INTERNATIONAL PACIFIC HALIBUT COMMISSION

Celebrating 100 Years

1924-2024

Development of the 2023 stock assessment

Agenda item: 4.1.1

IPHC-2023-SRB023-06

I. Stewart & A. Hicks

Recent and planned stock assessments

- 2022: Full assessment
- 2023: Update – no major changes to model or data structure, adding new information to existing data sets where available
  - SRB review of development avenues in June (SRB022) and final recommendations in September (SRB023)
- *2024: Update planned*
- *2025: Full assessment planned*

SRB requests and recommendations

1) SRB022–Req.02 (para. 18):

*"**NOTING** that analysis of whale depredation has clarified that the potential scale of removals from depredation is relatively small, except in IPHC Regulatory Area 4A, the SRB **REQUESTED** that updated analysis using USA observer data be presented at SRB023 to evaluate whether incorporation of whale depredation in the stock assessment is warranted."*

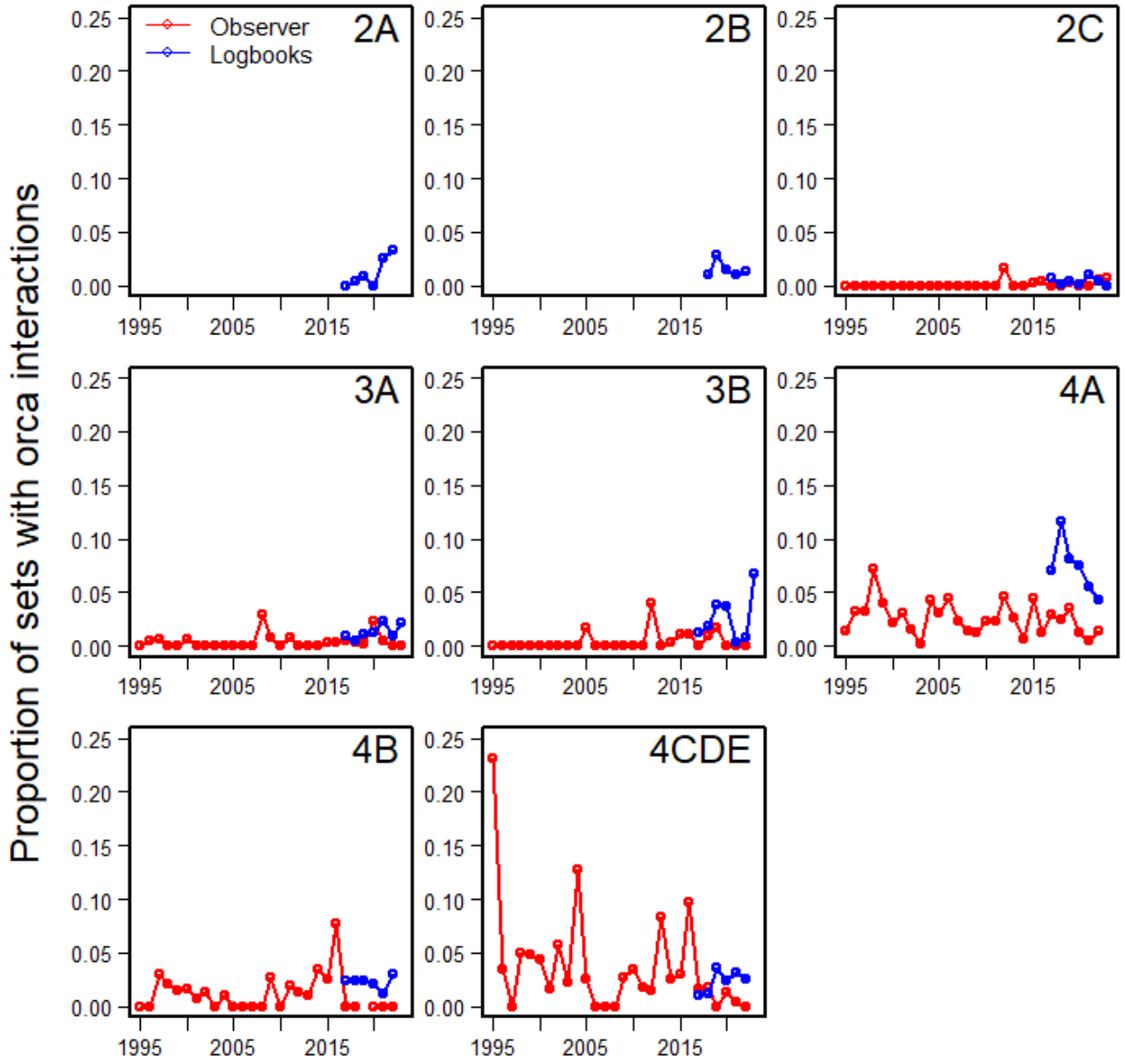
2) SRB022-Rec.02 (para. 19):

*"**NOTING** that the scale of impact from different model weighting approaches presented here is small relative to the impact of other factors in the MSE (e.g. two- vs. three-year assessment intervals and TCEY), the SRB **RECOMMENDED** that the Secretariat continue using the equal weighting approach for model averaging."*

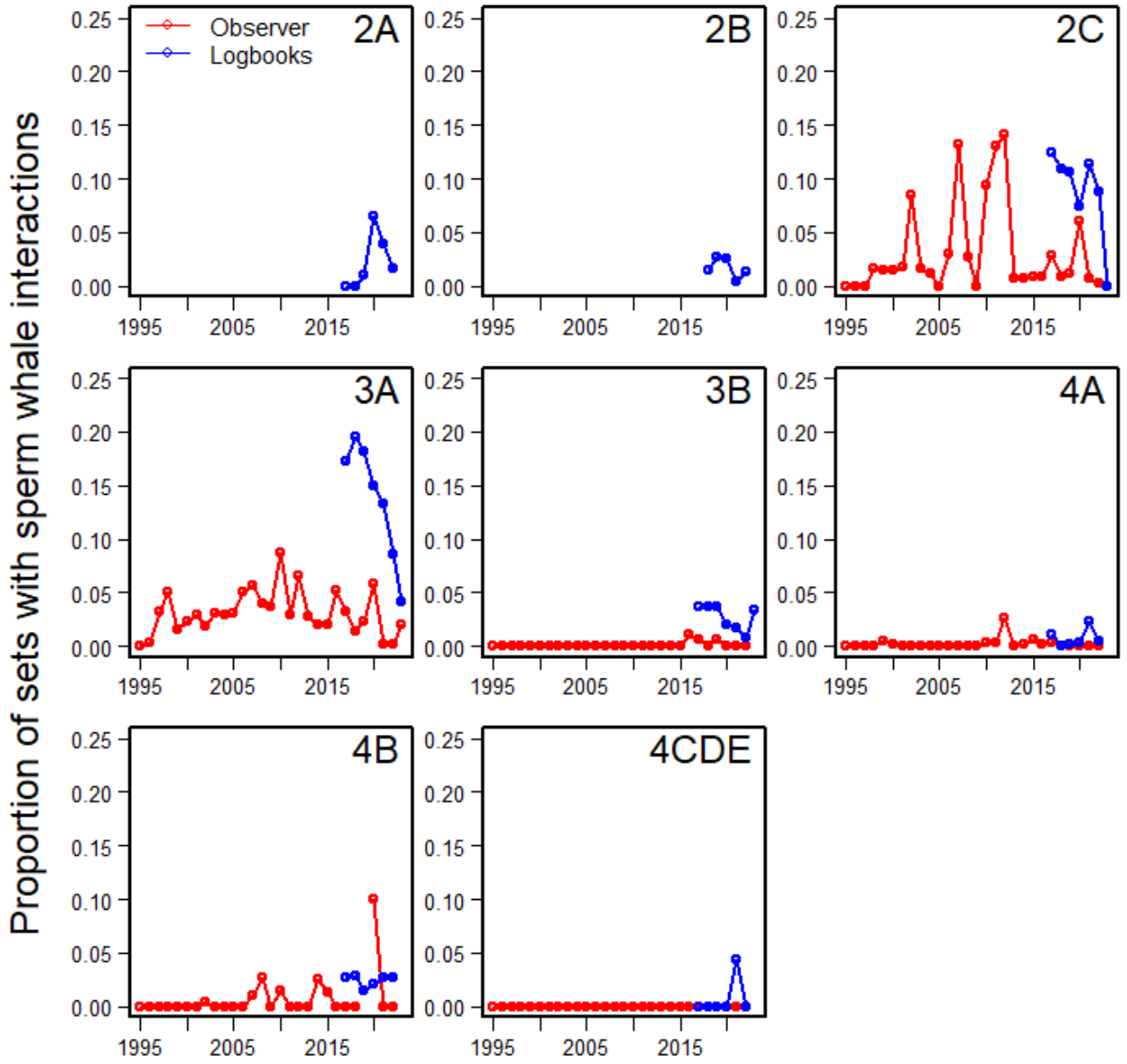
Depredation – Alaska observer data

- Observers record both depredation and marine mammal sightings; however, marine mammal monitoring not their primary task
- Major restructuring in 2013 – prior to that, no/little coverage on <60' vessels, nonrandom deployment, no coverage for directed halibut fishery
- Included all sightings and depredation (Orca and Sperm whale)
  - 'Maximum depredation estimate'
- Sensitivity to the % of fishing time monitored was conducted (25% used as base)

Comparison of logbooks and observer data - Orca whales



Comparison of logbooks and observer data - Sperm whales



Estimation over 1995-2022

- Average depredation rate from 2017-2020 applied <2017
- Sublegal halibut assumed to depredated at the same rate as landings, but based on total catch (not mortality accounting for discard survival)

Inclusion in the stock assessment

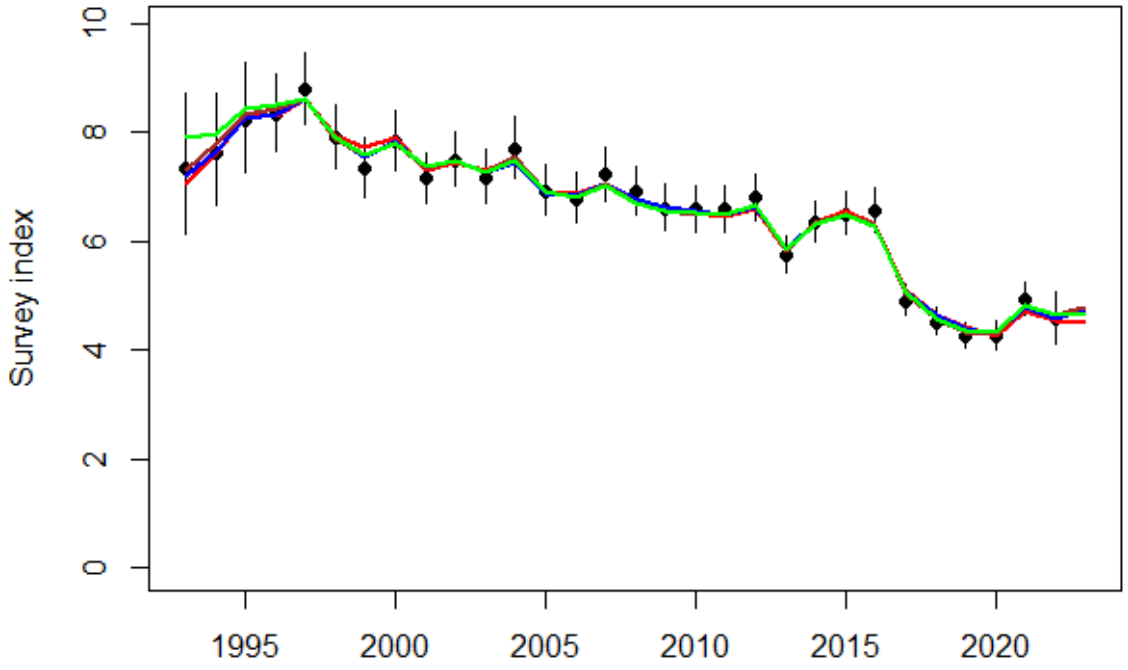
- Added whale depredation estimates (1995-2022) to commercial landings and discard mortality – implicitly assumes the whales are not size-selective
- Re-estimate all model parameters
- Calculate the yield consistent with Spawning Potential Ratio projected for the 2023 adopted mortality limits
- Subtract off the 3-year running average (2020-2022) depredation
- Compare fishery mortality to projection of 2023 fishery mortality based on models ignoring depredation

Depredation – net effects

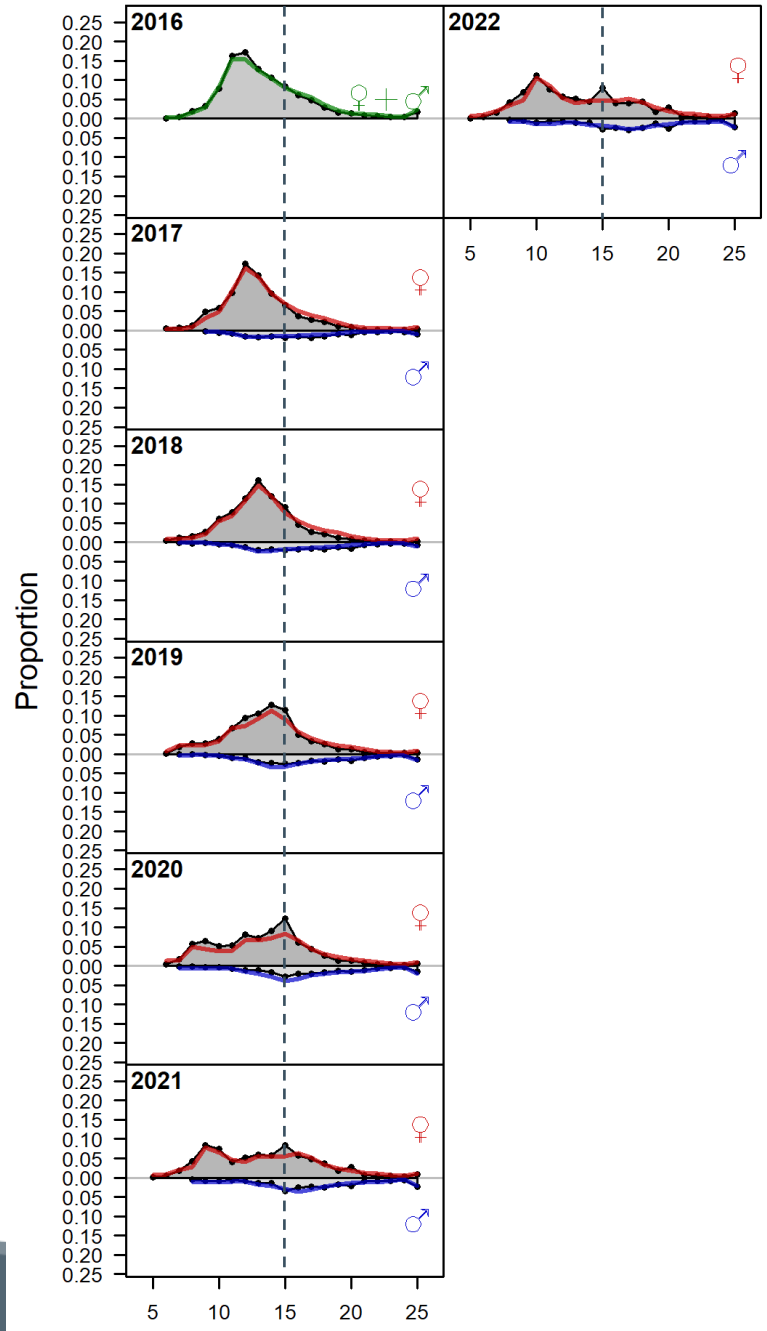
- Estimated 1.41 Mlbs of lost yield since 1995
- Assessment model spawning biomass scales upward slightly (1-3% among the four models)
- 0.20 Mlbs of depredation mortality would have been projected for 2023 (deducted from the directed commercial landings and discard mortality)
- The two effects nearly cancel: mortality limits to achieve the same SPR result in nearly identical net fishery limits (+0.02Mlbs)

Model weighting

- Equal weighting will be retained for the 2023 ensemble
- Will continue to monitor predictive skill and implied MASE weighting



Preliminary data: directed commercial fishery age compositions



Preliminary data: directed commercial fishery age compositions

- Adding the 2022 data to the final 2022 stock assessment resulted in a 2.5% reduction in the estimated spawning biomass at the beginning of 2023.
- Given the recent trend in the stock, and the likelihood of a reduced FISS in 2024, the Secretariat recommends continued annual genetic analysis of the previous year's data (at least through 2024) to ensure we have as much information available to maintain accuracy and precision in the stock assessment

Remaining model development for 2023

- No structural changes to models or data are proposed for 2023

Data to be updated for the final 2023 assessment

1) New modelled trend information from the 2023 FISS for all IPHC Regulatory Areas.
2) Age, length, individual weight, and average weight-at-age estimates from the 2023 FISS.
3) Directed commercial fishery logbook trend information from 2023 (and any earlier logs that were not available for the 2022 assessment) for all IPHC Regulatory Areas.
4) Directed commercial fishery biological sampling from 2023 (age, length, individual weight, and average weight-at-age) from all IPHC Regulatory Areas.
5) Biological information (lengths and/or ages) from non-directed discards (all IPHC Regulatory Areas) and the recreational fishery (IPHC Regulatory Area 3A only) from 2022. The availability of these data routinely lags one year.
6) Updated weight-at-age for younger Pacific halibut captured in NOAA Fisheries trawl surveys in the Aleutian Islands and Bering Sea in 2022. These data also routinely lag one year.
7) Updated mortality estimates from all sources for 2022 (where preliminary values were used) and estimates for all sources in 2023.

Recommendation/s:

a) **NOTE** paper IPHC-2023-SRB023-06 which provides a response to requests from SRB022, and an update on model development for 2023.

b) **RECOMMEND** any changes to be included in the final 2023 stock assessment to be completed for presentation at IM099.

c) **REQUEST** any further analyses to be provided at SRB024, June 2024.

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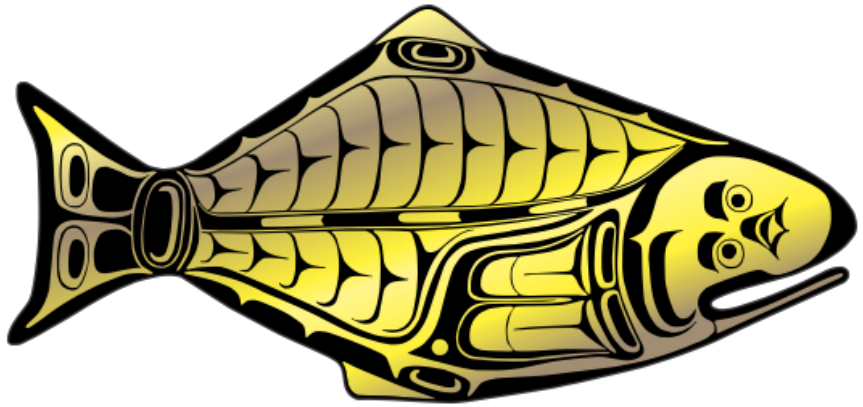

HALIBUT COMMISSION