

# Status of Petrale sole stock off the U.S. West Coast in 2026



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## Acronyms

NWFSC Northwest Fisheries Science Center. 5

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# 1 Executive Summary

## 1.1 Assessment Model

## 1.2 Reference Points, Stock Status, and Projections

The stock assessment for Petrale sole was conducted by the Northwest Fisheries Science Center (NWFSC) in U.S. West Coast. The terminal spawning biomass for the current assessment year (2022) was 8.41671. You can find more information on the results of this assessment in [Section 4.4](#). The guidelines for this report follow those outlined in [Abrams \(2014\)](#).

## 2 Introduction

Testing adding in an introduction for Petrale sole. There is currently no read of parameters for child documents.

### 2.1 Stock ID

### 2.2 Management History

### 2.3 Fishery Descriptions

### 2.4 Ecosystem Considerations

Ecosystem considerations and/or climate indicators were not included in this assessment.

### 3 Data

#### 3.1 Life History

#### 3.2 Catch

#### 3.3 Indices and Standardization

#### 3.4 Composition Data

#### 3.5 Absolute Abundance

#### 3.6 Environmental/Ecosystem Indicator Data

## 4 Assessment

### 4.1 Current Modeling Approach

### 4.2 Configuration of the Base Model

### 4.3 Bridging

## 4.4 Modeling Results

### 4.4.1 Parameter Estimates

### 4.4.2 Time Series

### 4.4.3 Model Fits

### 4.4.4 Model Diagnostics

## 4.5 Sensitivity Analyses

## 4.6 Management Benchmarks

## 4.7 Projections

## 5 Discussion

## 6 Acknowledgements

This document was produced using the R package `asar` (Schiano et al. 2026), which is free to use and publicly available on [GitHub](#).

## 7 References

- Abrams, J.L. 2014. The effect of local fishing pressure on the size and age structure of fishes associated with rocky habitats along California's north coast. PhD thesis, Humboldt State University.
- Schiano, S., Breitbart, S., and Saul, S. 2026. Asar: Build NOAA stock assessment report. Available from <https://github.com/nmfs-ost/asar>.

## 8 Tables

Table 1: Landed catch by fleet and year in (mt). (1 of 6)

Year	Landings Observed Weight North (mt) (se)	Landings Predicted Weight North (mt) (se)	Landings Observed Weight South (mt) (se)	Landings Predicted Weight South (mt) (se)
1876	0.00 (0.01)	0.00 (0.01)	1.00 (0.01)	1.00 (0.01)
1877	0.00 (0.01)	0.00 (0.01)	1.00 (0.01)	1.00 (0.01)
1878	0.00 (0.01)	0.00 (0.01)	1.00 (0.01)	1.00 (0.01)
1879	0.00 (0.01)	0.00 (0.01)	1.00 (0.01)	1.00 (0.01)
1880	0.00 (0.01)	0.00 (0.01)	11.55 (0.01)	11.55 (0.01)
1881	0.00 (0.01)	0.00 (0.01)	22.10 (0.01)	22.10 (0.01)
1882	0.00 (0.01)	0.00 (0.01)	32.65 (0.01)	32.65 (0.01)
1883	0.00 (0.01)	0.00 (0.01)	43.20 (0.01)	43.20 (0.01)
1884	0.00 (0.01)	0.00 (0.01)	53.75 (0.01)	53.75 (0.01)
1885	0.00 (0.01)	0.00 (0.01)	64.30 (0.01)	64.30 (0.01)
1886	0.00 (0.01)	0.00 (0.01)	74.85 (0.01)	74.85 (0.01)
1887	0.00 (0.01)	0.00 (0.01)	85.40 (0.01)	85.40 (0.01)
1888	0.00 (0.01)	0.00 (0.01)	95.95 (0.01)	95.95 (0.01)
1889	0.00 (0.01)	0.00 (0.01)	106.50 (0.01)	106.50 (0.01)
1890	0.00 (0.01)	0.00 (0.01)	117.05 (0.01)	117.05 (0.01)
1891	0.00 (0.01)	0.00 (0.01)	127.60 (0.01)	127.60 (0.01)
1892	0.00 (0.01)	0.00 (0.01)	138.15 (0.01)	138.15 (0.01)
1893	0.00 (0.01)	0.00 (0.01)	148.71 (0.01)	148.71 (0.01)
1894	0.00 (0.01)	0.00 (0.01)	159.26 (0.01)	159.26 (0.01)
1895	0.00 (0.01)	0.00 (0.01)	169.81 (0.01)	169.81 (0.01)
1896	0.24 (0.01)	0.24 (0.01)	180.36 (0.01)	180.36 (0.01)
1897	0.20 (0.01)	0.20 (0.01)	190.91 (0.01)	190.91 (0.01)
1898	0.15 (0.01)	0.15 (0.01)	201.46 (0.01)	201.46 (0.01)
1899	0.15 (0.01)	0.15 (0.01)	212.01 (0.01)	212.01 (0.01)
1900	0.15 (0.01)	0.15 (0.01)	222.56 (0.01)	222.56 (0.01)
1901	0.14 (0.01)	0.14 (0.01)	233.11 (0.01)	233.11 (0.01)
1902	0.14 (0.01)	0.14 (0.01)	243.66 (0.01)	243.66 (0.01)
1903	0.13 (0.01)	0.13 (0.01)	254.21 (0.01)	254.21 (0.01)

Table 2: Landed catch by fleet and year in (mt). (2 of 6)

Year	Landings Observed Weight North (mt) (se)	Landings Predicted Weight North (mt) (se)	Landings Observed Weight South (mt) (se)	Landings Predicted Weight South (mt) (se)
1904	0.13 (0.01)	0.13 (0.01)	264.76 (0.01)	264.76 (0.01)
1905	0.13 (0.01)	0.13 (0.01)	275.31 (0.01)	275.31 (0.01)
1906	0.12 (0.01)	0.12 (0.01)	285.86 (0.01)	285.86 (0.01)
1907	0.12 (0.01)	0.12 (0.01)	296.41 (0.01)	296.41 (0.01)
1908	0.11 (0.01)	0.11 (0.01)	306.96 (0.01)	306.96 (0.01)
1909	0.11 (0.01)	0.11 (0.01)	317.51 (0.01)	317.51 (0.01)
1910	0.10 (0.01)	0.10 (0.01)	328.06 (0.01)	328.06 (0.01)
1911	0.10 (0.01)	0.10 (0.01)	338.61 (0.01)	338.61 (0.01)
1912	0.10 (0.01)	0.10 (0.01)	349.16 (0.01)	349.16 (0.01)
1913	0.09 (0.01)	0.09 (0.01)	359.71 (0.01)	359.71 (0.01)
1914	0.09 (0.01)	0.09 (0.01)	370.26 (0.01)	370.26 (0.01)
1915	0.08 (0.01)	0.08 (0.01)	380.81 (0.01)	380.81 (0.01)
1916	0.08 (0.01)	0.08 (0.01)	386.42 (0.01)	386.42 (0.01)
1917	0.08 (0.01)	0.08 (0.01)	526.41 (0.01)	526.41 (0.01)
1918	0.07 (0.01)	0.07 (0.01)	423.85 (0.01)	423.85 (0.01)
1919	0.07 (0.01)	0.07 (0.01)	333.44 (0.01)	333.44 (0.01)
1920	0.06 (0.01)	0.06 (0.01)	230.49 (0.01)	230.49 (0.01)
1921	0.06 (0.01)	0.06 (0.01)	293.76 (0.01)	293.76 (0.01)
1922	0.05 (0.01)	0.05 (0.01)	424.78 (0.01)	424.78 (0.01)
1923	0.05 (0.01)	0.05 (0.01)	427.36 (0.01)	427.36 (0.01)
1924	0.05 (0.01)	0.05 (0.01)	532.86 (0.01)	532.86 (0.01)
1925	0.04 (0.01)	0.04 (0.01)	528.47 (0.01)	528.47 (0.01)
1926	0.04 (0.01)	0.04 (0.01)	521.67 (0.01)	521.67 (0.01)
1927	0.04 (0.01)	0.04 (0.01)	632.04 (0.01)	632.04 (0.01)
1928	0.00 (0.01)	0.00 (0.01)	620.09 (0.01)	620.09 (0.01)
1929	1.54 (0.01)	1.54 (0.01)	706.04 (0.01)	706.04 (0.01)
1930	1.22 (0.01)	1.22 (0.01)	658.83 (0.01)	658.83 (0.01)
1931	17.17 (0.01)	17.17 (0.01)	623.93 (0.01)	623.93 (0.01)

Table 3: Landed catch by fleet and year in (mt). (3 of 6)

Year	Landings Observed Weight North (mt) (se)	Landings Predicted Weight North (mt) (se)	Landings Observed Weight South (mt) (se)	Landings Predicted Weight South (mt) (se)
1932	41.73 (0.01)	41.73 (0.01)	556.66 (0.01)	556.66 (0.01)
1933	54.42 (0.01)	54.42 (0.01)	424.32 (0.01)	424.32 (0.01)
1934	68.97 (0.01)	68.97 (0.01)	1,110.98 (0.01)	1,110.98 (0.01)
1935	86.80 (0.01)	86.80 (0.01)	895.44 (0.01)	895.44 (0.01)
1936	115.33 (0.01)	115.33 (0.01)	510.98 (0.01)	510.98 (0.01)
1937	198.06 (0.01)	198.06 (0.01)	817.70 (0.01)	817.70 (0.01)
1938	134.64 (0.01)	134.64 (0.01)	989.10 (0.01)	989.10 (0.01)
1939	374.27 (0.01)	374.27 (0.01)	1,160.51 (0.01)	1,160.51 (0.01)
1940	602.24 (0.01)	602.24 (0.01)	714.63 (0.01)	714.63 (0.01)
1941	771.51 (0.01)	771.51 (0.01)	405.25 (0.01)	405.25 (0.01)
1942	1,928.65 (0.01)	1,928.65 (0.01)	277.41 (0.01)	277.41 (0.01)
1943	1,959.02 (0.01)	1,959.02 (0.01)	416.86 (0.01)	416.86 (0.01)
1944	1,111.90 (0.01)	1,111.90 (0.01)	509.50 (0.01)	509.50 (0.01)
1945	973.80 (0.01)	973.80 (0.01)	534.46 (0.01)	534.46 (0.01)
1946	1,596.12 (0.01)	1,596.12 (0.01)	1,209.41 (0.01)	1,209.41 (0.01)
1947	885.76 (0.01)	885.76 (0.01)	1,336.82 (0.01)	1,336.82 (0.01)
1948	1,971.81 (0.01)	1,971.81 (0.01)	2,308.64 (0.01)	2,308.64 (0.01)
1949	822.94 (0.01)	822.94 (0.01)	2,246.26 (0.01)	2,246.26 (0.01)
1950	1,480.79 (0.01)	1,480.79 (0.01)	1,980.46 (0.01)	1,980.46 (0.01)
1951	1,084.95 (0.01)	1,084.95 (0.01)	1,238.49 (0.01)	1,238.49 (0.01)
1952	864.21 (0.01)	864.21 (0.01)	1,312.51 (0.01)	1,312.51 (0.01)
1953	414.09 (0.01)	414.09 (0.01)	1,514.08 (0.01)	1,514.08 (0.01)
1954	634.02 (0.01)	634.02 (0.01)	1,891.97 (0.01)	1,891.97 (0.01)
1955	652.60 (0.01)	652.60 (0.01)	1,641.72 (0.01)	1,641.72 (0.01)
1956	571.36 (0.01)	571.36 (0.01)	1,277.89 (0.01)	1,277.89 (0.01)
1957	1,051.75 (0.01)	1,051.75 (0.01)	1,587.99 (0.01)	1,587.99 (0.01)
1958	890.87 (0.01)	890.87 (0.01)	1,427.80 (0.01)	1,427.80 (0.01)
1959	686.92 (0.01)	686.92 (0.01)	1,194.06 (0.01)	1,194.06 (0.01)

Table 4: Landed catch by fleet and year in (mt). (4 of 6)

Year	Landings Observed Weight North (mt) (se)	Landings Predicted Weight North (mt) (se)	Landings Observed Weight South (mt) (se)	Landings Predicted Weight South (mt) (se)
1960	1,034.52 (0.01)	1,034.52 (0.01)	1,122.94 (0.01)	1,122.94 (0.01)
1961	1,010.41 (0.01)	1,010.41 (0.01)	1,538.01 (0.01)	1,538.01 (0.01)
1962	1,311.39 (0.01)	1,311.39 (0.01)	1,379.45 (0.01)	1,379.45 (0.01)
1963	1,205.57 (0.01)	1,205.57 (0.01)	1,504.99 (0.01)	1,504.99 (0.01)
1964	927.02 (0.01)	927.02 (0.01)	1,223.64 (0.01)	1,223.64 (0.01)
1965	901.65 (0.01)	901.65 (0.01)	1,207.58 (0.01)	1,207.58 (0.01)
1966	961.76 (0.01)	961.76 (0.01)	1,327.75 (0.01)	1,327.75 (0.01)
1967	925.63 (0.01)	925.63 (0.01)	1,255.79 (0.01)	1,255.79 (0.01)
1968	817.32 (0.01)	817.32 (0.01)	1,303.81 (0.01)	1,303.81 (0.01)
1969	948.66 (0.01)	948.66 (0.01)	1,300.34 (0.01)	1,300.34 (0.01)
1970	1,164.62 (0.01)	1,164.62 (0.01)	1,549.34 (0.01)	1,549.34 (0.01)
1971	1,314.18 (0.01)	1,314.18 (0.01)	1,573.50 (0.01)	1,573.50 (0.01)
1972	1,331.65 (0.01)	1,331.65 (0.01)	1,621.70 (0.01)	1,621.70 (0.01)
1973	1,645.58 (0.01)	1,645.58 (0.01)	1,304.98 (0.01)	1,304.98 (0.01)
1974	2,068.70 (0.01)	2,068.70 (0.01)	1,556.13 (0.01)	1,556.13 (0.01)
1975	2,006.61 (0.01)	2,006.61 (0.01)	1,483.24 (0.01)	1,483.24 (0.01)
1976	1,413.47 (0.01)	1,413.47 (0.01)	1,350.59 (0.01)	1,350.59 (0.01)
1977	1,269.72 (0.01)	1,269.72 (0.01)	998.22 (0.01)	998.22 (0.01)
1978	1,864.01 (0.01)	1,864.01 (0.01)	1,194.78 (0.01)	1,194.78 (0.01)
1979	1,666.00 (0.01)	1,666.00 (0.01)	1,388.97 (0.01)	1,388.97 (0.01)
1980	1,401.60 (0.01)	1,401.60 (0.01)	1,066.00 (0.01)	1,066.00 (0.01)
1981	1,236.04 (0.01)	1,236.05 (0.01)	805.15 (0.01)	805.15 (0.01)
1982	1,838.53 (0.01)	1,838.53 (0.01)	791.80 (0.01)	791.80 (0.01)
1983	1,630.29 (0.01)	1,630.30 (0.01)	583.90 (0.01)	583.90 (0.01)
1984	1,148.63 (0.01)	1,148.63 (0.01)	590.54 (0.01)	590.54 (0.01)
1985	982.89 (0.01)	982.89 (0.01)	856.56 (0.01)	856.56 (0.01)
1986	1,024.00 (0.01)	1,024.00 (0.01)	726.43 (0.01)	726.43 (0.01)
1987	1,381.18 (0.01)	1,381.20 (0.01)	823.66 (0.01)	823.67 (0.01)

Table 5: Landed catch by fleet and year in (mt). (5 of 6)

Year	Landings Observed Weight North (mt) (se)	Landings Predicted Weight North (mt) (se)	Landings Observed Weight South (mt) (se)	Landings Predicted Weight South (mt) (se)
1988	1,354.06 (0.01)	1,354.07 (0.01)	795.12 (0.01)	795.12 (0.01)
1989	1,312.07 (0.01)	1,312.08 (0.01)	840.63 (0.01)	840.63 (0.01)
1990	1,086.22 (0.01)	1,086.22 (0.01)	678.42 (0.01)	678.42 (0.01)
1991	1,192.57 (0.01)	1,192.58 (0.01)	734.80 (0.01)	734.80 (0.01)
1992	1,021.46 (0.01)	1,021.46 (0.01)	532.04 (0.01)	532.04 (0.01)
1993	1,039.69 (0.01)	1,039.69 (0.01)	463.52 (0.01)	463.52 (0.01)
1994	825.58 (0.01)	825.58 (0.01)	549.56 (0.01)	549.56 (0.01)
1995	1,066.33 (0.01)	1,066.33 (0.01)	592.72 (0.01)	592.72 (0.01)
1996	1,010.33 (0.01)	1,010.33 (0.01)	818.27 (0.01)	818.27 (0.01)
1997	1,113.93 (0.01)	1,113.93 (0.01)	833.79 (0.01)	833.79 (0.01)
1998	989.95 (0.01)	989.95 (0.01)	472.82 (0.01)	472.82 (0.01)
1999	931.30 (0.01)	931.30 (0.01)	565.81 (0.01)	565.81 (0.01)
2000	1,253.23 (0.01)	1,253.23 (0.01)	640.04 (0.01)	640.04 (0.01)
2001	1,270.22 (0.01)	1,270.22 (0.01)	575.00 (0.01)	575.00 (0.01)
2002	1,317.36 (0.01)	1,317.36 (0.01)	479.73 (0.01)	479.73 (0.01)
2003	1,661.17 (0.01)	1,661.17 (0.01)	408.41 (0.01)	408.41 (0.01)
2004	1,471.05 (0.01)	1,471.05 (0.01)	492.92 (0.01)	492.92 (0.01)
2005	1,970.53 (0.01)	1,970.53 (0.01)	763.83 (0.01)	763.83 (0.01)
2006	1,858.41 (0.01)	1,858.41 (0.01)	751.79 (0.01)	751.79 (0.01)
2007	1,333.54 (0.01)	1,333.54 (0.01)	919.30 (0.01)	919.30 (0.01)
2008	1,294.91 (0.01)	1,294.91 (0.01)	924.80 (0.01)	924.80 (0.01)
2009	1,236.74 (0.01)	1,236.74 (0.01)	530.70 (0.01)	530.70 (0.01)
2010	589.72 (0.01)	589.72 (0.01)	213.38 (0.01)	213.38 (0.01)
2011	757.01 (0.01)	757.01 (0.01)	177.50 (0.01)	177.50 (0.01)
2012	896.27 (0.01)	896.27 (0.01)	221.45 (0.01)	221.45 (0.01)
2013	1,776.22 (0.01)	1,776.22 (0.01)	477.14 (0.01)	477.14 (0.01)
2014	1,783.41 (0.01)	1,783.41 (0.01)	625.33 (0.01)	625.33 (0.01)
2015	2,085.62 (0.01)	2,085.62 (0.01)	579.55 (0.01)	579.55 (0.01)

Table 6: Landed catch by fleet and year in (mt). (6 of 6)

Year	Landings Observed Weight North (mt) (se)	Landings Predicted Weight North (mt) (se)	Landings Observed Weight South (mt) (se)	Landings Predicted Weight South (mt) (se)
2016	2,254.21 (0.01)	2,254.21 (0.01)	473.42 (0.01)	473.42 (0.01)
2017	2,313.91 (0.01)	2,313.91 (0.01)	616.71 (0.01)	616.71 (0.01)
2018	2,284.80 (0.01)	2,284.80 (0.01)	609.64 (0.01)	609.64 (0.01)
2019	2,079.95 (0.01)	2,079.95 (0.01)	536.96 (0.01)	536.96 (0.01)
2020	1,548.72 (0.01)	1,548.72 (0.01)	543.41 (0.01)	543.41 (0.01)
2021	2,103.03 (0.01)	2,103.03 (0.01)	776.08 (0.01)	776.08 (0.01)
2022	2,093.58 (0.01)	2,093.58 (0.01)	966.36 (0.01)	966.36 (0.01)

## 9 Figures

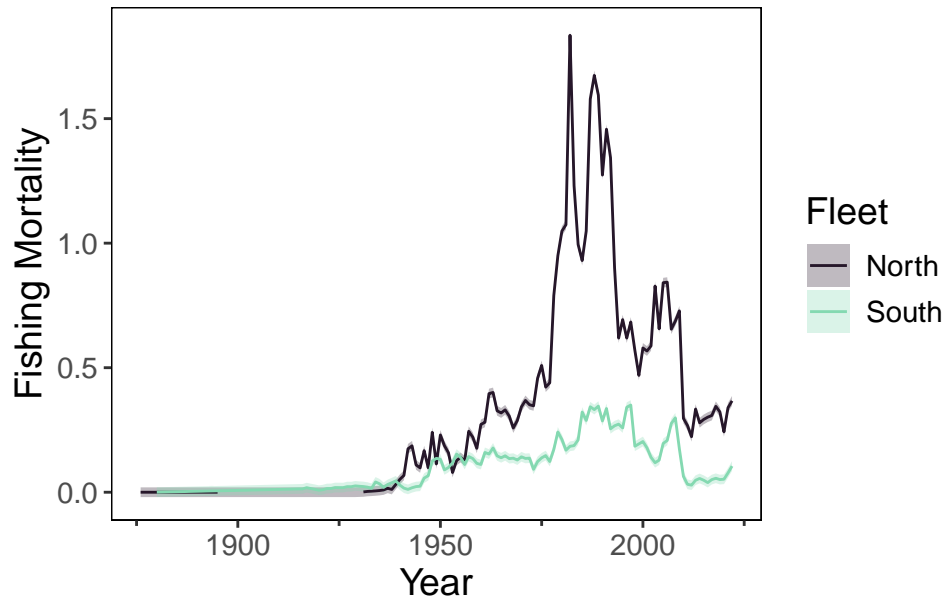


Figure 1: Fishing mortality (F) over time. The horizontal dashed line represents the target reference point (msy).

## A Appendices