

6. Assessment of the Rex Sole Stock in the Gulf of Alaska

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Executive Summary

Introduction

The Gulf of Alaska rex sole stock is assessed every four years and was last assessed in 2021. In between the full assessment years, we present an executive summary to recommend harvest levels for the next two years. Please refer to the 2021 full stock assessment report for further information regarding the assessment model (McGilliard and Palsson, 2021, available online at https://apps-afsc.fisheries.noaa.gov/Plan_Team/2021/GOArex.pdf). A full stock assessment document with updated assessment and projection model results will be presented in 2025.

Rex sole is assessed using a sex- and age-structured two-area model and Tier 3 determination. The Western-Central GOA and Eastern GOA are modeled as separate areas with distinct growth patterns estimated by area. Thus, the single species projection model was run separately for the two areas using parameter values from the accepted 2021 rex sole assessment model (McGilliard and Palsson 2021), together with updated catch information for 2021-2024, to predict stock status for rex sole in 2025 and 2026 and to make ABC recommendations for those years. Projections are conducted using numbers-at-age for rex sole from age 3-20+ by area and historical recruitment of age 3 individuals by area to calculate OFL's and ABC's.

Description of Updated Catch

New data added to the projection model included updated final catch data from 2023 from the Western and Central GOA of 410 t, estimated catch for 2024 of 395 t (based on the long-term average proportion of catch from September-December added to the realized catch of 347 t as of August 31, 2024). Estimated yearly catch for 2025-2027 was 851 t, which is the average of catches for the most recent five years. Catches from the Eastern GOA area often confidential with a long-term average of less than 2 t. New estimated catches for 2025-2027 was calculated as the average catch over the previous five years.

Summary of Results

Based on the updated projection model results, the recommended ABC's for 2025 and 2026 in the Western-Central GOA are 17,080 t and 16,935 t, and the OFL's are 20,747 t and 20,572 t. The new ABC recommendation and OFL for the Western-Central GOA in 2025 are similar to those projected for 2025 developed in 2023 (16,987 t and 20,635 t). The recommended ABC's for 2025 and 2026 in the Eastern GOA are 4,307 t and 4,238 t, and the OFL's are 5,255 t and 5,171 t. The principal reference values are shown in the following three tables. The first table shows quantities for the entire GOA, the second table shows quantities for the Western-Central GOA, and the third table shows quantities for the Eastern GOA. The Western-Central and Eastern GOA are based on a Tier 3a approach, and the entire GOA table is simply the sum of the two areas.

Quantity (Entire GOA)	As estimated or <i>specified this year for:</i>		As estimated or <i>recommended this year for:</i>	
	2024	2025	2025	2026
<i>M</i> (natural mortality rate)	0.17	0.17	0.17	0.17
Tier	3a	3a	3a	3a
Projected total (3+) biomass (t)	129,611	129,296	129,835	129,082
Female spawning biomass (t)	60,486	61,413	61,695	61,649
<i>B</i> _{100%}	See area-specific tables below		See area-specific tables below	
<i>B</i> _{40%}				
<i>B</i> _{35%}				
<i>F</i> _{OFL}				
<i>maxF</i> _{ABC}				
<i>F</i> _{ABC}				
OFL (t)	25,978	25,900	26,002	25,743
maxABC (t)	21,364	21,303	21,387	21,173
ABC (t)	21,364	21,303	21,387	21,173
Status	As determined <i>last</i> year for:		As determined <i>this</i> year for:	
	2022	2023	2023	2024
Overfishing	no	n/a	no	n/a
Overfished	n/a	no	n/a	no
Approaching overfished	n/a	no	n/a	no

Quantity: (Western-Central GOA)	As estimated or specified this year for:		As estimated or recommended this year for:	
	2024	2025	2025	2026
<i>M</i> (natural mortality rate)	0.17	0.17	0.17	0.17
Tier	3a	3a	3a	3a
Projected total (3+) biomass (t)	104,316	104,219	104,776	104,311
Female spawning biomass (t)	49,586	50,458	50,756	50,811
<i>B</i> _{100%}	46,850	46,850	46,850	46,850
<i>B</i> _{40%}	18,740	18,740	18,740	18,740
<i>B</i> _{35%}	16,398	16,398	16,398	16,398
<i>F</i> _{OFL}	0.28	0.28	0.28	0.28
<i>maxF</i> _{ABC}	0.23	0.23	0.23	0.23
<i>F</i> _{ABC}	0.23	0.23	0.23	0.23
OFL (t)	20,660	20,635	20,747	20,572
maxABC (t)	17,006	16,987	17,080	16,935
ABC (t)	17,006	16,987	17,080	16,935
Status	As determined last year for:		As determined this year for:	
	2022	2023	2023	2024
Overfishing	no	n/a	no	n/a
Overfished	n/a	no	n/a	no
Approaching overfished	n/a	no	n/a	no

* Projections are based on the final catch of 2021-2023 from the Western and Central GOA of 299 t, 695 t, and 410 t and estimated catch for 2024 of 395 t. 2024 estimated catch was calculated by adding the long-term average proportion of catches for Sep-Dec to the current realized catch as of August 31, 2024 of 347 t. The 2025-2027 projected catch was calculated as the average catch over the previous five years of 851 t.

Quantity: (Eastern GOA)	As estimated or <i>specified this year for:</i>		As estimated or <i>recommended this year for:</i>	
	2024	2025	2025	2026
<i>M</i> (natural mortality rate)	0.17	0.17	0.17	0.17
Tier	3a	3a	3a	3a
Projected total (3+) biomass (t)	25,295	25,077	25,059	24,771
Female spawning biomass (t)	10,900	10,955	10,939	10,838
<i>B</i> _{100%}	8,998	8,998	8,998	8,998
<i>B</i> _{40%}	3,599	3,599	3,599	3,599
<i>B</i> _{35%}	3,149	3,149	3,149	3,149
<i>F</i> _{OFL}	0.31	0.31	0.31	0.31
<i>maxF</i> _{ABC}	0.25	0.25	0.25	0.25
<i>F</i> _{ABC}	0.25	0.25	0.25	0.25
OFL (t)	5,318	5,265	5,255	5,171
maxABC (t)	4,358	4,316	4,307	4,238
ABC (t)	4,358	4,316	4,307	4,238
Status	As determined <i>last</i> year for:		As determined <i>this</i> year for:	
	2022	2023	2023	2024
Overfishing	no	n/a	no	n/a
Overfished	n/a	no	n/a	no
Approaching overfished	n/a	no	n/a	no

* Projections are based on estimated catches of 1 t (the average over 2019-2023) used in place of maximum permissible ABC for 2024-2027. Realized catches were used for 2021-2023. In many years catches from the Eastern GOA are small and confidential.

The stock is not being subject to overfishing, is not currently overfished, nor is it approaching a condition of being overfished.

Fishery Trends

Updated catch data (NMFS Alaska Regional Office Catch Accounting System via the Alaska Fisheries Information Network (AKFIN) database, <http://www.akfin.org>) are summarized in **Error! Reference source not found.** and indicate lower catches in 2023 than in 2022, with lower than average catches for 2021-2023.

Survey Trends

The ratio of total catch to age 3+ modeled total biomass has been stable over the past three years, around a value of 0.01 (Figure 1).

Area Apportionment

The table below shows apportionment of the 2025 and 2026 ABCs among areas. The ABCs calculated for the Western-Central area (based on model estimates) are apportioned based on random effects model predictions of the proportion of Western-Central survey biomass in the Western and Central areas, respectively, in 2024-2025. Likewise, the ABC calculated for the Eastern area (based on model estimates) are apportioned based on random effects model predictions of the proportion Eastern survey biomass in the West Yakutat and Southeast areas, respectively.

Quantity	Western	Central	Total Western-Central	West Yakutat	Southeast	Total Eastern
Area Apportionment	19.80%	80.20%	100.00%	33.34%	66.66%	100.00%
2025 ABC (t)	3,382	13,698	17,080	1,436	2,871	4,307
2026 ABC (t)	3,353	13,582	16,935	1,413	2,825	4,238

Figures

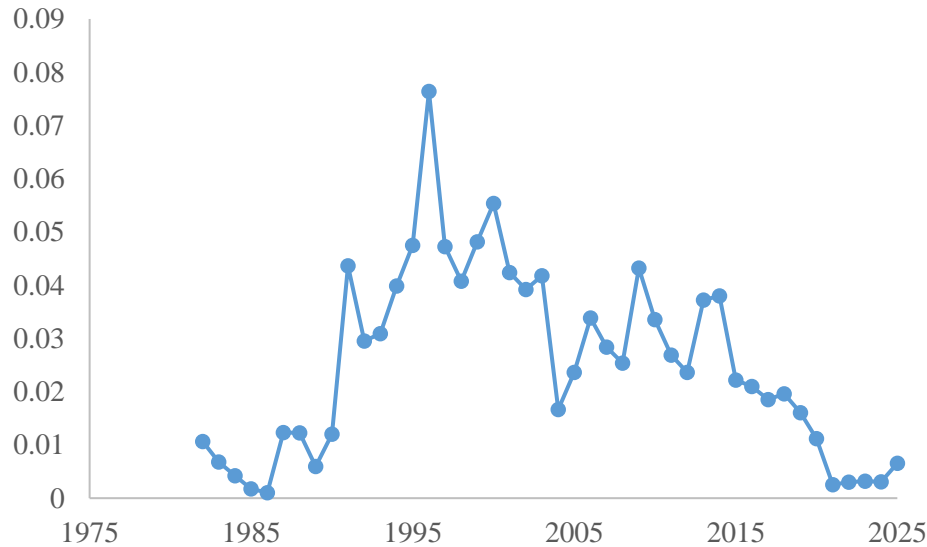


Figure 6.1. GOA rex sole catch-to-biomass ratio using age 3+ biomass for the entire GOA.

Tables

Table 6.1. Total fishery catches for GOA rex sole. Catch for 2023 is through August 31, 2024.

Year	Western Gulf	Central Gulf	Eastern Gulf
1994	49	3508	85
1995	220	3628	174
1996	552	5202	191
1997	681	2438	177
1998	440	2195	36
1999	603	2393	63
2000	883	2702	Confidential
2001	435	2507	Confidential
2002	398	2619	Confidential
2003	772	2726	2
2004	527	940	0
2005	576	1603	Confidential
2006	350	2944	0
2007	411	2438	1
2008	185	2522	Confidential
2009	342	4410	1
2010	134	3534	2
2011	131	2746	1
2012	215	2228	Confidential
2013	104	3596	0
2014	126	3450	1
2015	76	1882	Confidential
2016	172	1575	3
2017	48	1434	2
2018	83	1665	2
2019	74	1536	2
2020	36	1201	1
2021	14	285	2
2022	40	655	0
2023	23	388	1
2024*	21	327	Confidential

*2024 catches are current as of August 31, 2024

Literature Cited

McGilliard, C.R. and Palsson, W. 2021. 6. Assessment of the rex sole stock in the Gulf of Alaska. In Stock Assessment and Fishery Evaluation Report for the Groundfish Resources of the Gulf of Alaska. North Pacific Fishery Management Council, P.O. Box 103136, Anchorage AK 99510.