

## **Fishery Monitoring and Survey Selectivity**

*February 24 - 26 2014, New Bedford, MA*

Scientists, fishery managers, fishermen, groundfish sector managers and other stakeholders from throughout New England contributed to a workshop focused on reviewing the fishery monitoring system in New England, specifically for the Northeast groundfish fishery. The workshop was hosted by The Massachusetts Marine Fisheries Institute (MFI) as the third in a series that forms an end-to-end review of groundfish stock assessments and management<sup>1</sup>.

### Terms of Reference

1. Document current protocols and sampling designs for the fishery monitoring programs and resource surveys.
2. Document the current data needs of management and science, including any changes anticipated to these needs. Determine if these needs are being met by current sampling programs.
3. Recommend revisions to the current data collection system to improve the ability to meet the scientific and management needs.
4. Provide recommendations for an optimal sampling system to meet scientific and management needs.
5. Provide recommendations that are relevant to the general topic.

Conclusions and recommendations were intended to be complementary to the NMFS review of data collection programs in 2013. Consensus recommendations developed at the workshop relative to surveys and fishery-monitoring programs are provided below. A more detailed workshop report will be provided as a part of the integrated end-to-end review of groundfish stock assessments and management.

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<sup>1</sup> *Representatives from National Marine Fisheries Service Greater Atlantic Regional Fisheries Office (formerly Northeast Regional Office) and Northeast Fisheries Science Center participated in this workshop. This does not constitute an endorsement of the recommendations of the workshop.*

## **Surveys**

### Conclusions

1. Inshore surveys are necessary to complement offshore surveys, particularly in nursery areas.
2. Industry-based and other supplemental surveys are necessary to complement programmatic surveys for addressing specific science and management objectives.

### Short term Recommendations

1. Short-term science and management issues should be addressed using supplemental studies that are designed to meet a specific objective rather than revising or temporarily expanding programmatic state and federal surveys.
  - a. Industry based surveys should be used to monitor the effectiveness of closed areas. More passive sampling methods (e.g., fixed gear, cameras) may be needed.
  - b. Industry based surveys with alternative sampling methods (e.g., flatfish sweep, acoustic surveys) should be used to investigate short-term issues or species-specific questions.
  - c. The scope and objectives of industry based surveys should be based on current and future funding available, and the funding should be committed to meet those objectives.
  - d. Coordination with scientific and management processes is needed throughout the study (from scoping to dissemination) to facilitate use of results.
  - e. A probability-based sampling design should be considered to meet the objective of the industry based survey.
  - f. Protocols developed for survey should be maintained throughout the study. When changes in protocol are needed, they should be documented.
  - g. Consider surveys that produce absolute estimates of abundance so that advances in survey technologies and changes in protocol can be sequentially incorporated.
2. Field studies should be considered to inform relative selectivity and efficiency of surveys:
  - a. Independent estimates of relative efficiency from field surveys should be considered in stock assessments.
  - b. Information on the form of selectivity (i.e., flat-topped vs. domed) from field studies should be considered.
  - c. Paired tow comparisons with relatively more efficient sampling gear, gear with greater retention or longer tows should be considered for estimating relative efficiency and selectivity.
  - d. Escapement studies (video, retention bags), including herding efficiency, should be considered for estimating efficiency and selectivity.
  - e. All aspects of selectivity and efficiency should be considered, including vessel effects, timing of surveys, fish behavior, availability, area sampled, and fish behavior.
3. Absolute estimates of area-swept abundance from industry-based surveys or other supplemental studies (e.g., abundance and mortality estimates from tagging studies) should be considered to inform stock assessments.

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4. Investigate when it would be appropriate to use the Bigelow survey as a single time series for stock assessments, rather than converting the Bigelow series to the Albatross series.
5. Investigate the effect of environmental changes and new habitat data on survey design and relative abundance indices.
  - a. Investigate the effects of shifting depth and geographic distributions on survey catchability and relative abundance indices (e.g., continuing and expanding GARMIII investigations) or post-stratification of surveys to account for changes.
  - b. Investigate the effect of changes in environmental patterns on surveys, possibly using environmental correlates to adjust survey catchability (similar to the 2013 butterfish assessment approach) or post-stratification of surveys to account for environmental patterns.
  - c. Investigate post-stratifying analyses of survey data by species, and possibly re-stratifying survey designs by multi-species habitat attributes (e.g., NEFSC ecosystem production units) or management areas (e.g., jurisdictional boundaries, 'permanent' habitat closures) or reallocating stations based on multispecies patterns.
6. Day-night differences need more investigation for many species.

### Long term Recommendations

1. When changes to the survey system are imminent (e.g., vessel changes), consider improvements to all aspects of the survey system, including the consideration of alternative sampling gear, advanced sampling technologies, and coordination among surveys.
2. State and federal surveys should be more coordinated in their planning (e.g., timing, protocols, spatial coverage, standardization) while maintaining their specific objectives and take advantage of opportunities for coordination (e.g., common stations).
3. Expand the objectives of surveys where needed to consider monitoring natural mortality (e.g., feeding studies, tagging studies), and ecosystem approaches to assessment and management as well as applications beyond stock assessment (e.g., habitat).

## **Fishery Monitoring System**

### Conclusions

1. The fishery monitoring system includes the process to decide the coverage levels, selection process, fishery definitions, data collection, analysis and application of discard ratios and other monitoring metrics, as well as communication and data access to vessel owners and other stake holders. Although the current fishery monitoring system is designed to meet many objectives (e.g., enforcement, sector monitoring, stock assessments, monitoring annual catch limits of all managed species in the Northeast region), and the current system was developed based on a sequence of changing needs, the system has not been evaluated for its performance and cost efficiency in meeting current and near-future needs.
2. Improvements are needed to support the increased needs of timely fishery monitoring and more effective fishery management in general (e.g., sector management).

### Short term Recommendations

1. Communication of the objectives, general design, protocols and uses of each data collection program as well as how they are linked is needed for all data users to understand the current system and how it can be accessed and improved.
2. A unique trip identifier for all fisheries is needed for all appropriate data collection programs.
3. More timely availability of information is needed for management of all fisheries (e.g., sector management).
  - a. A more efficient reconciliation process through better cooperation between NMFS, sector managers, fishermen and dealers would decrease time lags.
  - b. A transparent and coherent policy on sector carry-over needs to be developed to support sector management, including timely communication of decisions.
4. The At-Sea Monitoring Program should be designed to primarily meet the additional needs of sector monitoring.
  - a. Secondly, where possible, at-sea monitoring should be compatible with the Northeast Fisheries Observer Program, which is currently designed to support the needs of stock assessment and catch limit monitoring for all Northeast fisheries.
  - b. Both at-sea monitoring and the Northeast Fisheries Observer Program should be cost-effective.
    - i. Considering the many species targeted by demersal fisheries that are not included in the multispecies groundfish management plan (e.g., monkfish, skates, dogfish), alternative identification of groundfish trips for at-sea monitoring may improve cost-effectiveness.
  - c. The objectives, design and protocols of at-sea monitoring should continue to have input from the fishing industry to support sector management and to meet at-sea monitoring standards.

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- i. At-sea monitoring standards need to be further developed.
      - ii. Alternatives to the precision standard should be considered for determining coverage objectives.
    - d. The NMFS-led discard methodology review should consider and evaluate alternative monitoring designs (e.g., proportional sampling, or adaptive sampling for species expected to approach a catch limit) and alternative management processes that can potentially achieve agreed standards with greater cost-efficiency (e.g., those developed by the GMRI monitoring group and others; which are not mutually exclusive):
      - i. Fixed-discard rate
      - ii. Maximized retention, possibly with dockside monitoring or electronic monitoring
      - iii. Vessel-based discard allocation and monitoring
      - iv. Sector-specific monitoring programs
      - v. Alternative stratifications
5. Data needs to be more accessible to all users.
  - a. Access to non-confidential information should be easy for anyone.
  - b. Data sharing exceptions should be granted for sector management, bycatch avoidance or catch optimization.
  - c. The confidentiality policy should be transparent.
  - d. 3<sup>rd</sup> party organizations should be considered for quick analysis of confidential data.
  - e. Data applications that will improve collaboration with the fishing industry, including increased benefits of participation in monitoring programs should be explored.
6. The derivation of at-sea catch weights derived from fish length as compared to measured weights at sea and at port should be investigated. Volumetric sub-sampling would need to be considered for some length-based estimates of catch weights.
7. Comparisons of study fleet data to observer data as a consistency check should be continued and expanded to evaluate the use of study fleets for monitoring and stock assessment.
8. Investigate the appropriate use of standardized fishery catch rates from study fleets for comparison to survey indices of abundance.
9. Identify additional gear characteristics in vessel trip reports to refine fleet definitions for discard estimation
10. More biological sampling is needed (including maturity, age) in some recreational fisheries, particularly those with access to groundfish closed areas.
11. Collection of maturity data from commercial fisheries (e.g., observers and study fleets) should be evaluated.
12. A more precise approach to determining location of catch from unobserved trips is needed.

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Long term Recommendations

1. The current objectives and system requirements need to be defined and the system needs to be revised to meet those needs.
2. A more integrated system of collection programs would be more efficient.
3. Simplification, stream-lining and cost-effectiveness should be considered.
4. Streamlined electronic reporting with efficient data entry and processing would be an improvement over logbooks.
5. Challenges with acceptance and training associated with new and emerging technologies will need to be confronted.
6. Acceptance of new technologies and higher quality data reporting need to be incentivized (e.g., additional allocations, similar to the Scottish Cod Conservation Program, or removing discards from allocations).
7. Contracting software development to private industry should be considered as an option.
8. Lessons from the entire groundfish sector monitoring system should be considered in the design of monitoring programs for all northeast fisheries.