

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

Meaghan D. Bryan and Bridget Ferriss

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Executive Summary

The shallow-water flatfish (SWF) stock complex in the Gulf of Alaska (GOA) 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. 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.

The GOA SWF stock complex is assessed on a 4-year schedule and was last assessed in 2021 (Bryan and Ferriss, 2021). This year represents an off-cycle year when a full assessment is not completed. Additionally, this was an off-cycle year for the GOA bottom trawl survey. Therefore, the random effects model is not run. The management advice that is provided for 2023 and 2024 represents the sum of the updated ABC and OFL for northern and southern rock sole (Bryan 2022) and the specified 2023 advice for the other shallow-water flatfish.

The 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).

Quantity/Status	As estimated or <i>specified last year</i> for:		As estimated or <i>recommended this</i> year for:	
	2022	2023	2023	2024
M (natural mortality)	0.2*	0.2*	0.2*	0.2*
Tier	3a, 5	3a, 5	3a, 5	3a, 5
Biomass (t)	442,423	449,250	449,607	452,916
F _{OFL}		*	*	*
maxF _{ABC}		*	*	*
F _{ABC}		*	*	*
OFL (t)	62,273	65,676	65,736	68,015
maxABC (t)	50,610	53,486	53,537	55,474
ABC (t)	50,610	53,486	53,537	55,474
Status	As determined <i>last</i> year for:		As determined <i>this</i> year for:	
	2020	2021	2021	2022
Overfishing	No	n/a	No	n/a

*Table 1 has a summary of the tier 3 projection model results for northern and southern and the random effects results for all other shallow-water flatfish. Also see Bryan (2022) for values for northern and southern rock sole. Estimated catches of 551 t for 2022-2024 were used in the northern rock sole, central GOA and southern rock sole, central GOA projection models. Estimated catches of 13 t for 2022-2024 were used in the northern rock sole, western GOA and southern rock sole, central GOA projection models.

Summary of Results

The recommended ABCs for GOA shallow-water flatfish in 2023 and 2024 is 53,537 t and 55,474 t. The recommended OFLs for 2023 and 2024 are 65,736 t and 68,015 t. The recommended advice for 2023 is similar to what was specified from the 2021 assessment.

Area Allocation of Harvest

The recommended apportionment is as follows:

	Western	Central	Yakutat	Southeast
Proportion	0.42	0.50	0.05	0.03
2023 ABC (t)	22,485	26,769	2,677	1,606
2024 ABC (t)	23,299	27,737	2,774	1,664

Summaries for Plan Team

Stock	Year	Biomass ¹	OFL	ABC	TAC	Catch
Shallow-water flatfish	2022	442,423	62,273	50,610	42,604	1,221
	2023	449,607	65,736	53,537		
	2024	452,916	68,015	55,474		

Stock	Area	2022				2023		2024	
		OFL	ABC	TAC	Catch ²	OFL	ABC	OFL	ABC
Shallow-water flatfish	W		21,256	13,250	30.7		22,485		23,299
	C		25,305	25,305	1,181		26,769		27,737
	Y		2,531	2,531	8.233		2,677		2,774
	SE		1,518	1,158	0.822		1,606		1,664
	Total		62,273	50,610	42,604	1220.6	65,736	53,537	68,015

¹ Total biomass (age 0+) estimates from the northern and southern rock sole age-structured model and the random effects model for tier 5 species.

² Current as of September 29, 2022. Source: NMFS Alaska Regional Office Catch Accounting System via AKFIN database (<http://www.akfin.org>).

References

Bryan, M.D., Palsson, W. 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.D. 2022. 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.

Figures

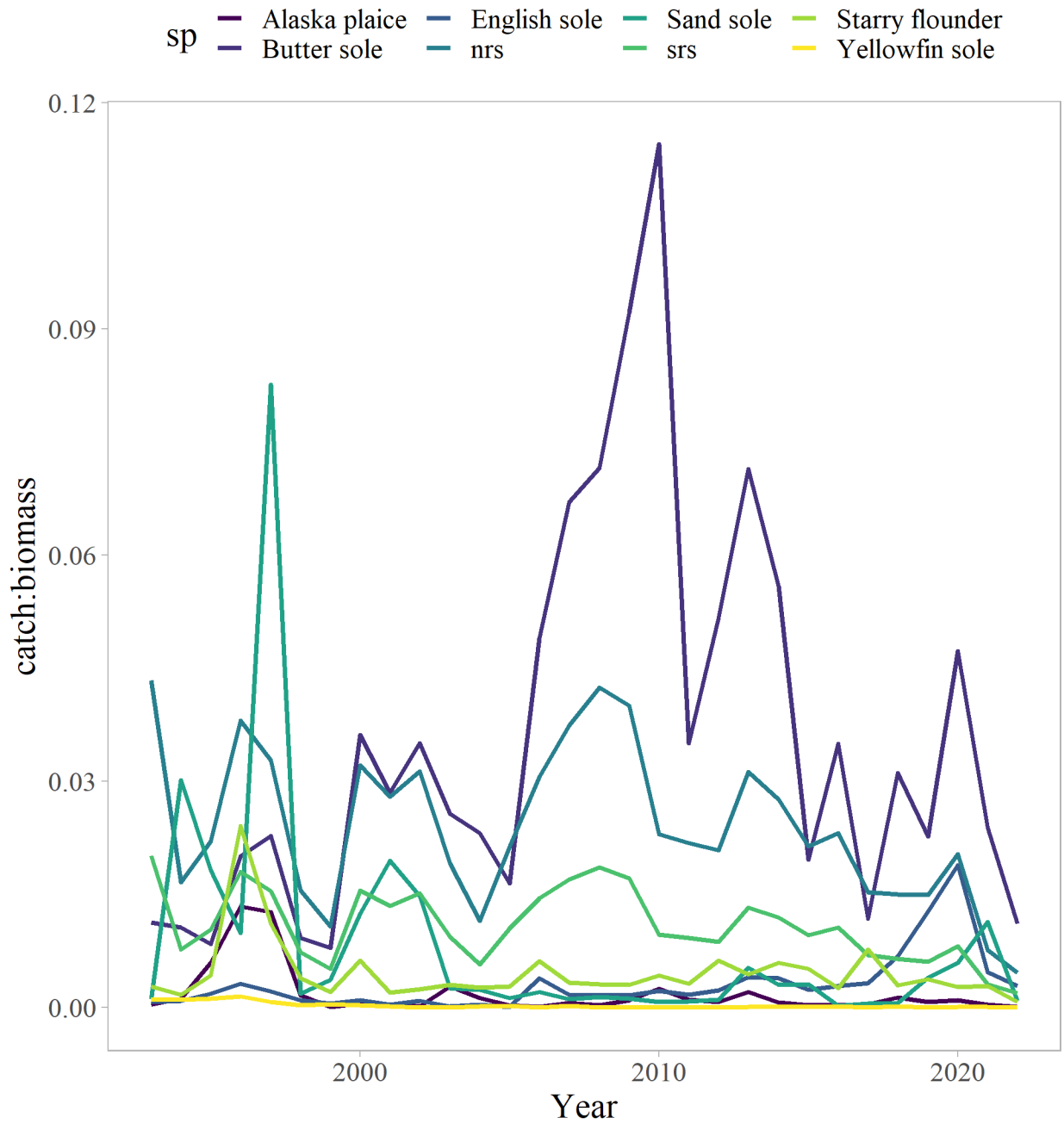


Figure 4.1. Catch-biomass ratios for shallow water flatfish including northern and southern rock sole from 1993 until 2022. The ratios were derived from species-specific catch obtained from the AKRO Catch Accounting System and total biomass estimates from the random effects model for the tier 5 shallow water flatfish species and the tier 3 projection model for northern and southern rock sole.

Tables

Table 4.1. The 2022 and 2023 estimates for tier 5 species are from the random effects model fit to survey biomass through 2021. The northern and southern rock sole biomass estimates from the tier 3 projection model estimates (Bryan 2022).

Species						As specified last year for:				As recommended this year for:			
						2022		2023		2023		2024	
Shallow-water flatfish	Tier	F _{ABC}	F _{OFL}	2022 Biomass ¹	2023 Biomass ¹	ABC	OFL	ABC	OFL	ABC	OFL	ABC	OFL
Northern rock sole*	3a	-	-	100,360	103,592	11,863	14,169	12,695	15,162	12,722	15,193	13,337	15,924
Southern rock sole*	3a	-	-	243,859	247,811	24,018	28,464	26,062	30,874	26,086	30,903	27,408	32,451
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				442,423	449,607	50,610	62,273	53,486	65,676	53,537	65,736	55,474	68,015

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. – FABC and FOFL are area-specific.