

## One-Page Summary

### Status of the Pacific Hake (whiting) stock in U.S. and Canadian waters in 2020

#### Joint Technical Committee of the Pacific Hake/Whiting Agreement Between the Governments of the United States and Canada

March 3rd, 2020

- The stock assessment model for 2020 is similar in structure to the 2019 model. It is fit to an acoustic survey index of abundance, annual commercial catch data, and age-composition data from the survey and commercial fisheries.
- Structural changes from 2019 involve a new prior distribution for the parameters that weight the age-composition data, removal of the constraint that estimated recruitment deviations must sum to zero, and using the average of the most recent five years (rather than all years) of weight-at-age data for calculating forecasts.
- Updates to the data include: the biomass estimate and age-composition data from the acoustic survey conducted in 2019, fishery catch and age-composition data from 2019, weight-at-age data for 2019, and minor changes to pre-2019 data.
- Coast-wide catch in 2019 was the third largest on record at 411,283 t [t represents metric tons], out of a Total Allowable Catch (adjusted for carryovers) of 597,500 t. Attainment in the U.S. was 71.8% of its quota (down 0.3% from last year); attainment in Canada was 60.4% (down 0.7% from last year).
- The median estimate of the 2020 relative spawning biomass (female spawning biomass at the start of 2020 divided by that at unfished equilibrium,  $B_0$ ) is 65% but is highly uncertain (with 95% credible interval from 31% to 129%). The median relative spawning biomass reached a historical low of 33% in 2010, increased due to large estimated 2010 and 2014 cohorts, and has gradually declined since 2017 during a period of record catches.
- The median estimate of female spawning biomass at the start of 2020 is 1.196 million t (with 95% credible interval from 0.550 to 2.508 million t). This is a decrease from the 2019 median of 1.379 million t (with 95% credible interval 0.736–2.706 million t).
- The estimated probability that spawning biomass at the start of 2020 is below the  $B_{40\%}$  (40% of  $B_0$ ) reference point is 9.9%, and the probability that the relative fishing intensity is above its target at the end of 2019 is 8.4%. The joint probability of both these occurring is 4.3%.
- Based on the default harvest rule, the estimated median catch limit for 2020 is 666,458 t (with 95% credible interval from 258,675 to 1,588,947 t).
- Projections are highly uncertain due to uncertainty in estimates of recruitment for recent years and, thus, were conducted across a range of catch levels. Projections setting the 2020 and 2021 catch equal to the 2019 Total Allowable Catch of 597,500 t show the estimated median spawning biomass decreasing from 65% of  $B_0$  in 2020 to 47% of  $B_0$  in 2021 and to 34% of  $B_0$  in 2022, with a 60% chance of the spawning biomass falling below  $B_{40\%}$  in 2022. There is an estimated 97% chance of the spawning biomass declining from 2020 to 2021 and an 87% chance of it declining from 2021 to 2022 under this constant level of catch.