Day 1 – Tuesday November 21, 2023

Overview

* Motivation for TESA small pelagics workshop: 2018 workshop … (Boldt et al. )
* Anticipated outcomes:
  + Proceedings report outlining good practices for small pelagics

Speaker: Noel Cadigan

* Stock assessment challenges
  + Length based survey indices
  + No fishery age comps
  + Poorly known accuracy of landings (amorphous uncertainty)
* Catch length age assessment (statistical catch-at-length models)
  + Ex: Thorny skate
  + Data- survey focused (multiple survey indices- treated as 4 surveys, each with different length selectivity curve)
    - More length bins than years; correlation in error structure
    - Not using fishery size data (because poor quality)
      * Thus limited ability to estimate age patterns in F
  + Lorenzen M suggests evidence of high age-0 M, or unusual selectivity
  + Used SURBAL model to predict catches
    - Removed landings data
    - Prior on survey q
    - Fit model with constant M, with process error on M (0.1, 0.5)
  + Demonstration of ability to do catch multiplier projections (mgmt. request)
  + Potential pelagic benefits (of SURBAL)
    - Ability to use fleet length sampling even if the fleet has no age samples or poor landings data
* Discussion
  + Application of methods to capelin, shorter lived species
  + Lorenzen M, big fish eat little fish (eg, cod) may not apply to small pelagics
    - Not ideal for thorny skate because Lorenzen M doesn’t apply for small age-0 high mortality period
    - Importance for species experts to contribute M info
    - How would we determine which small pelagics this would be appropriate?
  + Why not use a purely length based model?
    - How to account for changes in growth
      * Time varying k, time varying l\_infinity are possible (WHAM model)
        + Time varying pars can be slow to compute

Speaker: Tim Barrett

* SWNS/BoG herring
* LRP- defined in 2012 based on acoustic index (mean index from 2005-2010)
* Status- stock below LRP since 2018
* MSE initiated in 2019
  + Key uncertainties: M and SPR
    - 3 M scenarios (0.35, plus 0.25 and 0.65)
    - BH stock-rec, with 2 steepness scenarios (0.65, 0.95)
  + Several LRPs explored within the OM (2020-2021)
    - Bo based, Bmsy, Blim, others
  + Bmsy
    - Widely different estimates depending on the time frame selected for calculating
    - Guidance from the policy
      * Longest time period as possible for estimating reference points
      * Other considerations mentioned in the policy
    - Guidance from ICES- use average of last 10years
    - Guidance from US- reevaluate reference points to check if consistent with current productivity conditions
  + Dynamic Bmsy
    - Defined as a proportion of dynamic Bo (eg, Berger 2019)
      * Assumes temporal changes in Bo are … and not density dependent <other…>
    - Dynamic Bmsy did not pass peer review, defaulted to the 2012 LRP based on acoustic index
  + Conclusions from Marentette et al (Proceedings of limit reference points…)
    - Fully dynamic estimates of Bo was not appropriate for LRP
  + Key challenges for this framework
    - Lack stock-rec relationship and high dependence on fixed h- required because few to no observations at low biomass
      * Posterior estimates the prior when prior set as two different assumed steepness values
  + Herring OMs
    - M and h were fixed in all OMs
    - Differences in Bmsy depending on whether calculated using SSB or egg production
    - Discussed 2020 preferred approach for defining LRP
      * Under high and low h, both translate to 0.8Bmsy or higher
        + How has this been received?

Not well…

* + - * Focus needs to be on not using Bmsy because it’s so heavily influenced by h and the stock-rec relationship

Speaker: Elisabeth Van Beveren

Topic: M

* Stuck with constant M, despite quite a bit of evidence that this might not be true
* Mackerel data not available to support the estimation of M
* Internal model approaches were not supported
* Used consumption estimates (of mackerel)
  + Birds, mammals, fish
  + Conclusions:
    - 1. Strong evidence of increasing M
    - 2. Method supports reporting minimum number of mackerel consumed in last decade is 2x scale of F
    - 3. Ensemble of predators is important
  + Application in the assessment- used this approach to justify increase in constant M
* Largest impact is with use in the projections
  + How to generate projected consumption M
* MSE
  + Hindsight, needed to have more buy in from industry, and to better understand the uncertainties prior to starting the process; start smaller with closed-loop sims rather than starting with MSE

Papers:

When to conduct, and when not to conduct, management strategy evaluations (ICES, Waller III, March 2023)

A review of estimation methods for natural mortality and their performance (Maunder)

Speaker: Jennifer Boldt

* Recap of National Workshop- Filling in the Forage Fish Gap
  + Summarized advantages and disadvantages of sampling methods for pelagic fish
  + Identified knowledge gaps, and research priorities or opportunities
    - Eg, Effects of climate and oceanographic surveys
  + Develop a formal National working group on forage fish
    - Concept supported but only small funding provided
    - Project: Developed forage fish distribution maps (3 species so far)
    - Project: literature mapping for forage fish (for 11 species)
      * More studies (reports/ publications) on commercially fished species
      * Identification/ summary of environmental pressures (and gaps)
    - Define areas of future research
  + National EAFM project, focus on Haida Gwaii herring
    - Identify pressures and responses as linked to different life history stages of herring
    - Identification of indicators (recommended, available, …)
  + Opportunities!
    - Integrated ecosystem surveys will help advance EAFM
    - Add complementary sampling to existing surveys
  + Q: How much is the challenges of assembling the data a barrier to advancing EAFM?
    - Somewhat of a barrier, and, the pacea package can help.

Speaker: Jaclyn Cleary and Sarah Hawkshaw

(no notes)

Speaker: Francois Turcotte

Why we thought would be beneficial to estimate time varying natural mortality for sGSL herring

* Good background on how to estimate time varying M in several species: Atlantic cod, American plaice, …
* Predation by grey seals identified as culprit for increases in M for cod, is a known predator for herring
* Abundance of other predators has also increased
* Lack of recovery for spring spawners and declining trends in fall spawners
* Approach
  + Adapted cod SCA model for sGSL herring (following approach developed by Doug Swain)
  + Looked at models with and w/o time varying M and q
  + 4-way cross comparison revealed best model to be time varying q and M
    - M modelled as random walk with 2 age groups (2:6, 7-11+)
  + Results show increasing M estimates for/in older fish
  + Predator data available through
    - Benoit published work
    - Updated herring consumption by Bluefin tuna data through diet studies
  + Assessments model fits were improved
  + Information was challenging to introduce in meetings
    - Changes in SSB when M is high means that for historic catches the F’s are now lower
    - However stakeholders accepted predator / predation work

Speaker: Keith Lewis

Capelin and LRPs: 2J3KL capelin

* Reiterated the importance of LRP SAR (National guidance document) and the Marentette et al guidance document
* Acknowledge there are many LRP considerations/ approaches and depending on data availability, life history, ability (or not) to estimate SRR, should be able to assemble suite of approaches for estimating LRPs
* Spring biomass index
  + Shows very high biomass mid-1980’s-1990, and low low state from 1991-recent
    - Decision to use entire time series for estimating LRP
* Narrowed options for capelin to 3 approaches for LRP
  + Historical time series
  + capcod model (bioenergetics model)
    - Because cod feed on capelin, the model can calculate capelin biomass given the amount of cod (and be used to estimate capelin needed to maintain cod at given biomass level)
    - Pick capelin acoustic biomass level that will maintain cod at its LRP
* Discussion
  + How does this inform about serious harm?
* Outcome- success in implementing ecosystem based LRP

**Key themes for today, for follow up discussion:**

Predator-prey interactions

LRPs

Precautionary approach policy