



Comments on the quillback rockfish assessment

Ray Hilborn
School of Aquatic and Fishery Sciences
University of Washington

Would we expect the length data and catch to be informative?

- The key assumption is that the length data represent the total population filtered by the selectivity function
- All length data comes from catch, no scientifically designed length sampling
- When you have ontogenetic depth migration selectivity is always a concern

Where does the information on relative stock status come from?

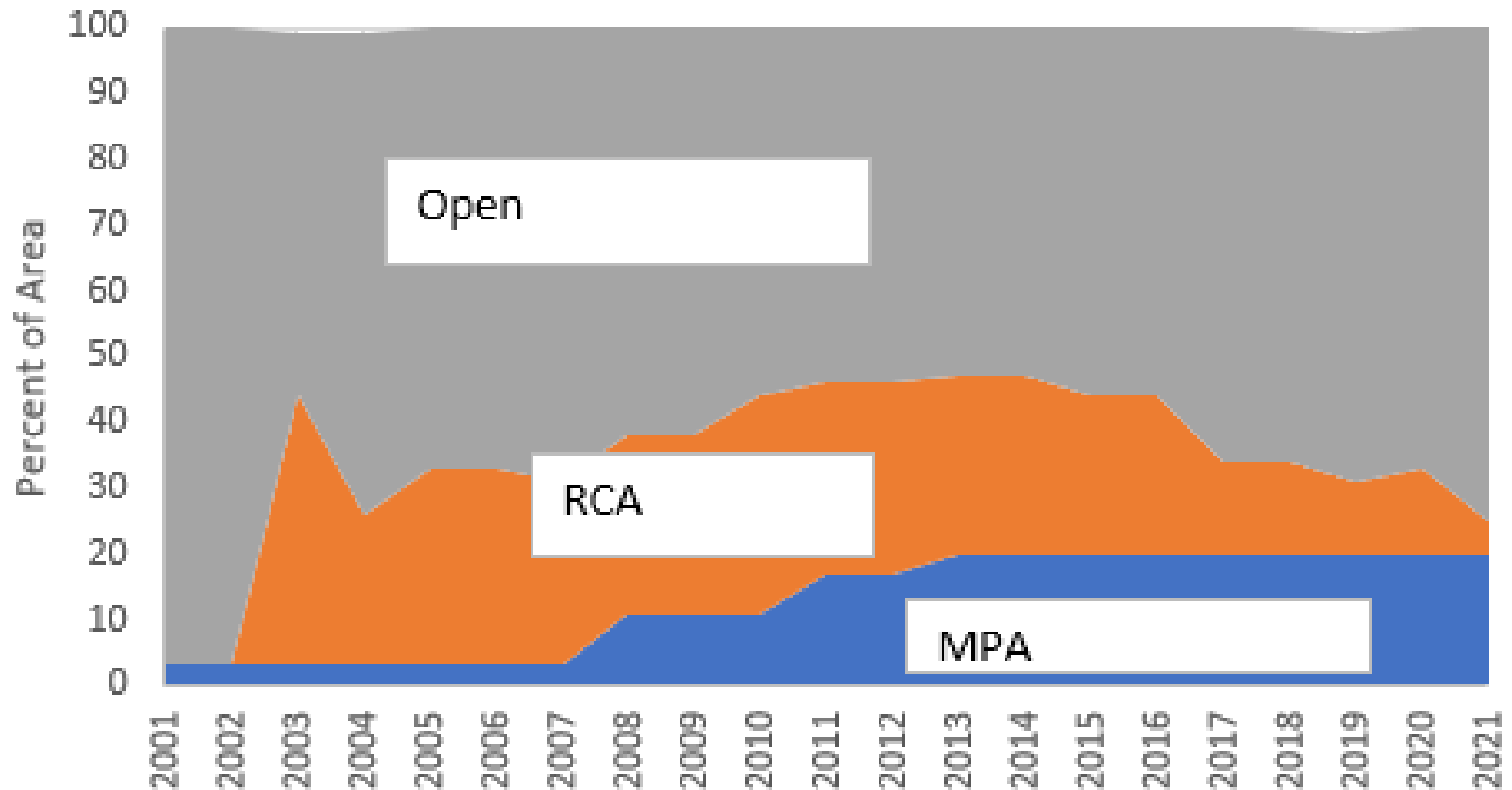
- Changes in index of abundance can directly inform stock status, but changes in age structure or length structure can also indicate poor stock status.
- In an assessment with only catch and length data one would assume that whatever information there is comes from the length data, but it is surprising to see an assessment that indicates a highly depleted stock when the average length is as high as it was when the stock was at management targets. The base case presumably explains this by estimating poor recruitments in recent years.

Contrasting explanations for the mean length being as high as the 1980s

- Base case: poor recent recruitments from a combined steepness of 0.72 and negative recruitment residuals
- The alternative that fits the data better: the stock is not as depleted and recruitment has been better.
- Perhaps the closing of inshore areas from the MLPA starting in about 2008 explains the lack of smaller fish, not a recruitment decline.

The depths being fished have changed

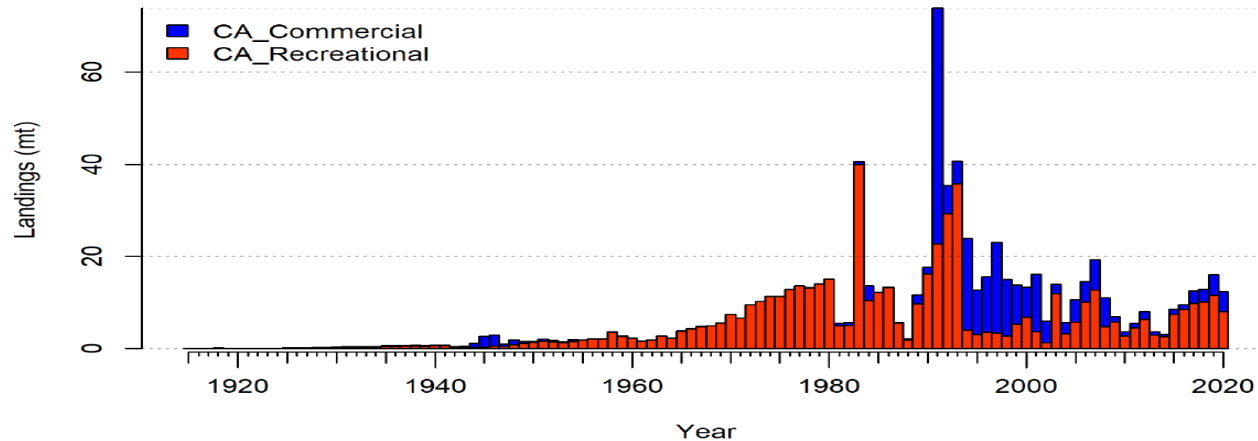
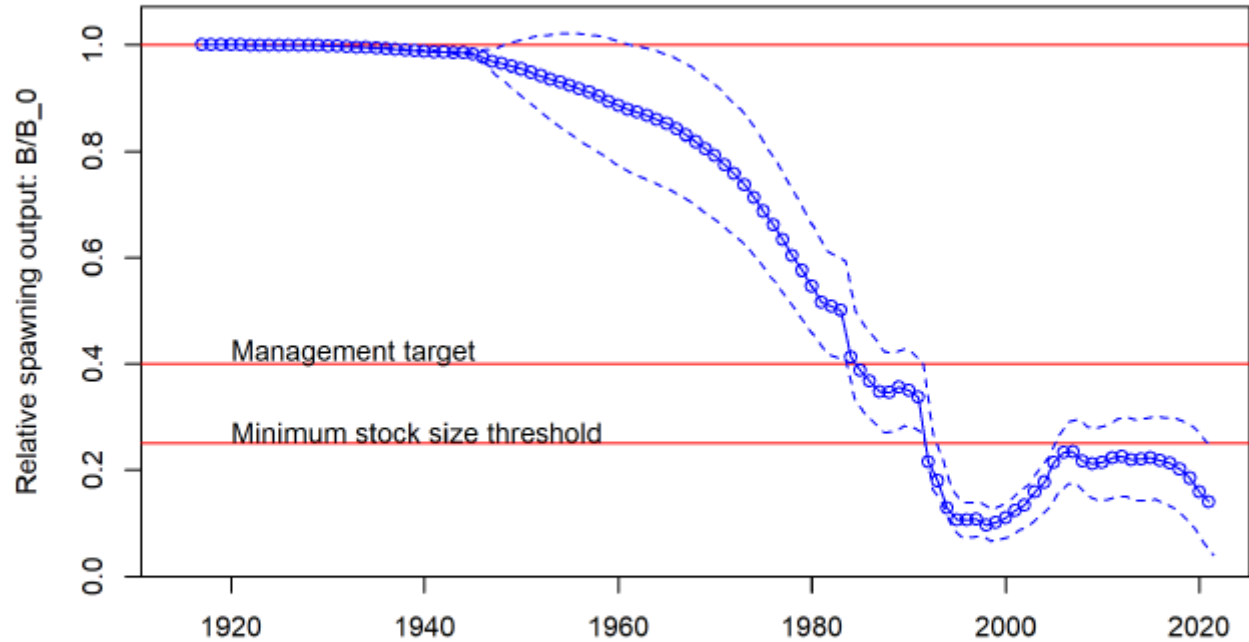
Open and Closed Area



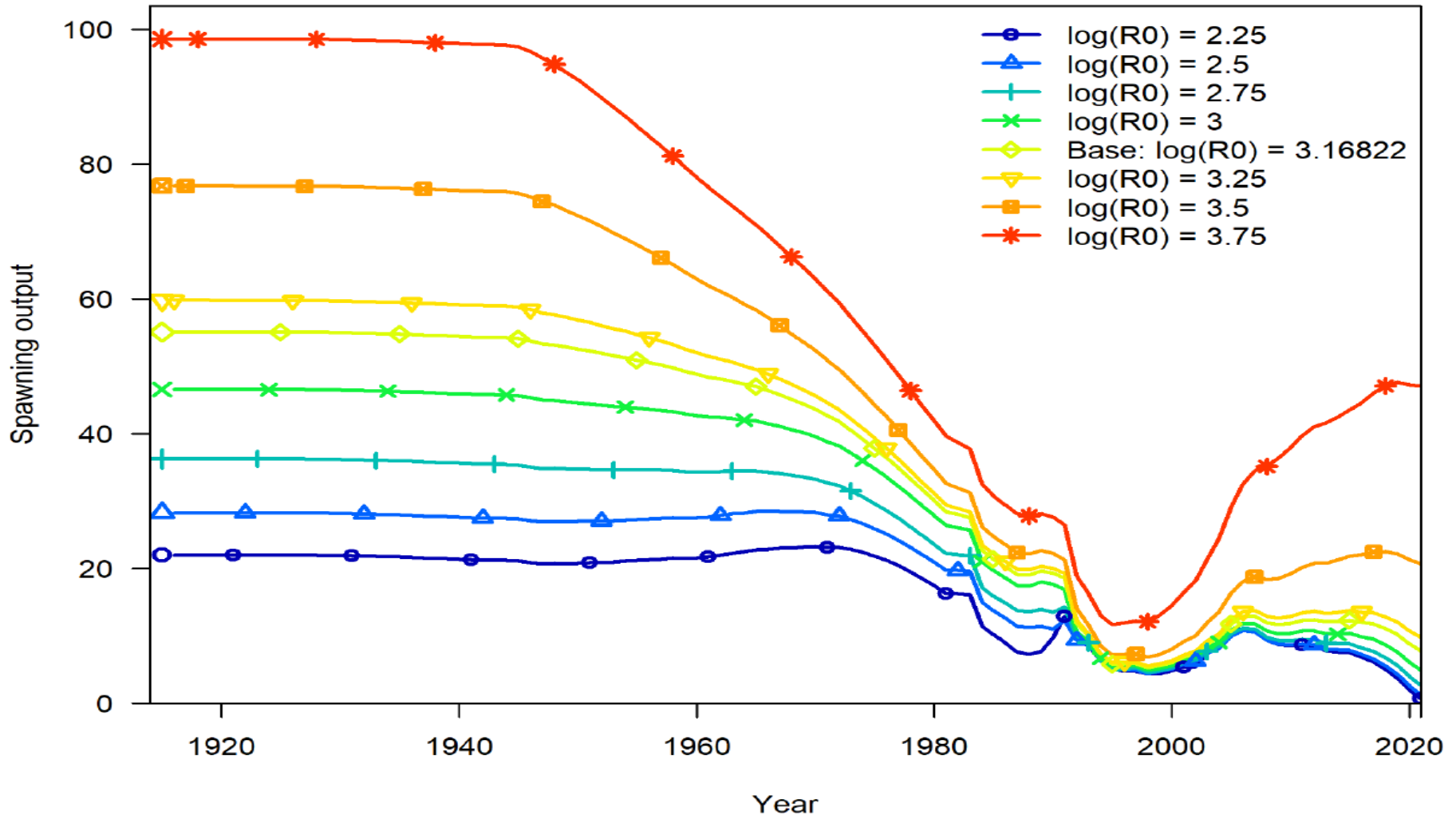
Red flag #1



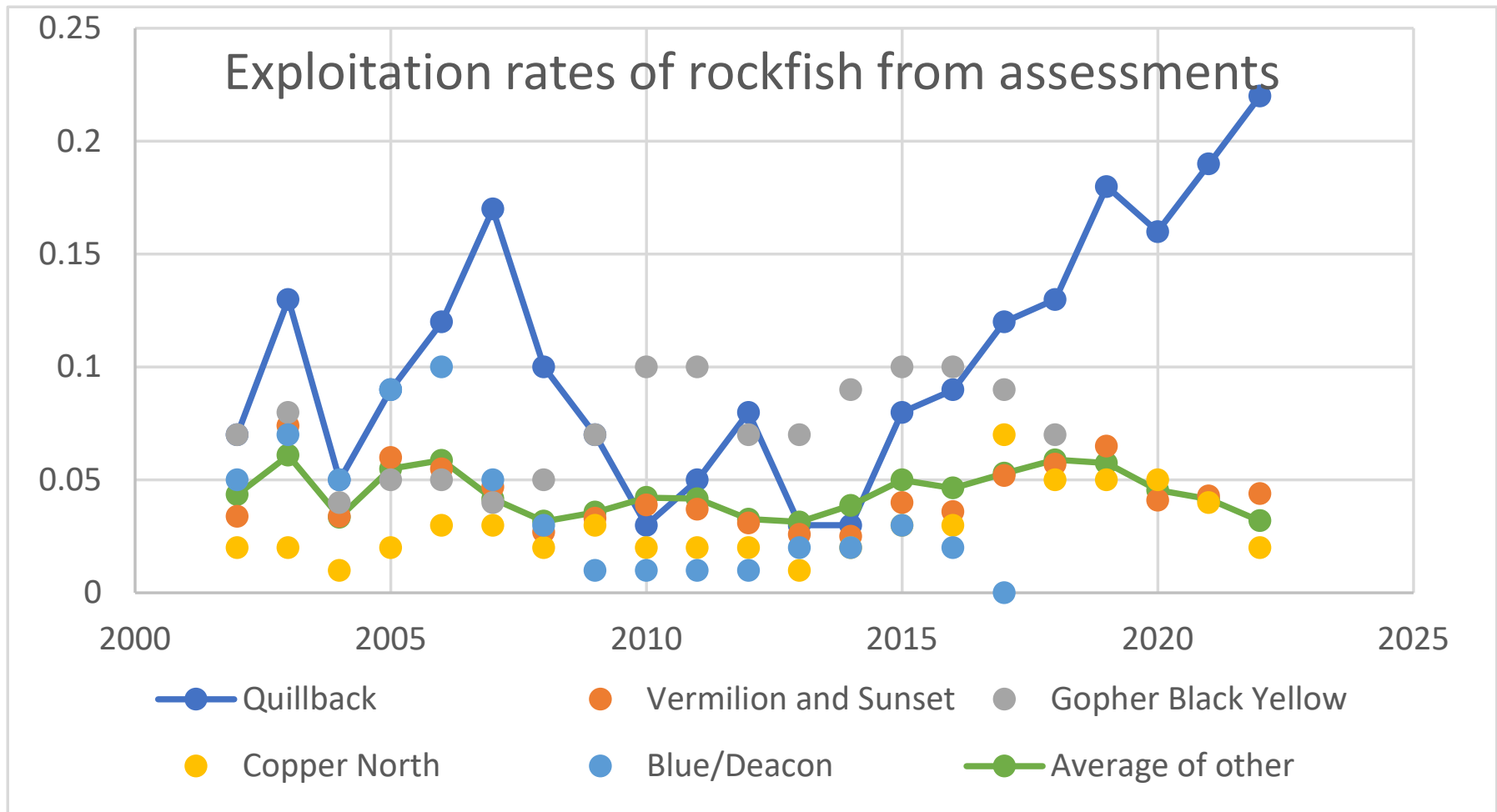
Do the results make sense?



The ups and downs are determined by the catches



But the estimated exploitation rate does not make sense



The evidence is that fishing effort has been relatively steady since the early 2000s

- How could exploitation rates have increased so much for quillback but not for other species?

Red flag #2



Where does the information on relative stock status come from?

- In an assessment with only catch and length data one would assume that whatever information there is comes from the length data

But the quillback status is determined
not by the length and catch data

- It is driven by fixed parameter estimates and the key assumptions about selectivity in the model structure
 - Also of course the stock definition

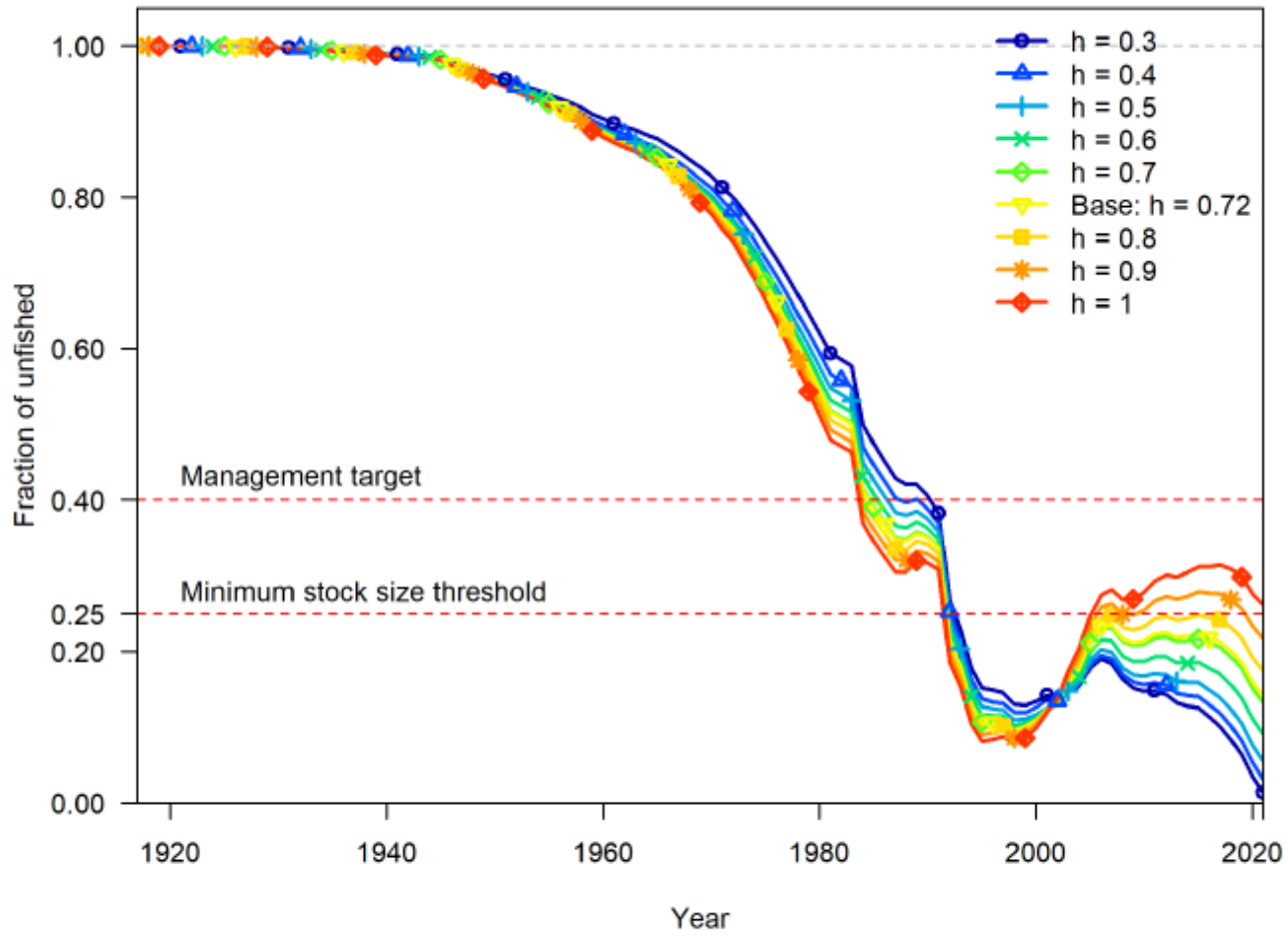
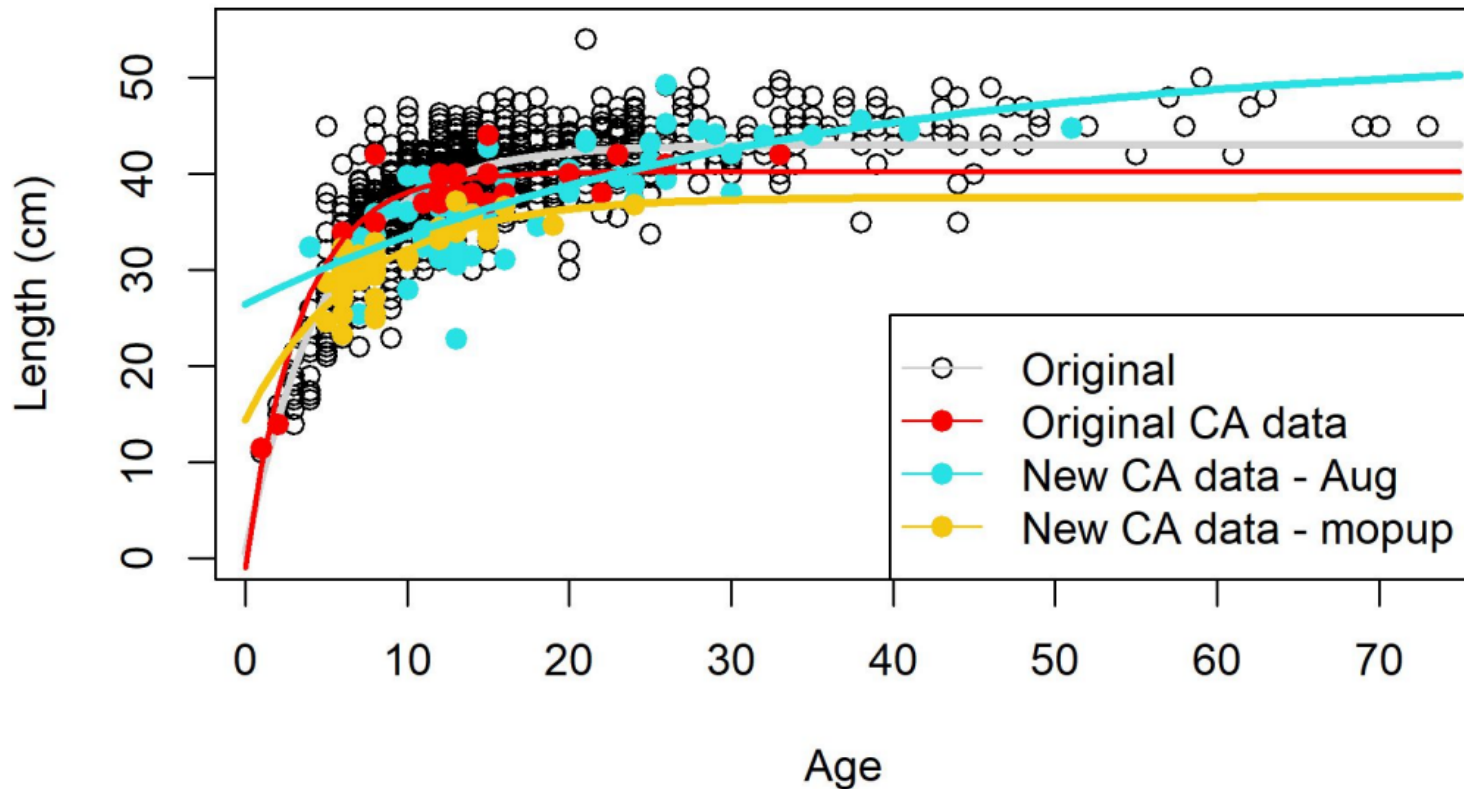


Figure 31: Change in the estimate of fraction unfished across a range of steepness values.

Red flag #3



How representative are the growth data?



Red flag #4



The critical question is thus

- Are the estimated fixed parameters best available science?
- Or are they the result of a series of previous decisions
 - Fixing steepness at 0.72
 - Using length data not from California
 - Setting M from one individual fish

Best available science is not a base case with fixed parameters

- If uncertainty in the fixed parameters and selectivity structure were incorporated and the data were allowed to speak
- It would be clear that there is enormous uncertainty in the current status of the stock
- And that the data available at the time of the 2021 assessment is simply not sufficient to provide management advice

The choices of this subcommittee would seem to be

- Accept the current base case as best available science
- Do some new runs with alternative parameters or even estimate uncertainty in current stock status
- Admit that there is too much uncertainty to provide a reliable estimate of stock status and wait for a new assessment in 2025 and put that through a STAR panel

Other factors to consider

- There is now much more information available including some indices of abundance, California age size information etc.

Objectives of the Magnuson-Stevens Act

“the fisheries can be conserved and maintained so as to provide optimum yields on a continuing basis”

“The term "optimum", with respect to the yield from a fishery, means the amount of fish which will provide the greatest **overall benefit to the Nation, with particular reference to food production and recreational opportunities;** “

Conclusion

- Impacts of the northern cod collapse

