

Session 3 Recap

How to assess and develop fishing level recommendations for species exhibiting distributional changes



Trigger Question Categories

- **Addressing changing fish distributions in stock assessments/survey implications**
- **Accounting for uncertainties in shifting distributions**
- **Adaptivity of management framework to address changing distributions**

Summary Points: **RED** Group [Auditorium]

- **Addressing changing fish distributions in stock assessments/survey implications**
 - The use of VAST and dynamic overlap approaches to determine survey catchability associated with different environmental parameters are becoming more routine.
 - Not just shifting fish that will impact surveys and assessment, but other spatial issues – offshore wind, area closures – need to be considered
 - There is a need for more finely resolved spatial distribution information and spatial assessment models for a greater understanding of stock implications in support of management decisions
- **Accounting for uncertainties in shifting distributions**
 - Current buffering approaches such as P^* are likely more of a band-aid approach and not a long-term solution
 - Increased focus and development of short-term forecasting skills is needed to help inform how management can respond
 - Need to effectively communicate uncertainties and that predictions are becoming more uncertain (may get things wrong more often)
 - Use of ecosystem status reports to communicate these uncertainties and identify the relevant risks and challenges
- **Adaptivity of management framework to address changing distributions**
 - Management needs to be more adaptive and flexible in the future given these distribution changes and uncertainties. Greater role and more consideration for social and economic factors
 - This is particularly true for stocks under a rebuilding plan as drivers are changing
 - Lots of challenges given current national, regional, and geo-political climate, but there may be opportunities to collaborate and coordinate and potentially develop general guidance and evaluate what has worked or not

Summary Points: **BLUE** Group [Raven]*

Addressing changing fish distributions in stock assessments/survey implications

- Shifts vary (north/south, east/west, depth); regions using various tools (VAST, survey resampling, research set asides)
- Fixed timing for long-term surveys may not continue to be appropriate given changes, e.g. in spawning time
 - Potential communication problem when fishery timing adapts to changing conditions and survey can't: fishermen have different perception of status of stock than scientists
- Concern with mismatch between the survey area and the assessment area, emphasizes need for adaptive monitoring

Jurisdictional boundaries affecting assessment and management needs

- Many examples of State/Fed tensions, as well as across international boundaries - process ranges from long-standing agreements with formalized processes to newly developing avenues of communication
- Historic agreements can be inflexible to changing envtl conditions - need for periodic review of these agreements
- Top priority - development of single cross-boundary assessment that aligns with the biological stock characteristics, so all managers have same starting point
 - If lacking, can result in asymmetrical impacts in terms of who gets penalized for ensuring conservation of resource

Adaptivity of management framework to address changing distributions

- Need to think about mechanisms in fishery systems to allow quota transfers or accommodate market responses to shifts
- MSA rebuilding timelines can be constraining, not adaptive to regime shifts or need for ongoing data collection from fishery
 - Highlight the importance of having fishery-independent data sources
 - Term 'overfished' misleading for stocks incapable of rebuilding
- EFH review process has the tools to provide advance warning of distributional shifts, but would need to more dynamic to be able to respond on management time-frames

Summary Points: GREY Group [Raven]

- **Addressing changing fish distributions in stock assessments/survey implications**
 - Need funding for additional/expanded surveys to capture when distributions may be shifting
 - Important to think about effects of timing, location, and gear types when adjusting/expanding surveys
 - Work with industry to respond to concerns and increase buy-in
 - Use LK/TK and create citizen science programs to capture observations over time and across regions
 - Need to develop statistical methods for using new survey data or make results from multiple surveys comparable
- **Accounting for uncertainties in shifting distributions**
 - Important to maintain genetic diversity. Some reproductive strategies may have been genetically beneficial under old climate but are not successful now.
 - If there are signs of changes in productivity then may be a regime shift
- **Adaptivity of management framework to address changing distributions**
 - Need new management vocabulary for species that may be “depleted” but not “overfished”
 - Pay attention to record landings or changes in fishing effort
 - Different management strategies needed for crustaceans and bony fish as they have different booms and busts and sensitivities to temperatures and oxygen
 - Potential for large economic impacts when stocks are assessed over large areas and allocated in smaller areas
 - Socio-cultural implications- access issues and differing abilities to adapt, fairness and equity
 - How to deal with rebuilding plan requirements for stocks that do not respond to fishing reductions

Summary Points: **GREEN** Group [Pink Salmon]

- **Addressing changing fish distributions in stock assessments/survey implications**
 - Research is occurring with modeling and tagging; however, there have been limited advances in accounting for distribution shifts in assessments.
 - Surveys are heterogeneous across the regions, as well as funding to support surveys, and research on distribution and regime shift investigations.
 - Movement models have explored changes in Bering Sea fish distribution.
 - Some surveys have been extended in the Bering Sea, Gulf of Mexico, the East Coast, and Caribbean to better understand changes in fish distributions, including using emerging technologies. These efforts are limited by funding.
- **Accounting for uncertainties in shifting distributions**
 - P-star approaches do not account for uncertainty due range shifts. Note the consequences of a range shift could result in misperceptions of stock size in either direction.
 - ESPs and ESRs can be a useful resource to provide information about regime shifts.
 - Projecting shifting distributions and regime shifts often relies on ocean model projections, which are lacking in many regions. Climate Ecosystem and Fisheries Initiative could begin to address this challenge.
 - MSEs are a useful tool to explore the consequences of shifting distributions in a simulation model (e.g., examples from NE and Pacific Hake).
 - Jurisdictional boundaries increase uncertainty due to challenges of coordination of management, assessments, and data collection.
- **Adaptivity of management framework to address changing distributions**
 - Management responses to shifting distributions and regime shifts are typically reactive in response to unexplained and severe stock declines.
 - **Recommend revisiting Klaer. et al. 2015 decision framework** to determine whether a shift in productivity has occurred for a stock.
 - Explore an F-based management framework to be more adaptive. Consider moving away from biomass-based reference points because they are hard to estimate and rely on assuming stationarity.
 - More collaboration and coordination is needed across jurisdictional boundaries. This is generally more challenging across international boundaries
 - Workshops across regions could come up with creative solutions and conduct simulation work needed to develop better guidance.

Summary Points: **YELLOW** Group [Eagle]

- **Addressing changing fish distributions in stock assessments/survey implications**
 - Communication between survey operators and data providers is critical for understanding distributional changes
 - Expansion of surveys would be ideal, but resources are often limiting
- **Accounting for uncertainties in shifting distributions**
 - P^* approaches do not always adequately capture the uncertainty in a stock assessment
 - Consideration of social and economic factors can be difficult under P^*
- **Adaptivity of management framework to address changing distributions**
 - Communication between regions is necessary to ensure proper consideration of biological, social, and economic effects
 - Some regions already have well-established collaborative relationships; all regions are expected to need to collaborate with their neighbors as distributions change

Overall Session Findings: Addressing changing fish distributions in stock assessments/survey implications

- Expansion of surveys is the best way to immediately begin to address problem but resources are often limited
- Increased collaboration with industry (surveys, communication of mis-matches between fishery timing and survey, other concerns, industry buy-in)
- Use of additional spatio-temporal modeling tools helpful; continued work on additional statistical tools recommended
- Priority should be to develop single cross-boundary assessment that aligns with the biological stock characteristics but requires issues of jurisdictional boundaries to be addressed

Overall Session Findings: Accounting for uncertainties in shifting distributions

- Current buffers (whether OFL distribution and P^* or qualitative) may provide initial 'band-aid' to shifting distributions but longer-term solution to address uncertainty needed
 - P^* does not necessarily account for uncertainty due to range shifts
- Need for increased social and economic considerations in addressing shifting distributions
- Need to more effectively communicate uncertainties and that predictions are becoming more uncertain
- Uncertainty compounded by issues in identification of regime shifts and when distributional changes and changes in productivity are more likely to be longer-term

Overall Session Findings: **Adaptivity of management framework to address changing distributions**

- Increased need for management systems that are robust to rapid and often unpredictable change
 - modifications in quota systems, increased ability to diversity operations, transferability provisions and other means to respond more rapidly to changing conditions in fisheries
- Modifications to rebuilding definitions
 - Term 'overfished' misleading for stocks when environmental conditions not fishing pressure is the cause of the decline > suggest term 'depleted'
 - How do we better address stocks that are incapable of rebuilding (regardless of cause of decline fishing or environmental)
- Increased communication and collaboration amongst all regions as well as internationally as distributions change and regions must address unforeseen situations
 - Workshops for conducting simulations and creative solutions
 - Collaboration/communication involves more than fisheries scientists and management; some require international diplomacy solutions