

# Document 3e: Summary of Fishery Ecosystem Plan Components

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## 1. Goals and objectives

### 1.1. Goals – measurable or desirable outcomes (see draft list)

### 1.2. Objectives - General description of how the FEP is designed to achieve goals

## 2. Scope

A description of spatial boundaries, primary managed species, and secondary affected species, as well as fisheries, communities, and affected businesses

### 2.1. Ecosystem Production Unit (EPU)

A description of the spatial boundaries and range of trophically related stocks and species

### 2.2. Management Unit (or subunits) (MU)

A description of spatial boundaries and fisheries with allocated catch allocations and specific technical measures to regulate fisheries that occur here. Ideally, the boundaries chosen would be defined by a commonality among fisheries occurring within the MU, rather than on a species stock definition. A single management unit would not cross EPU boundaries.

## 3. Ecosystem processes (EPU)

### 3.1. A description of processes and parameter estimates for the EPU

### 3.2. Acknowledge linkages and estimate forage dynamics

### 3.3. Ecosystem Reference Points

#### 3.3.1. Limit on total ecosystem removals - Estimate Ecosystem Production Capacity as a system-wide limit (estimate uncertainty and buffer, recognize trends due to climate change)

Linked but distinct ecological production units based on habitat/oceanography/low trophic production many key species migrate, depend on multiple units seasonally text box: migratory and resident species by habitat within EPUs figure: key food web linkages

Dynamic reference points based on current system production regime Broad set of indicators for production

- Indicator selection criteria, continued monitoring
- Determine status relative to reference points using multiple tools, transparent decision process

- Balance conservation and social objectives  
(<http://s3.amazonaws.com/nefmc.org/150818.Risk.Policy.Road.Map.Draft.pdf>) (Tool: Risk assessment; Tool: stakeholder process based MSE)

3.3.2. Total allowable catch allocation by guild and/or trophic level (Tactical management advice; policy guidance agreement amongst management authorities, i.e. evaluation of tradeoffs)

3.3.2.1. Flexible allocation recommendations amongst MUs (accommodate effects of climate change)

3.3.2.2. Jurisdictional coordination and cooperation - Total allocations amongst MUs set by agreement of management authorities (Councils, Commission, NMFS HMS, Canada (under sharing agreement)

3.3.3. Penalties (one pound of catch counts for more than a pound of total removal) for catches of depleted, overfished, or key sensitive species, based on minimum stock size thresholds for individual species

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

3.4. Evaluate trends in ecosystem indicators and status (relative to reference points)

3.4.1. Overfishing criteria applying to aggregates of species at the ecosystem or group level

3.4.1.1. Fishing impacts on ecosystem

Fishing fleets and communities with variable dependence, resilience fishing fleets characteristics, participation across multiple fisheries other human uses of EPU, community vulnerability, tradeoffs/conflicts

3.4.1.2. Non-fishing impacts on ecosystem

Climate influences on the social-ecological system list current observations/impacts specific to EPU, communities projected changes

3.4.2. Overfished threshold apply at species/stock level

3.4.2.1. Fishing impacts on species or stock

Weak link stocks and spatial management considerations

3.4.2.2. Non-fishing impacts on species or stock

#### **4. Marine Resource and Fisheries Management Units (MU, spatially oriented subset of an EPU)**

**Management context complexity of within and between jurisdiction resource management legal mandates for fisheries, other ocean uses need for flexibility to address changing ecosystems and communities. Spatial management considerations.**

4.1. Management Board of commercial fishermen, recreational fishermen, community and business representatives, other marine resource users and stakeholders

4.1.1. Lead Council/Commission authority with participation by other Councils or Commission with interest in managed species

4.1.2. Annual monitoring report provides data and information for MU and EPU

4.2. Authorization to fish and catch allocations within the MU

To maximize flexibility and resiliency to change, any vessel authorized to fish in an MU may catch and land ANY species in the MU with ANY allowable gear. Individual or group limits would be needed to prevent a race to fish, based on historic catch or other criteria. A vessel may fish on separate trips in more than one MU if it has authorization to fish there.

4.3. Technical measures regulating fisheries within the MU

May address localized depletion of forage, bycatch reduction, marine mammal and endangered species avoidance, size selectivity to improve yield per recruit, impacts to habitat, and spawning potential

4.3.1. Allowable gears and mesh

4.3.2. Seasonal fishing restrictions (e.g. spawning closure)

4.3.3. Bycatch reduction devices and methods

4.3.4. Size limits

4.3.5. Spatial measures to conserve habitats.

4.4. Catch Monitoring and Accountability – includes ALL species, the same monitoring procedures used in all MUs in an EPU (see 4.4)

4.5. Marine Protected Areas (MPAs) – applies to a variety of fishing activities

May address local forage needs and demographics, as well as genetic and species diversity, other types of species interactions.

4.6. Habitat Protection Areas (HPAs) – applies to gears that affect bottom habitat

## **5. Research and Ecosystem Monitoring**

5.1. Biological and environmental sampling

5.2. Research evaluation and prioritization

5.3. Cooperative and gear effects research

5.4. Complete catch accounting (including all fish, mammals, reptiles, and invertebrates)

## **6. Affected Environment (EIS)**

### **A. Ecology of the Northeast Continental Shelf**

#### A.1 Physical Setting

##### *A.1.1 Habitat Characteristics*

##### *A.1.2 Oceanography of the Northeast Shelf*

##### *A.1.3 Climate Influences*

#### A.2 Ecological Production Units

#### A.3 Food Webs and Species Relationships

##### *A.3.1 The Base of the Food Web*

###### 3.3.1.1 Primary Production

###### 3.3.1.2 Zooplankton Production

##### *A.3.2 Benthos*

##### *A.3.3 Demersal Species*

##### *A.3.4 Pelagic Species*

##### *A.3.5 Threatened and Endangered Species*

#### A.4 Energy Flow and Production

##### A.4.1 Implications for Fisheries

### **B Human Dimensions**

#### B.1. Humans as Part of the Ecosystem

#### B.2 Coastal Communities

##### *B.2.1 Social Considerations*

##### *B.2.2 Economic Consideration*

#### B.3 Human Uses of the Oceans and Coasts

##### *B.3.1 Food Production*

###### B.3.1.1 Commercial Fishing

###### B.3.1.2 Mariculture

##### *B.3.2 Recreation*

###### B.3.2.1 Recreational Fishing

###### B.3.2.2 Boating

##### *B.3.4 Shipping*

##### *B.3.5 Energy*

###### B.3.5.1 Renewable Energy

###### B.3.5.2 Non-renewable Energy

#### B.4 Confronting Tradeoffs

##### *B.4.1 Tradeoffs Within/Among Fisheries*

##### *B.4.2 Tradeoffs with Other Ocean Use Sectors*

### **C Ecosystem Status**

#### C.1 Legally-Mandated Status Determinations

##### *C.1.1 Overfishing*

###### C.1.1.1 Fish

###### C.1.1.2 Shellfish

##### *C.1.2 ESA Listing Status*

###### *C.1.2.1 Fish*

###### *C.1.2.2 Marine Mammals*

###### *C.1.2.3 Sea Turtles*

###### *C.1.2.4 Sea Birds*

##### *C.1.3. Index of Leading Social-Ecological Indicators*

- C.1.3.1 Reference Levels
- C.1.3.2 Trends
- C.1.4. Regime Shifts*
  - C.1.4.1 Recruitment Patterns
  - C.1.4.2 Condition Factors
  - C.1.4.3 System-wide Metrics
- C.1.5 Multispecies Models*
  - C.1.5.1 Reference Points
  - C.1.5.2 Assemblage Analysis
  - C.1.5.3 Portfolio Analysis
  - C.1.5.4 Multimodel Inference
- C.1.6 Management Strategy Evaluation*
  - C.1.6.1 Management Procedure: Floors and Ceilings
- C.1.7 Risk Assessment