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Draft Plan for Five-Year Research Priorities for New England Council Fishery Management Plans 2009-2013

The following list of research priorities was prepared by the Council's Research Steering Committee and subsequently reviewed and revised by its Scientific and Statistical Committee (SSC). The SSC is seeking approval from the full Council so the document may be forwarded to the National Marine Fisheries Service's Office of Science and Technology for consideration during its annual cycle of research planning, as well as to the Regional Administrator and Northeast Fisheries Science Center Director.

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), and also where practicable, were reviewed by the species oversight committees. In the case of silver hake and red crab, the Council's respective oversight committees and PDTs did not meet; however, given that stock assessment information needs for both species were updated at Stock Assessment Workshops held within the last two years, those items are listed below.

A number of priorities on the list 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 involve an expansion of current data collection efforts and stock monitoring, but also may be addressed by a re-examination of high priority research activities that have been successfully completed in the recent past, such as the study fleet or electronic logbook initiatives.

Similarly, any number of the investigations proposed may 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 NEFSC's initiatives in this areas and specifically continues to support the agency's Cooperative Research Program.

It is also important to recognize that the Council will be developing a Fishery Ecosystem Plan during 2009-2010. While 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 as the Ecosystem Plan evolves.

Finally, it must be noted that although the priority calling for "appropriate programs to collect information required for social and economic impact analyses" is a recommendation that grew out of discussions concerning groundfish management, this is a pressing information need for every NEFMC fishery management plan.

I. Fisheries

A. Stock Assessments

1. Spatial-temporal distributions

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 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 **skates**; extensive investigation of the biology of **red crab**, including the growth rate, molt and reproductive cycle, 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** and quantify age-specific fecundity.

3. Other

Investigate/determine the cause for retrospective patterns in New England multispecies **groundfish** assessments, and identify appropriate adjustments 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 on new advanced scallop and multipurpose survey technologies (video, sonar, towed, AUV, etc.) and protocols which should be compatible with and compliment the existing scallop resource survey. 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**. Surveys of spawning aggregations of **silver hake** on the southern flank of Georges Bank are also needed. Continue development of hydroacoustic surveys to provide an independent means of estimating stock sizes and/or defining localized depletion (long-term research possibilities).

C. Fishery Performance and Fisheries Monitoring

1. Improve sampling of commercial catch at age data, such as through cooperative NMFS/industry programs to supplement port agents for **groundfish** and similarly for **herring** with an emphasis on bycatch.
2. Develop appropriate programs to collect information required for social and economic impact 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, groundfish**, and by gear type, area, season, depth, and bottom type for all seven **skate** species with an emphasis on overfished species (thorny, winter and little skates)
5. Define localized depletion on a spatial and temporal scale in herring.

D. Fisheries Management

Groundfish

1. Synthesize available information/research results to improve utility to managers (in particular related to the following items).
 - Investigations into relationships between stocks, including predator/prey relationships and evaluation of whether stock status of some species is slowing rebuilding of groundfish stocks.
 - 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. 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.
 - 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).
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 timing closures to coincide with spawning activity (e.g. Gulf of Maine rolling closures).

Sea Scallops

1. Scallop and area management research, including but not limited to: 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 estimation of factors affecting fishing power for each limited access vessel.

Skates

1. Develop effective species identification methods for fishermen, dealers, and port samplers. This could include an inexpensive biochemical/genetic assay method, better training, and better morphological keys for juvenile skates.

II. Fisheries Interactions

Bycatch

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.

Expanded Ecosystem Studies

1. Explore ocean zoning and the use (siting) of marine resource services for long-term multi-jurisdictional planning.
2. Investigations into relationships between stocks, including predator/prey relationships and evaluation of whether stock status of some species is slowing rebuilding of **groundfish** stocks.
3. Research concerning trophic interactions of **monkfish** with other species.
4. Investigate the influence of physical factors (including environmental changes) on shifts in range and distribution of species within the **skate** complex.
5. Synthesize **herring** predator/prey information and conduct investigations to address information gaps; investigate the role of herring in the Northwest Atlantic ecosystem and the importance of herring as a forage species for other commercial fish stocks; assess the importance of herring as forage relative to other forage species in the region.
6. predator/prey interactions and trophic interactions between **skate** species in the complex and between skates and other bottom species that occupy the same habitats.

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. Study turtle behavior, especially where (on the bottom or in the water column) and how sea turtle interactions with scallop dredge gear are occurring.
4. Investigate protected species bycatch/discards in the directed herring fishery.

III. Habitat

1. Investigate growth rates for deep sea coral species.
2. Undertake detailed habitat mapping throughout the Council's area of operations, including along the continental slope for **red crab** and other deepwater species.
3. Further study the contribution of benthic habitat to prey survivability.
4. Quantify adverse impacts of fishing gears and gains to habitat possible through increases in catch per unit of fishing effort.
5. Conduct before-after control impact studies (BACI) in New England waters to test for fishing gear impacts in different substrates, depths and energy environments.
6. Link habitat types and their specific functions with fishery resource productivity.
7. (Evaluate/quantify the effects) of land-based activities on critical ocean habitats, including the potential for designating EFH using expanded metrics such as fish condition indices and habitat quality.

FMP-Specific Habitat Research

Groundfish

1. 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. 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.

Sea Scallops

1. Identify and evaluate methods to reduce habitat impacts, including, but not limited to: broader investigation of variability in scallop dredge efficiency across habitats, times, areas, and gear designs; and research on habitat effects from scallop fishing and 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 commences; development of high resolution sediment mapping of scallop fishing areas using Canadian sea scallop industry mapping efforts as an example process; identification of 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 related 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 better definition of the complex ecosystem processes that occur in these areas.

Monkfish

1. Tagging and telemetry studies focusing on habitat usage.

IV. Other Areas of Research

Groundfish

Development of appropriate programs to collect information required for social and economic impact analyses.

