Black Sea Bass Data Workshop Recommendations

A black sea bass data workshop was held April 9-11, 2013, sponsored by the Partnership for the Mid-Atlantic Fisheries Science (PMAFS) and conducted by the Atlantic States Marine Fisheries Commission (ASMFC). The workshop participants included PMAFS scientists, ASMFC staff, MAFMC staff, NEFSC staff, state biologists on the ASMFC Black Sea Bass Technical Committee, University of Rhode Island (URI) and Rutgers University scientists, and Mid-Atlantic Fishery Management Council (MAFMC) Scientific and Statistical Committee (SSC) members. The workshop summarized available state and federal fishery independent and dependent data, as well as any outside (academic) research surveys/projects available for use in the development of indices of relative abundance; evaluated the utility of indices as measures of black sea bass relative abundance; evaluated the spatial heterogeneity of indices among states/regions; and recommended approaches for utilizing indices available within a black sea bass benchmark assessment. The group also developed short and long term research recommendations intended to address both the most recent peer review and SSC highlighted concerns for the black sea bass assessment.

The working group concluded that there are no additional data analyses or data sets that, if taken in conjunction with the existing assessment model, would likely result in an SSC decision to elevate the black sea bass assessment from Level 4 to 3 (based on the ABC control rules the SSC applies). Therefore, based on the information reviewed at the workshop, it is highly unlikely the SSC's perception of uncertainty in the assessment will change with an assessment update. In this case, an assessment update would not be used for management purposes and the SSC would continue to apply catch-based approaches under the Level 4 control rules.

It is the recommendation of the working group to delay the 2014 black sea bass benchmark peer review to 2016 or later, depending on the amount of progress that could be made on interim analyses and modeling approaches. The working group outlined critical areas of analysis, research, and modeling approaches that will need to be addressed for a benchmark to provide meaningful results. This work should be started immediately in preparation for a 2016 peer review. The group recommends that in lieu of an assessment update in 2013 and 2014, the Southern Demersal Working Group should provide a summary of the most recent catch to inform the SSC and Council specifications process. It is recommended the resources that would have be used for a 2014 benchmark and 2013 assessment update go toward the following short and long-term recommendationsto forward the progress of black sea bass modeling:

Short term research to address SSC Concern #2 (uncertainty in the spatial structure of the stock)

Assessment Model Development

- Explore the impact of spatial heterogeneity on the stock assessment results. Conduct sensitivity analyses on this topic. Specifically, if you break the stock north-south do you get qualitatively different stock status results than coastwide stock? [Center resources needed and outside funding possibly needed]
- Explore the use of time-varying catchability to account for changes in density dependent surveys catchability. This was a criticism of use of trawl surveys for a "structure-obligate" species. This will need to be added to the current assessment model (SCALE) code. [Center resources needed and outside funding possibly needed]

- Use paired trawl experiments coefficient/data as prior's when estimating survey selectivities and estimate the change in selectivity instead of specifying it. This will need to be added to the assessment model code. [Center resources needed and outside funding possibly needed]

Supporting Analyses
- Characterize ageing uncertainty: a) Conduct ageing validation study. b) Conduct formal ageing comparison of NEAMAP & NMFS ageing. c) Conduct formal ageing comparison between south and north Atlantic and borrow their ALKs. Conduct aging exchanges for otoliths (no scales). d) Develop ageing error matrices using this comparison study data for informing model inputs. [multiple agency staff required]
- Explore cohort tracking in surveys (formally check that all surveys with multiple age classes show coherence). Determine if the surveys are tracking strong year classes such that age or length structure in the data could inform the assessment model. [Technical Committee]
- Compare the temporal and spatial trends among surveys and report on the evidence of spatial structure of stock among surveys or lack thereof (e.g., spatial autocorrelation of catch and LF, cluster analysis). [Technical Committee]
- Explore the catchability of surveys relative to black sea bass migration (e.g., correlation with temperature cues, etc.). Conduct a comprehensive spatio-temporal comparison of availability (side-by-side mapping and analysis of catch in each survey by date and location). [Technical Committee]
- Conduct paired scup/BSB pot survey and VAS data with NJ trawl comparison using nearby locations. Explore if BSB are truly structure obligate and if trawls are valid for BSB. Compare catch and length frequency on/off structure. [Technical Committee and URI]
- Build an index of relative abundance using Jon Hare's larval survey data. [Center resources]
- Look at the implication of pooling samples in the age-length keys (ALK) versus filling parts of the annual keys that are low on samples. [Center resources]

Long term research to address SSC Concern #2 (uncertainty in the spatial structure of the stock)

Assessment Model Development

- Build a simulation model that incorporates spatial structure for black sea bass as well as other necessary features (e.g., protogynous life history, sex-specific, etc.). Use existing data to simulate/ determine the scale at which management could be implemented. This simulation exercises should be developed at a complex level, but then be used to determine how simple your models need provide management advice. The simulation can be used to identify critical model features (e.g., plasticity of the size/age at transition from female to male, etc.) and data gaps – see protogynous fish workshop report. [likely require outside collaboration]
- Evaluate the ability of the existing data to support a spatially-explicit assessment for management (if needed based on the simulation study above) and implement any necessary data collection protocols to support this approach. [long-term permanent commitment]
- If needed, build a spatially-structured, sex-specific assessment model for management. [long-term research track]

Fieldwork

- Collect additional biological data on all FI surveys
- The collection of nearshore commercial trawl and pot fishery biosamples (i.e., lengths and sex) are needed

- Sex ratio data should be collected from commercial and recreational port/intercept sampling to explore importance of sex information in assessment modeling
- Ages should be collected from nearshore surveys (MA, RI, CT, NJ) for use in development of regional/local ALKs
- Tagging study (natural or artificial) should be conducted to determine mixing/migration [2yr , funding required]

Long term research to address SSC Concern #1(Unusual Life History – priority 2)

Fieldwork

- Studies should be conducted to understand the general reproductive behavior of black sea bass. What is the role of non-dominant males (e.g., sneaker males) in reproductive stock dynamics? Do black sea bass develop spawning harems or leks? [outside funding]
- Studies should be conducted to determine the relationship between fertilization rates and sex ratio so this can be included into population dynamics models. A parentage analysis could be used to determine fecundity. [outside funding required, long-term]
- Work should be conducted to determine the natural mortality by sex; life stage research is needed [ongoing, outside funding]