Ecological Reference Point Work Group Summer Meeting

Wednesday, July 18, 2024 1:00 PM – 3:00 PM

Members in Attendance: M. Cieri, A. Schueller, M. Celestino, G. Nesslage, A. Buchheister, M. Dean, J. Boucher, H. Townsend
Staff in Attendance: K. Drew, K. Anstead, J. Patel, J. Boyle
Others: B. Chiles, R. Kane, S. Gehan, J. Clark, J. Kelian, G. DiDomenico, J. Higgins, A. Colden, W. Poston, M. Appleman

ERP Species Data Updates

Marine Mammals

Originally, a marine mammal literature review was to be conducted to find estimated mammal abundance, biomass, diet, consumption rates of clupeid species, and migration patterns seasonally in and out of the EwE model area. However, it was found that most papers either only address a very small spatial range or time. Instead, it was decided to use the estimated average body weights and dietary composition, seasonal abundances, standing stock and biomass densities, and estimated prey consumption by species for the 18 cetacean species and 4 regions defined in Kenney et al. 1997. All 4 regions from this paper fall into the model area. Additionally, for more specific information about diet and range, the results from Smith et al. 2015 and the NOAA marine mammal stock assessments should be used.

Next steps: J. Patel to help A. Buchheister use these three sources to help inform the NWACS-full model.

Nearshore piscivorous birds

The USGS Breeding Bird Survey data is a potential source for abundance trends for nearshore piscivorous birds. The survey encompasses 500+ North American bird taxa and is conducted annually during breeding season (June) along 3,000 randomly established roadside survey routes. Routes are roughly 24.5 miles with counting locations at approximately half-mile intervals. At each stop, a citizen scientist highly skilled in avian identification conducts a 3-minute point count, recording every bird seen or heard within a quarter-mile radius. Surveys begin 30 minutes before local sunrise and take approximately 5 hours to complete. The regions of interest from this survey are S14 (Maine), S30 (southern Maine to Virginia), and S27 (southern Virginia to northern Florida and across the Gulf coast to Louisiana. It should be noted that much of S27 falls outside of the model region. Since the majority of birds in the data set are not nearshore or seabirds, most were filtered out, but indices of abundance were explored for the following species: Bald Eagle, Belted Kingfisher, Black-crowned, Night Heron, Brown Pelican, Common Loon, Common Merganser, Glossy Ibis, Great Black-backed Gull, Great Blue Heron, Great Egret, Green Heron, Gull-billed Tern, Herring Gull, Hooded Merganser, Laughing Gull, Osprey, Pie-billed Grebe, Red-breasted Merganser, Tricolored Heron, White Ibis,

Yellow-crowned Night Heron with pelicans and gulls being counted as seabirds and the rest being addressed as nearshore birds.

Some notable trends include that osprey and eagle abundances have increased overtime, especially in S30. This trend remained valid for S30 after standardizing the data around the 1985 abundance indices for the species. Heron abundances across species have been decreasing overtime. Mergansers also had a notable uptick in abundance in the last 20 years in S30. Eagle, osprey, and merganser abundances have also increased over time in S14. Notably, pelican and gull indices are far above the rest of the species this data set. Additionally, this data set shows relative abundance across species, which gives the opportunity to convert abundances to biomass and compare across species, potentially negating species that have very low abundances compared to others.

Discussion revolved around 2 questions: 1) is there a possible way to combine the regions and species indices into a single index to use in the model? 2) is there a way to split the area in S27 to exclude the Gulf? For the first question, the group talked about potentially weighting the different species or species group by level of menhaden consumption, the average weight of an individual of each species, or empirical estimates of total biomass at some point during the time-series from other studies. For the second, it was advised that a ratio of coastline in the model area is calculated and the abundances are split accordingly. There was an idea to calculate this ratio by habitat, but it would vary from species to species, which may complicate incorporation in the model. There was also another idea to drop S27 all together since most of the area is outside of the model.

Given the number of individual species in the reduced version of the dataset and the potential of negative and positive trends within a family group canceling one another out, conversation revolved around potentially just picking out 1-2 species to be representative of their family. However, since different species have different feeding habits, a stronger approach may be to guild the various species based on size-class selectivity of menhaden (i.e., ones that can eat adults and ones that can only eat juveniles or young-of-the-year).

A concern was also brought up about osprey trends since regional trends in the Chesapeake Bay do not reflect coast-wide trends. As this data set is not region-specific, it would be worth looking into Chesapeake Bay-specific sets as to address public concerns for that region.

Next steps: J. Patel and A. Buchheister work to guild birds by taxa or by diet or select representative species to use in the model and decide whether to include S27 or leave it out of the model.

Bluefin tuna

There is a fair amount of diet data for bluefin tuna and it may be the most important highly migratory species for the ERP models. Population trends for this species were derived from the most recent bluefin stock assessment, so the main missing component is understanding how much of the bluefin range overlap with our model. Currently, the group is waiting to hear back from some of the bluefin scientists (Block, Guildari) who can answer this question and provide tag data and maps of probability.

Next steps: M. Dean to wait on spatial range data and update D. Chagaris once the data has been received.

Benthic invertebrates
There has been exploration of the National Benthic Inventory (NBI) to find benthic invertebrate data, but the NBI mostly consists of collections of one-off studies from discrete regions. Because of the small spatial and temporal scales, NBI may not be the best avenue for benthic invertebrate data for the EwE modes. However, as these will have relatively low biomass and thus impact compared to other species in the model, the group is working on deprioritizing this group.

Zooplankton
Several sources were contacted to obtain zooplankton data with success. A large data request was put in to Harvey Walsh at the Narragansett lab to obtain indices by different regions.

Discussion for this species revolved around potentially putting in a request to for federal information through the CEFI as ERP work is a good candidate for the climate initiative.

Next steps: M. Celestino to follow up with Harvey Walsh for the data request and potentially meet with K. Drew and H. Townsend to discuss a CEFI request if necessary.

Bay anchovy
To obtain data for this species, surveys from all previous MSVPA models will be used to develop indices of biomass trends across or within different regions. Data covers multiple EwE regions and there are only 2-3 surveys left to track down.

Discussion revolved around whether we needed swept area biomass or if index of abundance with a single point of data for biomass was sufficient for the model. Data needs for biomass for the EwE models usually involves 2 components: a way to parameterize the biomass and a time series of relative measure of change.

Atlantic Herring
The Atlantic herring update was based on a presentation by John Deroba given by M. Cieri. The management track assessment for this species was completed in June 2024, using the model from SARC 65 in 2018. No changes were made to the model for herring except to add the latest 2 years of data since the last assessment update in June of 2022. The model uses 2 fleets and 4 surveys which include an acoustic time series and a summer survey. The M was 0.35. There was no stock recruitment relationship, and F40% was used as proxy for F. The trends showed low discards, a downward trend for herring across spring, fall, and summer, as well as low abundances overall. The same trends were seen in acoustic data. Herring is at its lowest level since 1960s and has had consistently bad recruitment since 2012. There is a significant retrospective pattern for these data that overestimates biomass and underestimates F.

Herring's single-species assessment will be moving forward with the WHAM model to replace ASAP through the ongoing Research Track assessment. The plan is to finalize the model in the fall and peer review in March. Discussion centered on whether significant changes to the scale of the population would be expected out of the Research Track assessment, compared to the most recent management track assessment, and the consensus was that it was unlikely. The WHAM model is using the same value for M as the current ASAP model, and initial model runs are showing a similar scale to the management track assessment.

Next steps: ERP model development will use the management track assessment instead of waiting for the WHAM to be completed.

Striped Bass & Weakfish
Both species have an on-going assessment with a 2023 terminal year that are set to be completed in late summer/early fall. The assessment output that ended with 2022 was given to D. Chagaris to add more data to stripped bass while waiting for final update. Both species are set to have completed their assessments around same time as the menhaden single-species assessment.

Bluefish
Bluefish had a management track update in 2023 (2022 as the terminal year). The status has now been changed to not overfished and overfishing not occurring; the stock was overfished and experiencing overfishing in the terminal year of the last ERP benchmark assessment. Scale of population has not changed, but there may be changes to natural morality and differences in recruitment. WHAM output was given to D. Chagaris.

Menhaden
For the single species assessment, all of the indices are complete, and bait landings have been completed and validated. Completed reduction landings and ages are still missing with reduction ages just completed this week and the 2022-23 bait catches subsampled but not aged yet. There isn't a base run for the BAM yet. The goal was to be updating BAM until October, but its more likely that the base run will have to take place during the workshop as a result of the data delay.

There was some discussion about the impact of subsetting bait ages on the VADER model, but ages have been subset for the past few year, and, like the BAM, the VADER model can account for this by adjusting the effective sample size.

Spiny dogfish
Data for this species will be available through 2022 instead of 2023 because next assessment is in 2026.

<u>Timeline Discussion</u>
The methods workshop will take place in early November.

<u>Model Development Updates</u>
For the NWACS-full model, diet data was requested from Jim Gartland for NEAMAP and ChesMMAP data, and the group is still in the process of getting that data. NEFSC diet data by species group and stanza by decade was also requested and obtained from Brian Smith. This data is not the MSVPA diet data, which is already in use, but new, more recent data to add to the model. Similarly, biomass data from NEAMAP and ChesMMAP was requested and is pending receipt. Biomass data from NEFSC has been obtain through Andy Bett. This brought up the question of which areas of survey regions to use in the model and which season to use for each group.

There are some discrepancies in region-specific-areas (from the 2014-2024 data pull). This may be due to a different set of strata between 2014 and 2024, a different projection, or a different set of shapefiles. Given the mostly consistent percent of different, it shouldn't affect calculations too much so it was suggested to move forward with the 2024 approach. It was also recommended that the

geospatial data are in an equal area projection (e.g., Lambert equal area conic) before calculating areas.

For which season to use, some groups have similar trends while others have different magnitudes and trends in the spring and in the fall. Some options would be to use a representative single season for each group (e.g. season with highest biomass or least interannual variability) or to combine the seasons using the means. Biomasses will be summed across regions.

Stock assessment data are still needed for the EwE models. These include Atlantic menhaden, Atlantic herring, bluefish, striped bass, weakfish, and spiny dogfish. The goal is to streamline the process by getting stock assessment input/output files and using an R script to process them. The main data needs are biomass time-series, catch time series, P/B (or Z), and K and weight at maturity relative to infinity for multi-stanza groups. Additional data from commercial/recreational landings from NOAA would help as well.

For the NWACS-MICE model, D. Chagaris is still waiting on a few datasets to update inputs and calibrate against. Most of the environmental drivers and spatial data needed to run the set of proposed models have been compiled. There has also been development of an Ecospace calibration routine for other models. There may be a possibility of extending the fall workshop by a day to get the models running on multiple computers.

WG members provided some links for NEFSC stock assessment data and MRIP public datasets to streamline the data gathering process for the EwE models.

NEFSC Stock Assessment Support Information (SASINF):
https://apps-nefsc.fisheries.noaa.gov/saw/sasi.php

MRIP public access datasets and R scripts:
https://www.fisheries.noaa.gov/recreational-fishing-data/recreational-fishing-data-downloads

State of the ecosystem data:
https://github.com/NOAA-EDAB/ecodata