

Copper Rockfish (*Sebastes caurinus*) along the US West coast in
2020

by
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Executive Summary

Stock

This assessment reports the status of Copper Rockfish (*Sebastes caurinus*) off the US West coast using data through xxxx.

The years is 2020

Landings

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Table 1: Catches!

Year	Recreational (mt)	Commercial (mt)
2009	2,731.91	0.00
2010	2,132.14	0.00
2011	2,641.62	0.00
2012	1,759.56	0.00
2013	2,561.77	0.00
2014	2,343.20	0.00
2015	1,318.84	0.00
2016	1,853.86	0.00
2017	1,293.98	0.01
2018	3,024.60	0.00
2019	4,273.52	0.00
2020	0.00	0.00

Alterantive formatting using function format_table:

Does this work Table 1 vs. Table 2?

Table 2: Formatted catches

Year	Recreational (mt)	Commercial (mt)	Total Mortality
2,009	2,732	0.00	2,731.91
2,010	2,132	0.00	2,132.14
2,011	2,642	0.00	2,641.62
2,012	1,760	0.00	1,759.56
2,013	2,562	0.00	2,561.77
2,014	2,343	0.00	2,343.20
2,015	1,319	0.00	1,318.84
2,016	1,854	0.00	1,853.86
2,017	1,294	0.01	1,293.99
2,018	3,025	0.00	3,024.60
2,019	4,274	0.00	4,273.52
2,020	0	0.00	0.00

Data and Assessment

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Stock Biomass

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Recruitment

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Exploitation Status

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Table 3: Estimated spawning output and relative stock status (depletion) and the 95 percent confidence intervals (CI).

Year	Spawning Output	CI	Depletion	CI
2009	3,786	3,786–3,786	45.1	45.1–45.1
2010	3,738	3,738–3,738	44.5	44.5–44.5
2011	3,756	3,756–3,756	44.7	44.7–44.7
2012	3,726	3,726–3,726	44.4	44.4–44.4
2013	3,786	3,786–3,786	45.1	45.1–45.1
2014	3,766	3,766–3,766	44.9	44.9–44.9
2015	3,767	3,767–3,767	44.9	44.9–44.9
2016	3,872	3,872–3,872	46.1	46.1–46.1
2017	3,922	3,922–3,922	46.7	46.7–46.7
2018	4,029	4,029–4,029	48.0	48.0–48.0
2019	3,956	3,956–3,956	47.1	47.1–47.1
2020	3,750	3,750–3,750	44.7	44.7–44.7
2021	3,979	3,979–3,979	47.4	47.4–47.4

Reference Points

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Management Performance

Replace text.

Unresolved Problems and Major Uncertainties

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Decision Table

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Research and Data Needs

Replace text.

1 Introduction

1.1 Basic Information

This assessment reports the status of Copper Rockfish (*Sebastes caurinus*) off the US West coast using data through xxxx.

1.2 Life History

Replace text.

1.3 Ecosystem Considerations

Replace text.

1.4 Historical and Current Fishery Information

Replace text.

1.5 Summary of Management History and Performance

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1.6 Foreign Fisheries

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2 Data

A description of each data source is provided below (Figure 1).

2.1 Fishery-Dependent Data

2.2 Fishery-Independent Data

2.2.1 AFSC/NWFSC West Coast Triennial Shelf Survey

The AFSC/NWFSC West Coast Triennial Shelf Survey (Triennial Survey) was first conducted by the Alaska Fisheries Science Center (AFSC) in 1977, and the survey continued until 2004 (Weinberg et al. 2002). Its basic design was a series of equally-spaced east-to-west transects across the continental shelf from which searches for tows in a specific depth range were initiated. The survey design changed slightly over time. In general, all of the surveys were conducted in the mid summer through early fall. The 1977 survey was conducted from early July through late September. The surveys from 1980 through 1989 were conducted from mid-July to late September. The 1992 survey was conducted from mid July through early October. The 1995 survey was conducted from early June through late August. The 1998 survey was conducted from early June through early August. Finally, the 2001 and 2004 surveys were conducted from May to July.

Haul depths ranged from 91-457 m during the 1977 survey with no hauls shallower than 91 m. Due to haul performance issues and truncated sampling with respect to depth, the data from 1977 were omitted from this analysis. The surveys in 1980, 1983, and 1986 covered the US West Coast south to 36.8°N latitude and a depth range of 55-366 m. The surveys in 1989

and 1992 covered the same depth range but extended the southern range to 34.5°N (near Point Conception). From 1995 through 2004, the surveys covered the depth range 55-500 m and surveyed south to 34.5°N. In 2004, the final year of the Triennial Survey series, the Northwest Fisheries Science Center (NWFSC) Fishery Resource and Monitoring division (FRAM) conducted the survey following similar protocols to earlier years.

2.2.2 NWFSC West Coast Groundfish Bottom Trawl Survey

The NWFSC West Coast Groundfish Bottom Trawl Survey (WCG BTS) is based on a random-grid design; covering the coastal waters from a depth of 55-1,280 m (Bradburn, Keller, and Horness 2011). This design generally uses four industry-chartered vessels per year assigned to a roughly equal number of randomly selected grid cells and divided into two ‘passes’ of the coast. Two vessels fish from north to south during each pass between late May to early October. This design therefore incorporates both vessel-to-vessel differences in catchability, as well as variance associated with selecting a relatively small number (approximately 700) of possible cells from a very large set of possible cells spread from the Mexican to the Canadian borders.

2.3 Biological Data

2.3.1 Natural Mortality

2.3.2 Maturation and Fecundity

2.3.3 Sex Ratio

2.3.4 Length-Weight Relationship

2.3.5 Growth (Length-at-Age)

2.3.6 Ageing Precision and Bias

2.4 Environmental and Ecosystem Data

3 Assessment Model

3.1 Summary of Previous Assessments and Reviews

3.1.1 History of Modeling Approaches (not required for an update assessment)

3.1.2 Most Recent STAR Panel and SSC Recommendations (not required for an update assessment)

3.1.3 Response to Groundfish Subcommittee Requests (not required in draft)

3.2 Model Structure and Assumptions

3.2.1 Model Changes from the Last Assessment (not required for an update assessment)

3.2.2 Modeling Platform and Structure

General model specifications (e.g., executable version, model structure, definition of fleets and areas)

3.2.3 Model Parameters

Describe estimated vs. fixed parameters, priors

3.2.4 Key Assumptions and Structural Choices

3.3 Base Model Results

3.3.1 Parameter Estimates

3.3.2 Fits to the Data

3.3.3 Population Trajectory

3.3.4 Reference Points

3.4 Model Diagnostics

Describe all diagnostics

3.4.1 Convergence

3.4.2 Sensitivity Analyses

3.4.3 Retrospective Analysis

3.4.4 Likelihood Profiles

3.4.5 Unresolved Problems and Major Uncertainties

4 Management

4.1 Reference Points

4.2 Unresolved Problems and Major Uncertainties

4.3 Harvest Projections and Decision Tables

4.4 Evaluation of Scientific Uncertainty

4.5 Research and Data Needs

5 Acknowledgments

Here are all the mad props!

6 Tables

7 Figures

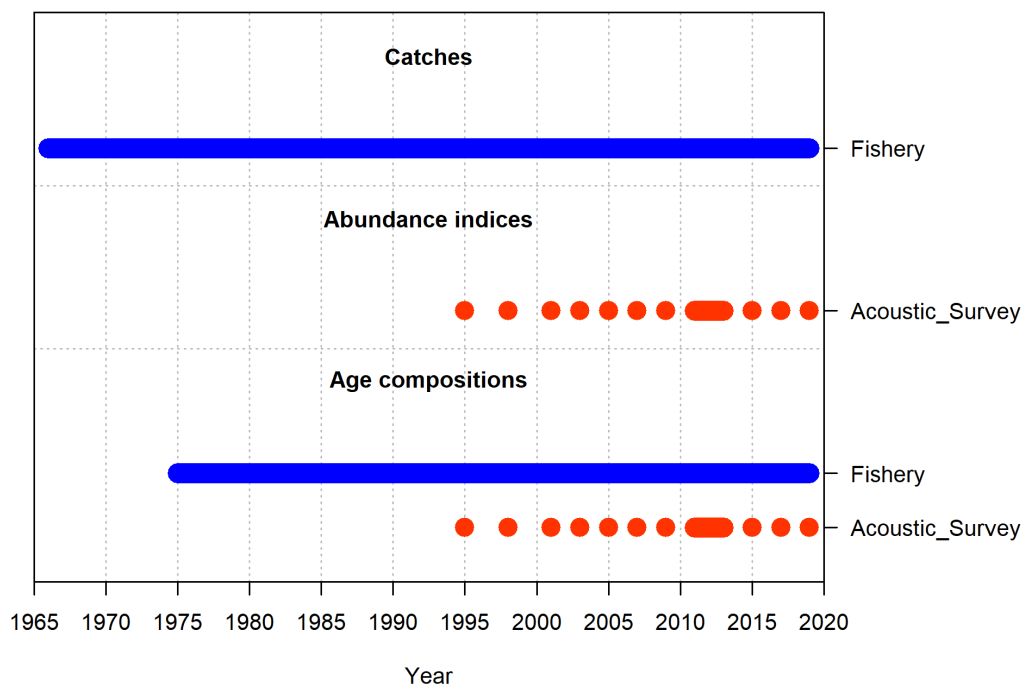


Figure 1: Summary of data sources used in the base model.

8 References

- Bradburn, M. J., A. A. Keller, and B. H. Horness. 2011. "The 2003 to 2008 US West Coast Bottom Trawl Surveys of Groundfish Resources Off Washington, Oregon, and California: Estimates of Distribution, Abundance, Length, and Age Composition." US Department of Commerce, National Oceanic; Atmospheric Administration, National Marine Fisheries Service.
- Weinberg, K. L., M. E. Wilkins, F. R. Shaw, and M. Zimmermann. 2002. "The 2001 Pacific West Coast Bottom Trawl Survey of Groundfish Resources: Estimates of Distribution, Abundance and Length and Age Composition." NOAA Technical Memorandum NMFS-AFSC-128. U.S. Department of Commerce.