



## New England Fishery Management Council

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# **New England Fishery Management Council Research Priorities and Data Needs 2010-2014**

The research priorities listed below were derived from recent fishery management plan documents, reviewed and in some cases updated by the Council's Plan Development Teams (PDTs) as well as Council staff. The Scientific and Statistical Committee reviewed the list approved by the Council in 2009, made very few deletions and a number of additions where appropriate. The list is not prioritized except where noted.

A number of the items could have been categorized under several headings, but were not repeated unless there was a specific need to do so (for example, if a synthesis of several items is identified in addition to the separate components). Other recommendations could involve an expansion of current data collection efforts and stock monitoring, but also may be addressed by a re-examination of current activities including such efforts the study fleet or electronic logbook initiatives.

Some investigations could be addressed through the collaborative efforts of scientists and fishermen. The Council has long recognized the benefits and value of cooperative research, has fully supported the Northeast Fisheries Science Center's initiatives in these areas and continues to support the agency's Cooperative Research Program specifically.

With respect to habitat and ecosystem research, the items below address current and perhaps the most obvious information gaps. The Council will likely expand this list once a synthesis of currently available information is developed. Studies on broader species relationships, understanding the impacts of land-based activities as well as the range of offshore energy-related development activities, mapping for a baseline understanding of fish habitats, understanding the effects of climate change and a host of other issues will emerge and should be taken into consideration in the future.

## I. Fisheries

### A. Stock Assessments

#### 1. Spatial-temporal distributions

Further investigations into stock definition, stock movements, mixing, and migration through tagging studies, DNA markers, morphological characteristics and other means for **groundfish, monkfish, skates, herring, and silver hake**.

#### 2. Biology

Life history work focusing on: (a) age and growth, (b) longevity, (c) reproduction, and (d) natural mortality of **monkfish**; recruitment processes (reproduction, larval and early post-settlement stages), growth, natural mortality (including predation and disease) of **scallops**; age, growth, maturity, and fecundity of managed **skate species**; extensive investigation concerning the biology of **red crab**, including growth rates, molt, reproductive cycles, maturity schedule, fecundity, and particularly the reproductive consequences of depleting large males. Examine red crab sex ratios by depth and year, information on larval supply, transport, settlement and early juvenile distributions and abundance. Investigate bathymetric demography of population of **silver hake**, including changes in seasonal distribution caused by environmental forcing to help with stock identification.

#### 3. Other

Investigate/determine the cause for retrospective patterns in New England **multispecies groundfish and herring assessments**, and identify appropriate adjustments (e.g., data or modeling revisions for both) to resolve those patterns.

### B. Surveys

Conduct intensive industry-based surveys of each of the five **sea scallop** access areas (Closed Area I, Closed Area II, Nantucket Lightship, Elephant Trunk and Delmarva areas) and beyond (Northern Gulf of Maine management area and Southern New England). Research new advanced scallop and multipurpose survey technologies (video, sonar, towed, AUV, etc.) and protocols that should be compatible with and complement the existing scallop resource surveys. Conduct peer-review and inter-survey calibrations of new and existing scallop surveys. Conduct deepwater (> 200 m) surveys and efficiency estimation of NMFS survey gear for **monkfish**. Continue development of hydroacoustic surveys and other resource surveys of **pelagic species** to provide an independent means of estimating stock sizes and/or defining localized depletion (long-term research).

### C. Fishery Performance and Monitoring

1. Improve sampling of commercial catch at age data, such as through cooperative NMFS/industry programs to supplement port agent activities for **groundfish** and similarly for **Atlantic herring**, with an emphasis on bycatch.
2. Develop programs to collect information required for social and economic impact as well as cost benefit analyses for **groundfish**.
3. Conduct research on the extent and composition of discards and bycatch in the **monkfish, groundfish** (including small-mesh) and **skate** fisheries.

4. Investigate discard mortality rates by gear for **monkfish** and **groundfish**, and by gear type, area, season, depth and bottom type for **all seven skate species** with an emphasis on overfished species (thorny and smooth skates).
5. Define localized depletion of spawning components on a spatial and temporal scale for **herring**.
6. Investigate fleet behavior and decision-making with respect to their relationship to population dynamics, closed areas, catch rates, etc.
7. Develop methods to improve reporting compliance, including accurate reporting of species and area fished. This includes proper identification of key species, which are often mis-reported by fishermen (e.g. skates and whiting (red/white; silver/offshore)). Improve procedures to reduce aggregate trip reporting by coastal states, so that more catches are reported by an identified vessel at an identified dealer, whether or not they have a federal permit, when they land a federally-regulated species (reportedly) captured in state waters.

## D. Fisheries Management

### Groundfish

1. Synthesize the available information/research results to improve utility to managers (in particular related to the following items):
  - Undertake comparative studies on the impacts (positive and negative) of gear on habitat, such as the different impacts between chain nets, roller gear and rockhopper gear, etc. Conduct studies on whether limiting roller or rockhopper gear, or specifying other aspects of trawl gear, results in areas of complex habitat that are not used by trawl fishermen.
  - Conduct research on the extent and composition of discards and bycatch in the groundfish fishery, including research to estimate discard mortality rates by gear for groundfish.
2. Develop a management strategy evaluation program (a specific approach to address scientific and management uncertainty, organizational and/or institutional programs and bodies, and sources and levels of funding).
3. Develop industry-based information collection systems to improve information used for groundfish management.
4. Quantify the impacts of closed areas, and evaluate the effectiveness of timing closures to coincide with spawning activity (e.g. Gulf of Maine rolling closures).
5. Investigate the effect of various management instruments (specifically user rights and ocean zoning) on management performance (biological, social and habitat) and enforcement.
6. Investigate the feasibility of public leasing of vessels to reduce fishing mortality for fisheries that have long-term potential to sustain the existing fleet capacity.
7. Consider management options for minimizing impacts on vulnerable marine ecosystems.
8. Evaluate effects and effectiveness of permanent closed areas.

### Sea Scallops

Scallop and area management research, including but not limited to: an evaluation of ways to control predation on scallops; research to actively manage spat collection and seeding of sea scallops; social and economic impacts and consequences of closing areas to enhance productivity and improve yield of sea scallops and other species; and estimate factors affecting fishing power for each limited access vessel.

## Skates

Develop effective species identification methods for fishermen, dealers, and port samplers to improve data on species composition of landings and discards. This could include an inexpensive biochemical/genetic assay method, better training and better morphological keys for juvenile skates and skate wings.

## II. Fisheries Interactions

### Bycatch

1. Research fishing practices or gear modifications that may change the ratio of component catch species or improve size and species selectivity of gear in groundfish, scallop, monkfish, herring and skates.
2. Collect data on discards of other clupeids in the sea herring and other fisheries.

### Expanded Ecosystem Studies

1. Synthesize predator/prey information on **herring and other forage fishes** and conduct investigations to address information gaps; investigate the role of **herring and other forage fishes** in the Northwest Atlantic ecosystem and the importance of **herring and other species** as a forage for other commercial fish stocks; assess the importance of herring as forage relative to other forage species in the region.
2. Provide information for use in marine spatial planning.
3. Investigate relationships between stocks, including predator/prey relationships and evaluate whether stock status of some species is slowing the rebuilding of **groundfish** stocks.
4. Conduct research concerning trophic interactions of **monkfish** and monkfish cannibalism on other species; recognize the need to incorporate monkfish into prey assessments.
5. Investigate the influence of physical factors (including environmental changes) on shifts in the range and distribution of species within the **skate** complex.
6. Examine trophic interactions between **skate** species and other bottom species that occupy the same habitats.
7. Monitor trends in non-target, ecosystem components
8. Investigate effectiveness and economic impacts of closed areas and special access areas to achieve desired goals, including bycatch avoidance/reduction, mortality reduction, yield benefits, and ecosystem improvement.

### Endangered, Threatened and Protected Species

1. Develop gear modifications or fishing techniques that may be used to reduce or eliminate the threat of sea turtle interactions without unacceptable reductions in target retention in **all fisheries**.
2. Identify "hot spots" within the **scallop** fishery through data available on the observed take of sea turtles and other suitable information (*i.e.*, data on observed turtle interactions for other fisheries or fishery surveys in the area where the scallop fishery operates).
3. Continue and update studies on turtle behavior with respect to how sea turtle interactions with scallop dredge gear are occurring.
4. Investigate protected species bycatch/discards in the **directed herring fishery**.

### **III. Habitat**

1. Research resulting in spatial databases designed for analyses of managed species, geological, biological, and physical habitat relationships. Ideally, these data will contain absolute species abundances and concurrently sampled habitat features and substrates. The resulting data products should contain explicit statements regarding the limitations of the data for EFH analyses given the original sampling design and spatio-temporal sampling scale(s). Particular areas of interest include:
  - a. Geological and biological sampling of the Gulf of Maine region .
  - b. Broad-scale infaunal sampling and benthic community structure analyses (i.e. an update to the Theroux and Wigley dataset).
  - c. Ground-truthing via physical sampling of benthic fauna observed in video and still imagery-based datasets.
  
2. Experimental examination of gear impacts on seabed habitats in Northeast US waters. Sampling should follow an appropriate experimental design, such as before-after control impact (BACI). Particular areas of interest include:
  - a. Studies that would inform assessments of the effects of fixed gears on seabed habitat components. In particular, the extent of fixed gear movement along the seabed during setting, soaking, and hauling is not known.
  - b. Comparative studies of the effects of various trawl gear configurations on seabed habitat components. These studies would inform estimates of the possible benefits of gear restrictions/modifications. Also, evaluate whether gear restrictions actually result in changes in the distribution of fishing effort by habitat type. In order to model the effects of these changes, data would need to be collected on when, where, and under what conditions particular gear configurations are employed.
  - c. Studies that help to quantify the degree of seabed contact for particular gears and their component parts.
  
3. Link habitat types and their specific functions with fishery resource productivity. This information could be used to refine EFH designations, to understand the relative benefits of EFH impact minimization alternatives and possibly to inform reference point definitions.
  
4. Collect additional data on the locations of deep-sea corals on/adjacent to the Northeast US continental shelf. Broad-scale observations of previously unsurveyed areas would refine understanding of the total area of seabed covered by these species - much of the current data was collected on a fine scale and there are many gaps in coverage.
  
5. Refine estimates of critical shear stress at the seabed/water column interface. Where possible, use data from sensors deployed on the seabed to groundtruth modeled estimates.
  
6. Conduct studies on invasive species/organisms to understand dispersal, and impacts on habitat, species, etc.
  
7. Explore trade-offs between habitat protection within closed or restricted areas and shifts in effort to open areas; impacts of implicit or explicit outcomes should be ground-truthed.

## FMP-Specific Habitat Research

### **Groundfish**

Undertake comparative studies on the impacts (positive and negative) of gear on habitat, such as the different impacts between chain nets, roller gear, and rockhopper gear, etc.

### **Sea Scallops**

1. Identify and evaluate methods to reduce habitat impacts, including, but not limited to: broader investigations of variability in scallop dredge efficiency across habitats, times, areas, and gear designs; and research on habitat effects from scallop fishing and the development of practicable methods to minimize or mitigate those impacts.
2. Habitat characterization research including, but not limited to: video and/or photo transects of the bottom within scallop access areas and within closed scallop areas and in comparable fished areas that are both subject and not subject to scallop fishing before and after scallop fishing commences; develop high resolution sediment mapping of scallop fishing areas possibly using the Canadian sea scallop industry mapping efforts as a model; identify nursery and over-wintering habitats of species that are vulnerable to habitat alteration by scallop fishing; and other research that relates to habitats affected by scallop fishing, including, but not limited to, long-term or chronic effects of scallop fishing on marine resource productivity, other ecosystem effects, habitat recovery potential and fine scale fishing effort in relation to fine scale habitat distribution --- in particular, projects that directly support evaluation of present and candidate EFH closures and HAPCs to assess whether these areas are accomplishing their stated purposes and to assist in better defining the complex ecosystem processes that occur in these areas.

### **Monkfish**

Conduct tagging and telemetry studies focusing on basic life history as well as habitat use.

## **IV. Areas of Research for all Fishery Management Plans**

Initiate or expand appropriate programs to collect information required for improved social and economic impact analyses. This has been identified as a pressing need for every NEFMC fishery management plan.