



**NOAA
FISHERIES**

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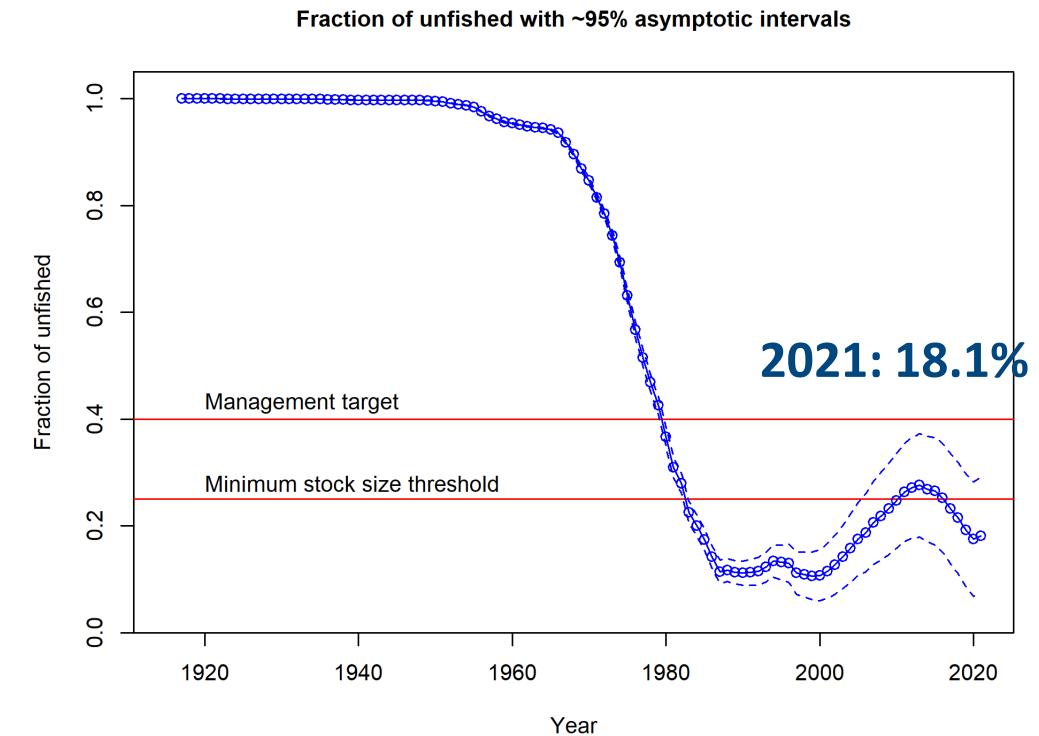
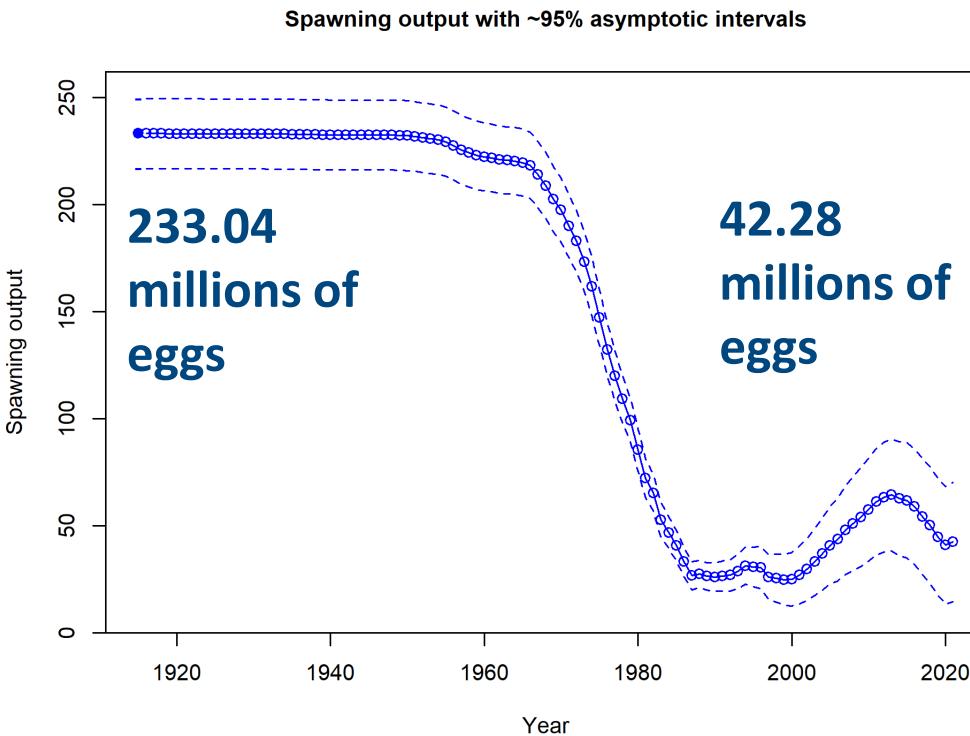
Copper Rockfish: Rebuilding Plan for the area South of Point Conception off the coast of California

SSC Groundfish Sub-Committee Mop-Up Meeting September 29, 2021

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Rebuilding specifications

- Based on the 2021 assessment;
- Analysis conducted using rebuilder executable 3.12h (August 2021);
- Pre-specify removals in 2021-22 based on GMT suggest values of 90.8 and 88.9 mt, respectively;



Alternative rebuilding strategies

1) Eliminate all harvest, $F = 0$, beginning in the next management cycle, 2023, the same as setting a constant SPR harvest rate of 1.0

- Tables 2, 4-7 and Figures 1-3.

2) Apply a range of SPR values: 0.55, 0.60, 0.65, 0.70, and 0.75

- Tables 2, 4-7 and Figures 1-3.

3) Apply the Annual Catch Limits (ACL) based on the 40:10 harvest control rule

- Tables 2, 4-7 and Figures 1-3.

4) Apply the Acceptable Biological Catch (ABC) with time-varying σ

- Tables 2, 4-7 and Figures 1-3.

5) Apply SPR harvest rates that are estimated to lead to a 50 percent probability of recovery by alternative target years: T_{MID} , T_{MAX} , and other years between T_{MIN} and T_{MAX}

- Tables 3, 8-12 and Figures 1-3.

Rebuilding reference points

Table 1:

Parameter	Values based on the 2021 assessment and rebuilding analysis
Unfished Spawning Output (millions of eggs)	233.04
40% of Unfished Spawning Output	93.22
Spawning Output in 2021	42.28
Year Rebuilding Plan Begins	2023
Current Year	2021
T_{MIN}	10
Mean Generation Time (years)	17
T_{MAX}	2050
T_{TARGET}	TBD
SPR_{TARGET}	TBD

Alternative rebuilding strategies

Table 2:

	SPR = 0.55	SPR = 0.60	SPR = 0.65	SPR = 0.70	SPR = 0.75	Year = T_{MID}	F = 0	40:10 Rule	ABC Rule
2023 ACL (mt)	18.66	15.90	13.39	11.06	8.91	16.49	0	8.57	18.94
2024 ACL (mt)	20.9	17.97	15.25	12.69	10.29	18.60	0	11.16	21.00
SPR	0.55	0.60	0.65	0.70	0.75	0.589	1	----	----
T_{TARGET}	2046	2042	2039	2038	2036	2043	2033	2041	2044
T_{MAX}	2050	2050	2050	2050	2050	2050	2050	2050	2050
Probability of recovery by T_{MAX}	0.697	0.876	0.949	0.984	0.997	0.848	1	0.898	0.810

Alternative rebuilding strategies

Table 3:

	Year = 2036	Year = 2040	Year = 2044	Year = 2048	Year = 2050
2023 ACL (mt)	9.44	14.47	17.92	20.21	21.13
2024 ACL (mt)	10.88	16.43	20.12	22.53	23.49
SPR	0.737	0.628	0.563	0.524	0.509
T _{TARGET}	2036	2040	2044	2048	2050
T _{MAX}	2050	2050	2050	2050	2050
Probability of recovery by T _{MAX}	0.992	0.927	0.755	0.577	0.50

Alternative rebuilding strategies

