

Discussion Document 1

Summary of Fishery Ecosystem Plan Components

1. Goals and objectives

1.1. Goals – measurable or desirable outcomes

1.1.1. Overarching Goal

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

1.1.2. Strategic Goals (Derived from Magnuson definition of OY as in Risk Policy Document):

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

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

1.2.1. Strategic Objectives

1. Maintain/restore functional production levels (ecosystem, community scale emphasis)
2. Maintain/restore functional biomass levels (community/species scale emphasis)
3. Maintain/restore functional trophic structure
4. Maintain/restore functional habitat

1.2.2. Operational Objectives (SMART: Specific, Measurable, Achievable, Relevant, Time-bound)

1. Ecosystem and community/aggregate fishing mortality and or total catch is below established dynamic threshold (Strategic Objective 1)
 - a. Phrased as probability according to risk policy
 - b. Specified for each spatial scale and time unit
 - c. Dynamic to account for environmental/climate shifts
 - d. “GB EPU total catch has less than 40% probability of exceeding the total catch limit between 2016-2018”
2. Fishing-related mortality for threatened/endangered/protected species is minimized (could establish caps if desired) (Strategic Objective ?)
3. Managed and protected species biomass is above established minimum threshold (Strategic Objectives 1 and 3)

- a. Phrased as probability according to risk policy
 - b. Specified for each spatial scale and time unit
 - c. Dynamic to account for environmental/climate shifts
 - d. “GB haddock biomass has less than 40% probability of dropping below minimum B threshold between 2016-2018”
4. Maintain ecosystem structure within historical variation, recognizing inherent dynamic properties of the system; Ecosystem structure includes size structure, trophic structure, and functional group structure. (Strategic Objective 3)
- a. Maintain size structure within acceptable limits; e.g. *The large fish indicator within defined limits
 - b. Maintain trophic structure within acceptable limits; e.g.
 - i. *Mean trophic level of the catch within defined limits
 - ii. *Marine trophic index of the community (MTI) within defined limits
 - iii. *Mean trophic level of the community within defined limits
 - iv. *Mean trophic level of the modelled community within defined limits
 - c. Maintain functional group/guild structure within acceptable limits; e.g. *Functional Group/Guild-level biomass across ecosystem components within defined limits
5. Maintain habitat productivity and diversity (Strategic Objective 4)
6. Habitat structure and function are maintained for exploited species
7. Minimize the risk of permanent (>20 years) impacts; e.g.
- a. Corals and sponges
 - b. Other vulnerable biogenic habitats
 - c. Coastal habitats vulnerable to Aquatic Invasive Species (AIS)
 - d. Vulnerable physical habitats (e.g. relict glacial gravel banks)

Comment [AJA1]: Should 5 and 6 be combined?

2. Scope

A description of spatial boundaries, primary managed species, and secondary affected species, as wells 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.

2.1.1. Description of geographic boundaries

2.1.2. Description of biological boundaries, including abundance and landings trends

2.1.2.1. Top level trophic species and stocks

2.1.2.1.1. Marine mammals and reptiles (including endangered and threatened species)

2.1.2.1.2. Seabirds

2.1.2.1.3. Sharks

2.1.2.1.4. Managed finfish

- 2.1.2.1.5. NEFMC
- 2.1.2.1.6. MAFMC
- 2.1.2.1.7. ASMFC
- 2.1.2.1.8. NMFS HMS

2.1.2.2. Intermediate trophic species and stocks

- 2.1.2.2.1. Pelagic
- 2.1.2.2.2. NEFMC
- 2.1.2.2.3. MAFMC
- 2.1.2.2.4. ASMFC
- 2.1.2.2.5. NMFS HMS
- 2.1.2.2.6. Unmanaged

2.1.2.3. Benthic

- 2.1.2.3.1. NEFMC
- 2.1.2.3.2. MAFMC
- 2.1.2.3.3. ASMFC
- 2.1.2.3.4. NMFS HMS
- 2.1.2.3.5. Unmanaged

2.1.2.4. Lower level trophic species (derived from food habits data and stomach contents observations)

- 2.1.2.4.1. Forage fish
- 2.1.2.4.2. Pelagic invertebrates
- 2.1.2.4.3. Emergent and infaunal invertebrates
- 2.1.2.4.4. Managed invertebrates
- 2.1.2.4.5. Unmanaged invertebrates

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 there. 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 and Control Rules

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

- Reference points
Description and discussion
- Assemblage analysis
Description and discussion
- Portfolio analysis
Description and discussion
- Multimodel Inference
Description and discussion

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)
- Management Strategy Evaluation and Testing
Evaluation of management procedures: Floors, ceilings, control rule, uncertainty buffers, etc.

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)

Comment [AJA2]: Can we define what we mean by guild?

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. Management of forage species

3.3.3.1. Commercially harvested fisheries

3.3.3.1.1. Food and meal production

3.3.3.1.2. Production for bait

3.3.3.2. Recreationally harvested fisheries for bait

3.3.4. Overfished species and stocks

3.3.4.1. Status criteria

3.3.4.1.1. Assessment-based

3.3.4.1.2. Survey-based

3.3.4.2. Special priority management

3.3.4.2.1. Special catch limits

- 3.3.4.2.2. Area or gear restrictions
- 3.3.4.2.3. Landings prohibition (e.g. thorny skate, smooth skate)
- 3.3.4.3. Weak link stocks and spatial management considerations
- 3.3.4.4. Non-fishing impacts
 - 3.3.4.4.1. Climate change
 - 3.3.4.4.2. Pollution
 - 3.3.4.4.3. Other

3.3.5. Penalties (e.g. 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

3.3.6. 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 EPUs, 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 EPUs/communities projected changes

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.

4.2.1. Limited access qualification

4.2.2. Permit accumulation limits

4.2.3. Permit transferability

4.3. Catch allocation

Vessels may fish for all species within a guild that are present within an MU. The species and stocks that comprise a guild are likely to change with time.

4.3.1. Amongst MUs in an EPU

4.3.2. Between permits

4.4. 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

4.4.1. Allowable gears and mesh

4.4.2. Seasonal fishing restrictions (e.g. spawning closure and bycatch control)

4.4.3. Bycatch reduction devices and methods

4.4.4. Size limits

4.4.5. Spatial measures to conserve habitats.

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

4.6. Special management areas

4.6.1. 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.

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

5. Research and Ecosystem Monitoring

5.1. Management Strategy Evaluation (MSE)

Evaluation of FEP performance will be periodically conducted for each EPU with a draft or final/implemented FEP. The main focus of this evaluation will be conducted using one or more MSEs to determine how well the FEP is meeting goals and objectives. The MSE may also identify additional

or new management measures and procedures that could improve FEP performance.

- 5.1.1. Methods
- 5.1.2. Frequency
- 5.1.3. Pre-implementation
- 5.1.4. Post-implementation

5.2. Environmental Impact Statement (EIS)

Every five years or another period that meets NEPA requirements, the NMFS and its management partners will develop or supplement an EIS which will incorporate information in the Affected Environment (see below) as well as evaluate cumulative effects of the status quo and alternatives. It is intended that the measures developed for the MUs will be evaluated by tiering off this EIS.

5.3. Biological and environmental sampling

5.4. Research evaluation and prioritization

5.5. Cooperative and gear effects research

5.6. 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.2.1 Trends in productivity and guild assemblages

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
- B.3.1.3 Mariculture
- B.3.2 Recreation*
 - B.3.2.1 Recreational Fishing
 - B.3.2.2 Boating
 - B.3.2.3 Commercial tours (whale watching, etc.)
- B.3.4 Shipping (biological effects)
- 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*