C1 BSAI and C2 GOA Ecosystem Status Reports

The SSC received presentations from Elizabeth Siddon (NOAA-AFSC) for the eastern Bering Sea (EBS), Ivonne Ortiz (University of Washington) for the Aleutian Islands (AI), and Bridget Ferriss (NOAA-AFSC) for the Gulf of Alaska (GOA). There was one comment letter for the EBS ESR, but no oral public testimony for the ESRs. The SSC thanks the ESR authors for their continued progress to collect and synthesize a large number of indicators to better understand the status of marine ecosystems that support federally managed fisheries of Alaska. The SSC appreciates the structure of the reports, especially the consolidated information provided in the Report Card, Ecosystem Assessment, Noteworthy Topics, and Indicator Summary sections. The SSC acknowledges the value of these reports for EBFM in Alaska and as reference documents used broadly throughout the region. The separate "In Briefs" visually translate key information to the Council processes, as well as broader audiences.

There are no major concerns from 2024, but items that are noteworthy include poor condition of many fish species in the southeastern Bering Sea, continued east-west gradient of respectively good to poor conditions in the AI, and continued return to pre-heatwave conditions for more indicators across trophic levels in the GOA.

General Comments Applicable to all three ESRs

The SSC thanks the authors for their responses to SSC comments, in particular the development of integrated metrics to track changes in ecosystem state, modeling approaches to help discern linkages among indices affecting individual species, and references to how conditions will affect different groundfish species depending on spawn timing, larval ecology, and varying responses to temperature changes. The SSC encourages continued efforts along these lines.

A combination of average strength and position of the Aleutian Low and moderated effects of the 2024 El Niño while transitioning to a La Niña resulted in an average year of sea ice formation and ocean temperatures near the long-term mean in many areas of the ESR regions with some exceptions.

The SSC looks forward to the continued consideration of socioeconomic metrics that could be included in ESRs.

The SSC requests that for report cards, contributors not connect time series points in figures if there is a gap greater than the standard survey interval to avoid indicating a trend between missing years (for example, the 2010 data point in some of the northern Bering Sea (NBS) report card time series). Exceptions would include modeled or interpolated data and if so, clearly identify the interpolated points. The SSC notes the value of continuing dynamic structural equation modeling (DSEM) modeling efforts, but recommends including the full model for comparison with the final most parsimonious model to clearly identify which hypothesized links were not supported by the data. The SSC appreciates the five-month lead climate forecasts.

The SSC appreciates the confirmation that satellite-derived chlorophyll-a metrics are routinely validated with *in-situ* measurements to ensure accuracy. To this end, the ESR authors noted inconsistencies in 2024 satellite-derived chlorophyll-a values and decided to postpone updating these contributions until 2025.

BSAI Ecosystem Status Reports

Bering Sea

A third consecutive year of near average sea ice and cold pool (< 2°C) extent in the Bering Sea has improved conditions to promote post-heatwave recovery for some populations, which should persist given the Aleutian low-pressure system (NPI) and the anticipated La Niña (cooler) conditions. There are a few caveats to these near average thermal conditions, including the spatial extent of the coldest water (< 0°C) of the cold pool was more similar to warmer years, warmer deep-water intrusion on the outer shelf and increased storms that destabilize the water column and deepens the mixed layer, which generally benefits pelagic more than benthic species. Still, after a few years of average conditions, there are positive trends for the snow and tanner crab portions of the motile epifauna indicator. The sharp increase observed in these crab species might also partly result from low abundances of their benthic predators.

The SSC appreciates the addition of the NBS report card and highlights the important contrasts between the two regions throughout the report. For example, large copepods were above average in the NBS, but below average in the SEBS. Likewise, in the NBS juvenile chum salmon abundance was among the highest observed and body condition remains at or above average in the NBS, whereas body condition is still low for juvenile chum salmon, age-0 pollock and a variety of other species in the SEBS. In the NBS, there was a large increase in capelin that surpassed pre-heatwave levels, but capelin catch in the SEBS was still low. Pelagic forage fish biomass overall was still low in the NBS and SEBS. Apex predators in the SEBS remained below their long-term mean with a decrease in Pacific cod and an increase in arrowtooth founder. Pelagic forager biomass remained just above the long-term mean, though the pollock component of this index increased by 78% from 2023. There was no bottom trawl survey in the NBS this year, so apex predator and pelagic forager metrics were not available. However, portions of the SEBS bottom trawl do extend into the NBS, beyond latitude 60N. The SSC recommends that contributors evaluate whether annual metrics for the NBS can be produced from sampling at these stations.

The author noted that the EBS has cooled to long-term mean conditions in recent years and that the EBS has not experienced a cold year in over a decade. The new borealization index, which quantifies the ecosystem of the SEBS on a continuum between a subarctic (boreal) and arctic state, was near the long-term mean, and has been at or above the mean since 2014, the longest period of a positive state in the 63-year time series.

The SSC supports the continued application of DSEM to explore mechanisms driving changes in forage and juvenile groundfish populations as in this ESR and recruitment as explored in the GOA pollock assessment. The SSC recommends pollock as a focus of further exploration of DSEM for the EBS given the wealth of data for this species and as an attempt to understand the contrasting patterns of indicators. For example, 2024 had the highest pollock larval biomass recorded, but age-0 pollock abundance in the middle domain was low by late summer, and possibly shifted inshore, and age-0 condition has been chronically low since 2014, yet adult pollock biomass has increased with a couple strong year classes during this time. The SSC supports further investigation into why previous recruitment relationships for pollock in the EBS appear to have broken down.

The SSC also requests that the pollock cannibalism index include an extrapolation to quantify the biomass of pollock consumed by other pollock in order to better understand the effect of both rate and scale of predation.

Aleutian Islands

The SSC appreciates the work that went into improving this ESR, and notes that many indicators were updated this year. Notably, after a multi-year warm period with frequent heatwave conditions, climate indicators show that overall the region experienced a return to more average conditions; however, sea surface temperatures remain at least one standard deviation above the long-term mean. Winter sea surface temperatures were still among the ten warmest on record, and marine heatwave conditions were present in the western Aleutian Islands. The warm winter conditions were one of several indicators that were cited as rationale for sustaining a risk table Level 2 for environmental conditions for AI Pacific cod and Atka mackerel. The National Multi-Model Ensemble predicts warm waters moving into western Aleutian Islands (WAI) in winter of 2025.

Indicators of large diatoms, the copepod community, and seabird reproductive success all suggest a gradient of poor productivity in the WAI to good productivity in the eastern Aleutian Islands (EAI). From Pacific cod diet indicators, it also appears the EAI food-web is more piscivorous and neritic, while the WAI food-web is more planktivorous and oceanic. 2024 was a 'low' year for East Kamchatka pink salmon but the authors noted abundances were now as high as previous 'high' years. This may be linked to the sustained lower availability of large copepods as prey. The SSC was appreciative of reporting pink salmon in terms of biomass, and recommends the authors clarify units and context for the values being reported.

Groundfish condition remained poor across regions for all species other than small pollock and southern rock sole. Biomass of pelagic foragers was stable or increasing across the chain, with rockfish, primarily Pacific ocean perch (POP) now the main pelagic foragers in the system. This shift could result in increased competition for zooplankton. Indicators of apex predators showed decreasing trends, particularly the biomass of AI Pacific cod and arrowtooth flounder in the WAI, and abundance of Steller sea lions in the CAI and WAI. The SSC notes that the GOA and EBS ESRs both have dedicated synthesis or integrated modeling efforts (e.g., DSEM analysis) and suggests that a similar effort could be developed for the AI to integrate and understand ecosystem processes in this region.

The SSC appreciates the inclusion of socio-economic indicators; and highlights the Adak school closure and overall trend of declining enrollment in the region including Unalaska. The author plans to look into the potential drivers of these trends, including exploring larger economic trends within the community, school enrollment trends statewide, locally owned vessel engagement indicators, and processing indicators.

The SSC discussed a few topics in the ESR report that were not in the presentation, such as the indicator that harmful algal blooms (HABS) continue to be a risk at sampling sites in the EAI and central Aleutian Islands (CAI). The SSC appreciates the inclusion of the seabird bycatch report in this year's ESR. Overall, trends in bycatch have decreased to pre-marine heatwave levels; however, there was a lethal take of the endangered short-tailed albatross in 2023/24 in the GOA Pacific cod hook-and-line fishery, which was extrapolated to a total bycatch of two birds in the AI.

The SSC had a few suggestions for overall AI ESR development. First, for the report cards, it was suggested that authors consider selection of the y-axis range for indicators that do not include improbable values (e.g., negative numbers for indicators of abundance). It was also suggested authors might consider how to note indicators that were not updated with data from 2024 due to reporting lags (e.g., Steller sea lion non-pup counts are lagged by a year). The SSC appreciates that throughout the report the individual indicators used the same color-schemes for representing data from the SEBS, EAI, CAI and WAI.

GOA Ecosystem Status Report

Overall, the GOA ecosystem is returning to post-heatwave levels for more indicators. The 2024 El Niño had less influence on the GOA than anticipated, with minimal warming in winter and spring and no strong ecological response. The developing La Niña is expected to continue cooling the GOA at least through spring of 2025.

Indicators show larger phytoplankton cells and diatom production that is favorable for food web dynamics in supporting energy rich zooplankton species. Abundances of some mid-trophic level forage fishes such as herring and capelin show positive trends and reproductive success of piscivorous seabirds was generally above average across the GOA. Likewise, humpback whale birth rates in southeast Alaska are back to pre-heatwave levels. This is particularly significant given that a female whale requires good multi-year feeding conditions to produce an offspring.

The SSC notes the concern that eastern GOA surface temperatures over approximately 75% of the shelf area often hit marine marine heatwave levels for the first five months of the year. Temperatures, however, did not exceed thresholds for early spring spawning groundfish species (pollock, cod, rock sole). Additionally, 2024 pink salmon returns were well below expectations for Prince William Sound in the central GOA, whereas Southeast Alaska met their regional pink salmon run forecast. Reasons for the low salmon returns are currently unknown and the SSC supports further investigation into plausible explanations for juvenile salmon and other species that showed similarly low abundances in this region, such as sand lance.

The SSC appreciates the integration of groundfish early life history information when summarizing how current trends in metrics might affect various species. The author noted that a warmer first half of 2024 could be favorable for stronger year classes for rockfish and sablefish, but could be problematic for pollock, Pacific cod, and northern rock sole. Above average spring zooplankton biomass indicates favorable prey resources for zooplanktivorous groundfish such as pollock, POP, dusky and northern rockfish, and larval life stages of many groundfish species.

The SSC notes that patterns of spatial variability also indicate continued post-heatwave recovery of the GOA from the offshore with many production metrics higher and more spatially consistent with the nearshore with intertidal communities trending back toward local drivers of variability and away from the more uniform across-region heatwave signal.

The SSC appreciates and supports the new ecosystem state analysis provided by the author. From this analysis, the author noted evidence for a community shift around 2014 that has persisted to 2022 in many components of the food web throughout the GOA.

The SSC recommends evaluation of spatial variability beyond the existing east and west GOA boundaries. Initial focus could include spatial variability that can be linked to persistent geographic and hydrographic features. For example, sea surface temperatures are more similar between the NOAA bottom trawl survey in the west and Icy Strait in the east, whereas the Seward Line in the west is more similar to the NOAA bottom trawl survey in the east. Likewise, Middleton Island seabird diets could be compared to western GOA and eastern GOA, and the outer continental shelf of that region.

C1 BSAI and C2 GOA Groundfish Specifications

Steve Barbeaux (NOAA-AFSC; BSAI GPT co-chair) and Jim Ianelli (NOAA-AFSC; GOA GPT co-chair) presented the Joint Groundfish Plan Team (JGPT) report from the November 2024 JGPT meeting. Dr. Barbeaux gave an overview of the November 2024 BSAI GPT meetings and recommendations for BSAI groundfish OFLs and ABCs. The SSC received a presentation by Jim Ianelli (NOAA-AFSC; GOA GPT

co-chair) and Sara Cleaver (NPFMC) on the November 2024 GOA GPT meeting and GOA groundfish OFL and ABC recommendations. Kalei Shotwell (NOAA-AFSC; BSAI GPT co-chair), Chris Lunsford (NOAA-AFSC; GOA GPT co-chair), and Cindy Tribuzio (NOAA-AFSC; BSAI GPT vice-chair) were available for clarifications and questions. Dr. Ianelli presented the EBS pollock stock assessment and Dr. Barbeaux presented the EBS Pacific cod stock assessment. The SSC thanks the entire GPT leadership team and all the authors that were online for questions. Their participation greatly improved the meeting.

The SSC reviewed the Stock Assessment and Fishery Evaluation (SAFE) report chapters with respect to status determinations for BSAI, GOA, or Alaska-wide groundfish. **The SSC-approved models indicated that no stocks were subject to overfishing in 2023. In reviewing the status of stocks with reliable biomass reference points (all Tier 1–3 stocks), the SSC concurs that these stocks are not overfished or approaching an overfished condition in 2024.** The SSC reviewed harvest projections for the BSAI and GOA at their October 2024 meeting. Status determination recommendations made by the SSC are based on the best scientific information available and final status determination will be made by NMFS Headquarters following SAFE review.

To streamline and simplify the SSC report, recommended ABCs, OFLs and area apportionments are summarized exclusively in Table 1 (BSAI) and Table 2 (GOA). Recommendations that differ from those of the GPTs are marked in **bold**.

Table 1. SSC recommended proposed OFL and ABC for Groundfish in the Bering Sea and Aleutian Islands (metric tons) for 2025-2026 (changes from BSAI GPT in bold).

Species	Area	2024 OFL	2024 ABC	TAC	Catch as of 11/11/2024	2025 OFL	2025 ABC	2026 OFL	2026 ABC
Pollock	BS	3,162,000	2,313,000	1,313,580	1,298,531	2,957,000	2,417,000	2,496,000	2,036,000
	AI	51,516	42,654	5,420	4,878	55,728	46,051	56,231	46,437
	Bogoslof	115,146	86,360	250	23	77,354	58,015	77,354	58,015
Pacific cod	BS	200,995	167,952	147,753	116,791	183,509	153,617	169,243	141,520
	AI	18,416	12,431	8,080	3,827	16,782	13,376	16,273	12,973
	BSAI/GOA	55,084	47,146	n/a		58,532	50,111	57,797	49,482
Sablefish	BS	n/a	11,450	7,996	5,326	n/a	**13,203**	n/a	**13,037**
	AI	n/a	13,100	8,440	1,152	n/a	**11,566**	n/a	**11,421**
Yellowfin sole	BSAI	305,298	265,913	195,000	81,307	299,247	262,557	305,039	267,639
Greenland turbot	BSAI	3,705	3,188	3,188	769	2,598	**1,678**	2,059	**1,328**
	BS	n/a	2,687	2,687	464	n/a	**1,415**	n/a	**1,120**
	AI	n/a	501	501	305	n/a	**263**	n/a	**208**
Arrowtooth flounder	BSAI	103,280	87,690	14,000	9,915	104,428	88,683	102,472	87,035
Kamchatka flounder	BSAI	8,850	7,498	7,498	4,913	8,019	6,800	7,790	6,606
Northern rock sole	BSAI	197,828	122,091	66,000	29,137	165,444	157,487	166,220	158,225
Flathead sole	BSAI	81,605	67,289	35,500	12,017	101,621	83,807	106,283	87,700
Alaska plaice	BSAI	42,695	35,494	21,752	10,091	34,576	28,745	33,965	28,230
Other flatfish	BSAI	22,919	17,189	4,500	3,071	26,083	19,562	26,083	19,562
Pacific Ocean perch	BSAI	49,010	41,096	37,626	34,894	44,594	37,375	43,084	36,578
	BS	n/a	11,636	11,636	9,742	n/a	10,121	n/a	9,905
	EAI	n/a	7,969	7,969	7,594	n/a	6,278	n/a	6,144
	CAI	n/a	5,521	5,521	5,250	n/a	5,559	n/a	5,441
	WAI	n/a	15,970	12,500	12,308	n/a	15,417	n/a	16,058
Northern rockfish	BSAI	23,556	19,274	16,752	8,775	22,848	18,694	22,284	18,232
Blackspotted/Rougheye Rockfish	BSAI	761	569	569	616	838	706	902	766
	BS/EAI	n/a	388	388	177	n/a	408	n/a	441
	CAI/WAI	n/a	181	181	439	n/a	298	n/a	325
Shortraker rockfish	BSAI	706	530	530	149	631	473	631	473
Other rockfish	BSAI	1,680	1,260	1,260	1,337	1,406	1,054	1,406	1,054
	BS	n/a	880	880	770	n/a	639	n/a	639
	AI	n/a	380	380	568	n/a	415	n/a	415
Atka mackerel	BSAI	111,684	95,358	72,987	71,937	122,622	103,247	107,889	92,361
	BS/EAI	n/a	41,723	32,260	31,530	n/a	46,650	n/a	41,731
	CAI	n/a	16,754	16,754	16,616	n/a	26,511	n/a	23,716
	WAI	n/a	36,882	23,973	23,791	n/a	30,087	n/a	26,914
Skates	BSAI	45,574	37,808	30,519	24,934	44,086	36,523	43,285	35,833
Sharks	BSAI	689	450	400	173	689	450	689	450
Octopuses	BSAI	6,080	4,560	400	240	6,080	4,560	6,080	4,560
Total	BSAI	4,609,077	3,476,801	2,000,000	1,724,804	4,334,715	3,590,572	3,849,059	3,192,029

Sources: 2024 OFLs, ABCs, and TACs are from harvest specifications adopted by the Council in December 2023 , 2024 catches through 11/11/2024, from AKR Catch Accounting.

Table 2: SSC recommended OFL and ABC for Groundfish in the Gulf of Alaska (metric tons) for 2025 and 2026.

		2024			Catch	SSC Recommended 2025		SSC Recommended 2026	
Species	Area	OFL	ABC	TAC	11/1/2024	OFL	ABC	OFL	ABC
Pollock	State GHL	n/a	4,769		3,640	n/a	4,526	n/a	3,326
	W (610)	n/a	38,882	38,882	31,457	n/a	37,344	n/a	27,453
	C (620)	n/a	90,937	90,937	71,571	n/a	82,265	n/a	60,477
	C (630)	n/a	50,587	50,587	20,534	n/a	51,605	n/a	37,936
	WYAK	n/a	5,565	5,565	1,382	n/a	5,282	n/a	3,883
	Subtotal	269,916	190,740	185,971	124,944	210,111	181,022	153,971	133,075
	SEO	12,998	9,749	9,749	-	12,998	9,749	12,998	9,749
	Total	282,914	200,489	195,720	124,944	223,109	190,771	166,969	142,824
Pacific Cod	W	n/a	8,745	6,121	4,216	n/a	8,710	n/a	8,182
	C	n/a	20,590	15,442	14,401	n/a	20,506	n/a	19,263
	E	n/a	2,937	2,203	489	n/a	2,925	n/a	2,748
	Total	38,712	32,272	23,766	19,106	38,688	32,141	36,459	30,193
Sablefish	W	n/a	4,699	4,699	2,620	n/a	4,746	n/a	4,687
	C	n/a	9,651	9,651	6,698	n/a	9,744	n/a	9,622
	WYAK	n/a	2,926	2,926	2,295	n/a	2,686	n/a	2,652
	SEO	n/a	5,320	5,320	4,073	n/a	5,660	n/a	5,589
	GOA Total	n/a	n/a	22,596	15,686	n/a	22,836	n/a	22,550
Alaska-wide OFL and ABC	AK Total	55,084	47,146	n/a	21,758	58,532	47,605	57,797	47,008
Shallow-Water Flatfish	W	n/a	23,337	13,250	63	n/a	23,755	n/a	23,902
	C	n/a	27,783	27,783	2,742	n/a	28,279	n/a	28,455
	WYAK	n/a	2,778	2,778	1	n/a	2,828	n/a	2,846
	SEO	n/a	1,667	1,667	1	n/a	1,697	n/a	1,707
	Total	68,121	55,565	45,478	2,807	69,277	56,559	69,610	56,910
Deep-Water Flatfish	W	n/a	237	237	8	n/a	234	n/a	231
	C	n/a	2,655	2,655	78	n/a	2,616	n/a	2,568
	WYAK	n/a	1,856	1,856	3	n/a	1,828	n/a	1,795
	SEO	n/a	2,314	2,314	2	n/a	2,280	n/a	2,238
	Total	8,387	7,062	7,062	91	8,263	6,958	8,114	6,832
Rex Sole	W	n/a	3,367	3,367	23	n/a	3,382	n/a	3,353
	C	n/a	13,639	13,639	474	n/a	13,698	n/a	13,582
	WYAK	n/a	1,453	1,453	1	n/a	1,436	n/a	1,413
	SEO	n/a	2,905	2,905	-	n/a	2,871	n/a	2,825
	Total	25,978	21,364	21,364	498	26,002	21,387	25,743	21,173
Arrowtooth Flounder	W	n/a	30,409	14,500	486	n/a	33,593	n/a	33,716
	C	n/a	64,871	64,871	16,329	n/a	68,261	n/a	68,511
	WYAK	n/a	7,870	7,870	29	n/a	6,695	n/a	6,719
	SEO	n/a	16,099	6,900	22	n/a	10,998	n/a	11,039
	Total	142,485	119,249	94,141	16,866	142,832	119,547	143,347	119,985
Flathead Sole	W	n/a	13,273	8,650	145	n/a	13,592	n/a	13,757
	C	n/a	21,307	21,307	763	n/a	21,817	n/a	22,083
	WYAK	n/a	3,876	3,876	0	n/a	3,970	n/a	4,018
	SEO	n/a	2,047	2,047	0	n/a	2,097	n/a	2,122
	Total	49,414	40,503	35,880	908	50,587	41,476	51,176	41,980
Pacific ocean perch	W	n/a	1,787	1,787	1,667	n/a	1,753	n/a	1,688
	C	n/a	28,757	28,757	21,294	n/a	28,209	n/a	27,156
	WYAK	n/a	2,110	2,110	1,946	n/a	2,070	n/a	1,993
	SEO	n/a	7,065	7,065	-	n/a	6,930	n/a	6,672
	Total	47,466	39,719	39,719	24,907	46,562	38,962	44,826	37,509
Northern Rockfish	W	n/a	2,535	2,535	315	n/a	1,396	n/a	1,346
	C	n/a	2,280	2,280	817	n/a	3,680	n/a	3,549
	E	n/a		-	NA	n/a		n/a	
	Total	5,750	4,815	4,815	1,132	6,064	5,076	5,848	4,895
Shortraker Rockfish	W	n/a	34	34	15	n/a	34	n/a	34
	C	n/a	189	189	137	n/a	189	n/a	189
	E	n/a	424	424	191	n/a	424	n/a	424
	Total	863	647	647	343	863	647	863	647
Dusky Rockfish	W	n/a	145	145	71	n/a	209	n/a	199
	C	n/a	7,365	7,365	2,122	n/a	5,818	n/a	5,527
	WYAK	n/a	84	84	5	n/a	215	n/a	204
	SEO	n/a	30	30	-	n/a	96	n/a	91
	Total	9,281	7,624	7,624	2,198	7,705	6,338	7,319	6,021
Rougheye and Blackspotted Rockfish	W	n/a	197	197	51	n/a	224	n/a	229
	C	n/a	315	315	140	n/a	359	n/a	366
	E	n/a	525	525	98	n/a	597	n/a	608
	Total	1,555	1,037	1,037	289	1,576	1,180	1,631	1,203
Demersal shelf rockfish	W/C/WYAK	n/a	n/a	n/a	n/a	361	271	361	271
	SEO	376	283	283	153	524	394	524	394
Thornyhead Rockfish	W	n/a	314	314	35	n/a	206	n/a	206
	C	n/a	693	693	65	n/a	590	n/a	590
	E	n/a	621	621	64	n/a	542	n/a	542
	Total	2,170	1,628	1,628	164	1,784	1,338	1,784	1,338
Other Rockfish	W/C/WYAK	n/a	1,353	1,353	511	n/a	1,084	n/a	1,084
	SEO	n/a	2,421	300	30	n/a	2,421	n/a	2,421
	Total	4,977	3,774	1,653	541	4,618	3,505	4,618	3,505
Atka mackerel	Total	6,200	4,700	4,700	380	6,200	4,700	6,200	4,700

Table 2: SSC recommended OFL and ABC for Groundfish in the Gulf of Alaska (metric tons) for 2025 and 2026.

Species	Area	2024 OFL	2024 ABC	2024 TAC	Catch 11/1/2024	SSC Recommended 2025 OFL	SSC Recommended 2025 ABC	SSC Recommended 2026 OFL	SSC Recommended 2026 ABC
Big Skate	W	n/a	745	745	163	n/a	745	n/a	745
	C	n/a	1,749	1,749	815	n/a	1,749	n/a	1,749
	E	n/a	341	341	140	n/a	341	n/a	341
	Total	3,780	2,835	2,835	1,118	3,780	2,835	3,780	2,835
Longnose Skate	W	n/a	104	104	35	n/a	104	n/a	104
	C	n/a	1,894	1,894	461	n/a	1,894	n/a	1,894
	E	n/a	538	538	220	n/a	538	n/a	538
	Total	3,380	2,536	2,536	716	3,380	2,536	3,380	2,536
Other Skates	GOA-wide	887	665	665	547	887	665	887	665
Sharks	GOA-wide	6,521	4,891	4,891	1,288	6,521	4,891	6,521	4,891
Octopuses	GOA-wide	1,307	980	980	197	1,307	980	1,307	980
TOTAL		**765,608**	**599,784**	**520,020**	**214,879**	**709,422**	**590,762**	**649,064**	**539,295**

Source: 2024 and 2025 Final GOA Harvest Specifications; Catch Accounting System. GOA catch (not AK wide catch) for sablefish included in catch total. Note: The corrected sablefish WYAK/SEO ABC does not include any gear adjustments. These gear adjustments are incorporated after the TAC is recommended by the Council, and should not be calculated using the ABC subarea apportionments.

General Groundfish Stock Assessment Comments

Loss of survey data

The SSC notes its concerns over numerous survey data losses identified in the GPT reports. In particular, the SSC emphasizes the importance of the longline survey as an important source of data for a number of assessments and for spatial apportionments. Therefore, the SSC requests that the longline survey be conducted in 2025, if at all possible. Species assessments that rely heavily on this survey include sablefish, Greenland turbot, and a number of rockfish species, at least two of which (other rockfish, shortraker rockfish) showed substantial decreases in the longline survey this year, prompting SSC requests for any survey results to be brought forward in the next assessment cycle for the Plan Teams to review. If warranted, this would provide an opportunity to request additional information or assessments other than catch reports in time for the December 2025 meeting.

Loss of the Summer Acoustic Survey in the Gulf of Alaska

The primary objective of the AFSC summer acoustic survey in the GOA was to provide biomass estimates for the GOA walleye pollock assessment, but it was also the only platform that comprehensively surveyed the midwater component of the GOA ecosystem. The survey provided indices of euphausiids and capelin abundance and had the potential to provide other ecosystem indices as acoustic and other sampling technologies become more sophisticated. With the potential loss of this survey in 2025 and thereafter, the SSC requests that AFSC scientists consider ways to replace the data streams provided by the summer acoustic survey. Examples discussed by the SSC included using acoustic data collected during the summer bottom trawl survey to develop an AVO-like index of pollock abundance, and developing a euphausiid index from data collected during the spring or fall EcoFoci oceanographic surveys or from the Seward line sampled seasonally during surveys conducted as part of the Long-term Ecological Research monitoring project in the northern GOA.

Projection Assumptions

The SSC requests that the GPT's conduct a synthesis across all assessments of assumptions currently in place for projections based on models where demographic or fishery parameters are estimated as time varying, and definition of the time series over which recruitment is averaged for forward projections. The goal of this short synthesis should be to identify current similarities and differences in practice, and to develop recommendations for consistent methodologies to the extent practicable. This will be particularly important in the context of dealing with climate-induced changes in biological characteristics such as growth, maturity and mortality.

"What If" Analysis

The SSC appreciates the "what if we were wrong" analysis included in the EBS Pacific cod assessment that quantified the implications of model structural uncertainty. Specifically, the authors considered the increased risk of biomass falling below reference points in the coming years and impacts on potential yield, if harvest recommendations were based on one model, while the true population dynamics were better described by an alternative model. The SSC highlights that this useful approach to quantifying the magnitude of potential risks associated with model misspecification may be useful for other assessment authors to consider in the future.

Tier 1 considerations

The SSC reflected on the extensive analyses and discussion around the use of Tier 1 versus Tier 3 harvest specifications for EBS pollock. General considerations included the need for priors on stock-recruitment parameters, the number of recruitment estimates occurring at low spawning biomass levels and the overall variability in recruitment. The SSC encourages similar evaluation of the information content of the stock-recruitment relationships for other Tier 1 stocks (BSAI yellowfin and BSAI northern rock sole), and consideration of whether these relationships are sufficient to reliably estimate B_{MSY} and F_{MSY}.

One-Step Ahead (OSA) residuals

The SSC appreciates the emerging use of OSA residuals for assessing model fits to compositional data and encourages stock assessment authors to work towards a standardized approach to presenting these residuals, possibly alongside Pearson residuals (if appropriate). The SSC also encourages authors to include some text regarding the interpretation of OSA residuals until reviewers develop more familiarity with the approach. In cases where there are large discrepancies between Pearson and OSA residuals, a diagnosis of why they may be so different would be helpful. See also our general comments on OSA residuals from October 2024.

Socioeconomic Information for Setting TAC

The SSC received a brief introduction and background leading to the "C1/C2 Social and Economic Information to Inform Groundfish TAC-setting" document from Anna Henry (NPFMC), which contains a brief description of existing products that provide social and economic information that is available and relevant to Total Allowable Catch (TAC) setting, including the Groundfish Economic Stock Assessment and Fishery Evaluation (Econ SAFE), Annual Community Engagement and Participation Overview (ACEPO), Ecosystem and Socioeconomic Profiles (ESPs), and in-season management reports. These descriptions have been provided in response to earlier SSC comments regarding the systematic inclusion of social and economic information across multiple Council decision-informing analytic products and as part of the lead-up to a larger SSC agenda item on the topic scheduled for the June 2025 meeting. It is also responsive to the Council's December 2023 C4 motion recommending a review of socio-economic indicators included in ESPs and ESRs and/or other refinements to the timing and aggregation of information presented in ACEPO and Econ SAFEs, as well as the Council's October 2024 D2 motion that in part addressed compiling social and economic information to meet the needs of using the best scientific information available and informing Council decision-making and TAC-setting.

The SSC expresses its appreciation for responsiveness to earlier comments and the progress that has been made toward incorporating social, economic, and community information into the ESRs, ESPs, and ACEPO as evidenced at these meetings. The SSC made several specific comments related to the currently available documents throughout the course of the meeting reflecting their support for the ongoing work and progress. First, the SSC appreciated efforts to incorporate ecosystem-level social and/or economic information in the ESRs. Second, the SSC noted their appreciation for the availability of the draft Economic SAFE through the JGPT e-agenda. Third, the SSC appreciated the updated ACEPO and other work that is being produced and included in these documents. Finally, the SSC noted the importance of the Community Snapshots as profiles of communities that include both fisheries and census data and the efforts to revise and keep them current.

The SSC recommends that a (remote) meeting of the SSC Economic and Socioeconomic (ESE) subgroup occur sooner rather than later to help ensure the success of the June 2025 discussion and to align work efforts of all involved between now and then. The SSC noted the importance of this

meeting to (1) discuss the intent of the June discussion; (2) develop and finalize an agenda with expected outcomes for the June discussion; and (3) prioritize tasks. The SSC expects a core function of the meeting and work before June to be mapping the use of economic, social, and community information in Council decision-making onto both the Council's annual process and the analytic products that support the decision-making process, as guided by the MSA, National Standards, and National Standard Guidelines. An overarching goal of this process is providing this information in a timely manner and at a scale appropriate to decisions being informed and in a way that is transparent, coordinated, consistent, with products useful to the Council, predictable for the public, and achievable within the constraints of staff capacity. The SSC noted several specific criteria to consider in developing next steps:

- Scale of the indicator or measure (e.g. species/fishery, community, FMP, ecosystem)
- Council decision-making timeline
- Modality (e.g., online interfaces, pdf reports)
- Nexus with other efforts and potential synergies/efficiencies (e.g. climate, Equity and Environmental Justice tools)
- Tradeoffs between quality versus timeliness

The SSC also discussed both the benefits of interdisciplinary work to meet goals related to inclusion of socioeconomic information into Council products and this type of work as a means of addressing capacity as a potential constraint. The SSC noted that generally more development has occurred related to economic indicators and analyses relative to social and/or distributional analyses. One discussion point related to efficiency was ensuring individuals are not asked to create something that is outside of their area of expertise without interdisciplinary support. This will likely need to be a collaborative effort of social scientists, economists and data analysts to develop the types of indicators that are relevant and informative to management. One example where interdisciplinary collaboration may result in large returns is quantitative analysis of distributional outcomes where more qualitative social scientists may be able to provide context for measures and input into what analyses to run, while more quantitative researchers develop and run appropriate analyses. The SSC also encouraged the team to consider paths like using R markdown and online tools that can be populated and updated relatively quickly as a means of improving efficiency.

The SSC also noted the importance of collaboration across teams producing different documents. Specifically, the SSC noted that the ESR was not mentioned in the C1/C2 document, but that potentially compelling indicators related to social and/or economic information at the ecosystem level were being developed and/or explored by the ESR teams. Specifically, the SSC noted work within the ESRs on school enrollment, potential efforts to acquire Department of Labor data, skipper science data collection efforts, and the concept of stock biomass portfolios by lifespan presented within the AI ESR. The SSC noted that, in addition to involvement of social scientists in these varied efforts to consider potential data sources and collaboration opportunities, these products may benefit from social science expertise to discuss indicators in a way that is consistent with general social science knowledge. For example, the SSC encouraged additional work to provide context for the declining school enrollment and cautioned that more work is needed to understand the nature and strength of the relationship, if any, between federal fishery management changes and school enrollment declines as opposed to, for example, a more generalized aging population trend.

Throughout the meeting the SSC also made specific comments related to what could be discussed during the ESE subgroup meeting:

- *The importance of developing measures across scales to provide a complete picture of the social and economic conditions relevant for management.* Regarding the scale of the indicators/analyses, the SSC provided some examples related to social information. For ESRs there could be some overarching indicators that reflect all communities that currently are, or historically were, substantially engaged in or dependent on federally managed fisheries in an Ecosystem region. For ESPs, indicators could reflect the species included in that document at the community level, similar to the Regional Quotients in several ESPs, but also capturing the smaller communities that might be dependent on a particular species. Because of confidentiality, that may need to be a qualitative discussion, or creation of a local quotient (i.e., the amount of a particular species landed within a community divided by the amount of all species landed).

- *The potential need for heterogeneous ESP indicators across species.* The ESP socioeconomic indicators that have been developed so far capture impacts on businesses and communities that target the species in question. This is appropriate for sablefish and crab, but some fleets depend on Pacific cod through joint harvests with other target species. The SSC suggests the analysts consider how TAC adjustments affect vessels that capture the species as joint harvest, bycatch or PSC, and whether there are other indicators that better capture important aspects of utilization in a multispecies context.

- *Dissemination of information and potential structural review of various products by the SSC in the longer run*. The SSC would benefit from presentations that provide an overview of the status of fisheries, FMPs, and ecosystems in terms of economic and social status as a context for SSC review of proposed actions and amendments throughout the year. The SSC also raised the question of when and how in the process analysts would (1) advance new analyses for review by the SSC; and (2) note a potentially substantial issue like a large price drop or processing plant closure that could have a large impact on a fishery/fisheries (similar to ESR 'Noteworthy topics').

Joint Plan Team Report

Sablefish

The SSC received a summary of the sablefish stock assessment results and associated JGPT recommendations. This assessment was an operational update and no changes to the previously approved model (23.5) were implemented. The only new data were updated 2024 catch data, 2023 length and age data from the fishery, and 2023 age data from the longline survey. Notably, there were no new survey data or fishery dependent CPUE data in 2024 due to the cancellation of the longline survey, an off-year for the bottom trawl survey, and the loss of the funding for IPHC logbook data.

Written and oral public testimony was provided by Linda Behnken (Alaska Longline Fisherman's Association) and oral testimony was provided by Doug Wells (F/V Baranof). Both supported setting a conservative ABC due to several concerns. These concerns include the history of increases followed by sharp declines and a longer-term downward trend in spawning stock biomass, the continued lack of older fish (> 10 years) in the population, the lack of the 2024 longline survey and associated uncertainty, declining catch rates across multiple areas and the large proportion of the ABC allocated to the BSAI area. Ms. Behnken also expressed continued support for the ongoing work on Management Strategy Evaluations and alternative management approaches, and highlighted the socioeconomic indicators in the ESP, which track poor market conditions and TAC underutilization. The SSC considered any conservation-related concerns in the discussion on reductions from maximum ABC as noted below.

The sablefish assessment continues to show positive trends in recruitment and spawning biomass, with all year classes since 2014 estimated to have been at or well above average recruitment. There are also some

indications that the incoming 2022 year class is above average based on bycatch of age-1 sablefish during Bering Sea trawl fisheries in 2023 and other indicators. While survey biomass indices were leveling off through 2023, the estimated spawning biomass continues to increase rapidly with the 2014 year-class now about 90% mature. **Spawning biomass is currently at 63% of B_0, projected to increase to 73% in 2025.**

The authors responded to previous SSC comments by updating the fishery performance portion of the risk table and conducting some sensitivity runs regarding input sample sizes for compositional data. The SSC appreciates these efforts and the authors' plans for addressing other SSC and JGPT comments in the next full assessment. The SSC accepts the authors' rationale for not doing a full ten-year peel until the 2026 assessment, and for the use of the combined longline/pot gear fishery index in the model despite poor fits to some years, given extensive evaluations of the combined and separate fishery indices (Cheng et al. 2023[1]). The longline fishery CPUE index will no longer be updated due to the loss of logbook data.

The SSC concurs with the author- and JGPT-recommended Model 23.5 and the resulting Tier 3a OFL and maximum ABC, as adjusted for whale depredation using 2022 depredation estimates (ABC_w in the assessment). The SSC also supports the area apportionments based on five-year moving averages of biomass distribution in each area, as estimated from the longline survey. The author and JGPT did not recommend a reduction from maximum ABC.

The SSC had extensive discussions on whether a reduction from maximum ABC is warranted for this stock. Last year, elevated concerns (level 2) were noted in the Fishery Performance category, primarily due to declining TAC utilization (< 50% in 2024), which resulted in uncertain estimates of current year catches and hence projected biomass and resulting OFL and maxABC recommendations. However, as this generally resulted in overestimating catches, SSB projections would be biased slightly low and hence not a conservation concern. The population dynamics concern over the lack of older fish has also decreased since last year. Although younger fish still disproportionately contribute to the spawning biomass, age diversity is slowly expanding as the strong year classes since 2014 continue to mature. The JGPT therefore noted no elevated concerns for this stock.

The SSC disagreed with the author and JGPT and concluded that there is an elevated concern in the assessment category due to the lack of new data to inform stock status, combined with concerns over low catch rates in the fishery. Although a single year gap in an individual survey does not usually imply an elevated concern, the SSC noted that three data streams that typically inform the assessment were not available this year: the 2024 longline survey was canceled, 2024 was an off-year for the bottom trawl survey, and the fishery CPUE time series is only available through 2022. Although fishery CPUE was on an upward trend from 2020 to 2022, public testimony suggested potentially low catch rates in 2024 at least in some areas and fisheries. An additional concern is the potential for reduced growth (length- and weight-at-age) associated with the high abundances of younger fish (Cheng et al. 2024[2]) that is not accounted for in the model and could result in an overestimation of current biomass. **Therefore, the SSC registered a Level 2 concern for the assessment category and determined that a 5% reduction from maximum ABC (ABC_w) is warranted for this stock.**

[1] Cheng, M.L.H., Rodgveller, C.J., Langan, J.A., Cunningham, C.J., 2023. Standardizing fishery-dependent catch-rate information across gears and data collection programs for Alaska sablefish (*Anoplopoma fimbria*). ICES Journal of Marine Science fsad037. https://doi.org/10.1093/icesjms/fsad037

[2] Cheng, M., Goethel, D. R., Hulson, P.-J. F., Echave, K. B., & Cunningham, C. J. (2024). 'Slim pickings?': Extreme large recruitment events may induce density-dependent reductions in growth for Alaska sablefish (Anoplopoma fimbria) with implications for stock assessment. *Canadian Journal of Fisheries and Aquatic Sciences*. https://doi.org/10.1139/cjfas-2024-0228

Regarding area apportionments, concerns were raised last year (and reiterated in public testimony) over substantial increases in area-specific ABCs in the western regions compared to the eastern regions, combined with the expectation that sablefish tend to move from the western areas to the east as they mature. The lack of a 2024 survey may exacerbate this concern as the previously estimated average biomass distribution may be even less likely to match the actual distribution in the upcoming fishing year. However, it is unknown how a 2024 survey might have affected the estimated distribution of biomass among areas and the SSC did not consider this a conservation concern as sablefish are considered to be a single, statewide stock.

The SSC had the following additional recommendations for the stock assessment authors and analysts, several of which re-iterate previous recommendations that could not be addressed in this update:

- The SSC agrees with the author and JGPT that exploring additional sex-specific dynamics, in particular disaggregating age data by sex, should be a priority. This may help address troublesome patterns in (sex-aggregated) age composition residuals and (sex-disaggregated) length composition residuals, which may reflect some combination of time-varying (e.g. density-dependent) growth, time-varying selectivity, differences in M between sexes, deviations from a 50:50 sex ratio, and aging errors.

- The SSC further suggests explorations of models that allow for variations in growth over time, given the results from Cheng et al. (2024) that provide strong evidence of density-dependent growth. Variability in growth could result in the residual patterns noted above.

- The SSC supports the plan team recommendation to explore the use of time-varying selectivity in the model to address the poor fit to the fishery CPUE index and fishery catch-at-age data.

- The SSC re-iterates a recommendation from last year to explore the Hulson and Williams (2024)[3] bootstrapping approach for determining appropriate input sample sizes for compositional data.

- The SSC appreciates the clarification of how the recruitment bias correction is currently handled in the model but encourages further explorations regarding the treatment of recruitment variances. As noted last year: "*The SSC encourages the use of an appropriate sigma constraining recruitment but notes that the maximum likelihood estimate of a random effects variance is negatively biased. This can be avoided by iteratively tuning in a maximum likelihood framework (per the approach of Methot and Taylor) or by using a full Bayesian analysis such that the recruitment deviations are integrated out.*"

- The SSC shares PT concerns over the loss of logbook data and supports the PT recommendation to consider developing a standardized fishery CPUE index using observer data only, especially if the longline survey cannot be conducted each year.

- The SSC encourages further work on skip spawning to assess its potential impact on reproductive potential, perhaps through the development of an index for the ESP.

- The SSC encourages assessment authors to seek out local knowledge regarding fishery CPUE, in particular regarding any issues with the performance of slinky pots that may affect CPUE.

[3] Hulson and Williams. 2024. Inclusion of ageing error and growth variability using a bootstrap estimation of age composition and conditional age-at-length input sample size for fisheries stock assessment models. Fisheries Research (270). https://doi.org/10.1016/j.fishres.2023.106894

Sablefish ESP

Regarding the sablefish ESP, the SSC commends the ESP Team and authors for revising and updating the suite of indices, which shows that the process is working as intended in that duplication is considered (e.g. no longer including a new fishery CPUE index in the ESP as it has been incorporated in the stock assessment), while new indices are added as they become available (e.g. indices of age-1 abundance).

The SSC encouraged the analysts to review the ESP text to ensure that there is clear language to clarify the roles of different types of information and its uses in the management process, which includes the use of ecological and fishery performance indicators to inform the risk tables for OFL and ABC determinations by the SSC and the use of socioeconomic indicators for TAC setting by the Council.

Regarding ecological indicators, the SSC noted several existing and new indices of early to late juvenile abundance, in particular:

- A juvenile sablefish abundance index for nearshore areas of the western and central GOA and the eastern Aleutians as observed in the ADF&G large-mesh bottom trawl survey was positively correlated with recruitment (as estimated in the assessment model) and was identified as a strong predictor of recruitment in the Bayesian Adaptive Sampling analysis. The SSC encourages the author and team to consider moving towards formally evaluating the index in the assessment.

- The SSC highlights several other promising indices, including an age-1 sablefish index based on the GOA summer bottom trawl survey and an index based on the number of hauls with age-1 sablefish in the EBS fishery. The SSC suggests that the authors of the latter index consider options to standardize the index to the total number of hauls.

With respect to the newly added socio-economic indicators, the SSC continues to be supportive of the general usefulness of those indicators and acknowledges the extensive amount of work and progress that has been made in developing the new indicators and associated figures and text. The SSC supports the interdisciplinary perspective offered throughout the document, including the current discussion linking ecological changes and economic outcomes, and encourages continued refinement.

The SSC also continues to acknowledge that this ESP is one of many and that the indicators in the sablefish ESP may not be appropriate for all species. Instead, the SSC supports flexibility in tailoring indicator selection to species. The SSC notes that sablefish is also a fishery with a lot of recent change and would support more streamlined ESPs for more stable fisheries. For example, not all species may require the additional data analysis and synthesis to provide a reasonable current summary of the economic and social status of the fishery.

Reiterating a comment from October 2024, the SSC appreciates the effort to bring forward in-season data on social and economic conditions associated with fisheries and synthesize the observed outcomes for use in the Council process. While in-season data provides timely characterization of the social and economic conditions within the fishery at the time of TAC setting, it has not been widely applied because it does not reflect end-of-season dynamics and adjustments. The SSC appreciates the analysts' efforts to find sources of in-season data, check the outputs against established data, and develop a replicable process to provide this information in a low-cost manner in the future. Relatedly, the SSC supports exploration of the potential to use Restricted Access Management (RAM) summary data on regional TAC utilization that was discussed in October, and the SSC supports efforts to scope other data sources that may be developed for other uses but could be leveraged as a low-effort input to ESPs.

Additionally, the SSC continues to support strategies to use analyst time efficiently while providing timely information. For example, the SSC supports using bullet point summaries within ESPs to characterize socioeconomic conditions.

Finally, the SSC discussed potential refinements to the socioeconomic ESP indicators falling into three categories: indicator units; profitability indicators; and social/distributional indicators.

1. Indicator Units

The SSC supports continued refinement of indicator units. Overall, the units and labels are much more readable than in the past and are responsive to previous SSC comments. The SSC suggests some additional refinement to provide clear and accurate units on ESP indices, for example:

- "% of TAC" implies a value between 0 and 100, so the scale could be changed accordingly or the description could follow other indicators and use the term "share"
- The total fishery "Value" is not 100-150. It appears this should be Value (Million $).
- Consistency in units across subfigures.
    - Currently the incidental catch appears 100x larger than the directed. It appears the incidental catch is in tons, but then the directed is in thousand tons (or thousand metric tons, see below).
    - The analysts should consider using a consistent tonnage measure throughout (tons or metric tons) and/or clearly note if different units are used.

2. Profitability Indicators

The ESP provides a thoughtful approach to synthesizing the most current data from multiple sources to provide a near real-time summary of the economic status of the fishery. The SSC also notes that in addition to the specific ESP, it was helpful to see the non-finalized Economic SAFE document that includes information across species and the associated summaries on expected prices.

The SSC discussion identified several potential paths for refinement and expansion. **A first potential avenue for future exploration is a measure of fishery cost**. Thinking about profit as the difference between revenue (price*quantity) and harvest cost, the SSC noted that the current ESP provides detailed exploration of revenue indicators, but not cost. The SSC suggests that a CPUE indicator could be useful for reflecting variation in cost, and supports the analysts examining potential CPUE measures for their ease of calculation and availability, or to consider other cost indicators. Furthermore, the SSC noted that a measure of CPUE best suited to characterizing fishery cost may not be the same as that which is most useful for stock assessment.

The SSC suggested some re-organization and consistency related to the exploration of the cause of the ex-vessel price decrease. In the section "Annual Sablefish Real Ex-vessel Price Fishery: Average real ex-vessel price per pound of sablefish measured in millions of dollars and inflation adjusted to 2023 USD" the report discussed the world market as a driver of price declines. Later in the text, it is noted how size distribution can impact the average ex-vessel price. The SSC suggests bringing this information together into one section and discussing these two potential main drivers and the evidence in favor of one or both mechanisms.

The SSC encourages the analyst to review the terminology related to "ex-vessel revenue" and "ex-vessel value" and associated calculations. First, these terms appear to be used interchangeably so the SSC recommends streamlining the language or explaining terminology used in more detail. The SSC also notes that the document could benefit from an explanation of any assumptions that were needed to develop these estimates or refine these indicators as necessary. For example, what assumptions were made in estimating ex-vessel value for catcher processors?

The SSC supports continued refinement of the "Implications" sections. The SSC appreciates the analysts' efforts to provide context and utility to the trends in ESP indicators through suggestive narratives when rigorous econometric analysis is not available. However, it is important that these narratives reflect the context and nuances of the fishery being assessed (e.g., multifishery relationships, rationalization programs), rather than what might happen in a generic fishery as suggested by general economic theory. Public testimony suggested a variety of responses to low prices; for example exit from the fishery or increased fishing effort to cover loan costs.

3. Social/Distributional Indicators.

The SSC encourages continued development of indicators that are social and/or distributional. The SSC discussed that the economic profitability indicators and associated text are more developed than other potential indicators that would fall under the socioeconomic section. The SSC commends the analysts for developing socio-economic indicators that are quantitative and focus on distributional outcomes across fleets, scales, communities and other geographies. **The SSC supports continued development of these indicators and notes that in the longer run these could benefit from continued interdisciplinary collaborations between economists and other social scientists.**

Lastly, the SSC recommends that the authors continue to develop narrative text and figures for the indicators currently included in the ESP. Narrative text can support inclusion of relatively small communities that are substantially dependent on or substantially engaged in the sablefish fishery. These communities may be among the most vulnerable to adverse circumstances in the fishery and are not currently identified in the ESP, due to confidentiality constraints and the tendency of a regional quotient approach to highlight larger communities. The SSC recommends expanded discussion of the current graphics. For instance, there is a spike in the regional quotient (RQ) value for Sitka that is quite dramatic in 2018 or 2019. It does not seem to be related to its landings RQ and adding some explanation of the graphic, other than noting the top communities in terms of RQ, would help in interpreting those trend lines. The SSC notes that this narrative text development would likely benefit from the interdisciplinary collaboration and inclusion of social science work discussed under the C1/C2 agenda item.

Forage Species

An Ecosystem Component report, prepared by a new author, was presented for the FMP forage fish and squid species groups in the GOA, EBS, and the AI. This year, the BSAI and GOA forage species reports were combined into a single report; the last GOA assessment was in 2022 and the last BSAI assessment in 2023. This report tracks the distribution, abundance, and prevalence of over 50 species considered as important forage for the BSAI and GOA ecosystems to help ensure their conservation and track any significant changes that may require additional management measures**. Currently, there are no conservation concerns for any of the included species groups**. However, bycatch of squid has increased noticeably over the past five years and should be continued to be tracked closely.

The majority of the SSC discussion focused on determining the main goal of the forage report, which would then help clarify what data and species groups to include in the report. The SSC agrees with the JGPT

recommendation that the report begin with a statement of purpose. **Additionally, the SSC recommends that this report focus only on the forage fish species explicitly stated in the GOA and BSAI groundfish FMPs and that all included metrics/indicators/analyses help determine whether there are any conservation concerns for those species groups.**

Grenadier

An Ecosystem Component report was presented for the grenadier stock complex in the GOA, EBS, and AI. No tier is assigned to this stock complex. This SAFE is on a four-year cycle, and the last assessment was in 2020. The grenadier stock complex is composed of three non-target species: giant grenadier, Pacific grenadier, and popeye grenadier. The results presented in this report are based primarily on giant grenadier and track trends in abundance and catch in all three regions (GOA, EBS, and AI). The SSC recognizes that there is no reliable information related to total biomass due to the mismatch between the depth distribution for grenadier and the depths primarily sampled by surveys and fisheries.

The SSC also recognizes that there is very little information about grenadier life-history. The SSC recommends that the author review a recent publication that brought up new information[4] about the life cycle and distribution of giant grenadier in the Northwest Bering Sea. This publication presents some insightful information regarding the giant grenadier spawning season.

There were changes in the model-based biomass estimates used since the last assessment in 2020. For the GOA and EBS, grenadier biomass was estimated using a random effects multi-survey model (REMA), combining trawl and longline survey data. Only relative indices were provided for grenadier in the AI. Data updates included adding catches through October 2024, 2021 and 2023 GOA trawl survey biomass estimates, 2022 and 2024 AI trawl survey biomass estimates, 2021-2023 GOA longline survey index estimates, 2022 AI longline survey index estimates, and 2021 and 2023 EBS longline survey index estimates.

As highlighted in this report, indices in the AI are challenging to combine due to the coverage of the trawl survey in terms of depth and the limited spatial coverage of the longline survey. **Both indices showed declining trends, which are consistent with the other two regions. The biomass predicted for 2025 in the GOA and EBS is the lowest in the time series. The SSC recognizes bycatch levels are very small compared to those estimates, suggesting there is no conservation concern.**

The SSC agrees with the author that determining ecosystem effects on the grenadier stock complex is difficult due to the lack of biological and habitat information and limited knowledge of the deep slope environment inhabited by these species.

C1 BSAI SAFE and Harvest Specifications for 2024/2025

Multispecies model (CEATTLE)

The SSC received a brief update on results from a multispecies model including walleye pollock, Pacific cod and arrowtooth flounder that had previously been provided as an appendix to the pollock assessment since 2016. The SSC appreciates the separate presentation on CEATTLE results to help inform individual assessments and supports the inclusion of model outputs into the ESR, in particular estimates of age-1 mortality and total consumption of each of the three species in the model.

The SSC also notes that the authors this year provided estimates of the biomass consumed annually of key prey species across the EBS and NBS that are not explicitly included in the multispecies model, such as

[4] Alferof, A. I. & Kurnosov, D. S. 2024. Life Cycle Characteristics and Distribution of Giant Grenadier Coryphaenoides pectoralis (Macrouridae) in Northwest Bering Sea. Journal of Ichthyology, 64 (2): 304-316.

snow crab and king crab. These estimates are based on assumed diet compositions of the three predators in the model and on model-estimated rations (kg eaten/predator) and abundances.

The SSC appreciates the development of these consumption indices and supports efforts to work with individual authors, either directly or indirectly via ESPs, to incorporate this information into single-species assessments. The SSC notes that unlike estimates of mortality from the multi-species model, these indices of consumption for a given species are largely independent of the data sources informing the assessment of that species, and may therefore be more suitable for inclusion in the single-species assessment to inform estimates of mortality or recruitment.

The SSC encourages authors of the pollock, Pacific cod and arrowtooth assessments to explore the use of outputs from the multispecies model. Either estimates of time-varying mortality or estimates of consumption could help inform natural mortality (M) in the single-species assessments and the SSC appreciates the work done on exploring the use of time-varying mortality estimates in the pollock assessment.

In addition to informing assessments, the main value of the multi-species model is its potential to provide strategic advice in a climate change context. The SSC appreciates the development of the hybrid approach to projections that combines 'climate-naïve' estimates of $B_{40\%}$ with a 'climate-informed' approach to determining stock status and F_{ABC}. Results from medium- and long-term projections are informative in a strategic planning context, in particular for the development of the climate work plan currently being considered by the Council, and would best be presented in a strategic planning context. **The SSC suggests that the focus of annual updates should be on how the multi-species model can help inform the current single-species assessments, such as through the development of indicators that can be incorporated in ESPs or directly in assessments.**

Finally, the SSC reiterates an earlier suggestion that temperature-dependent weight-at-age as estimated in the multi-species model should be compared to empirical or random effects model estimates of weight-at-age in the pollock assessment. The SSC looks forward to results from CEFI supported work along these lines planned for next year.

Walleye Pollock

Eastern Bering Sea Pollock

The SSC received a presentation on the 2024 stock assessment and BSAI GPT recommendations. Written and oral public testimony was provided by Austin Estabrooks (At-Sea Processors Association) in favor of retaining the Tier 1 classification (or Tier 2 as was used in 2021) and questioning the information content of other Tier 1 assessments in comparison to pollock. The SSC considered these comments in its deliberation of the Tier classification and potential use of a buffer from the maximum permissible ABC.

The authors provided an extensive evaluation of the available data, highlighting a few recent biological observations, including low weight-at-age (in 2023) for the important five year-old cohort and low relative condition factor in 2024. The pollock stock is currently largely composed of the 2018 year-class, which has led to relatively high spawning biomass in 2024 compared to recent decades. The authors highlighted the uncertainty in the 2018 year-class and its effect on 2025 spawning biomass but had no specific concerns over the current estimate of this year class.

There were no changes made from last year's stock assessment model (23.0). Standard updates to data sources included adding the 2023 fishery catch-at-age and weight-at-age, total catch for 2024, the 2024 bottom trawl survey data (as modelled using the VAST software), weight-at-age estimates used for

calculation of spawning biomass through 2024, the 2024 AVO index and 2024 ATS biomass and preliminary age-composition information. **The SSC supports the author and BSAI GPT selection of Model 23.0**.

The SSC thanks the author for the thorough response to previous SSC comments, both at this meeting and in October. The SSC noted that the current method used to determine the projected selectivity used to calculate the upcoming OFLs and ABCs is a five-year moving average, based on the results of the retrospective analysis provided in October. The SSC supports the use of the method moving forward, pending further development of the assessment.

The SSC appreciated the extensive evaluation of the stock-recruitment relationship and the reliability of the estimated B_{MSY} and F_{MSY}. In order to be classified as a Tier 1 stock, there must be reliable point estimates for B and B_{MSY}, and a reliable estimate of the probability distribution function for F_{MSY}. The analyses provided by the author indicate that much of the information in these parameters is currently derived from the priors that are used, and that substantial uncertainty exists in the stock dynamics, particularly at low spawning biomass levels. **The SSC supports the author and BSAI GPT recommendation to classify this stock as Tier 3a, and the OFL and maximum permissible ABC associated with this classification.** The SSC highlights that the EBS pollock assessment remains one of the most data rich in Alaska and a change in the Tier status does not reflect any shortcoming of the data collection programs or stock assessment model. Despite the large amount of high-quality data, the lack of recent observations at low stock sizes make estimation of the productivity of this stock very difficult. The SSC further notes that this change to Tier 3 is not an effort to be more precautionary (although it may be), but to better reflect the information content of the data that are available. **The SSC notes that with the change to Tier 3 classification, it is not necessary to bring forward the Tier 1 calculations in the next stock assessment**.

For many years the SSC has recommended a large buffer from the maximum permissible ABC (based on the Tier 1 calculation) to the ABC, reflecting the uncertainty in the stock-recruitment relationship and other considerations. With the change to Tier 3 status, the risk table provided by the authors suggests no elevated risk categories for this year. **Therefore, the SSC supports the author and BSAI GPT recommendation to set the ABC equal to the maximum permissible.**

The SSC recognizes the evaluation provided on catch stability and historical fishery performance, noting that **the author has provided a decision table to evaluate alternative harvest levels. The SSC continues to support the development and provision of this information for use by the Council in the TAC setting process.**

The SSC also continues to support the range of data evaluation approaches and model diagnostics used in this assessment. These are very helpful to better understand the varied and complex data sources and model performance.

The SSC offers the following additional recommendations for the authors:

- Explore moving to a state-space approach for this assessment (e.g., TMB or RTMB), which would allow treatment of weight-at-age, selectivity and recruitment as random effects, possibly with covariates as recommended by the BSAI GPT.
- Continued efforts to estimate the proportion of the stock in Russian waters and movement across this boundary based on acoustic moorings and other data sources.
- Continue moving forward with an evaluation of the FT-NIRS (spectroscopy) based age reading and integration of these data into the stock assessment.

- Review the relative role of the recruitment penalty on estimation of the 2018 year class and provide some discussion of why this penalty seemed to be favoring a larger recruitment estimate in the likelihood profile.

The SSC noted that the change to Tier 3 makes the use of a stock-recruitment relationship less influential to assessment results. **Given this, the SSC does not emphasize the need for future stock-recruitment analyses but defers to the authors if new methods evolve that warrant exploration.** Recruitment deviates should be from the estimated stock-recruit relationship and should model variability among annual recruitment estimates based on information in the data plus residual variability. The estimation process should ensure that log-normally distributed recruitments are mean unbiased, resulting in unbiased biomass estimates. If an informative prior is used for steepness, it should be based on meta-analysis of related species and reflect the uncertainty of that meta-analysis. Further consideration of time-periods (as in previous analyses) and the influence of temperature on the stock-recruit relationship may be helpful.

The SSC requests that the pollock document from September 2024 that details responses to SSC and Plan Team comments on uncertainties in the stock-recruit relationship be added to the EBS pollock SAFE as an appendix or, if that is impractical, to post it to the 2024 December SSC agenda for the historical record.

Aleutian Islands Pollock

The AI pollock stock is assessed on a two-year cycle, with the next operational assessment in 2026. This was a straightforward update of Model 15.1, which has been used consistently for about a decade. Trawl survey biomass remains substantially higher than the 2012 low but with high survey CVs. A minor change was made of removing pre-1991 survey age compositions, which is consistent with current best practices for AI stocks. A second model (15.2) was explored with elevated M at younger ages, but generally fit worse and was not recommended by the author.

The BSAI GPT and author discussed whether this stock might be a candidate to move from Tier 3 to Tier 5. Key considerations included low catch levels—less than 5,000 tons in 2024, well below the ABC and the 19,000-ton cap—and limited recent age data. A Tier 5 model could ease demands on the AFSC Age and Growth Program, but would rely heavily on the bottom trawl survey index, which isn't ideal for this stock given it is biennial and sometimes AI surveys have been canceled. The SSC cautions that this is a very high survey CV stock where the REMA model may not detect much signal in the data. If the Tier 3 model is relatively easy to conduct, continuing to do a short update assessment that can at least pull data from other sources to assist with the high CV and infrequent surveys seems appropriate.

An alternative was proposed by the BSAI GPT to construct a Tier 3 Stock Synthesis length-based model, which could handle missing survey years better than the Tier 5 model. The SSC does not perceive any benefit for authors to spend the effort converting to Stock Synthesis 3 (SS3), as the current AMAK model can accommodate a length-based assessment if so desired.

The SSC agrees with the BSAI GPT and the authors in continuing with Model 15.1 under Tier 3 with no reductions from maximum ABC as risk table scores were all level 1.

Bogoslof Pollock

This is an operational assessment updated biennially. The last assessment was in 2022. In 1992 this area was closed to directed pollock fishing. The NMFS acoustic trawl survey happens every 4 years and was previously conducted in 2020. The 2024 acoustic trawl survey estimate was 245 kt, a 31% decrease from the 2020 estimate.

The Bogoslof pollock assessment has been managed under Tier 5 of the FMP and is based on the random effects (autoregressive) model fit to acoustic survey trends.

The SSC agrees with the BSAI GPTs and the author's recommendations for the 2025 and 2026 OFL and maximum permissible ABC for this stock. There were no elevated risks for this stock and no buffer recommended from the maximum permissible ABC. The OFL and ABC for 2025 represents a 33% decrease from 2024.

For Tier 5 stocks, an overfished status determination cannot be made. However, the stock is caught at levels well below overfishing rates (F_{OFL} of 0.313).

A Tier 3 age-structured model had been developed for this stock. The BSAI GPT recommended bringing this model forward in the next assessment in order to track spawning biomass trends and to include survey age composition data. This model may be able to estimate natural mortality because fishing mortality has been near zero since 1992 due to directed fishing closures in this region. The SSC supports using the age-structured model to explore the estimate of M.

BSAI Pacific Cod

Eastern Bering Sea Pacific Cod

The SSC reviewed the 2024 operational full assessment for the Pacific cod stock in the EBS. This stock is assessed on an annual cycle, with the last operational full assessment conducted in 2023. No public testimony was provided.

Bottom trawl survey VAST abundance indices for the combined EBS+NBS region indicate a 19% decline in abundance between 2023 and 2024, an 8% decline in biomass, and a southward shift in the distribution of the stock.

The status quo model (23.1.0.d) was updated to incorporate newly available survey and fishery data, and included some appropriate updates to externally-estimated quantities and input data, including:

- Removal of 1994-1999 survey age data that were deemed unreliable given inconsistencies in aging methods, and inclusion of length compositions during this time period.
- Inclusion of annually varying growth 2000-2024.
- Updates to the aging error matrix and estimates of aging bias (2000-2007), based on re-reading of otoliths using new methodology.

In addition to the status quo model, the authors brought forward three alternative models that logically and sequentially add features, including:

- Model 24.0, that includes a change from 1 cm to 5 cm length bins for size composition data, based on considerations of computational efficiency in first-stage expansion of length compositions using VAST.
- Model 24.1, that changes which parameter is expected to vary annually within the growth relationship (from the Richards rho to K), and implements a non-parametric spline-based approach for describing aging error, in place of a linear approximation.

- Model 24.3, that includes all changes reflected in M24.1, but estimates survey selectivity as time-invariant.

The SSC appreciates the clear description of these progressive model updates. The change from 1 cm to 5 cm length bins resulted in very similar model estimates, a slight upward shift in survey catchability toward 1.0, and a marginally better fit to the data. The changes represented in model 24.1, led to a small improvement in overall fit (reduction in total negative log-likelihood) mostly arising from improved fits to marginal survey age compositions, and a very minor improvement in the retrospective pattern.

The SSC supports the author and BSAI GPT recommended Model 24.1 for 2025 harvest specifications. Model 24.1 projects a downward trajectory in spawning biomass, after the increase observed from 2010 to 2018, with the stock projected to reach $B_{38\%}$ in 2025 and $B_{37\%}$ in 2026, resulting in part from average or below average recruitment for the 2014-2017 and 2019-2021 year classes. Based on Model 24.1, the projected 2025 spawning biomass is above $B_{35\%}$ but below $B_{40\%}$, placing this stock in Tier 3b. **The SSC supports the 2025 recommended OFL and maxABC,** which results in ~9% decrease in the 2025 ABC, relative to 2024.

The risk table for this stock identifies Level 1 (no concern) for the assessment-related, population dynamics, and fishery considerations in 2024. In contrast, the authors identify a Level 2 (increased concern) for the ecosystem considerations based on recent increases in competitor abundance, the potential for increased predation pressure, and a decrease in available prey on the southern Bering Sea shelf. **The SSC supports the author and BSAI GPT recommendation for no reduction from maxABC.**

The SSC appreciates the inclusion of the "what if we are wrong?" analysis that explored the implications of basing management recommendations on a model that is inconsistent with the underlying population dynamics. In evaluating the impact of the higher harvest recommendations based on model 24.1, if the stock dynamics are truly represented by model 24.3, the authors found only a modest 3% increase in the probability of 2026 biomass falling under $B_{20\%}$. Conversely, if the stock were managed more conservatively under the model 24.3 harvest recommendations, but the model 24.1 dynamics were correct, projections suggest a foregone yield of ~59 kt across 2025 and 2026.

The SSC provides the following comments:

- The SSC appreciates the transparency provided by including the r4ss output figures and tables from all candidate models as easily accessible .html files, and the archiving of all model files in an easily accessible format.

- The SSC reiterates its recommendation for this assessment to incorporate marginal fishery age composition data, given the enhanced understanding of aging error and bias now available. The SSC highlights that inclusion of fishery age compositions may be especially important given upcoming changes in EBS bottom trawl survey gear design, which may result in near-term challenges in separating selectivity changes from recruitment signals.

- The SSC suggests consideration of using more recent means of time-varying parameters for projections and requests the authors ensure the SAFE document includes a clear description of the treatment of time-varying parameters in forward projections. (see also section on 'Projection Assumptions' in general groundfish stock assessment comments).

- The SSC requests the inclusion of confidence intervals for survey indices in figures comparing model fits to these data (e.g., Fig 2.30) to help interpret whether among-model differences are meaningful relative to the uncertainty in the data.

The SSC highlights several areas of future research for this assessment:

- Continued exploration of the extent to which climate-driven changes in distribution may have impacted survey catchability and variation in natural mortality.
- Given the evidence for a lack of genetic separation between the western GOA and EBS management areas, the SSC highlights the need to prioritize research on how to represent demographic connectivity within the stock assessment process. The SSC notes that applicable methods could include either a spatially explicit model structure that represents movement and recruitment among areas, or re-defining the stock boundary and using post-hoc apportionment of ABC, similar to methods currently used for Alaska sablefish. The SSC highlights that decisions about the optimal approach will likely depend on the availability of data to inform movement.

EBS Pacific Cod

In 2024, the majority of ESP indicators for EBS Pacific cod were neutral in status, with two exceptions: the summer euphausiid abundance observed in the EBS was low and the area occupied by Pacific cod in the EBS during the summer survey was high.

The SSC supports the continued development of relevant socioeconomic indicators, noting that none are currently presented for the fishery performance or community categories. The SSC further supports planned efforts in 2025 to expand the ESP data management system hosted on AKFIN and advance the AK-ESP R package.

The question was posed during the BSAI GPT meeting about whether it was necessary to utilize the most recent multispecies CEATTLE model output into the ESP, which the authors noted as having resulted in a time crunch during the annual cycle, as opposed to using the last year's projections from the multispecies as is currently done for GOA Pacific cod. The SSC supports using projections for this purpose if the timeframe for incorporating the most recent estimates is not actionable.

The SSC provides the following recommendations for continued ESP development:

- Exploration of additional economic indicators, including the percent of TAC harvested.
- Expansion of community indicators, perhaps including numbers of vessels participating by gear type.
- Consideration of developing an improved index of zooplankton abundance based on multiple data sources that better reflects overall prey conditions.
- Development of a spawning habitat index that might also consider the potential for successful offspring survival.
- Consideration of a CPUE-weighted temperature index, similar to that developed for sablefish, if not redundant with other indicators.
- Moving the 'biomass eaten' metric to the juvenile category.
- Consideration of the importance of describing export market conditions, including competition with Russian cod products.

Aleutian Islands Pacific Cod

An operational full assessment for the AI Pacific cod stock was presented, including the Tier 5 base model, an alternative Tier 5 model, and three alternative age-structured models for consideration for Tier 3 specification. The Tier 5 models differed in value of natural mortality, but both utilize the REMA framework, and are fit to the abundance index derived from AI bottom trawl survey data. The Tier 3 models utilize the Stock Synthesis software, and incorporate catch and survey data in an integrated framework. A new AI bottom trawl survey was conducted in 2024 and those results were used in all assessments. The estimated Pacific cod biomass in 2024 was the lowest in the time series, but was close to 2022 biomass, suggesting little change in stock status since the last survey in 2022.

The SSC appreciates the assessment author's thorough responses to previous SSC and Plan Team requests. These resulted in several improvements to the Tier 3 assessment model, including removing annual variation in growth, use of a more realistic fishing morality for projections, reduction in the number of parameters to model time-varying natural mortality, and turning off the fishing mortality penalty for final estimation.

The models under consideration for this assessment include:

Tier 5 models

- Model 13.4: Last year's model, a REMA model with a natural mortality of 0.34.
- Model 24.2: REMA model with a new natural mortality from a longevity-derived prior (0.417)

Tier 3 models:

- Model 24.0: Constant fixed natural mortality and Richards growth curve
- Model 24.1: Model 24.0 plus an estimated time block for natural mortality for 2016-2024.
- Model 24.1a: Model 24.1 but with a von Bertalanffy growth curve.

The SSC requested a model in October with von Bertalanffy growth and constant natural mortality, but this model was not presented due to lack of time. Nevertheless, each of these features was evaluated individually, so it is possible to anticipate how such a model might perform.

There were two major changes to the Tier 3 models compared to last year: use of Richards growth curve, and the use of a longevity-based prior for natural mortality. Use of the Richards growth curve seems reasonably well supported, both in terms of improvement in model fit with one additional growth parameter, and consistency with EBS Pacific cod model (but not the GOA Pacific cod model). Pacific cod show rapid, nearly linear, non-asymptotic growth throughout their life, hence exploring alternatives to von Bertalanffy growth is warranted.

The use of a longevity-based prior seems justified given the difficulty in estimating natural mortality. However best practice would entail incorporating both the point estimate and the uncertainty associated with the prior, at least as a trial run (see Hamel and Cope (2022)[5]). The estimation of a mortality block for the period 2016-2024 to account for warming temperatures in the AI resulted in improvements to model fit and a reduction in the retrospective pattern, which are both positive outcomes. However, this had the effect of consistently increasing the recruitment estimates for this period, which is contrary to hypothesized effects on temperature on Pacific cod stock dynamics. Bottom temperatures in the AI, while were somewhat higher

[5] Hamel and Cope. 2022. Development and considerations for application of a longevity-based prior for the natural mortality rate. Fisheries Research (256). https://doi.org/10.1016/j.fishres.2022.106477

in that period, were still below the thermal limit that was exceeded in the GOA. This raises a concern that there may be some other process affecting stock dynamics rather than changes in natural mortality. Other processes that should be explored include a step change in recruitment or temperature-dependent catchability for the trawl survey. The SSC recommends the authors continue to consider alternative mechanisms for the poor fit to the trawl survey biomass.

The author recommended Model 24.1 for harvest specification and the BSAI GPT agreed with this recommendation, which would result in AI Pacific cod being elevated to a Tier 3 stock. While there remains scope for improvement in the Tier 3 assessment models, particularly with respect to treatment of natural mortality, **SSC agreed with the assessment author and the BSAI GPT that Model 24.1 should be used for harvest specification for 2025-26.** This model achieved adequate fits to trend and compositions, had good convergence properties as shown by the jitter analysis, had the lowest retrospective pattern, and best model fits among the three models under consideration. **Results from Model 24.1 indicate that the stock is in Tier 3b, at approximately 24% of unfished spawning biomass.**

Last year, the SSC recommended a 10% reduction from the maximum permissible ABC, citing the elevated Level 2 scores for ecosystem and population considerations in the risk table, and the lack of current year survey. This year, the risk tables scores for population dynamics and ecosystem considerations remained elevated. In addition, this year a Tier 3 assessment is available that indicates an increase in natural mortality and provides a clearer perspective on stock status. On the whole, the concerns that led to the 10% reduction are still present, except for the lack of a current year survey. However, application of the Tier 3 harvest control, which ramps down fishing mortality at low stock size, addresses these concerns to a considerable extent, and thus the SSC does not recommend a reduction from the maximum permissible ABC.

Harvest projections were done using the historical natural mortality, rather than higher estimated value for the recent time block. The assessment author argued that this was appropriate since the higher temperatures in the recent time block represented a long-term change from the baseline that increases stress on the population. A higher natural mortality would result in a higher target fishing mortality, which would further increase impacts on the stock that is already experiencing challenging conditions.

While the SSC accepts this argument, with regard to reference points, there are complexities around the issue of changing life histories in a changing climate that preclude a broad-brush approach to harvest projections. One example is that harvest projections use both natural mortality for modeling stock dynamics as well as for determining harvest rates. Using a low natural mortality would result in higher and unrealistic projected stock size and potential overharvest. Projection modules in stock assessment models typically do not allow separate treatment of parameters used for reference points calculation and stock dynamics, but this capacity would have been helpful in this instance and may be useful in the future. The SSC encourages exploration of projections that use the most reasonable value for projected natural mortality while calculating the harvest rate based on the baseline value. Long-term changes in life history parameters such as natural mortality, growth, and maturation are likely to become increasingly common under climate change and there is a need to think more broadly about the issues in harvest projections and reference point calculation in a changing climate.

The SSC was also concerned that the approach of using long-term average recruitment for the harvest projections is overly optimistic given that recruitment for AI Pacific cod has been variable and declining. Projections should reflect current expectations of future recruitment, which suggests that alternative time periods for averaging recruitment should be considered. The issue is exacerbated by the recent higher natural mortality that elevates recent recruitments which propagates into higher reference points and larger year classes into the projection model.

The SSC has the following recommendations for future assessments:

- The document should be fully updated to reflect the 2024 survey results.
- Concerning Figure 2A.31: Likelihood profiles should extend to at least 2 log likelihood units above the MLE.
- Evaluate models where the upper and lower CV for length at age are estimated rather than fixed in the model. The availability of conditional age at length data should enable these parameters to be estimated and fixed parameters introduce undesirable rigidity into the model estimation process. If not estimated, provide a basis for the fixed values used.
- Given the relatively low abundance of the stock, provide the probability of the stock being below $B_{20\%}$, the lower limit for directed fishing, in stock projections.
- Consider estimating survey catchability using an informative prior on catchability rather than the analytical approach. There has been considerable research on the survey catchability of Pacific cod, and use of an informative prior would help to reduce assessment uncertainty.
- Explore models that explicitly model natural mortality as a function of temperature or other relevant covariate, rather than using a time block.
- Explore ways to expand the fishery performance section through analysis of fishery-dependent data such as CPUE.
- Reconcile catch numbers between Tables 2A.6, 2A.8, and 2A.9.
- Report bycatch in tons of bycatch, rather than proportions of total bycatch.
- 2023 OFL was 18,416, in the F_limit section it is calculated as 12,732 using the non-specified OFL from 24.1.
- Work with AI ESR authors to extend the Hendricks GOA ESR analysis of bottom temperatures by species as a potential cod specific covariate.

Finally, the SSC notes that AI Pacific cod assessment was developed using a team approach that included EBS and GOA lead assessment authors. The SSC appreciates the work of the authors on the assessment this year and highlights that it serves as a positive example of the benefits of a team-approach to developing assessments.

BSAI Flatfish

Yellowfin Sole

BSAI Yellowfin sole is assessed annually, and an operational update was presented this year. One model (23.0), which is the model that was accepted last year, was presented for this Tier 1 assessment. Updated data included: model-based survey age compositions through 2023, 2023 mean survey weight-at-age, total catch and catch estimates for 2023 and 2024, and 2024 model-based estimates and standard errors of the combined EBS and NBS NMFS survey biomass. Because of reductions in AFSC's Age and Growth Program staff the 2023 fishery age data for BSAI yellowfin sole was not available for this assessment.

The SSC concurs with the use of Model 23.0 as recommended by the author and the BSAI GPT. The total biomass of yellowfin sole has been slowly declining as the strong 1981 and 1983 year-classes have passed through the population. The current model indicates that the long-term decline is slowing and the total biomass is now increasing and projects that it will continue to increase through 2026. The female

spawning biomass has also declined since the peak in 1985, with a continued decline in 2024 and in the 2025 projection.

The spawning biomass is estimated to be 1.56 times greater than B_{MSY}, which qualifies this stock for management under Tier 1a. Good recruitment in the past few years suggests the potential for future increases. The large 2017 year class will be age 8 in 2025 and will become available to the fishery as the fish grow. The risk table has a Level 1 (Normal) risk for all four categories considered. Increases in the 2024 survey estimates and indication of a strong 2017 year class were reasons provided for assigning a Level 1 risk for population dynamics versus the Level 2 risk (major concern) determination in 2023. Similarly, the most recent data (e.g., environment, prey, competition, predation) indicated a Level 1 risk for environmental ecosystem concerns compared to the Level 2 risk determination in 2023. **The SSC agrees with the BSAI GPT's and authors' recommended OFL and ABC and no reduction from maxABC for 2025 and 2026.**

The SSC appreciates the authors' responses to the SSC recommendations from December 2023 and looks forward to future planned work on these recommendations. This includes a sensitivity analysis to evaluate the current approach used for natural mortality, which was also a BSAI GPT recommendation in November 2023. **The SSC supports the authors' plan to bridge to a Stock Synthesis model for the next assessment.**

The SSC supports the BSAI GPT recommendation for the authors to work with the data providers to understand how the survey biomass trend projections in the VAST time series behave, given the AR1 assumption, in years when there are no new data from the NBS survey and VAST accounts for the un-surveyed portion of the population. In addition, the SSC agrees with the BSAI GPT's general recommendation for assessment authors to incorporate confidence intervals on the standardized deviations of normalized residuals (SDNR). For yellowfin sole the BSAI GPT expressed concern that the low SDNR in this assessment is an indication of over-weighting because effective sample sizes are too large (results in unexpectedly small residuals that violate standard normal assumptions).

The SSC suggests that the author examine the data and stock-recruitment relationship and consider whether these continue to support a Tier 1 stock designation or if they warrant a different designation, similar to SSC discussions on EBS pollock, (see general stock assessment comments on this topic).

Finally, the SSC requests that the authors include a data gaps and research priorities section as with other SAFE reports.

Greenland Turbot

A BSAI GPT summary of the full operational assessment was presented for Greenland turbot. There was no public testimony. This stock is assessed on a biennial basis, with the last full assessment in 2022. The 2024 assessment considered five models but only Model 16.4c was brought forward for harvest specifications. Model 16.4c is the 2022 base model with new data updates. The other models led to increased instability and larger negative retrospective patterns. The SSC appreciates the responses to previous comments and, in particular, consideration for selectivity time blocks in fishery and survey data, noting that removing the survey time blocks did not improve the model results.

Data were updated to include new biomass estimates and size compositions from the 2023 and 2024 NMFS shelf bottom trawl survey; longline survey relative population numbers and size compositions for 2023; and length at age data from 2022 and 2023. Fishery catch estimates and size composition were also updated.

The SSC concurs with the use of Model 16.4c as recommended by the author and the BSAI GPT and the resulting 2025 and 2026 harvest specifications. The estimated 2024 female spawning biomass is above $B_{40\%}$, placing Greenland turbot in Tier 3a.

Risk table considerations were updated. Level 3 (extreme) concerns related to assessment considerations were identified due to uncertainty in the initial stock biomass, long term data loss from the EBS slope survey and canceled 2024 longline survey, coupled with strong negative retrospective patterns. Level 2 (increased) concerns related to population dynamics and fishery performance were identified due to uncertainty in recruitment expectations not matching historical periodic recruitment events.

The SSC agrees with the BSAI GPT recommendation for a reduction in the maxABC. However, the SSC recommends a 25% buffer to more fully acknowledge the concern for this assessment. Rationale for the reduction include the Level 3 (extreme) concerns identified under population assessment considerations in the risk table and, in particular, continued retrospective patterns. Additionally, lack of model fit to the most recent downward trend in survey indices is concerning. The SSC was also generally concerned with the relatively poor fit to all data in the model, and the need to use the previously accepted model despite efforts to improve many aspects of the analysis this year.

Apportionment of the ABC to the AI and the EBS uses an average of adult biomass in the AI region of 15.7%, as in previous years. This is based on an unweighted average of the EBS slope and AI survey biomass from the four most recent survey years when both of these surveys were conducted. **The SSC supports this area apportionment.**

The SSC supports the recommendations made by the BSAI GPT for future consideration. In addition, the SSC recommends that the authors continue to explore the use of VAST for the slope survey as requested in December 2020, consider excluding pre-1977 data, and consider new methods for deriving apportionments given the lack of recent EBS slope data.

The SSC appreciates the authors' development of a linear approximation approach to support the AFSC longline relative population numbers and recommends using this method in future model development where appropriate.

The SSC recommends the following efforts focused on the input data for the next stock assessment:

- Include bootstrapped input sample sizes for all compositional data.
- Along with the length-at-age data, consider using the age data from the AFSC trawl survey rather than the lengths to provide more direct information on recruitment.
- As requested in 2022, include the sex-specific length data from the recent longline surveys.
- Investigate and provide an explanation for the apparent binning in the length/age data for larger fish and the lack of small males in the shelf survey composition data.

The SSC suggests that the next operational stock assessment be considered for next year, rather than waiting for the scheduled two years, given the elevated concerns for this stock.

Kamchatka Flounder

Kamchatka flounder is assessed on a biennial cycle, and a full assessment was presented this year. The assessment method remained unchanged from the last full assessment in 2022 and projections were based

on Model 16.0b. Updated data included: updated fishery catch estimates (all years) and preliminary estimates for 2024, 2023 fishery length composition data, 2024 AI bottom trawl survey biomass and length composition, and 2023 and 2024 EBS shelf bottom trawl survey biomass and length composition. The EBS slope survey is included in this assessment model, but has not been done since 2016, which was highlighted in the BSAI GPT data loss discussion.

The SSC concurs with the use of Model 16.0b as recommended by the author and the BSAI GPT. There are no major concerns with the model fits to the data; however, the addition of the 2023 and 2024 EBS shelf survey data resulted in the previous several years being overestimated, even though the general downward trend in survey biomass in recent years is captured.

The EBS shelf biomass declined 16% in 2023 from 2022 levels but increased in 2024 to only 5% lower than the 2022 estimate. The 2024 AI survey biomass for Kamchatka flounder showed a relatively large increase (75%) from the 2022 estimate. Trends in SSB, total biomass, and age-2 recruitment are similar to the previous assessment in 2022. Overall, the SSB and total biomass for BSAI Kamchatka flounder have been relatively stable since about 2015. Total biomass estimates also show a slight decline in recent years. The projected 2025 female spawning biomass, based on Model 16.0b, decreased 5% from last year's projection for 2025 and total biomass (age 2+) is estimated to decrease in 2025 and 2026.

The estimated 2024 female spawning biomass is above $B_{40\%}$, placing Kamchatka flounder in Tier 3a. In the risk table, the authors scored assessment-related considerations at Level 2 (substantially increased concerns) because of the retrospective bias patterns and degrading model fit to the survey biomass. All other categories were scored at Level 1. The authors and the BSAI GPT recommended that the ABC be set at the maximum permissible value. **The SSC agrees with the recommended OFL and maximum permissible ABC for Kamchatka flounder under Tier 3a.**

The authors note that length and age data in the EBS and AI surveys suggest that there may be regional differences in growth and are interested in exploring these data to evaluate potential regional differences and to consider fitting growth within the model rather than it being fixed within the model. **The SSC supports the exploration of regional growth differences and fitting growth within the model as a priority for the next assessment.** The BSAI GPT suggested that with growth being fixed within the model, the model may not capture the decline in the EBS shelf survey biomass. **The SSC agrees with the BSAI GPT's recommendation that the authors explore why the model fails to capture the rapid decline of the shelf survey biomass for the most recent years.**

The SSC looks forward to authors addressing previous SSC and BSAI GPT recommendations including examination of relationships between catchability and temperature; examination of the age-length transition matrix; re-examination of the assumption regarding historical species compositions of arrowtooth and Kamchatka flounders; and exploring the incorporation of ageing error into the assessment as indicated by the authors. **Specifically, the SSC supports the evaluation of formal data weighting given the fits to the EBS shelf survey** and notes that the authors plan to evaluate input sample size for the compositional information using the afscISS R package.

Northern Rock Sole

An operational full assessment was presented for BSAI northern rock sole. There was no public testimony. This stock is assessed on a biennial basis and is managed in Tier 1. The last full assessment was presented in 2022. The survey biomass has been increasing since 2019. The 2024 biomass is a 4% increase from 2023. The stock is underutilized with average 2014 - 2024 catch about 20% of the ABC. This is attributed to poor market conditions.

This assessment uses a statistical catch-at-age model implemented in AD Model builder (ADMB). The previously accepted model (18.3) was updated with new data including catch biomass, fishery and survey age compositions, fishery and survey weight-at-age, and the EBS shelf trawl survey biomass. An alternative version of the accepted model (24.2) incorporates the data updates, as well as updated survey input sample sizes, and re-weighted compositional data using the Francis (2011) method. This model also estimates natural mortality for females and males separately.

Relative to Model 18.3, Model 24.2 improved fits to the survey biomass index, captured the proportion of the population in the plus group (age 20+) more accurately for both fishery and survey age compositions, generated estimates of catchability consistent with previous research on catchability and herding of BSAI northern rock sole and substantially reduced retrospective bias (Mohn's rho -0.002). The sex-specific natural mortality rates estimated in the model were biologically reasonable, and higher than the accepted model, resulting in larger estimates of recruitment leading to larger historical estimates of spawning biomass.

The SSC supports the author and BSAI GPT recommendation to use Model 24.2 and the resulting OFL and maxABC. The risk considerations were Level 1 for all categories and the SSC agrees that no reductions from maxABC are warranted.

The SSC appreciates the authors' efforts to address previous SSC recommendations and the consideration of model performance changes in the context of biological, ecological or fishery behavior mechanisms. The SSC supports the BSAI GPT recommendations to:

- Clarify when Markov Chain Monte Carlo (MCMCs) vs. Maximum Likelihood Estimators are being used in the recommendation table and model diagnostics.
- Explore sensitivity of model results to the maturity curve and the stock-recruitment relationship.
- Re-parameterize male natural mortality to be an offset from female natural mortality to reduce correlation between these two parameters and simplify the parameterization of time-varying fishery selectivity in early years where fishery age data are missing to further improve convergence of MCMCs.
- Explore whether age-specific availability of northern rock sole to the survey may be occurring and what processes (e.g., changes in distribution and behavior) and mechanisms (temperature-dependent changes in sensory biology re: herding) that would drive this.
- Continue work to incorporate estimates of ageing uncertainty or bias into the assessment.

Flathead Sole

An operational update assessment was presented for the flathead sole/Bering flounder stock complex in the Bering Sea and Aleutian Islands that is managed under Tier 3a. This assessment is on a 4-year cycle, and the last assessment was in 2020. The risk table has a Level 1 in all categories. The stock is not overfished and is not subject to overfishing. There was no public testimony. This assessment uses a two-sex, age-structured statistical catch-at-age model, and there are no changes in the current model (18.2c), except for data updates since 2020, which included updated survey composition input sample sizes via the surveyISS package, and an updated projections workflow.

This assessment provides updates on bottom trawl survey biomass, survey length composition data, conditional age-at-length data from the bottom trawl survey, marginal fishery length compositions, and

marginal fishery age compositions only from 2020 and 2021. The authors highlighted that this assessment lacks fishery age compositions in recent years due to staffing shortages in the AFSC Age and Growth lab.

Regarding the fits to the survey length compositions, the authors noted that after updating the input sample sizes, Francis data weights were re-tuned, and this is the lowest weighted dataset in the model. The SSC also noticed an increase in the survey biomass for the last four years and higher CVs for the higher values in the time series.

The SSC supports the BSAI GPT and the authors' recommendation for moving forward with Model 18.2c (2020) with updated data. The SSC also supports the recommended OFL and ABC with no reductions from maximum permissible ABC. Finally, the SSC agrees with the authors' future research plans, with an emphasis on exploring differences in growth.

The SSC re-iterated its request from December 2023 that the authors provide a rationale for selecting length-based selectivity in the assessment model.

Alaska Plaice

BSAI Alaska plaice is managed as a Tier 3 stock and is assessed on a quadrennial schedule with a full assessment being conducted in 2024. The last full assessment was in 2021. Alaska plaice has no directed fishery but is a bycatch species in groundfish fisheries targeting yellowfin sole and northern rock sole. For this assessment cycle, the author recommends transitioning from an age-structured model in ADMB to SS3. Updated data included: estimates of catch for 2022–2023 and estimated catch for 2024; new biomass index estimates from the 2024 EBS shelf bottom trawl survey; new EBS survey length composition data from 2022–2024; and fishery length composition data from 2000, 2002–2007, and 2021–2024.

For this assessment, the author presented four models implemented in SS3. The first is a model called "Base-3" that most closely mirrors the assessment model accepted in 2021. The second (Model 24.1) incorporates several updates to the Base-3 model and includes updated input sample sizes for survey age-compositions based on the general bootstrap framework in the "surveyISS" R package, updated input sample sizes for survey length-compositions, addition of age-1 and age-2 fish to the age composition data, updated growth parameter estimates, updated length-weight relationship parameters estimated externally (as done in the base model), updated old age CVs, and the weight-at-age relationship is calculated within SS3 rather than externally. Model 24.1a was Model 24.1 with input sample sizes for the survey length-composition determined by the "surveyISS" R package instead of using the number of hauls. The input sample sizes for both the survey age- and length-composition were re-weighted. Model 24.1b mirrors Model 24.1a except that the standard deviation in recruitment deviations (sigmaR) is tuned using the SS3 recommended value. Model 24.1b tended to have better fits to the age- and length-composition data, good fit to the biomass index, and incorporates more standard practices, such as Francis re-weighting of the survey age- and length- composition data and tuning of sigmaR. Model diagnostics did not reveal any concerns. **The SSC concurs with the use of Model 24.1b as recommended by the author and the BSAI GPT.**

Alaska plaice is a non-target species, but EBS and female spawning biomass are slowly declining even though the catch is consistently well below the ABC. The survey biomass estimate for 2024 was 5% lower than the 2023 estimate and is the second lowest value in the survey time series next to 2021. However, catch has been less than 50% of the ABC in recent years and was only 26% in 2024. Additionally, there appears to be relatively strong recruitment since 2014, which likely explains the increasing trend in total biomass since 2021. The stock is projected to be well above $B_{35\%}$ at current levels of exploitation even

though female spawning biomass is projected to continue to decline over the next several years. It was noted that up to 60% of the Alaska plaice biomass is estimated to occur in the NBS in some years, although NBS survey data are not included in the assessment.

The estimated 2024 female spawning biomass is above $B_{40\%}$, placing Alaska plaice in Tier 3a. In the risk table, all four categories of potential concern are at Level 1 (normal). The authors and the BSAI GPT recommended that the ABC be set at the maximum permissible value. The SSC discussed the possibility of a buffer to reduce the recommended ABC from maxABC given the lack of NBS biomass in the model. However, it was decided that currently there is not enough information to assess whether there is a concern that maxABC may be greater than the OFL. It was noted that there is no fishery for Alaska plaice in the NBS and that the EBS survey only observes a portion of the biomass and therefore total biomass and OFL are likely underestimated. **The SSC agrees with the author's and the BSAI GPT's recommended OFLs and ABCs and no reduction from maxABC for 2025 and 2026.**

The SSC appreciates the work of the author transitioning this assessment to SS3 and incorporating additional model improvements, which was the focus for this assessment cycle. **The SSC recommends that incorporating NBS bottom trawl survey data into the assessment be a priority for the next assessment**, as previously recommended by both the SSC and the BSAI GPT. The SSC supports the additional recommendations of the BSAI GPT to also include maps showing Alaska plaice distribution in surveys and fisheries, and analyses of distribution and movement patterns over time in response to environmental changes, such as variations in the cold pool area. The SSC also supports the additional model improvements that the author plans to explore including transitioning from age- to length-based selectivity, using conditional age-at-length data to refine the age-length key, and expanding the use of fishery age data (contingent on resource availability from the AFSC Age and Growth Program).

Finally, the SSC suggests that for the next assessment, the authors consider the potential implications of the observed pattern of continuing declines of this lightly exploited stock on the ecosystem.

Other Flatfish

An operational update assessment was presented for the other flatfish stock complex in the Bering Sea and Aleutian Islands, which includes 15 species and is managed under Tier 5. This assessment is on a 4-year cycle, and the last assessment was conducted in 2020. The risk table is Level 1 in all categories. There was no public testimony.

The 2020 catch was updated, catches from the years following the last assessment were included, and the EBS shelf survey and AI survey biomass estimates were added. The SSC appreciates the authors' rationale in choosing the estimates of natural mortality used in this assessment.

For the 2024 assessment, the REMA model was used to predict biomass and different configurations were run separately for each of the survey areas (AI, BS shelf, BS slope) and species groups (rex, Dover, and 'other' flatfish).

The SSC notes the decline of Dover sole in the AI survey biomass and the increase of rex sole in the EBS shelf survey biomass since 2015. **The SSC agrees with the BSAI GPT's recommendation that the authors investigate the potential use of the longline survey to supplement time series given the loss of the EBS slope survey.**

The estimated biomass based on the REMA model for Dover sole, rex sole, and all the other flatfish combined, summed across the survey areas, showed different trends. There has been a decline in recent years for Dover sole and 'other' flatfish and a consistent increase for rex sole since 2015.

The SSC supports the BSAI GPT recommendations for the OFL and maxABC under Tier 5, with no reductions from the maximum permissible ABC. The SSC concurs with the authors that there are no apparent ecosystem concerns. Exploitation rates are generally less than 5%, consistent with the previous assessment, and the total catch is substantially lower than the ABC.

BSAI Rockfish

Pacific Ocean Perch

An operational full assessment was conducted for BSAI POP. This stock is on a biennial assessment cycle with the last full assessment in 2022. There was no public testimony.

The SSC appreciates the work by the authors and responses to SSC and BSAI GPT recommendations on this assessment.

Changes to the model input data include: 1) updated catch data through 2023 and projected total catch for 2024; 2) the 2024 AI survey biomass estimate and length composition; 3) 2022 AI survey age composition; 4) the 2023 fishery age composition and 2022 fishery length compositions; and 5) reweighted input multinomial sample sizes for the age and length composition data using the McAllister-Ianelli iterative reweighting procedure.

Two alternative models were considered:

- Model 16.3 (status quo): updated data from previous assessment.
- Model 24.1: same as Model 16.3, with an increased penalty for the dome-shapedness in the bicubic spline and a lognormal prior on AI survey catchability.

The SSC agrees with the authors and BSAI GPT recommended Model 24.1, which represents an improvement over the status quo model, and the resulting OFL and maxABC for 2025 and 2026. The estimated 2024 female spawning biomass is above $B_{40\%}$, placing POP in Tier 3a.

Risk table considerations were updated and Level 2 concerns related to stock assessment considerations were identified due to strong positive retrospective patterns and poor fits to the age and length compositions. **The SSC agrees with the BSAI GPT that no reduction from maxABC is warranted.**

The SSC agrees with the author and BSAI GPT recommended area apportionment of ABC among four areas: the western, central, and eastern AI, and EBS. A random effects model was used to smooth the time series of subarea survey biomass and obtain the proportions.

The SSC agrees with the GPT recommendations for future model considerations. In addition, the SSC recommends that the authors:

- Include a discussion of stock structure in the assessment
- Consider other potential indices that may be useful for apportionment of the ABC given that this stock still relies on the EBS slope survey
- Explore implementing time-varying M (which had been discussed during the CIE review and during the BSAI GPT meeting) to address conflicts between the AI survey biomass and the age composition that was identified in a sensitivity analysis

- Consider the plausibility of the bimodality in the fishery selectivity

Blackspotted/Rougheye Rockfish

The SSC reviewed the 2024 operational full assessment of the blackspotted/rougheye rockfish complex in the BSAI region. This stock complex is assessed on a biennial cycle, with the last operational full assessment conducted in 2022. The AI portion of this stock complex is assessed using an age-structured model under Tier 3, while the EBS portion of the complex is assessed by applying Tier 5 methods to the NMFS AI trawl survey biomass index smoothed by a state-space random effects model. The overall BSAI ABC and OFL is calculated by summing across the regional estimates. There was no public testimony.

New data available for the 2024 Tier 3 (AI) assessment include:

- Updated catch data through 2023, and projected total catch through the end of 2024
- 2024 AI survey biomass estimate and associated length composition
- 2022 AI survey length composition data that previously informed the assessment were replaced by the 2022 AI survey age compositions
- 2023 fishery age compositions, and 2022 fishery length compositions

There are no proposed changes to methodology for this year, with Model 20 forming the basis for the Tier 3 assessment in the AI. However, the SSC notes that starting in the 2022 assessment, the presence of an extremely large and highly uncertain estimate for the magnitude of the 2010 year class was addressed by setting the value for this recruitment equal to the next largest year class (2002). With the addition of new data through 2024, it now appears that the 2011 year class is in fact the very large one, and the same procedure has been used to reduce its value.

The SSC supports the author and GPT recommendation of Model 20 for 2025/2026 harvest specifications.

Projected female spawning biomass for 2025 in the AI is above $B_{40\%}$, placing this component of the stock complex in Tier 3a.

The SSC supports the author and BSAI GPT recommended risk table scores and, after some discussion, also supports the associated recommendation of no reduction from maxABC.

The SSC had some discussion about the utility of exploring time-varying fishery selectivity in the context of this assessment to address the poor fits to fishery age and length compositions. However, the author later clarified that this had already been explored in the lead up to the 2022 assessment cycle with limited benefit provided by the added model complexity.

The spatial management of this species complex was the focus of extensive discussion by the SSC. Concern over the level of harvest relative to biomass in the WAI in the context of localized depletion led to the implementation of maximum subarea species catch (MSSC) for the Western and Central AI regions in 2015, based on smoothed subarea survey biomass proportions. **The SSC highlights that catch has been above the MSSC every year except one since its implementation in 2015. The SSC further highlights that the Western/Central Aleutian Islands regional ABC has been exceeded for the past six consecutive years including 2024, and the combined BSAI ABC was exceeded in three of the last four years (2021, 2023, and 2024).** The BSAI OFL has not been exceeded.

The SSC discussed why the MSSC has not been successful in limiting harvest to below the MSSC in the WAI, identifying the lack of management incentives avoiding or repercussions for exceeding the MSSC, and the reality that the blackspotted/rougheye complex is not directly targeted and realized catch primarily occurs incidentally by vessels targeting POP and Atka mackerel. However, it was noted that the MSSC may have had some benefit by aiding the fleet in planning in-season operations, changing fleet behavior, and possibly resulting in lower harvest than would have occurred in the absence of the MSSC.

In characterizing its level of concern regarding the recent pattern in harvest for the blackspotted/rougheye complex, the SSC highlights that catch in excess of ABC is always a concern, especially for long-lived, relatively sedentary species with long recovery times and high risk for localized depletion. However, in the context of this stock complex, the SSC also highlights that there are several promising signs. Survey biomass trends in the Aleutians have been increasing since 2016. This is consistent with local knowledge previously provided in public testimony to the SSC highlighting an increasing challenge in avoiding blackspotted/rougheye rockfish, despite active avoidance measures on the fishing grounds. There is also evidence for an exceptionally abundant 2011 year class. In the context of spatial management, the SSC notes that no genetic structure was found for blackspotted or rougheye rockfish using low coverage whole genome sequencing (lcWGS) conducted by the AFSC Genetic Program, as presented to the JGPT in September 2023. This contrasts with a genetic analysis from 2005 indicating stock structure, which was a significant contributor to the concern over local depletion on small spatial scales. However, it was emphasized that these recent genomic analyses indicating no genetic structure may not be a viable justification for adopting less conservative spatial management, as even moderate levels of demographic connectivity combined with the large population size and long-lived life history may be responsible for the lack of genetic structure. **Therefore, the SSC is concerned that the MSSC is not meeting its intended objective and that the overall ABC has been exceeded, and recognizes that the MSSC as a spatial management tool needs further examination.**

Shortraker Rockfish

The BSAI shortraker rockfish complex is currently managed in Tier 5 and is assessed on a biennial basis to coincide with the AI bottom trawl survey. The current assessment is an operational update from the previous 2022 assessment.

This assessment continues to use a random effects multi-area model (REMA) fit to survey data to estimate exploitable biomass and determine the recommended harvest specifications. This REMA model is fit to design-based estimates of survey biomass. Model 22_2024 is the base model (Model 22_2022) updated with any new survey data available since 2022. This includes the 2024 AI bottom trawl survey biomass and the 2023 longline survey relative population weights on the EBS slope.

The AI bottom trawl survey reported the second-lowest biomass estimate in the time series, showing a 40% decrease from 2022 with a high coefficient of variation (CV = 0.42). Additionally, the absence of a 2024 AFSC longline survey in the AI this year further exacerbated data gaps. The EBS longline survey in 2023 showed a 11% decline from 2021. The BSAI GPT expressed serious concerns that continued reductions in survey stations and lapses in survey coverage could negatively impact the management of this stock and emphasized the need for consistent and comprehensive survey data to ensure effective monitoring and management of shortraker rockfish.

Risk was broadly determined to be Level 1, with the exception of the assessment-related considerations which were rated at Level 2. This increased level was due to the inability of the base model to estimate region-specific process errors. While the authors plan for future improvements to the model, they do not

recommend setting the ABC below the maximum permissible level. OFL and ABC for 2024 and 2025 are recommended to be 11% below that specified for the stock in the previous assessment.

Understanding that this assessment is scheduled as a catch report next year, the **SSC requests the author or survey group bring forward survey results at the 2025 September BSAI GPT meeting (if available).**

The SSC agrees with the BSAI GPT and the authors' recommended model (Model 22_2024) and resulting OFL with no reductions from maximum permissible ABC.

The authors propose to combine the AI and SBS strata of the AI bottom trawl survey, resulting in a two-area model (AI BTS fit as one stratum, EBS slope fit as another stratum). The SSC agrees with the PT's recommendation for simplifying and combining strata. The second proposal is to bring forward a version of the model that shares process error among strata. The current model estimates three process errors (one for the AI, one for SBS, and one for the EBS slope).

The SSC appreciates the authors' responses to previous SSC comments made on this assessment process and the useful sections on outlining ecosystem considerations and fishery-informed stock considerations.

Other Rockfish

An operational update was presented for the other rockfish complex. The other rockfish complex is managed as a Tier 5 stock and is assessed on a biennial schedule. The assessment model remained unchanged from the last full assessment in 2022. Area apportionment methods between the BS and AI have not changed from the last full assessment. There was no public testimony. The Plan Team presentation highlighted that the catch of other rockfish complex exceeded the ABC in 2024**.**

The majority of the SSC discussion focused on the large (23%) decline in estimated biomass, which was strongly influenced by a 61% decline in the longline survey index of shortspine thornyheads. This is a marked decline, especially for long-lived rockfish species and is most likely attributable to sampling error. **However, there was sufficient concern that the SSC requests the author or survey group bring forward survey results at the September BSAI GPT meeting in 2025 (if available), recognizing that a catch report is currently scheduled for** 2025.

The SSC concurs with the use of Model 22 as recommended by the author and the BSAI GPT, and with the associated OFL with no reduction from maxABC. Additionally, the SSC agrees with the author and BSAI GPT recommended area apportionments for this stock complex.

Atka Mackerel

An operational update assessment was presented for Atka mackerel. The last full assessment was presented in 2022. In 2023, the Atka mackerel assessment frequency changed to biennial and future operational assessments will be presented in even years to coincide with the AI trawl survey. Harvest projections will be presented in odd years. The assessment is also transitioning to a new lead assessment author. The SSC thanks outgoing author Sandra Lowe for all of her work on this assessment and species over the years. There was no public testimony.

In this update assessment, there were no changes to the model configuration and a single model was presented. New data include updated catches, AI bottom trawl survey biomass from 2024, and age

compositions from the 2022 AI survey and 2022 – 2023 fishery. The authors added a very informative analysis to explore the impact of the new data to the model by sequentially adding datasets.

The base model (16.0b) from 2022 and this model with updated data performed similarly. The largest differences include changes in recruitment magnitudes (a decrease in the 2017 and 2018 year classes and an increase in the 2019 year class) and a shift in fishery selectivity towards younger fish. These results are typical for this model, which utilizes time-varying selectivity to account for management changes that have significantly impacted fishery operations over time. Mohn's rho is low and slightly negative. The addition of the OSA residuals diagnostics to this assessment indicate that model fits to the age compositions from both the survey and the fishery are acceptable.

The projected 2025 SSB is above $B_{40\%}$, placing Atka mackerel in Tier 3a for management. Risk table scores were elevated to Level 2 in one category, Ecosystem /Environmental Considerations. **The SSC supports the author and BSAI GPT recommended 2025 and 2026 OFLs and ABCs with no reduction from maxABC.**

The current assessment provided two methodologies for apportionment among the AI subareas, including the four-year weighted average used in the last full assessment and the random effects (REMA) model. **The SSC concurs with the authors and BSAI GPT to use the REMA model for apportionment of the ABC.**

The Atka mackerel assessment will undergo a CIE review in 2026. The SSC supports the authors' planned explorations regarding the fit to the survey age compositions, because the model has difficulty fitting two contrasting time periods, and the impact of new data on fishery selectivity and F.

This model estimates a penalty on recruitment variability (sigmaR). Similar to SSC comments for the current sablefish assessment, the SSC notes that the maximum likelihood estimate of this parameter can be negatively biased and requests the authors consider new approaches to estimating sigmaR.

Finally, the SSC supports the development of an ESP for Atka mackerel, as recommended by the BSAI GPT, and appreciates the inclusion of the Economic Performance report as an appendix to the assessment.