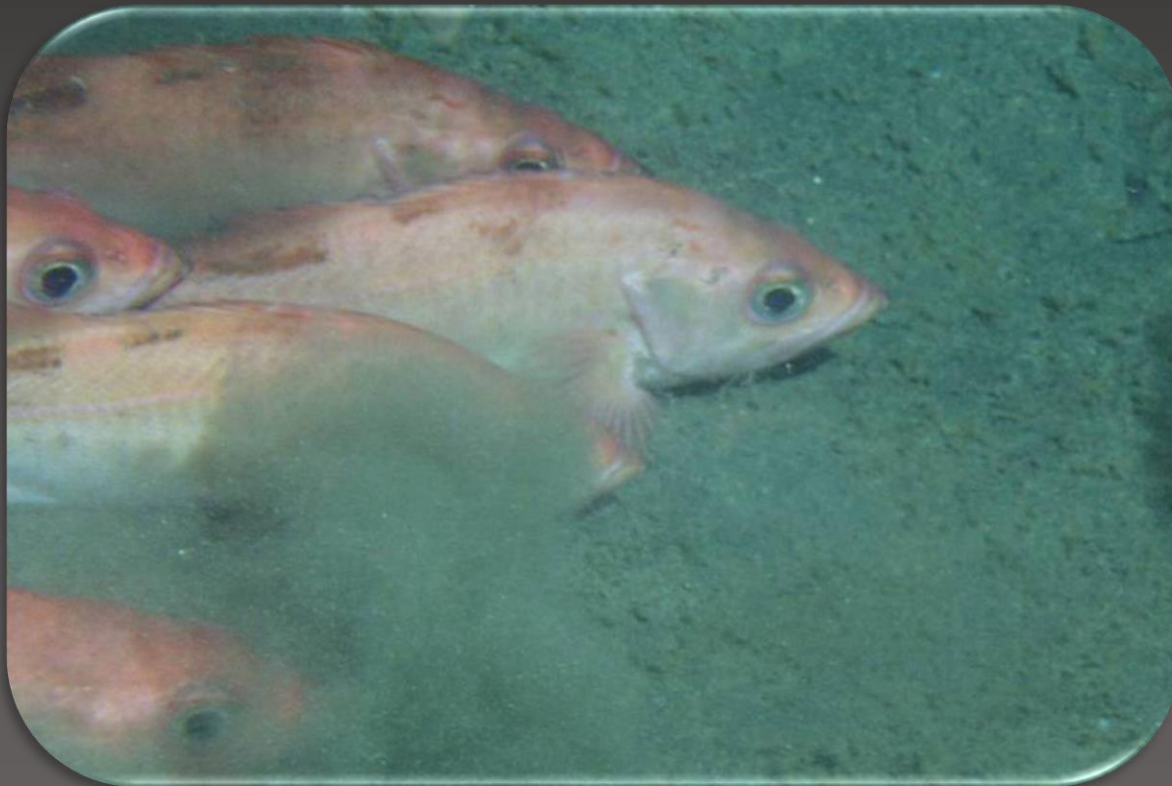# GOA POP Assessment Update

Pete Hulson, Jim Ianelli, Paul Spencer, Chris Lunsford, Curry Cunningham, Ben Williams
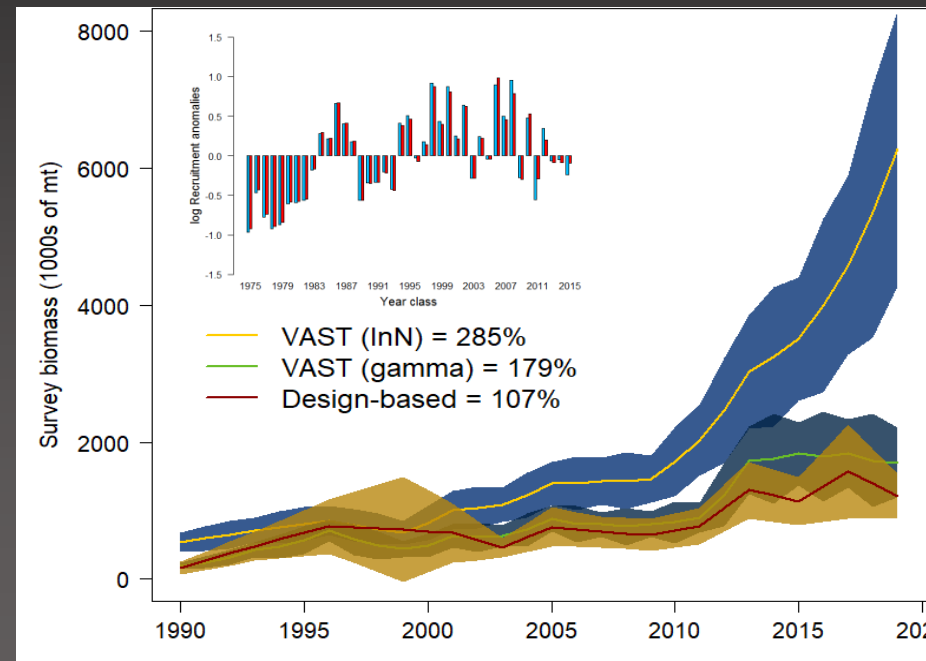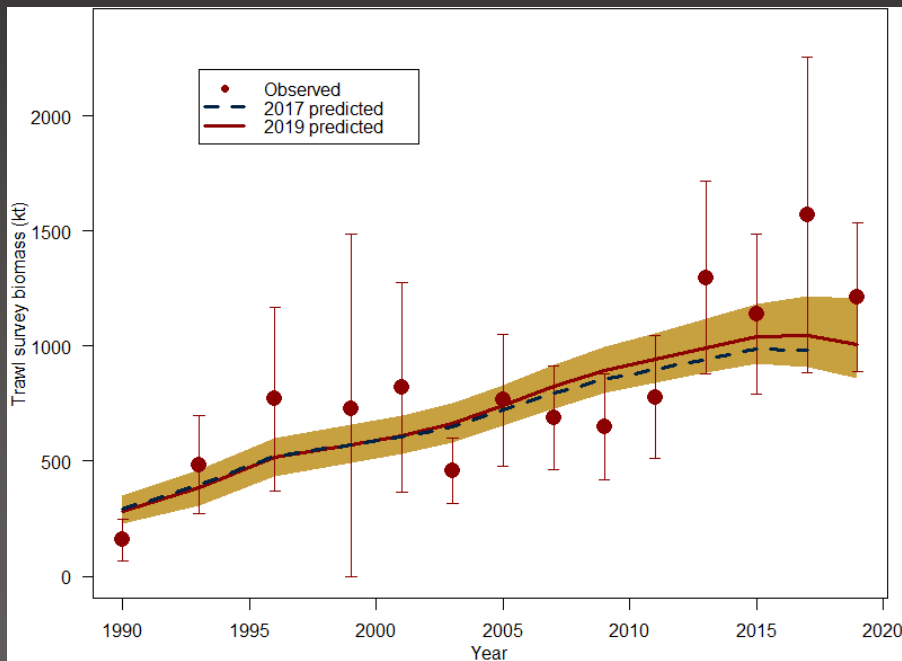
September 2020 Plan Team

Outline:

1. Post November 2019 Plan Team events

2. GOA POP Internal Review Team

3. Preliminary Results

4. Recommendations for Fall 2020 Assessment

Reminder of 2019 POP Assessment:

- Risk matrix: Assessment-related considerations & Pop'n dynamics considerations – Level 2: Substantially increased concerns
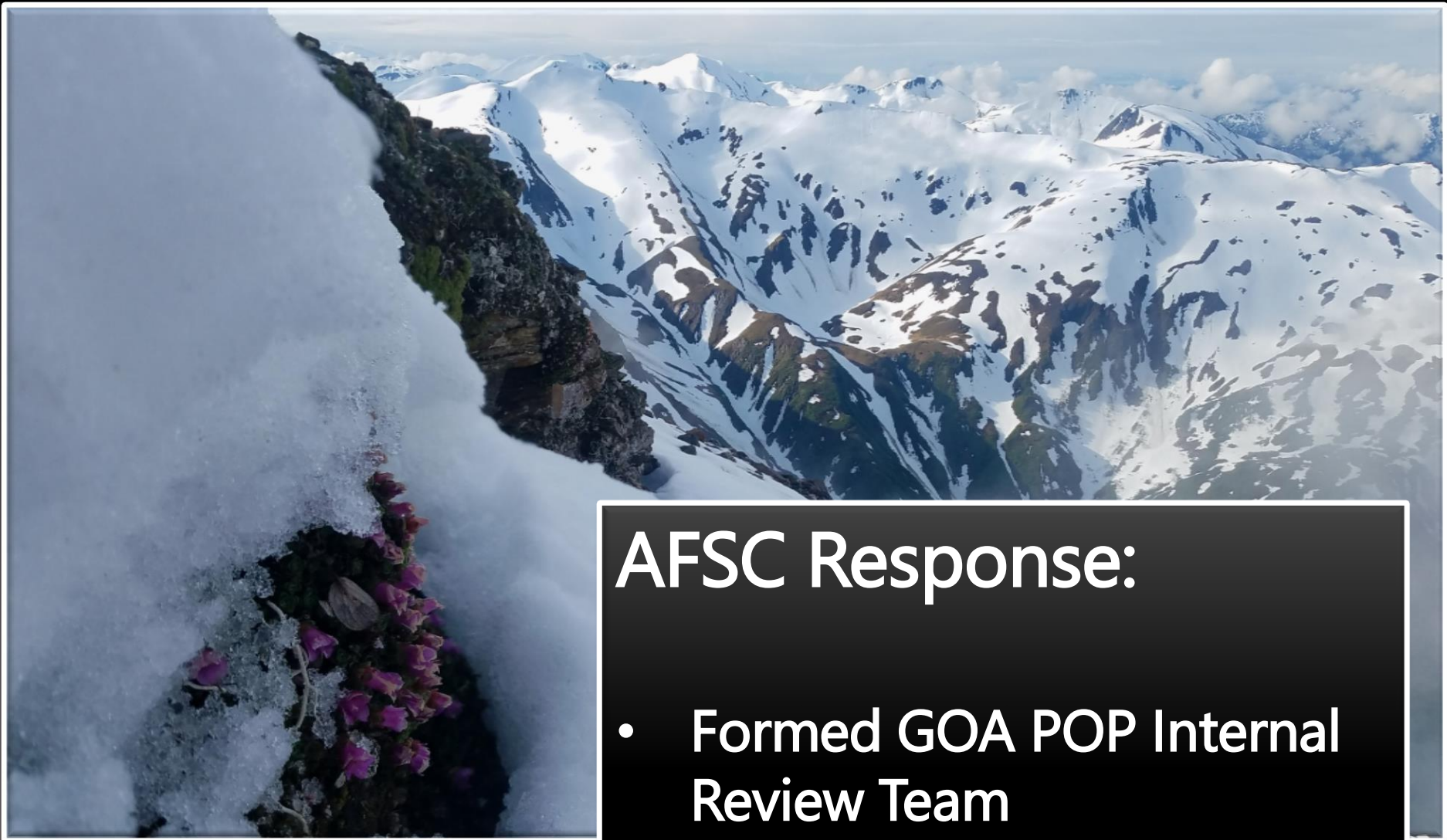
December 2019 Council meeting:

- At December 2019 NPFMC meeting industry requested an internal review of the GOA POP assessment and 'recommended that the TOR for the CIE review should emphasize model fit including time varying selectivity and time blocks, and design-based biomass estimators, with inclusion of acoustic-trawl (AT) data as an index of secondary priority'

- SSC minutes: *"The SSC agrees that the formation of an internal assessment review team prior to the CIE review would be beneficial."* SSC recommendations include:

  - Supports continued efforts to provide AT biomass estimates

  - Supports GOA GPT recommendation to explore incorporating AT into the assessment, examining catchability and selectivity, and examining VAST model for POP abundance and apportionment

December 2019 Council meeting :

- **AP Motion 6:** The AP recommends the CIE review Gulf Pacific Ocean Perch in April of 2020, and the terms of reference for the CIE need to prioritize fixing the models' performance and exploring the VAST model. The model should be revised before the September Plan Team meeting to move forward with the new ABC for the November Plan Team and 2021 Specs.
    - Rationale: The POP survey showed twice the POP biomass than the model; a CIE review of POP was recommended by the SSC and is important to model performance in time for use in next year's specification process
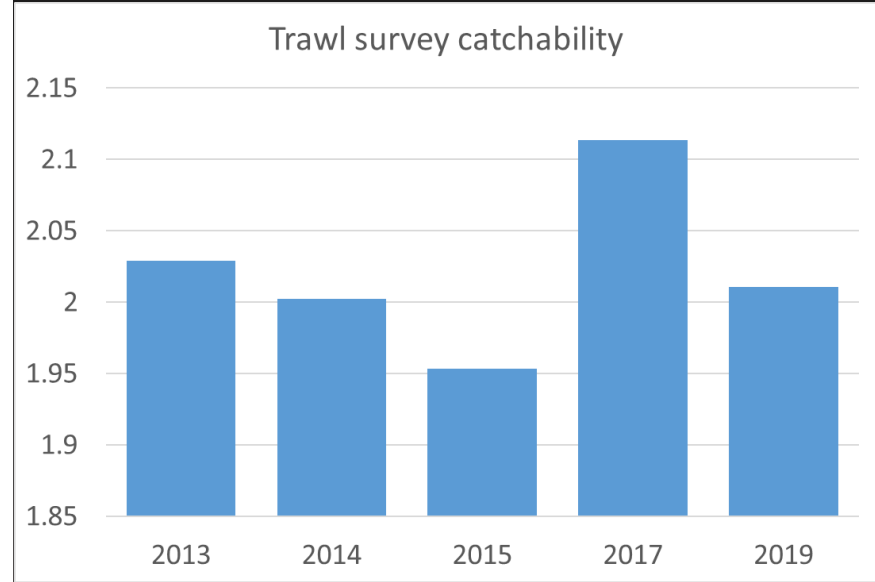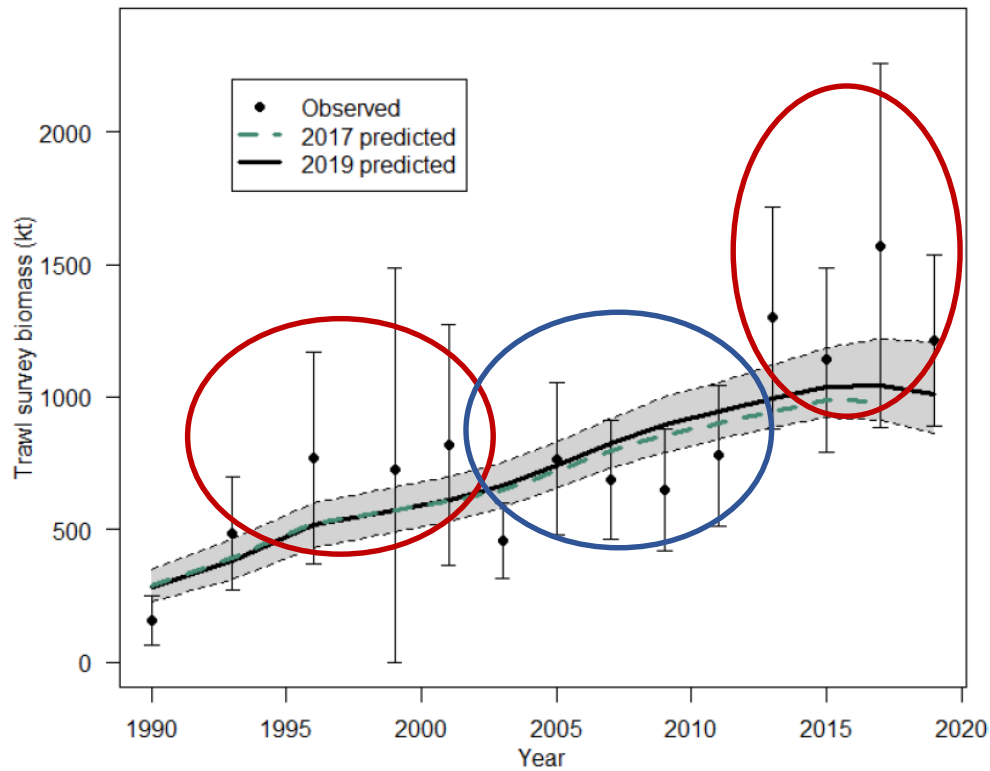
December 2019 Council meeting :

- From council minutes:
  - Ms. Baker made the following motion, which was seconded by Mr. Jensen: The Council recommends the Center of Independent Experts (CIE) review the Gulf of Alaska Pacific Ocean Perch stock assessment in April of 2020. The terms of reference for the CIE review should prioritize fixing the models' performance and exploring the VAST model. The model should be revised before the September Plan Team meeting. VOTE ON MOTION: The motion passed unanimously 12/6/2019 2:24 PM.

AFSC Response:

- Formed GOA POP Internal Review Team

- Met Bi-weekly (mostly) from March through August

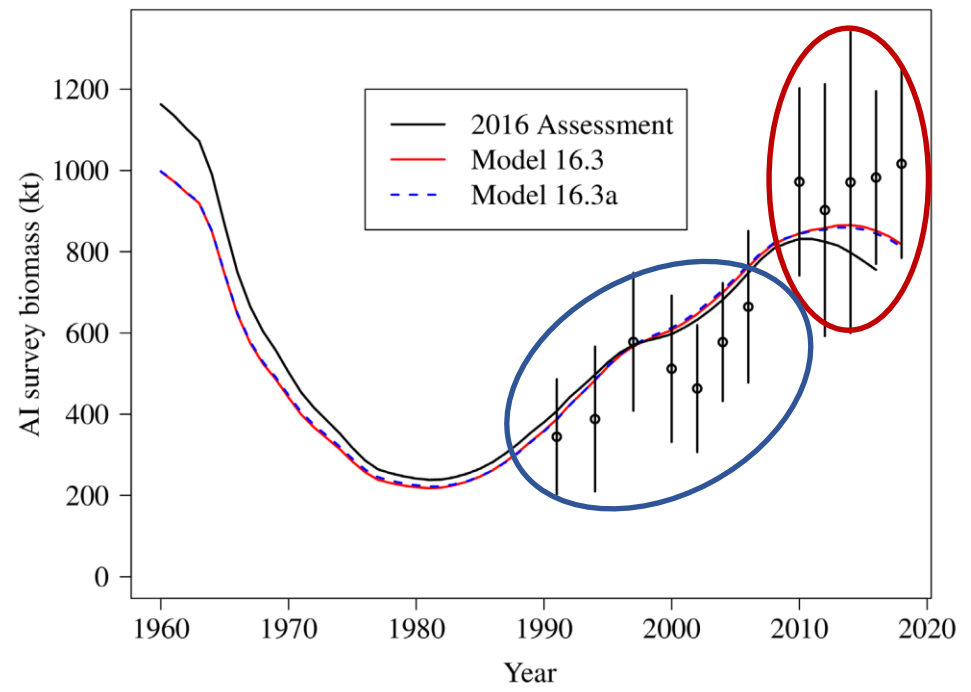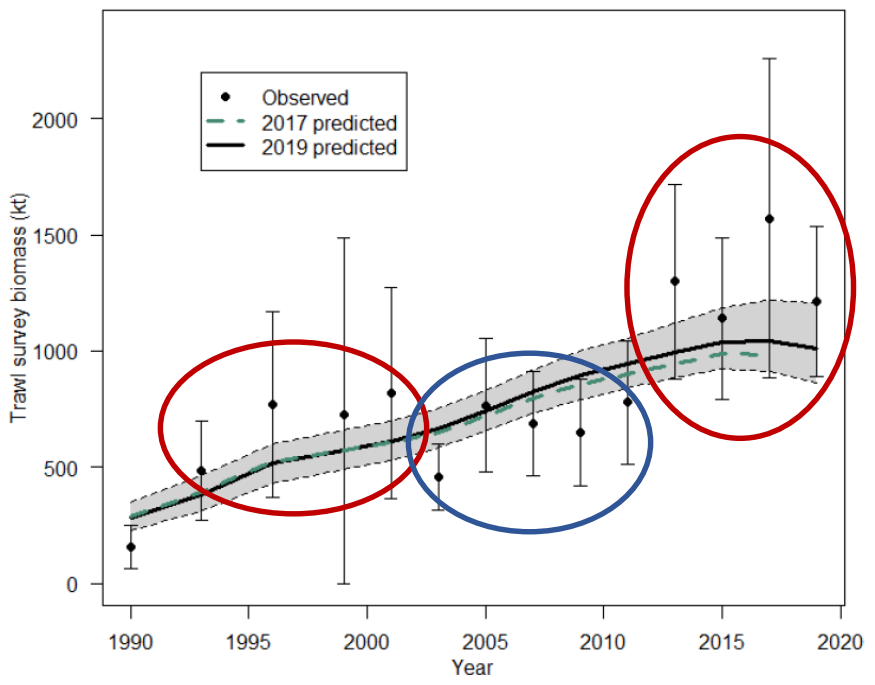# Initial meeting: framing the issues

Model underestimates trawl survey since 2013 assessment, but, also shows other consistent positive or negative residual patterns across the time series
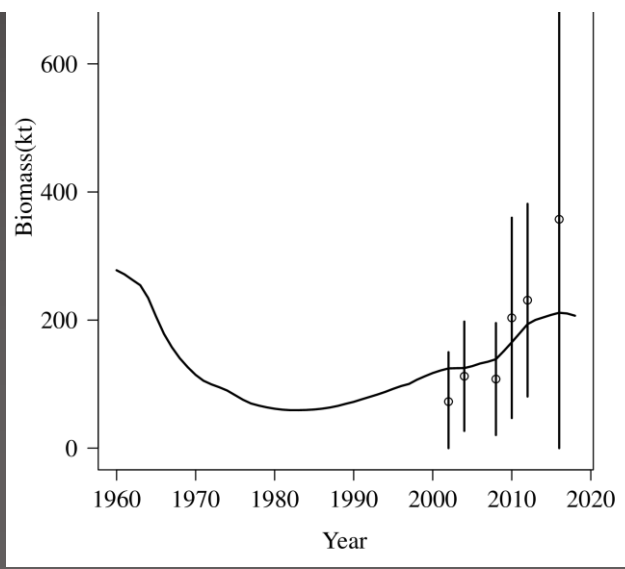
Catchability hovers around 2 (model retrospective shown), but, this is not new and has been this way since the first use of this model (q=1.88 in 2003 assessment)
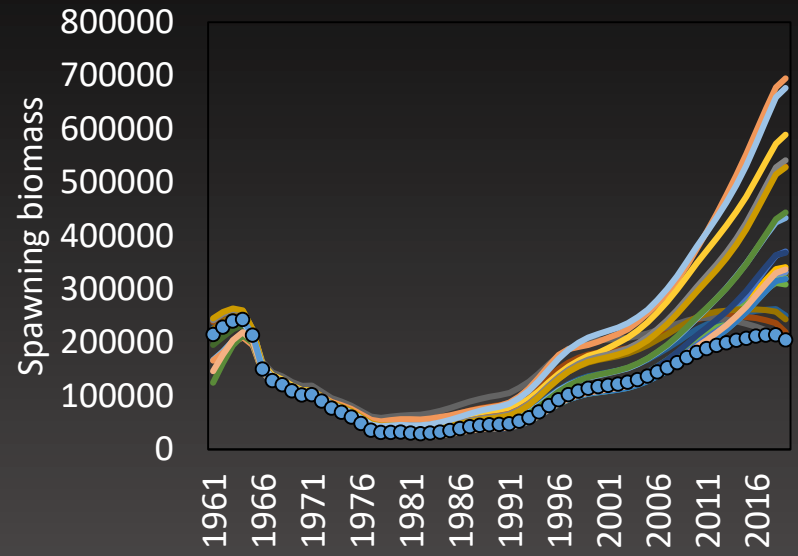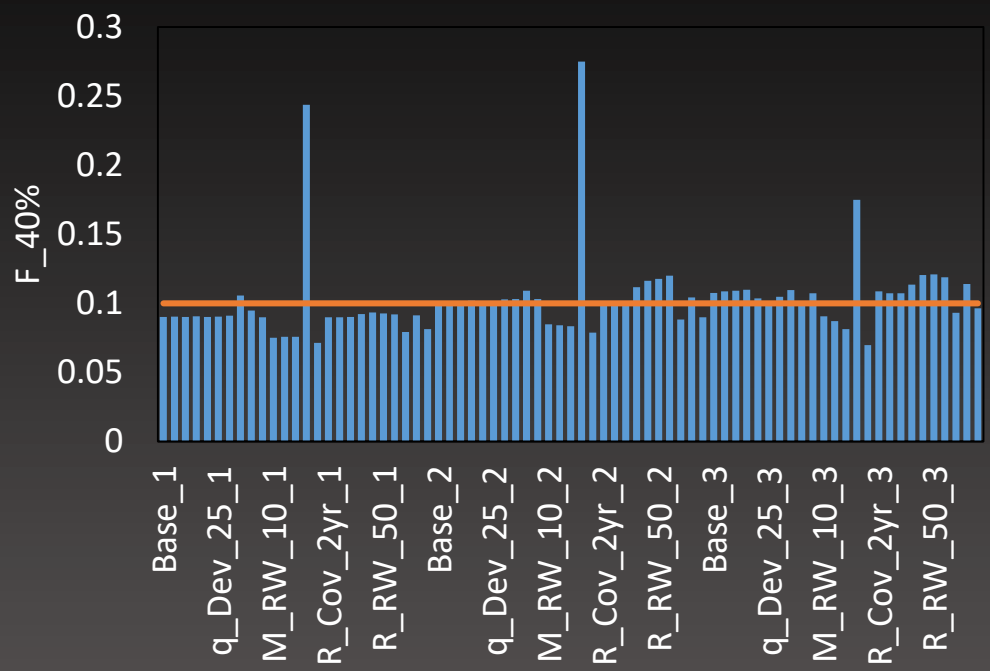
Model underestimate of POP survey biomass not unique to GOA, same thing occurring in AI (top right) and BS (bottom right) - meaning, what we accomplish today/this year may very well be applicable to both regions

Initial meeting: the kitchen sink

Model structures

1. 2019
2. New 2019
3. New 2019 w/ VAST

→

Parameters

q
M
log_mean_rec
sigr

→

T-D param

Covariate
Pnlzd devs
RW
Time blx

Internal review: distilling tasks

- ✓ Updating priors/data
- ✓ Initial abundance
- ✓ Fishery selectivity
- ✓ Time-dependent mean recruitment & recruitment variability
- ✓ Implementing VAST biomass index (with variance inflation parameter)

Internal review: distilling tasks

- Investigate utility of historical fishery length data
- Time-dependent survey selex
- Incorporate AT Index
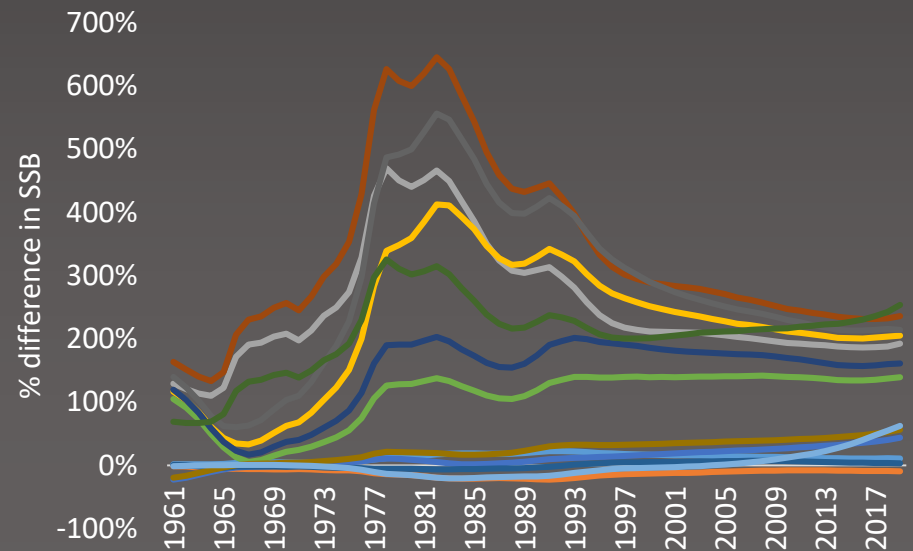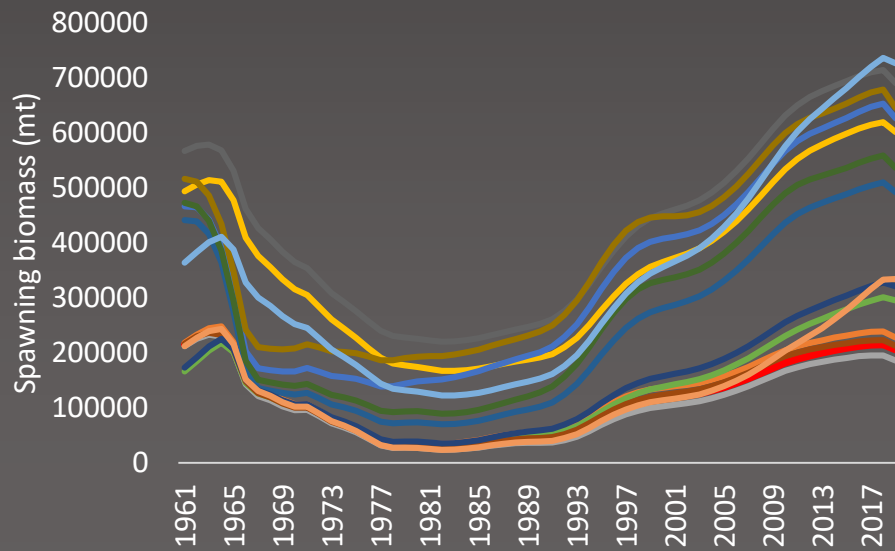- Time-dependent survey catchability

Internal review: other accomplishments

- ✓ Applied GOA POP data within BSAI POP model
- ✓ Applied GOA POP data within AMAK model
- ✓ Set up repository on GitHub
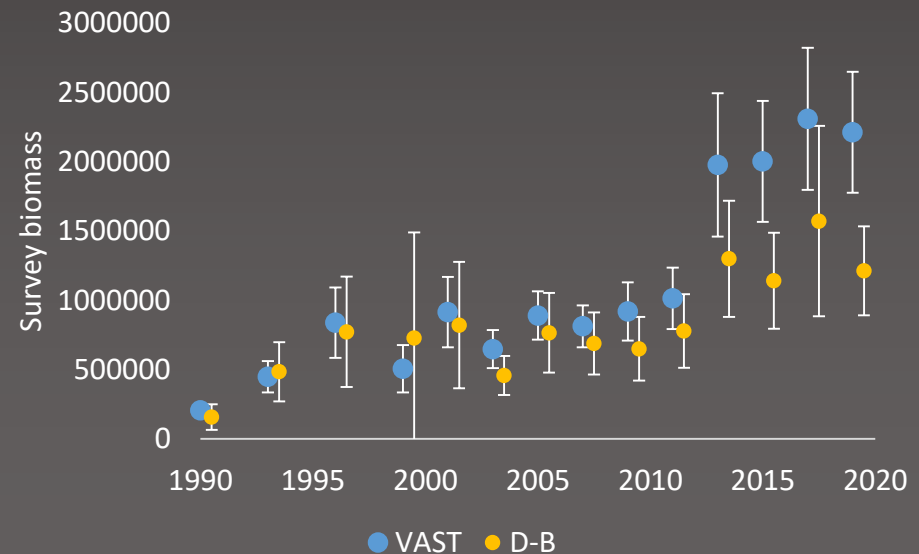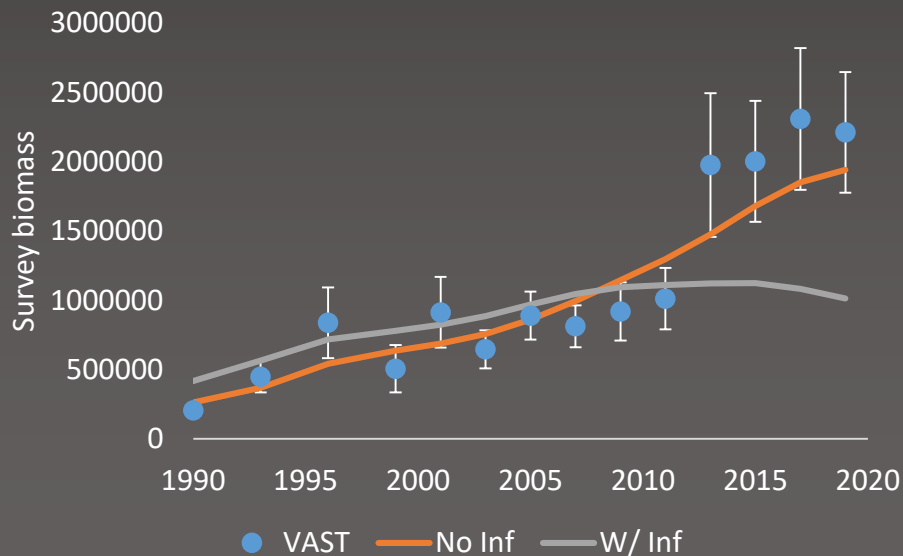- ✓ Developed some input/output code within tpl and R-script for plotting

Internal review: preliminary results

- Model sensitive to changes in parameterization
- Historical fishery length data influential on initial abundance estimates
- Fishery selectivity not as dome-shaped when allowed flexibility
- Fit to survey biomass improved when time-dependent estimation allowed in mean recruitment

Internal review: preliminary results

- Interesting model response to VAST estimates
- With variance inflation parameter, model ignores recent increase
- Recent increase in VAST has large influence on model parameters, still yet to be explained why divergence with design-based after 2013

Internal review: preliminary results

- Due to:
  - Large and still unexplained sensitivity of model to various methods explored
  - Some tasks still to be completed
  - Need for further review

- Internal review team does not recommend using any of these model changes this year

- Recommends further investigation geared towards CIE review in spring of 2021
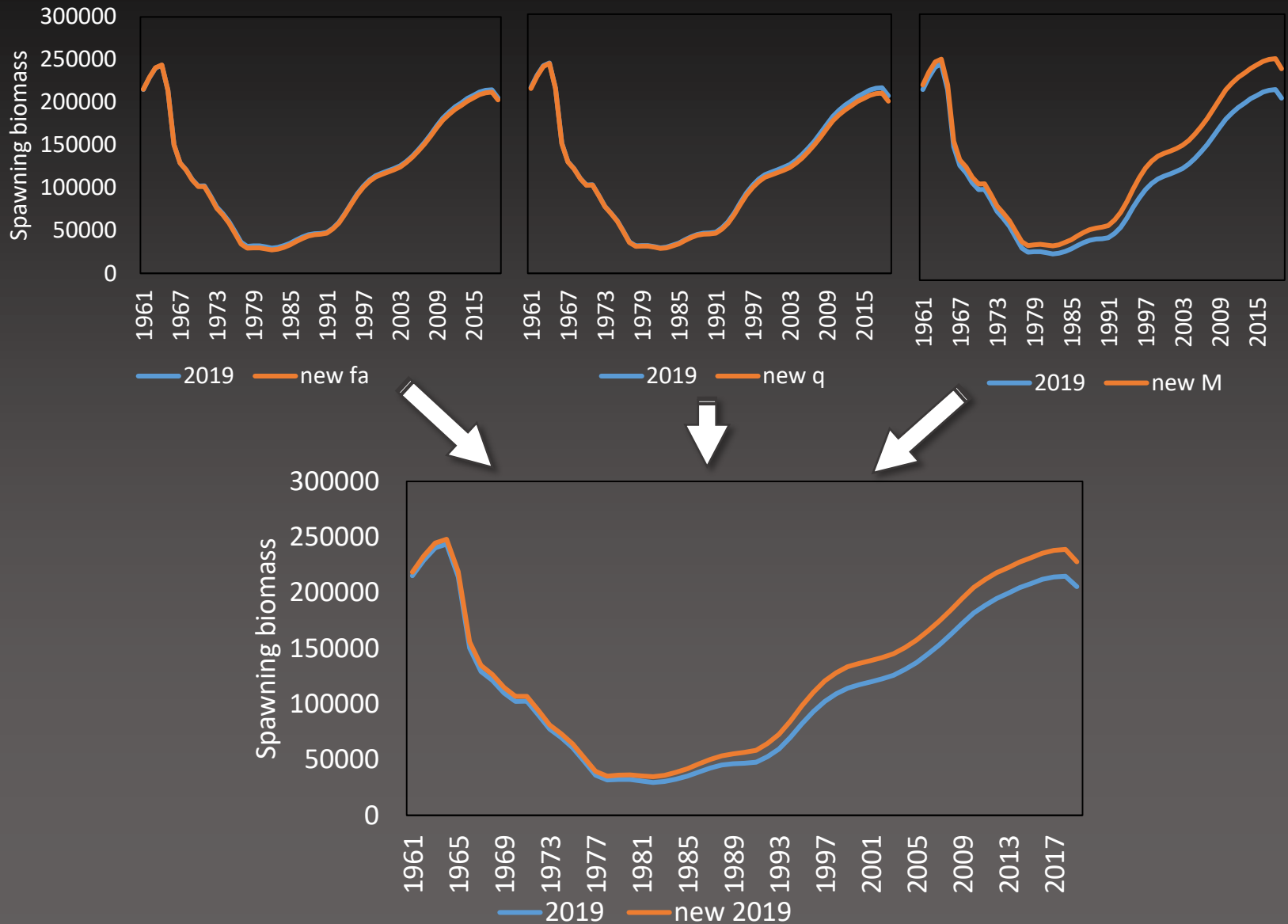
Recommendations for Fall 2020 assessment

- While model sensitivity still an issue, an intermediate step to a full assessment in 2021 would be to update priors and data
- Specifically:
  - Update fishery age comps and ageing error matrix
  - Define prior on M based on Hamel (2015)
  - Define prior on q based on Jones et al. (in review)

Recommendations for Fall 2020 assessment

- Preliminary results:

Recommendations for Fall 2020 assessment

- Was scheduled for an off-year assessment, does Plan Team support author recommendation to bring forward a full assessment with prior/data updates?

- Any other questions before I go?