

4. Assessment of the Shallow-water Flatfish Stock in the Gulf of Alaska

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Executive Summary

Gulf of Alaska shallow-water flatfish (SWF) stock complex includes Alaska plaice (*Pleuronectes quadrituberculatus*), butter sole (*Pleuronectes isolepis*), English sole (*Parophrys vetulus*), sand sole (*Psettichthys melanostictus*), starry flounder (*Platichthys stellatus*), yellowfin sole (*Pleuronectes asper*), northern rock sole (*Lepidopsetta polyxstra*), and southern rock sole (*Lepidopsetta bilineata*). Northern rock sole and southern rock sole are Tier 3 species and are assessed separately from the other shallow-water flatfish, which are Tier 5 stocks. The OFL and ABC for the SWF complex are calculated as the sum of the Tier 3 rock sole assessment values and the Tier 5 other shallow-water flatfish assessment values.

GOA SWF are assessed every 4 years according to the stock assessment prioritization schedule. The random effects model is fit to the AFSC GOA bottom trawl survey for all Tier 5 species to obtain estimates of annual biomass. The ABC and OFL for the Tier 5 stocks are derived as the product of the current biomass and $F_{40\%}$ and $F_{35\%}$. The Tier 5 proxy for $F_{40\%}$ is assumed to be equal to M (0.2 for all Tier 5 stocks) and the Tier 5 proxy for $F_{35\%}$ is 75% of M . The last full assessment was conducted in 2021 (Bryan and Ferriss, 2021; <https://apps-afsc.fisheries.noaa.gov/refm/docs/2021/GOAnsrocksole.pdf>). A full stock assessment document with updated assessment and projection model results is expected in November, 2027.

Description of Updated Catch

Catch data for northern and southern rock sole were updated for harvest projections (see Bryan 2026). Most of the shallow-water flatfish catch is rock sole (Figure 1). Catch has been declining for most species, except English sole (Figure 1).

Summary of Results

The recommended ABCs for GOA SWF for 2027 and 2028 are 56,518 t and 56,236 t. The recommended OFLs are 69,206 t and 68,867 t for 2027 and 2028. The values for the entire SWF complex are shown in the table below. Table 1 has a summary of the Tier 3- and Tier 5-specific ABC and OFL values for 2027 and 2028.

Survey biomass trends vary by species (Figure 2). Alaska plaice butter sole, and starry flounder survey biomass has been relatively flat and highly variable, English sole has an increasing trend, sand sole exhibits cyclic trends, southern rock sole increased between before 2010, was relatively flat and has increased over the last four years, and northern rock sole and yellowfin sole have declining trends.

Quantity/Status	As estimated or <i>specified in</i> 2024 for:		As estimated or <i>recommended this year for:</i>	
	2025	2026	2027	2028
M (natural mortality)	0.2**	0.2**	0.2**	0.2**
Tier	3a, 5	3a, 5	3a, 5	3a, 5
Biomass (t)	454,847	455,146	448,887	446,886
F_{OFL}	*	*	*	*
$maxF_{ABC}$	*	*	*	*
F_{ABC}	*	*	*	*
OFL (t)	69,277	69,610	69,206	68,867
$maxABC$ (t)	56,559	56,910	56,518	56,236
ABC (t)	56,559	56,910	56,518	56,236
	As determined <i>in 2024</i> for:		As determined <i>this year</i> for:	
Status	2023	2024	2025	2026
Overfishing	No	n/a	No	n/a

*Table 1 below provides the specific Tier 3 projection model results for northern and southern and the Tier 5 random effects results for all other shallow-water flatfish.

** Natural mortality for Tier 5 SWF. Table 2 below provides area-specific natural mortality for northern and southern rock sole.

Area Allocation of Harvests

The ABC apportionment by area was estimated by fitting the random effects model to the survey biomass summed for all species (including Tier 3 rock sole) by area and estimating the percent biomass by area. This was done in 2021 and remains unchanged because this was an off-cycle year for the GOA bottom trawl survey (Bryan and Ferriss, 2021).

	Western	Central	Yakutat	Southeast	
Proportion	0.42	0.5	0.05	0.03	Total
2027	23,738	28,259	2,826	1,695	56,518
2028	23,619	28,118	2,812	1,687	56,236

References

Bryan, M.D., Ferriss, B. 2021. Assessment of northern and southern rock sole (*Lepidopsetta polyxstra* and *bilineata*) stocks in the Gulf of Mexico. In: Stock Assessment and Fishery Evaluation Report for Groundfish Resources in the Gulf of Alaska. North Pacific Fishery Management Council, Anchorage, AK, USA.

Bryan, M. 2026. Assessment of the Northern and Southern Rock Soles Stock in the Gulf of Alaska. North Pacific Fishery Management Council, Anchorage, AK. Available from <https://www.npfmc.org/library/safe-reports/>

Tables

Table 1. ABC and OFL recommendations by species in the GOA shallow-water flatfish stock complex.

Species	Tier	FABC	FOFL	2025 Biomass ¹	2026 Biomass ¹	As specified last year for:		As recommended this year for:		2027		2028	
						2025	2026	2025	2026	2027	2028	2027	2028
Northern rock sole	3a	*	*	106,060	106,397	13,768	16,429	13,993	16,623	13,920	16,603	13,925	16,606
Southern rock sole	3a	*	*	247,731	246,119	28,062	33,208	28,188	33,347	27,869	32,963	27,582	32,621
Yellowfin sole	5	0.15	0.2	24,835	24,835	3,725	4,967	3,725	4,967	3,725	4,967	3,725	4,967
Butter sole	5	0.15	0.2	11,873	11,873	1,781	2,375	1,781	2,375	1,781	2,375	1,781	2,375
Starry flounder	5	0.15	0.2	25,433	25,433	3,814	5,086	3,814	5,086	3,814	5,086	3,814	5,086
English sole	5	0.15	0.2	29,867	29,867	4,480	5,973	4,480	5,973	4,480	5,973	4,480	5,973
Sand sole	5	0.15	0.2	3,000	3,000	450	600	450	600	450	600	450	600
Alaska plaice	5	0.15	0.2	3,196	3,196	479	639	479	639	479	639	479	639
Total ²				451,995	450,720	56,559	69,277	56,910	69,610	56,518	69,206	56,236	68,867

¹ Total biomass (age 0+) estimated from the northern and southern rock sole from the age structured model and the random effects model for Tier 5 species, ² Sum of columns may not equal totals due to rounding, * Biomass, OFL, and ABC estimates are from the summation of area-specific model estimates with species-specific natural mortality (F_{ABC} and F_{OFL} are area-specific, Bryan 2026).

Table 2. Natural mortality for GOA other shallow-water flatfish and area-specific and sex-specific natural mortality for GOA northern and southern rock sole.

Other SWF			
0.2			
Northern Rock Sole		Southern Rock Sole	
WGOA			
Females	0.2	Females	0.2
Males	0.254	Males	0.271
C/E GOA			
Females	0.2	Females	0.2
Males	0.232	Males	0.253

Figures



Figure 1. Catch (t) by species. Northern and southern rock catch is not reported by species and reported as rock sole.

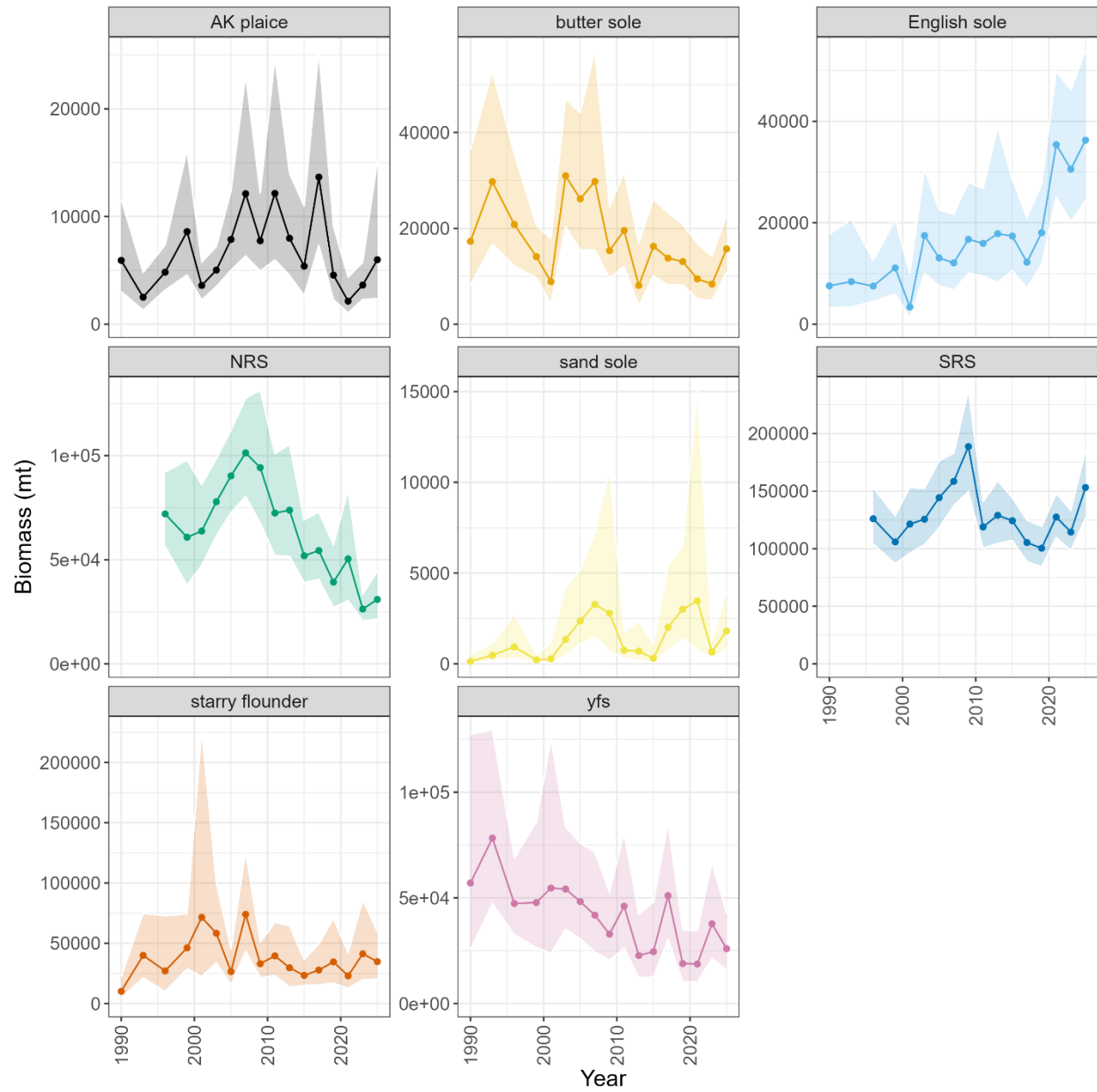


Figure 2. Survey biomass (t) by species.

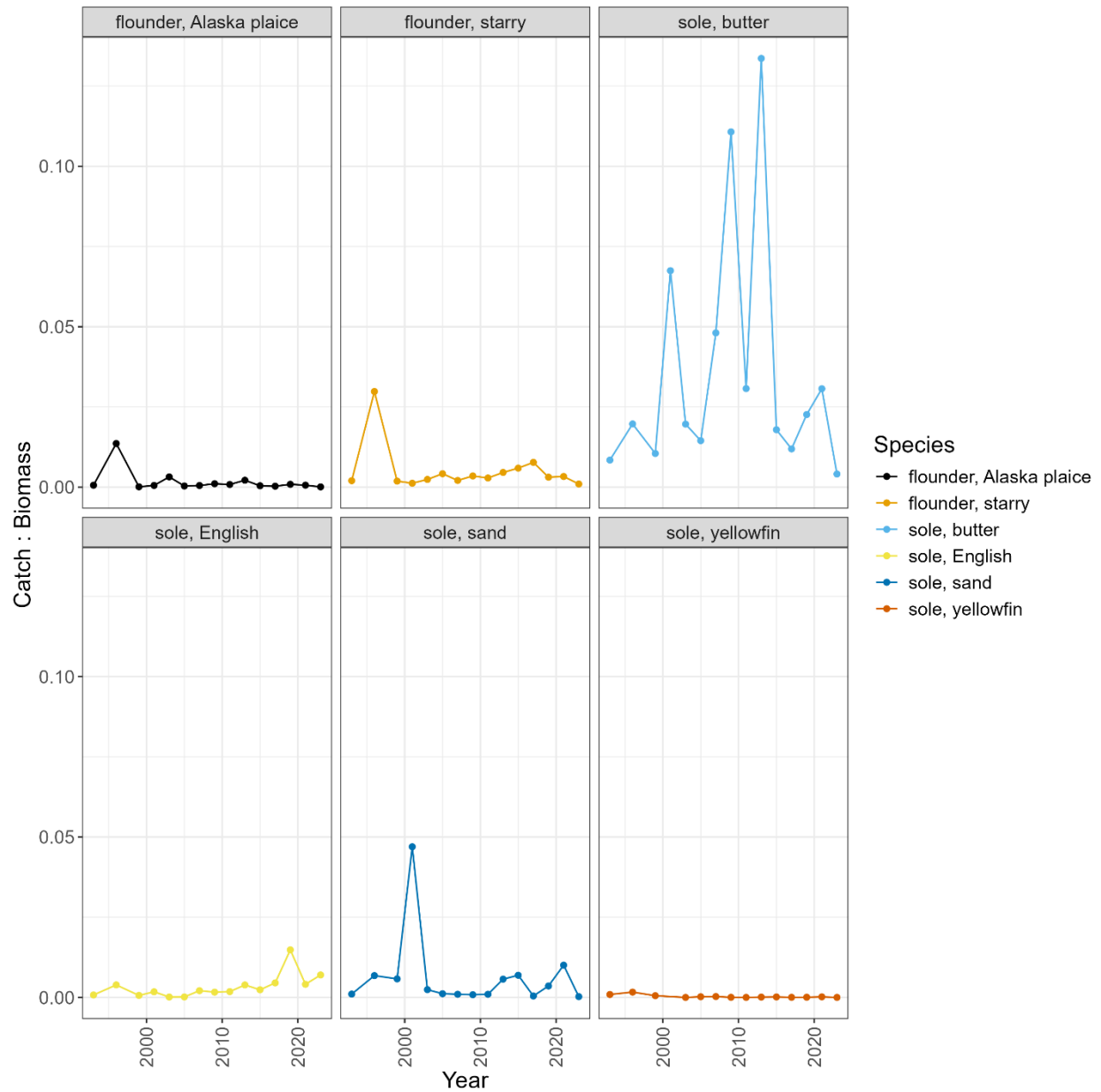


Figure 3. Catch-biomass ratios for tier 5 species where biomass is survey biomass. Bryan 2026 reports catch biomass ratios for the rock soles.