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NEFMC SSC Panel Peer Review of the Fishery Data for Stock Assessment Working Group Report

Patrick J. Sullivan (Chair), Hirotsugu Uchida, John Wiedenmann
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Terms of Reference

Determine if the Working Group Report is technically sound and assess the strengths, weaknesses, and relevance of each section of the report.

1. Explain how fishery dependent and fishery independent data are used in stock assessments, including how different data elements are used and interact in an age-based analytic assessment.

2. Summarize the theoretical utility and limitations of using catch per unit effort (CPUE) and landings per unit effort (LPUE) as indexes of abundance for Northeast multispecies (groundfish) stocks, including recent efforts to create a CPUE for any of these stocks and the results of those efforts.

3. Identify the fishery factors and fishery dependent data needed to create a CPUE that would be a reliable index of abundance for Northeast multispecies stocks – without regard to existing fishing practices, regulations, or monitoring systems.

4. Compare the desired factors identified with existing conditions and data for the fishery through a gap analysis of factors and data needed, as well as the analytical approaches necessary, to create a CPUE that would be a reliable index of abundance for Northeast multispecies stocks.

Background

- Accurate indexes of abundance are vital to fisheries assessment and management
- Indexes can come from a variety of sources, but may vary in information content and quality
  - Scientific surveys (fishery independent)
  - Commercial or recreational Catch Per Unit Effort (fishery dependent)
- Issues to consider include informational objectives, cost, coverage and statistical sampling biases
- A wide variety of approaches for deriving accurate indexes of abundance are successfully used in New England and worldwide

Example – Summer Flounder

- The MAFMC summer flounder (fluke) stock assessment includes:
    - Three NMFS adult surveys
    - One NMFS larval survey
    - Ten state surveys
    - Consideration made of commercial CPUE, but not included explicitly in the assessment

Overall Assessment of WG Report

- Clear and thorough coverage of the strengths and weaknesses of information collected from fishery dependent sources

- Particular attention was given to the usefulness and biases associated with Catch Per Unit Effort (CPUE) and Landings Per Unit Effort (LPUE) data as might be employed to assess relative changes in stock abundance to supplement federal or state survey CPUE indices.

- Discard data, although important, was not included in the ToR and so were not considered in the WG Report

Key Contrast in Data Sources

- The WG Report provides a clear and concise summary of the complex topic of how fishery data is gathered and used.
  - Federal and State surveys follow a proscribed unbiased statistical design while gathering other pertinent biological information (age, size and sex composition, growth, maturity and fecundity).
  - Data from fishery dependent sources, while abundant and rich in information, may not be, more specifically, globally representative of the dynamics.
  - Nevertheless, fishery dependent data is an abundant, rich and often underutilized source information worth careful examination.
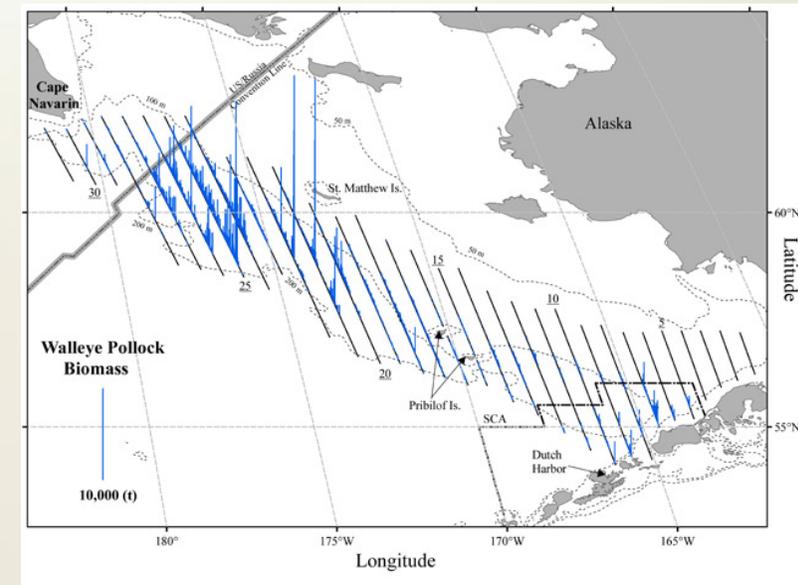
TOR1: *Explain how fishery dependent and fishery independent data are used in stock assessments, including how different data elements are used and interact in an age-based analytic assessment.*

- The WG Report clearly explains how fishery dependent and fishery independent data are used in fishery stock assessments.

- Both data sources are used in a variety of ways.

- In New England, stock assessments often rely on standardized statistically designed surveys using abundant survey information.

- Other regions, that do not have regular standardized surveys often rely solely on fishery dependent data sources, while still other regions, such as in the North Pacific, often incorporate both.

- Why are standardized approaches considered the gold standard?
  - Example: Herring purse seine fishery in the North Atlantic.
  - In this example, because the fish school, the perceived CPUE did not change as the stock decreased. The fleet continued to be able to find schools to set on until no more schools were left.

Managers were unintentionally misled about stock status and the stock collapsed.
This example is not an uncommon occurrence and is often used to justify scientific survey sampling as the gold standard.

Photo by Ian McAllister

TOR1: *Explain how fishery dependent and fishery independent data are used in stock assessments, including how different data elements are used and interact in an age-based analytic assessment.*

- As the WG reports, technological advances in terms of computational and data gathering hardware and software can greatly improve the acquisition and use of fishery dependent data.

- Should fishery dependent data be considered for expanded use in New England, data handling and quality assurance procedures already in use in areas outside the northeast might be considered (e.g. SEDAR, STAR).

- It is also useful to consider *other* information that may come from fishery dependent data sources, such as might inform social and economic consequences of risk and decision making relative to fishing behavior and responses to management actions.

TOR 2: *Summarize the theoretical utility and limitations of using catch per unit effort (CPUE) and landings per unit effort (LPUE) as indexes of abundance for Northeast multispecies (groundfish) stocks, including recent efforts to create a CPUE for any of these stocks and the results of those efforts.*

- The WG Report provides a thorough consideration of the pros and cons of using fishery independent and fishery dependent catch rates.

- Examples are provided of where and when CPUE data from both sources are used and seen to be valuable.

- For example, it is important to recognize that catch by itself is necessary and effort by itself is informative relative to spatial and temporal fishing pressure, and that CPUE can be used to examine local catch rates and reasons why fishers make the choices they make.

- Fishery CPUE also is a useful indicator of what the fishermen see relative to what scientists might see.

TOR 3: *Identify the fishery factors and fishery dependent data needed to create a CPUE that would be a reliable index of abundance for Northeast multispecies stocks – without regard to existing fishing practices, regulations, or monitoring systems.*

- As the WG reports, ideally one would like to have the fleet be homogenous (uniform) in fishing power, gear used, timing, and location. In many cases, not all of these criteria can be met or even standardized for all fisheries, but in some cases they can.

- Approaches exist to standardize indexes, including modern methods for statistical modeling, incentives for reporting, and the use of a study fleet.

- Directed research on factors influencing CPUE for both fishery dependent and fishery independent CPUE measures is needed and should be prioritized.

TOR 3: *Identify the fishery factors and fishery dependent data needed to create a CPUE that would be a reliable index of abundance for Northeast multispecies stocks – without regard to existing fishing practices, regulations, or monitoring systems.*

- Fine scale spatial and temporal resolution of catch, effort, and behavior information can now be gathered and interwoven with other biophysical phenomena through, remote sensing and oceanographic modeling, for example. This should be done for data from both fishery independent as well as fishery dependent sources.

- Often, a greater quantity of data is available from the fishery dependent sources, albeit targeted data, than can be collected from (expensive) surveys. Just this order of magnitude difference in quantity makes the utility of using such data sources worthwhile to consider.

- We fully endorse the use of action plans as outlined and exemplified in the WG Report in the recommendations section to implement efficient mechanisms for gathering data from all sources.

TOR 4: *Compare the desired factors identified with existing conditions and data for the fishery through a gap analysis of factors and data needed, as well as the analytical approaches necessary, to create a CPUE that would be a reliable index of abundance for Northeast multispecies stocks.*

- Differences in implementation exist when applying these methods to data collected from the commercial fleet compared to the recreational.

- If monitoring is to be considered for gathering any additional information, percent coverage of the fleet is an important consideration. In the North Pacific, debates continue to exist on whether partial coverage is adequate for observer programs.

Photo/New England Boating, Tom Richardson

***TOR 4:** Compare the desired factors identified with existing conditions and data for the fishery through a gap analysis of factors and data needed, as well as the analytical approaches necessary, to create a CPUE that would be a reliable index of abundance for Northeast multispecies stocks.*

- We strongly concur with the WG Report that the gap analysis conducted by the WG should be used to identify factors and data needed, including mechanisms for *a priori* identification of targeted fishing, clear effort metrics, use of advanced technologies for monitoring, and finer time and spatial scale standardization. In addition, we might add greater coverage of social and economic indicators. One example of this would be evaluating the quantity and quality of the dealer report data.

- We note that fishery dependent CPUE data was thoroughly examined several years ago and deemed of limited usefulness, but improvements in technology, statistical methods, and increasing need by management suggests that this analysis should be revisited.

Conclusion

- The Working Group Report provides a clear, thorough and comprehensive analysis of how fishery dependent data can be used, the strengths and weaknesses of such data and how they compare in their characterization of the fishery relative to data gathered from fishery independent sources.

- In this report, we expand slightly on the type of information that might be gathered from fishery dependent sources and why reconsideration of these data as input into stock assessment and management should be made.