Report of the September 2019 Joint Groundfish and Crab Plan Team meeting

NOAA FISHERIES
Alaska Fisheries Science Center

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October 2, 2019

Meeting overview

- Date: September 16
- Place: AFSC Seattle lab
- Leaders: Jim Ianelli, Chris Lunsford (GOA GPT co-chairs); Sara Cleaver (GOA GPT coordinator); Grant Thompson, Steve Barbeaux (BSAI GPT co-chairs); Steve MacLean (BSAI GPT coordinator); Martin Dorn, Katie Palof (CPT co-chairs); Jim Armstrong (CPT coordinator)
- Participation: 41 Team members present, plus numerous AFSC and AKRO staff and members of the public (many via WebEx)
- The Teams welcomed:
  - New GPT coordinators: Sara Cleaver (GOA), Steve MacLean (BSAI)
  - One new (unofficial) GPT member: Marysia Szymkowiak (GOA)
- Documents and presentation files available on the Team agenda site
  - Link provided on Council agenda (under item C5)

Agenda (action items in red)

- Administration
- Ecosystem Socioeconomic Profile (ESP) / prioritization
- Preview of Ecosystem and Economic Conditions (PEEC) workshop
- Bering Sea Fishery Ecosystem Plan (FEP)
- Social Sciences Planning Team (SSPT) overview
- Ecosystem Status Report (ESR): climate and oceanography update
- Vector Autoregressive Spatio-Temporal (VAST) model
- Electronic monitoring (EM) observer program issues

VAST (1 of 8)

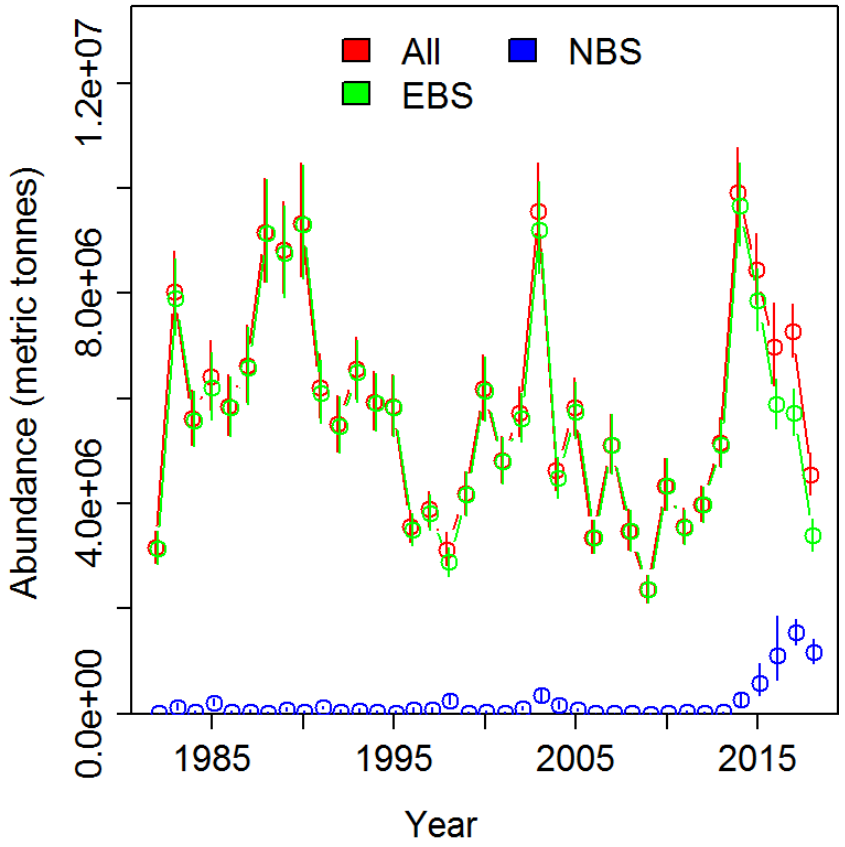
- Jim Thorson (HEPR, AFSC) presented an overview of the Vector Autoregressive Spatio-Temporal (VAST) model, including benefits, drawbacks, and proposed terms of reference (TOR) for using VAST
- No longer a “new idea”
  - Teams and SSC have discussed VAST over a dozen times, dating back at least as far as November 2015 (GOA GPT)
  - Many agencies are now using VAST, including ICES, New England FMC, Pacific FMC, and North Pacific FMC
    - NPFMC: GOA dusky (2015), GOA northern rockfish (2018), explored but not yet adopted for a few other stocks
  - Many published papers

VAST (2 of 8)

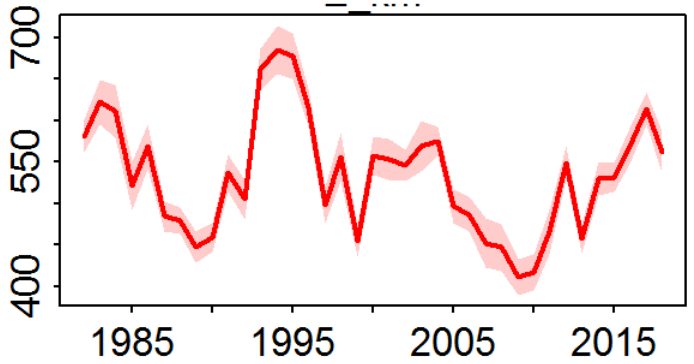
- One benefit of VAST, the ability to use spatially unbalanced data, was illustrated using the NBS trawl survey data as an example:
  - Specifically, VAST can be used to create a combined EBS+NBS index even though there are large gaps in the NBS time series
  - VAST estimates for pollock show increases in NBS abundance from 2011-2016, even though there were no NBS surveys in those years
    - This is due to temporal interpolation from 2010-2017 and spatial extrapolation from observations near the EBS-NBS border
  - VAST also estimates center of gravity and effective area occupied
  - Possible research item: investigate the ability of VAST to predict large unobserved areas by omitting some data from the EBS trawl survey in a cross-validation type exercise

VAST (3 of 8)

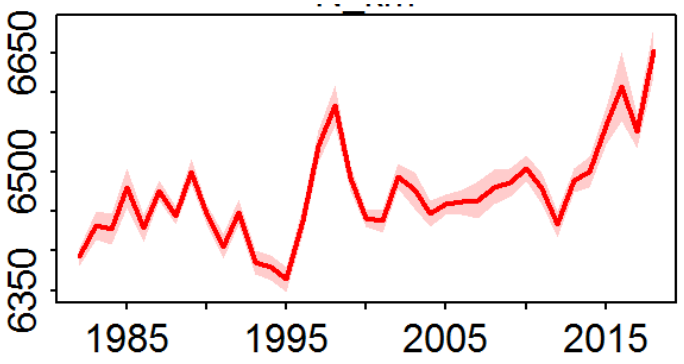
Pollock survey biomass



Eastward center of gravity (km)

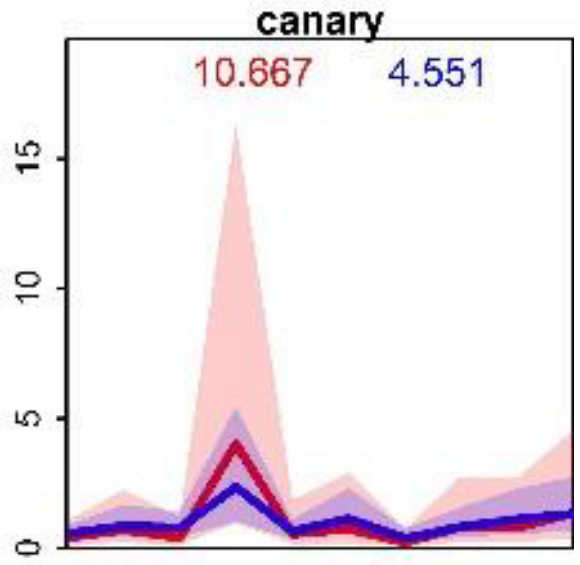


Northward center of gravity (km)



VAST (4 of 8)

- Another benefit of VAST, improving statistical efficiency given limited data, was illustrated using the influence of outliers as an example:
  - With a design-based estimator, an individual outlier observation can have a large influence on the estimate and standard error
  - With VAST, an individual outlier will have less influence on the estimate and the standard error will be more homogeneous



VAST (5 of 8)

- Drawbacks:
  - Potential for model-based estimators to introduce bias
    - Simulation studies have shown that VAST results in little bias
  - Analysts could “shop for an answer”
    - Well-defined TOR would avoid this
    - See Thorson 2019 *Fisheries Research* 210:143-161
  - VAST may require consideration of data weighting
    - Jim suggested that additional variance on the index, or time-varying catchability, be estimated in the stock assessment
    - Further research on the optimal number of knots would be useful
  - Difficulty in communicating the method
    - Input from public would help identify gaps in communication

VAST (6 of 8)

- Jim's suggested timeline:
  - April:
    - Determine stocks for which VAST estimates of indices needed
    - Determine stocks for which VAST estimates of comps needed
    - Determine TOR for that year
  - May: Make initial runs of indices and comps
  - September: Update initial runs with most recent data
- Jim's suggested responsibilities:
  - Groundfish Assessment Program (GAP) produce standardized results
  - Assessment scientists could:
    - Use VAST estimates or not
    - Re-run VAST if desired, justifying any departures from TOR

VAST (7 of 8)

- Much of the discussion revolved around timing; specifically, whether the model-based indices could be produced in time to be included in stock assessments:
  - Running the VAST model would add an extra several days to a week to the delivery of indices to stock assessment authors, and the current delivery dates are already pushing deadlines
  - Computing power could be prioritized, but it is uncertain how much time this would save
  - Timing may work for crab stock assessment authors, given that there is a May meeting where model configuration is agreed upon
  - Groundfish stock assessment authors need the indices by the end of September at the latest (and earlier would be better)

VAST (8 of 8)

- The Teams agree that the VAST model shows promise and recommend that terms of reference be developed; this can begin by using Thorson (2019) and ideas presented during this meeting
- The Teams recognize that time is critical in the fall, and recommend that if VAST is used, a process that accommodates short timelines be developed; the Teams encourage the assessment and survey groups to coordinate on a likely time-line for the Teams to consider
- The Teams recommend simulation testing to evaluate the performance of VAST under spatially unbalanced designs, such as with the EBS and NBS trawl surveys
- The Teams recommend that GAP produce VAST estimates for use by stock assessment authors, and applauds their willingness to assist
- The Teams recommend the development of diagnostics that identify when the model may not be performing as well as design-based indices

EM observer program issues (1 of 2)

- Craig Faunce presented an update of the observer program's deployment plan and issues related to electronic monitoring (EM)
- Craig sought the Teams' support on the following items:
  - Re-evaluate the fixed gear EM vessel selection process (to improve efficiency relative to reducing biases and uncertainty)
  - Re-evaluate the 30% trip selection value
  - Evaluate the impact of non-review of end-of-year fixed gear EM (video) data (and develop measures to avoid this problem)
  - Evaluate how EM catch-estimation methods are done for fixed gear; specifically, how catch in biomass is estimated in the absence of biological data
  - Identify and establish ways to integrate fixed gear EM data with standard observer data feeds (e.g., via AKFIN)
- Teams recommended that the above items be pursued and addressed

EM observer program issues (2 of 2)

- With respect to the EFP proposal for EM on trawl vessels, Craig laid out the scenarios evaluated (some 400,000 simulations) in the ADP and compared trade-offs with the fixed gear EM and coverage
  - This EFP is not in place yet and the AKRO and FMA are working with the authors of the proposal on the final EFP
- The Teams appreciated the efforts to evaluate the new program and the work to evaluate where there are potentially serious shortfalls of funding
- Craig noted that, presently, for estimates to be reasonably consistent with best practices, a funding shortfall exists
- The Teams recommended that resources be allocated to fund this shortfall and that efficiency measures to deploy observers and EM systems be pursued