Catch only Projection: Status of Widow Rockfish (*Sebastes entomelas*) Along the U.S. West Coast in 2023

#### John R. Wallace

Northwest Fisheries Science Center

U.S. Department of Commerce

National Oceanic and Atmospheric Administration National Marine Fisheries Service

2725 Montlake Boulevard East Seattle, Washington 98112-2097

john.wallace@noaa.gov

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This document provides the first catch-only projection of the 2019 update assessment that updated the 2015 benchmark assessment of the Widow Rockfish (Sebastes *entomelas*) that reside in the waters off California, Oregon, and Washington from the U.S.-Canadian border in the north to the U.S.-Mexico border in the south. Updated total catches for years 2017 – 2021 were derived from GEMM reports (Table 1). Estimated 2022 catch data is an aggregation of data from PacFIN, RecFIN, and NORPAC. The projected 2023 and 2024 catches were provided by the Groundfish Management Team (GMT). For years 2025 and beyond, model projected ABC catches were assumed.

Note that the ‘Hake’ column in Table 1, was previously labeled ‘At-Sea Hake’ in Table a of both the 2015 and 2019 assessments. However, this catch (now and previously) contains all Hake fishery sectors in WCGOP’s groundfish mortality (GEMM) landings (including Shoreside), and not just the At-Sea Catcher Processor (CP) and At-Sea Mothership Catcher Vessel (MSCV) sectors. Also, the legend of Table a of the 2019 update assessment claims that the numbers for the fisheries listed are for recent landings, but they are total mortality and sum to the ‘Total Mortality’ column.

In the projections, the split of catches among fleets was based upon the average split in the final three years. Scientific Uncertainty Buffer Fractions are based upon the number of years since the last assessment was conducted in 2019, based upon a Category-1 assessment with P\* = 0.45. Those Buffer Fractions, along with previous and updated Catches, OFLs and Depletions and updated Biomass, Spawning output, and ABCs are given in Table 2.

**Table 1: Recent total mortality (discards + landings; mt) for the bottom trawl, midwater trawl, at-sea hake, net, and hook-and-line fisheries and their cumulative total mortality plus modeled total landings. One hundred percent mortality is assumed for discards. The GMT projections of total mortality for 2023-24 are shown at the bottom.**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Year | Trawl | MidwaterTrawl | Hake | Net | Hook & Line | TotalMortality | TotalLandings |
| 2013 | 51.27 | 241.1 | 176.4 | 0 | 0.98 | 472.7 | 469.8 |
| 2014 | 71.28 | 306.6 | 342.2 | 0.03 | 1.84 | 725.8 | 721.9 |
| 2015 | 12.18 | 479.2 | 386.2 | 0 | 2.04 | 884.8 | 879.6 |
| 2016 | 9.62 | 588.0 | 440.8 | 0 | 0.82 | 1,045.4 | 1,039.2 |
| 2017 | 35.93 | 4,852.1 | 1,455.2 | 0 | 2.66 | 6,395.4 | 6,345.9 |
| 2018 | 35.93 | 9,374.3 | 1,081.3 | 0 | 1.50 | 10,588.1 | 10,493.0 |
| 2019 | 53.60 | 8,378.7 | 1106.00 | 0.00 | 30.05 |  9,568.3 |  9,4823.0 |
| 2020 | 83.70 | 7,581.2 | 754.20 | 0.00 | 10.03 |  8,429.1 |  8,352.2 |
| 2021 | 107.20 | 10,139.3 | 620.90 | 0.00 | 12.50 | 10,879.9 | 10,777.1 |
| 2022 | 120.08 | 10,876.7 | 1,136.68 | 0.05 | 9.20 | 12,142.7 | 12,032.4 |
| 2023 | *90.33* | *10,788.9* | *837.26* | *0.00* | *67.20* | *11,783.7* | *11,672.4* |
| 2024 | *81.86* | *9,714.5* | *778.12* | *0.00* | *67.20* | *10,641.7* | *10,541.1* |

**Table 2. Catch only projections through 2034.**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Year** | **OFLs from 2019 (mt)** | **Updated OFL Projection (mt)** | **Updated ABC Projection (mt)** | **Buffer** | **Assumed ABC Catch in 2019 (mt)** | **Actualized Total Mortality** | **Summary 4+ Biomass (mt)** | **Spawning Biomass (mt)** | **Fraction Unfished** | **Fraction Unfished from 2019** |
| 2019 | 14,670 | - | - | - | 10,868 | 9,568 | 180,855 | 80,910 | 0.919 | 0.919 |
| 2020 | 15,633 | - | - | - | 10,868 | 8,429 | 180,976 | 83,691 | 0.951 | 0.944 |
| 2021 | 15,749 | - | - | - | 14,725 | 10,880 | 177,351 | 85,511 | 0.972 | 0.951 |
| 2022 | 14,826 | - | - | - | 13,788 | 12,143 | 168,698 | 84,028 | 0.955 | 0.912 |
| 2023 | 13,633 | - | -  | - | 12,625 | 11,784\* | 159,117 | 80,183 | 0.911 | 0.861 |
| 2024 | 12,453 | - | -  | - | 11,481 | 10,642\* | 149,814 | 75,595 | 0.859 | 0.806 |
| 2025 | 11,487 | 12,254 | 11,237 | 0.917 | 10,533 | - | 141,975 | 71,324 | 0.811 | 0.756 |
| 2026 | 10,769 | 11,382 | 10,392 | 0.913 | 9,832 | - | 134,080 | 66,887 | 0.760 | 0.714 |
| 2027 | 10,240 | 10,731 | 9,754 | 0.909 | 9,308 | - | 127,625 | 63,199 | 0.718 | 0.679 |
| 2028 | 9,842 | 10,238 | 9,255 | 0.904 | 8,897 | - | 122,338 | 60,153 | 0.684 | 0.651 |
| 2029 | 9,534 | 9,857 | 8,872 | 0.900 | 8,580 | - | 118,001 | 57,635 | 0.655 | 0.627 |
| 2030 | 9,288 | 9,557 | 8,563 | 0.896 | 8,322 | - | 114,410 | 55,540 | 0.631 | 0.608 |
| 2031 | - | 9,314 | 8,308 | 0.892 | - | - | 111,419 | 53,787 | 0.611 | - |
| 2032 | - | 9,115 | 8,085 | 0.887 | - | - | 108,914 | 52,312 | 0.594 | - |
| 2033 | - | 8,949 | 7,902 | 0.883 | - | - | 106,817 | 51,072 | 0.580 | - |
| 2034 | - | 8,810 | 7,744 | 0.879 | - | - | 105,047 | 50,021 | 0.568 | - |

\* GMT projections of total mortality as seen in Table 1