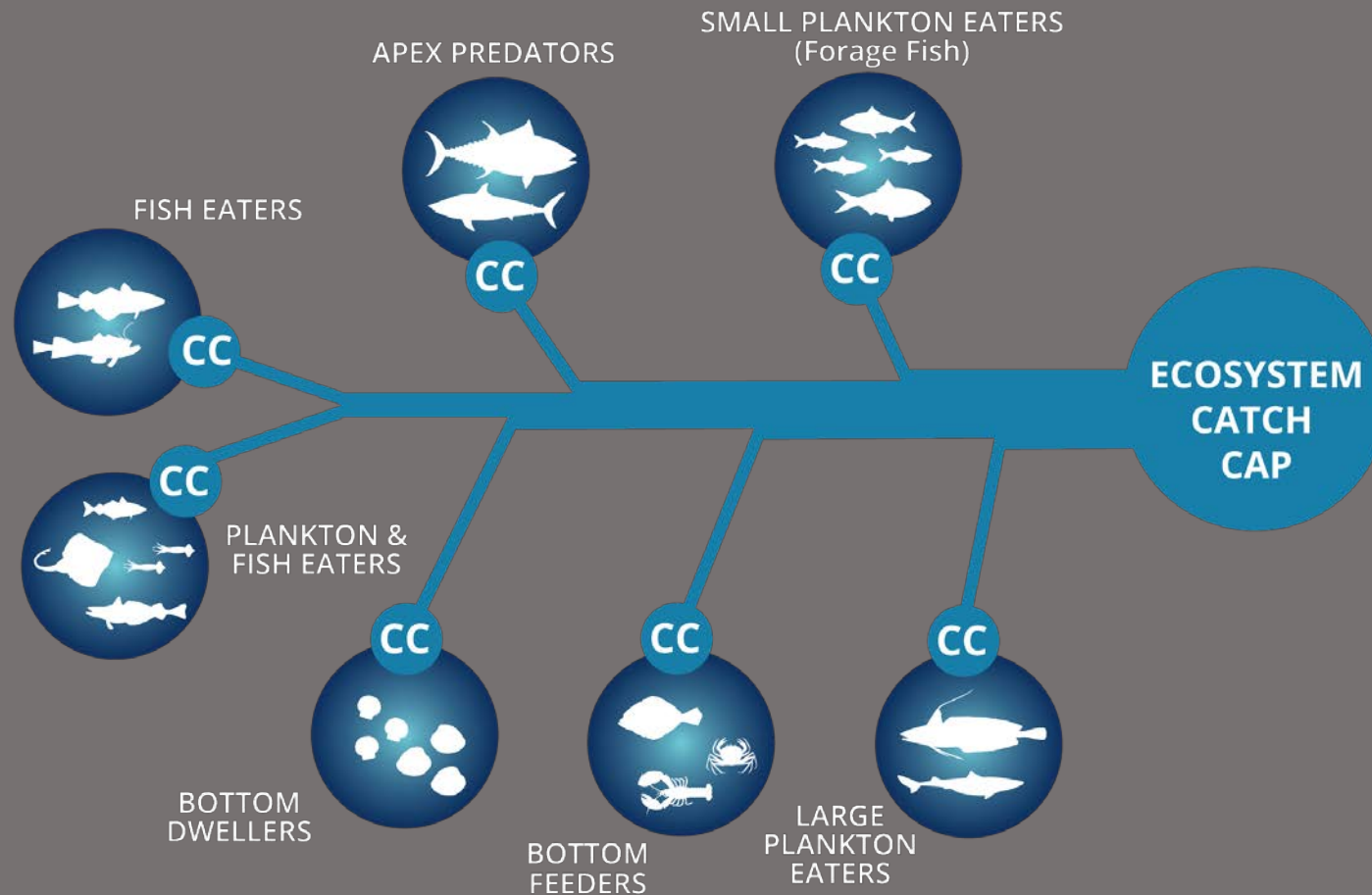
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2. The **goal has been**, identifying how many of these fish can we safely harvest and still leave enough so that we can fish in the future. This is known as **Maximum Sustainable Yield (MSY)**.

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

# How Are EBFM Catch Ceilings Determined?

After assessing the health of the ecosystem, NEFMC will identify three different types of catch ceilings



## Catch Ceilings:

1. **Ecosystem Catch Cap:** Total catch from the ecosystem can not exceed a Cap related to annual productivity.
2. **Stock Complex Ceilings:** Assessments of the balance between **predators and prey** in the ecosystem will help determine Species Complex Ceilings (CC).
3. **Species Biomass Floors:** Total biomass of individual species can not decrease below threshold levels.

# DRAFT Visualizing Catch Limit Components

- Ecosystem Catch Cap
- Species Complex Ceilings
- Species Biomass Floors



# Factors Considered When Determining Catch Ceilings

## Fishermen, Coastal Communities, & the Economy

*Economic and cultural objectives of multiple stakeholders*



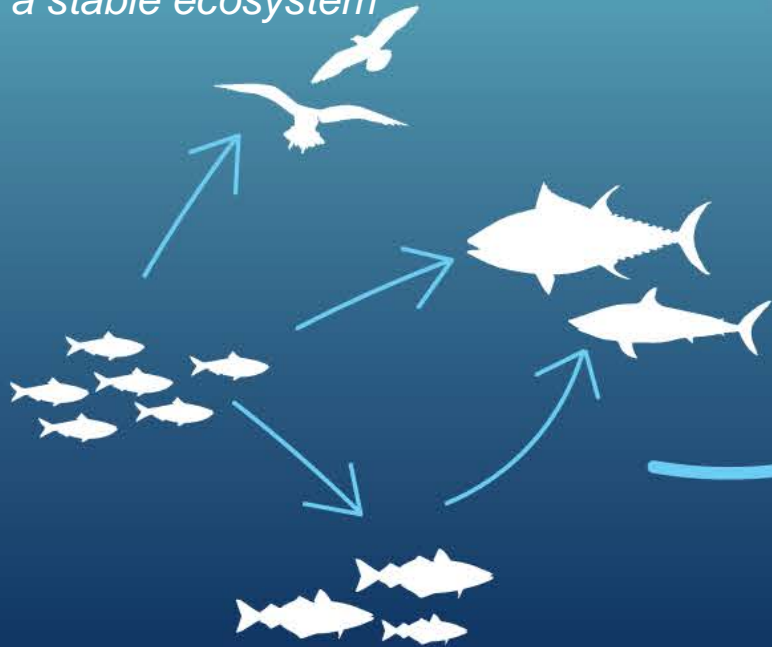
## Climate & Weather

*Weather patterns and changing climate lead to ecosystem shifts*



## Predator & Prey

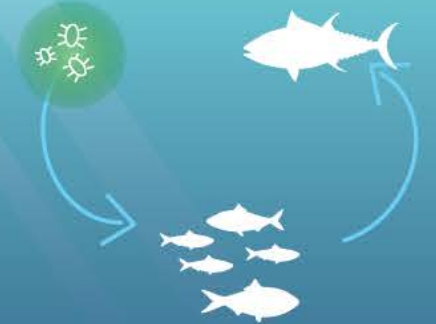
*A balanced food web contributes to a stable ecosystem*



## Catch Ceilings

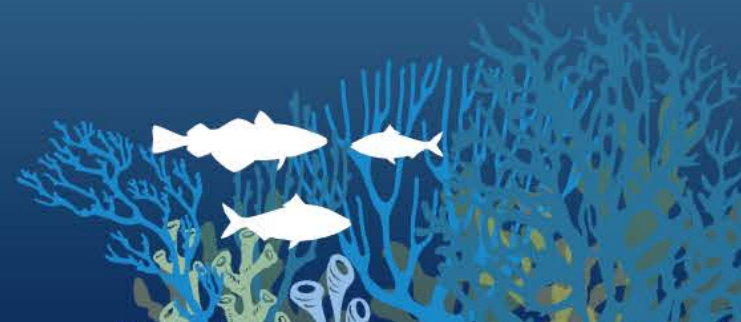


## Energy Flow Through the Ecosystem



## Habitat

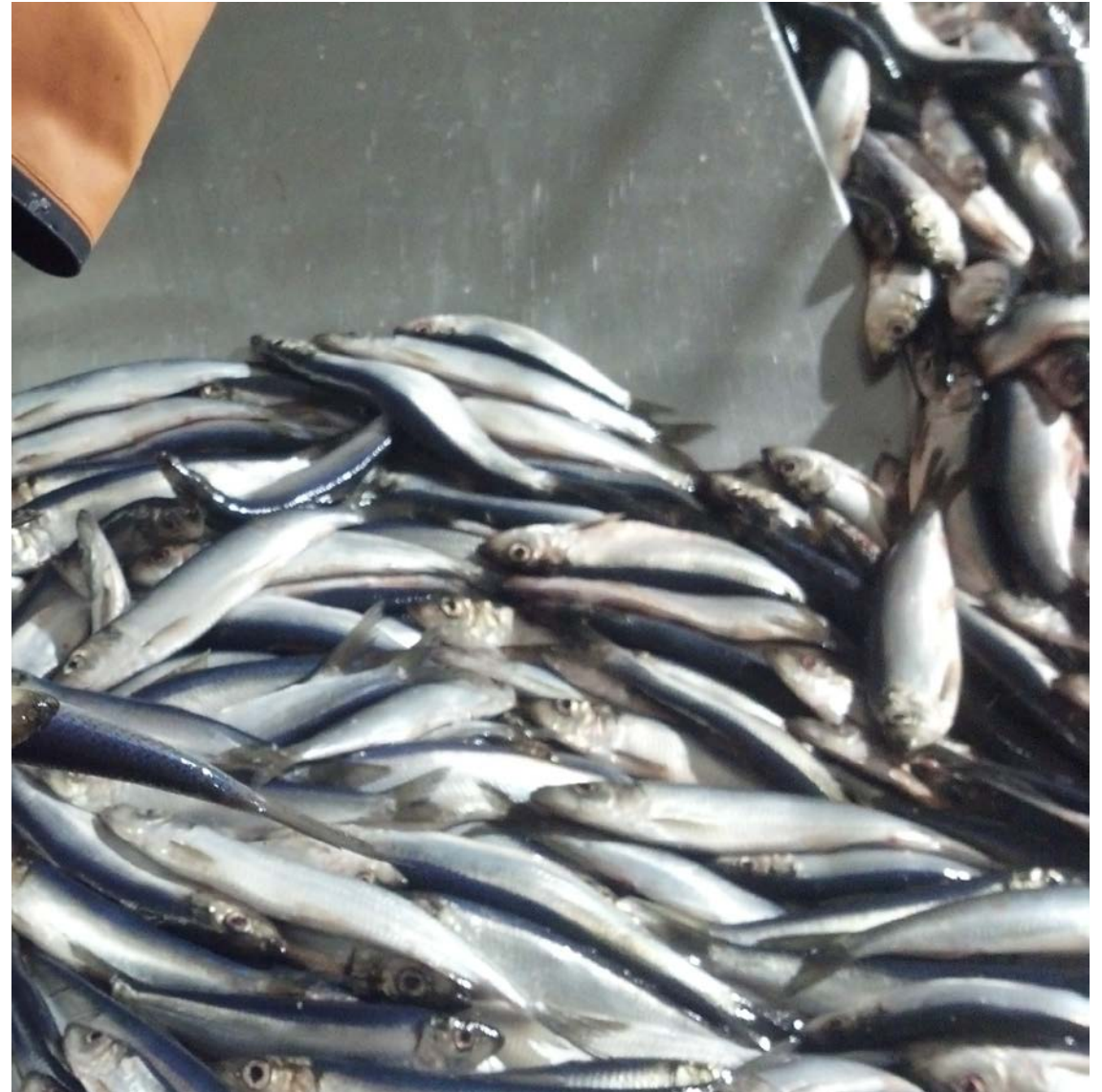
*Healthy fish stocks need healthy habitat*



# The Ecosystem Catch Cap

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1. The ecosystem refers to the Ecological Production Unit (EPU).
2. The Cap is the total allowed removal from the EPU.
3. It is related the annual available energy in the EPU.
4. Removal is limited to allow enough energy to remain and support the ecosystem.



# Ecosystem Catch Cap - *Energy*

Ecosystem Catch Cap is the total biomass that can be sustainably removed from the EPU, here, Georges Bank



## Primary Production

Just like plants, phytoplankton in the ocean use energy from the sun and nutrients from the surrounding water to grow and reproduce. Floating along with the phytoplankton are zooplankton which eat them.

This is the base of the food web and where energy enters the ecosystem.

# Ecosystem Catch Cap - *Energy*

In a healthy ecosystem, more energy at the base of the food web means more energy to “run” the ecosystem.



## Filter Feeders

Fish like menhaden filter plankton out of the water. More plankton means more energy which means more menhaden.

# Ecosystem Catch Cap - *Energy*

Energy cascades through the ecosystem as one species eats another.



## Predators

Filter feeding fish are an essential food source for larger, commercially important fish species.



Predators



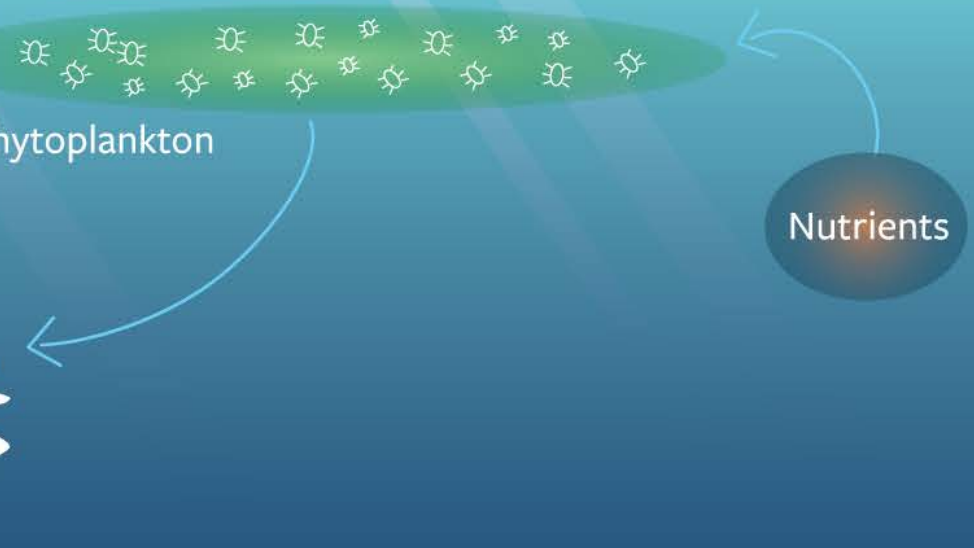
Filter Feeders



Phytoplankton



Nutrients



# Ecosystem Catch Cap - *Energy*

This sets a limit on total removal from the ecosystem to ensure there is enough energy for all ecosystem members.



## Non-Fish Species

Energy also needs to be available for other animals in the ecosystem.



Predators



Other Consumers



Filter Feeders



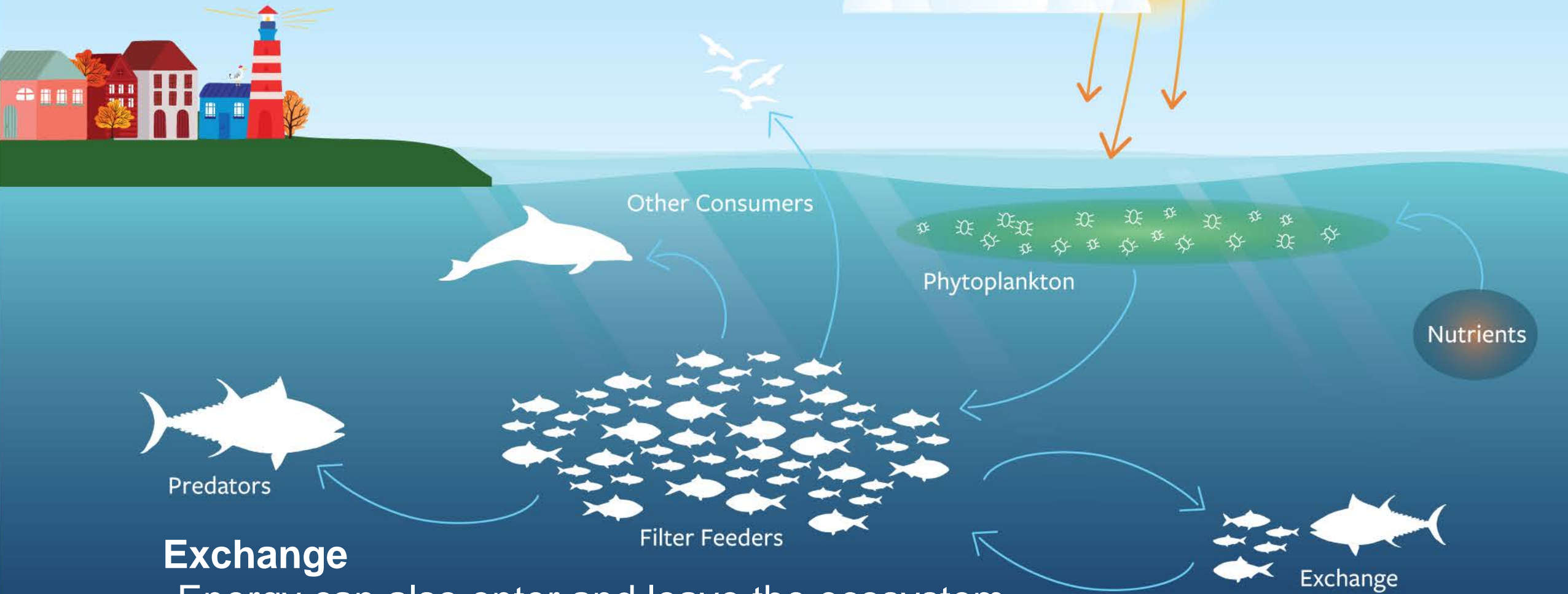
Phytoplankton

Nutrients



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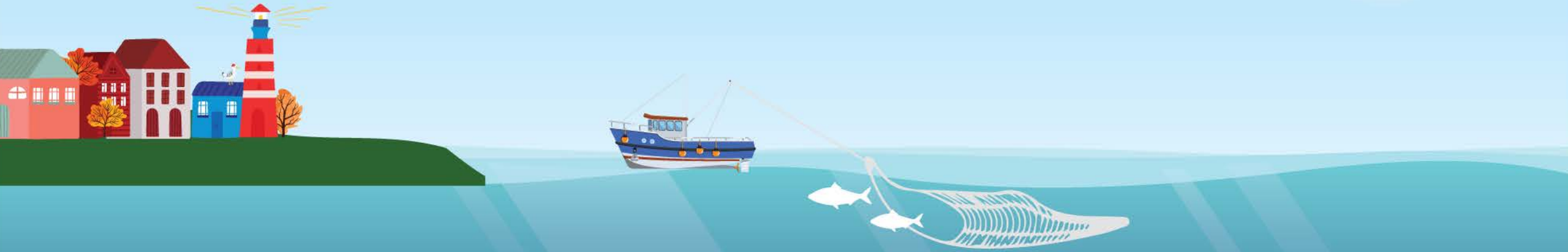


## Exchange

Energy can also enter and leave the ecosystem from neighboring EPU's.

# The Ecosystem Catch Cap

The Ecosystem Catch Cap sets a limit on the number of fish that can be sustainably removed from the EPU



1. The Cap includes both **managed** and **non-managed** species.

2. The Cap is related the annual available energy in the EPU.

3. Because the estimated energy can vary annually, the Cap can vary annually.





# Setting the Catch Cap

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Multiple methods for determining ecosystem productivity are currently being considered.

These methods use a combination of models and indicators of energy availability.



# What is a Stock Complex?

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Stock complexes are designed to address the reality that more than one species comes up in a net.

Species that play the same role in the ecosystem (use the same habitat, eat the same food, and swim the same way) are likely to be caught together.



## What is a Stock Complex?

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74 species are commonly caught in the Georges Bank EPU.

These have been assigned to one of seven Stock Complexes.



# Benefits of Managing By Stock Complex

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Managing catch at the complex level instead of the species level will provide **greater transparency** around trade-offs and the system of regulations, and fishermen **more flexibility** in business decisions.

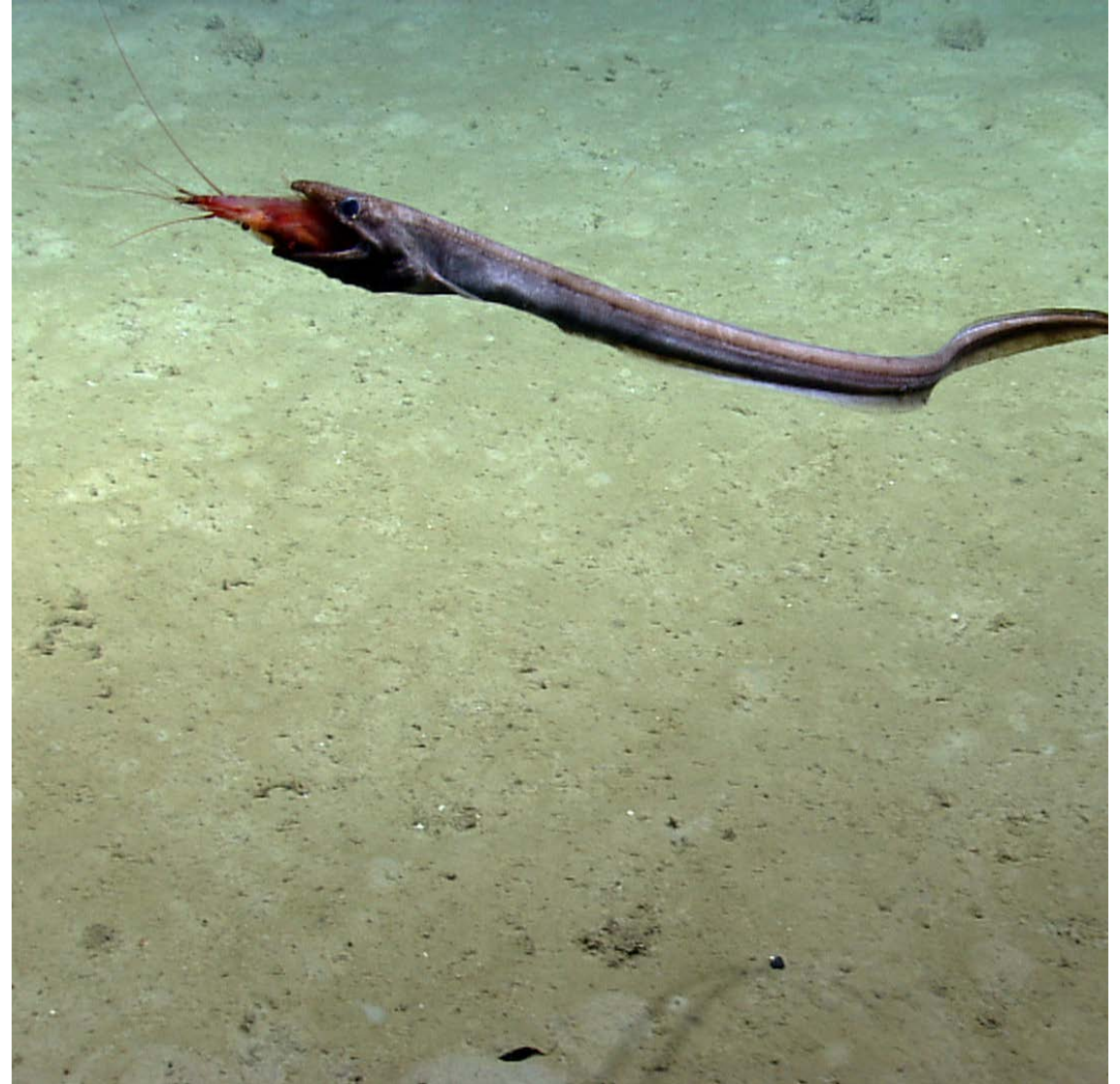


# Stock Complex Catch Ceilings

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The **Ceiling** is the **total catch** that can be sustainably removed from each of the Stock Complexes.

Ceilings take into account estimates of **predator and prey** interactions within the EPU.



## How Are Stock Complex Catch Ceilings Estimated?

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1. Use survey and catch data from all species w/in a complex and apply a production model to the complex, **OR**
2. Use a model that can assess multiple species and their interactions (predator/prey), **OR**
3. Based on the biomass trend for the complex adjusted for a sustainable catch.



# What are Species Biomass Floors?

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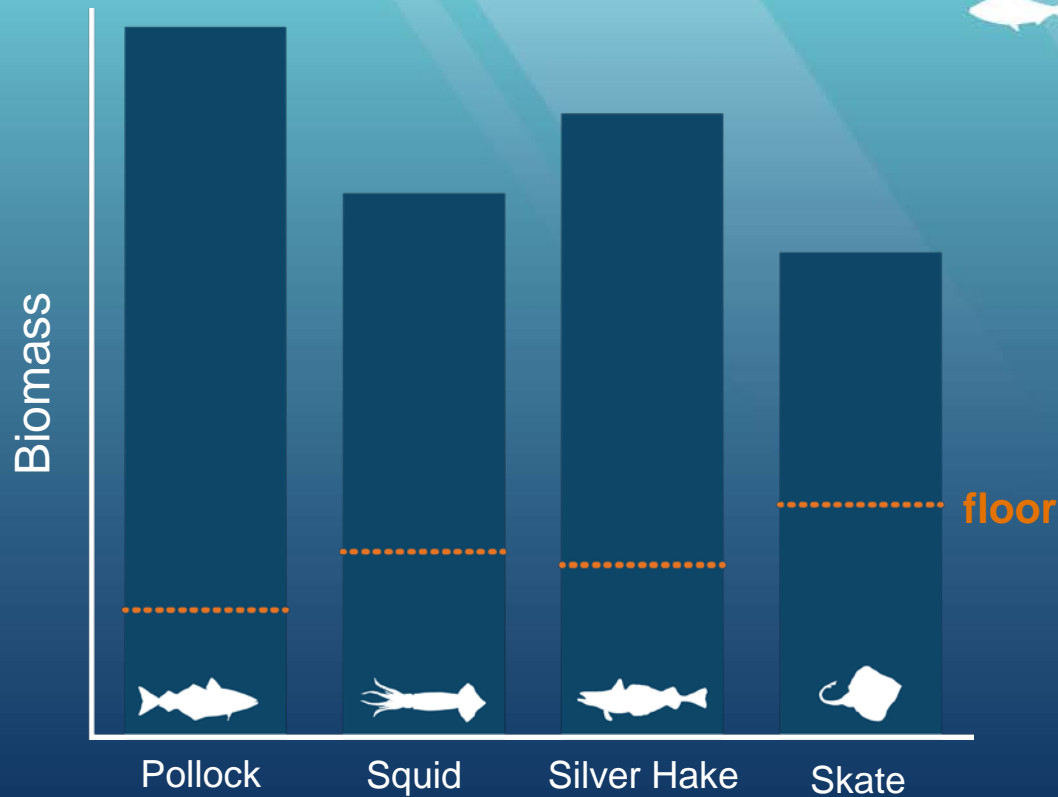
Floors are designed to protect **individual species**.

Amount of each species are not allowed to drop below a **level**, the Floor, that would put the species at **risk**.

Floors based upon best scientific evidence and Council policies.



# 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.



# What Is Your Role?

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- Attend these workshops and learn about EBFM.
- Determine what **your** goals would be in a fishery managed under EBFM.
- Ask **questions** and provide **input** and **feedback**.



## For More Information:

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- [NEFMC EBFM committee page](https://bit.ly/NEFMC-EBFM)  
<https://bit.ly/NEFMC-EBFM>
- [NEFMC Draft eFEP](https://bit.ly/DrafteFEP)  
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