Genetic Stock Composition Analysis of Chinook Salmon from the Prohibited Species Catch of the 2024 and 2025 Bering Sea /Aleutian Islands and Gulf of Alaska Walleye Pollock Trawl Fishery

Preliminary Report

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Executive Summary [1]

This report provides genetic stock identification results for Chinook salmon Prohibited Species Catch (PSC) samples collected in the 2024 and 2025 Bering Sea and Aleutian Islands (BSAI) and Gulf of Alaska (GOA) trawl fisheries for walleye pollock (*Gadus chalcogrammus*). All samples were genotyped for 233 single nucleotide polymorphism markers from which stock contributions were estimated using two new Chinook salmon baselines developed in conjunction with the Alaska Department of Fish and Game to further resolve Coastal Western Alaska stock groups. Newly resolved groups include Seward Peninsula / Norton Sound, Yukon Alaska (lower and middle portions of the Yukon River), and Kuskokwim / Bristol Bay.

In the BSAI, genetic samples were collected using a systematic random sampling protocol where one out of every 10 Chinook salmon encountered was sampled. The Chinook salmon PSC in the BSAI was 8,046 fish in 2024 and 19,797 in 2025. Based on analysis of 745 Chinook salmon bycatch samples in 2024, Kuskokwim / Bristol Bay (48.7%), North Alaska Peninsula (28.8%) and British Columbia (10.5%) accounted for the majority of the bycatch with smaller contributions from West Coast US (4.0%) and Southeast Alaska (4.5%). Contributions from Yukon stocks totaled ~ 1% of the bycatch. In 2025, based on the analysis of 1,545 samples, the bycatch was again mostly composed of Kuskokwim / Bristol Bay (63.7%), North Alaska Peninsula (14.9%) and British Columbia (5.6%). Yukon stocks comprised ~7% of the bycatch. Similar to previous years, comparisons of temporal groupings of the pollock “A” and “B” seasons revealed changes in stock composition over the course of the year, with increased contributions of southern stocks, particularly the British Columbia and West Coast US groups, in the B season.

Genetic samples were collected from Chinook salmon taken in the bycatch of the GOA pollock trawl fisheries using a simple random sample protocol with trip being the primary unit in 2024 and using a systematic random sampling protocol (mirroring the 1 in 10 sampling in the BSAI fishery) in 2025. The Chinook salmon PSC in the GOA was 25,772 in 2024 and 13,198 in 2025.

[1] *Disclaimer* - These represent preliminary analyses of the 2024 and 2025 Chinook Salmon genetic data. All estimates are subject to change. Numerous plots in this report display fishery information. All data are non-confidential. Data have been aggregated and any data point with fewer than three unique vessels has been removed.

Based on analysis of 2,542 genetic samples in 2024 and 1,099 in 2025, the vast majority of Chinook salmon that were caught as bycatch in the GOA pollock trawl fishery originated from three regions south and east of the Alaska Peninsula with the British Columbia region contributing the most (45.5% & 46.7% in 2024 and 2025 respectively), followed by the West Coast US (30.9% and 26.2%), and Coastal Southeast Alaska (20.7% and 20.8%) regions. This pattern is consistent for samples analyzed across finer-scale area and time strata within the GOA.

Bering Sea and Aleutian Islands pollock trawl fishery

Pacific salmon (*Oncorhynchus* spp.) are prohibited species in the federally managed Bering Sea groundfish fisheries, which are subject to management rules (NPMFC 2024a) that are in part designed to reduce prohibited species catch, hereafter referred to as "bycatch". It is important to understand the stock composition of Pacific salmon caught in these fisheries, which take place in areas that are known feeding habitat for multiple brood years of Chinook salmon (*Oncorhynchus tshawytscha*) from many different localities in North America and Asia (Myers et al. 2007, Davis et al. 2009). Chinook salmon are economically valuable and highly prized in commercial, subsistence, and sport fisheries. Determining the geographic origin of salmon caught in federally managed fisheries is essential to understanding the effects that fishing has on Chinook salmon stocks, especially those with conservation concerns (NPFMC 2024a). This section of the report provides genetic stock identification results for the Chinook salmon bycatch samples collected from the Bering Sea walleye pollock (pollock; *Gadus chalcogrammus*) trawl fishery.

Amendment 91 to the North Pacific Fishery Management Council (NPFMC) Fishery Management Plan (FMP) for groundfish of the BSAI Management Area was enacted in 2010 and included retention of all salmon caught in the pollock fishery. In 2011, a systematic random sampling design recommended by Pella and Geiger (2009) was implemented by the Alaska Fisheries Science Center (AFSC) Fisheries Monitoring and Analysis Division (FMA) North Pacific Groundfish and Halibut Observer Program (Observer Program) to collect genetic samples from one out of every 10 Chinook salmon encountered as bycatch in the Bering Sea pollock fishery.

Catch Summary

In 2024 and 2025, 8,049 and 19,797 Chinook salmon were caught in the BSAI pollock trawl fisheries, respectively (NMFS 2025, NMFS 2026a). While the bycatch in 2024 was substantially lower than the average bycatch from 1991 to 2023 (32,049; NMFS 2024, NMFS 2026a) and the average from 2011 to 2023 (18,316), the bycatch in 2025 was slightly above the average catch after implementation of amendment 91 (Fig. 1). In both years, the majority of the bycatch of Chinook salmon occurred in the A season. In 2024 and 2025, 5,287 and 13,984 Chinook salmon

were caught in the A season. In the B season, 2,762, and 5,813 were caught in 2024 and 2025, respectively.

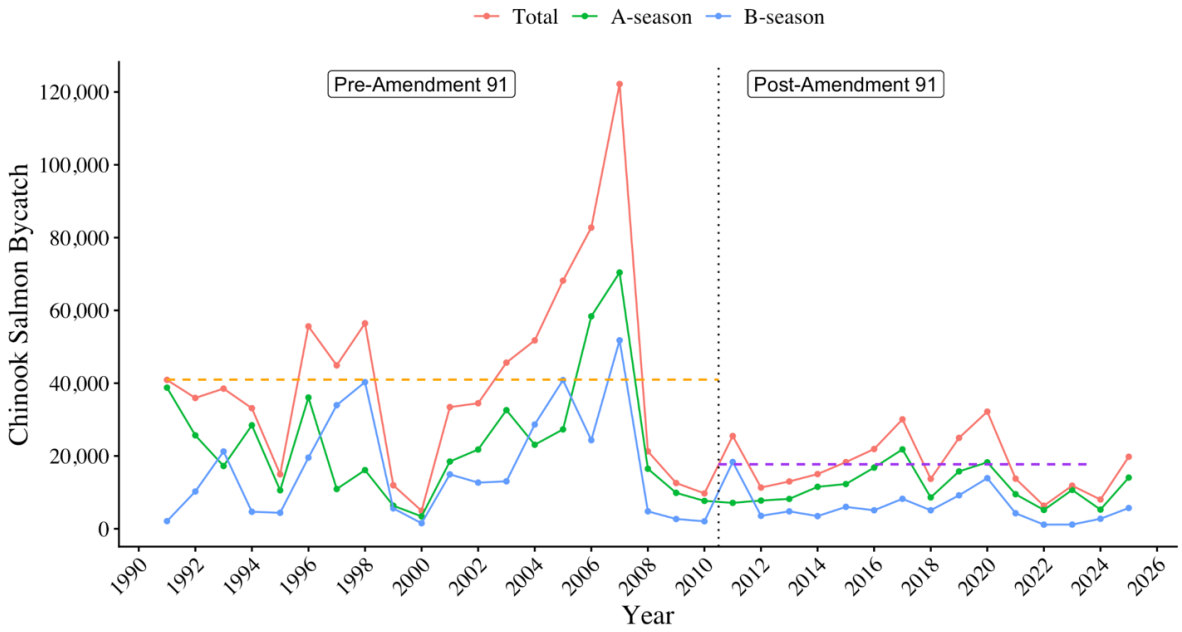

***Figure 1**: Chinook salmon prohibited species catch (bycatch) for the Bering Sea and Aleutian Islands pollock-directed trawl fisheries for the A, B, and both seasons. The horizontal dashed lines represent the mean PSC pre- and post-Amendment 91.*

Spatial & Temporal Trends

In both 2024 and 2025, there were clear spatial differences in the distribution of the Chinook salmon bycatch by season. National Marine Fisheries Service (NMFS) geographical statistical areas (NMFS area) associated with the Bering Sea groundfish fishery (NMFS areas 509-524) and Alaska Department of Fish and Game (ADF&G) statistical areas grids are shown in Figure 2a and are used to describe the spatial distribution of the Chinook salmon bycatch and genetic samples. In the A season, the bycatch is more contracted, primarily occurring within, and just outside of the eastern portion of the catcher vessel operational area (CVOA) and southeast of the Pribilof Islands (Fig. 2A). In the B seasons, the bycatch extends more uniformly across the shelf break to the northwest.

Historically the bycatch of Chinook salmon is highest in the start through the middle of the A season, declining to low levels through the late B season, and then increases going into the next year. In the A season of 2024, Chinook salmon bycatch demonstrated a generally increasing

trend through statistical week 10 peaking at 1,101 Chinook salmon, after which it decreased (Fig. 2B). In the B season there was a large amount of Chinook salmon taken early, 792 Chinook salmon encountered in statistical week 24, after which the bycatch remained relatively low.

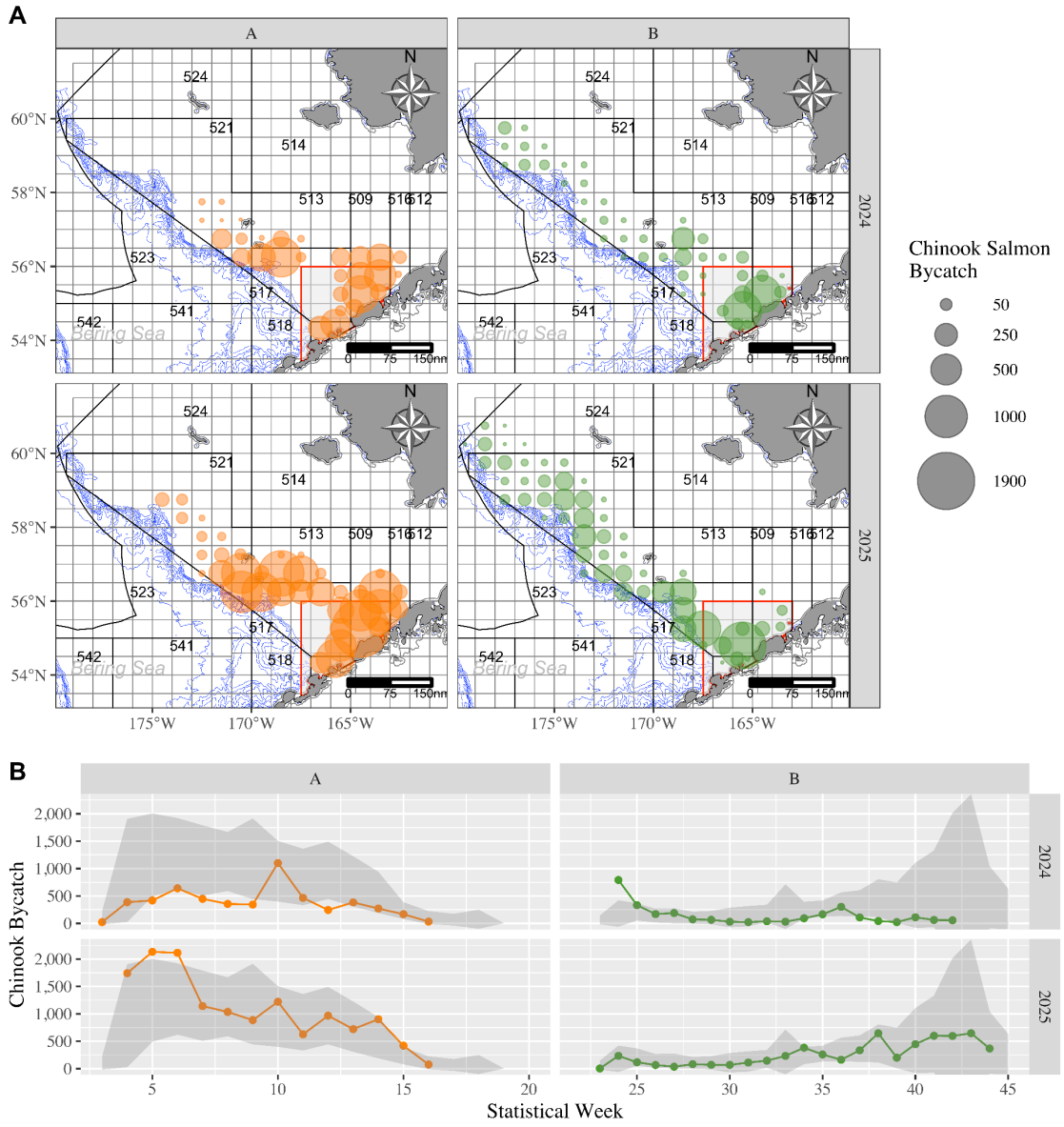

***Figure 2**: Location and timing of Chinook salmon prohibited species catch (bycatch) in the Bering Sea & Aleutian Islands pollock trawl fishery in the A and B seasons in 2024 and 2025. (A) Map of Chinook salmon bycatch by NMFS management areas (outlined in black) and ADF&G groundfish statistical areas (outlined in light gray) where circles represent the amount of total bycatch. (B) Timing of the Chinook salmon bycatch by statistical week. Average (± standard deviation) Chinook salmon bycatch shown as grey shaded region.*

A minor increase occurred in statistical week 36, when 302 Chinook salmon were encountered.

In the A season of 2025, Chinook salmon bycatch demonstrated a generally decreasing trend

through the A season, from a high of 2,131 fish in statistical week 5 to a low of 76 in week 16 (Fig 2B). The number of Chinook salmon increased throughout the B season, from a low of four fish in week 23 to a high of 646 in week 43. The increasing trend through the B season is typical of the Chinook salmon bycatch, although historically substantial variation in numbers of fish encountered post week 40 exists (Fig. 2B).

The Chinook salmon bycatch rate (Chinook salmon per metric ton of pollock) was higher in 2025 (0.015) than 2024 (0.006). Within each year, the bycatch rate was higher in the A season than the B season. The bycatch rate in the A season was 0.010 and 0.024 Chinook salmon per metric ton of pollock in 2024 and 2025, respectively. In the B season, the bycatch rate was less than half the A season values; 0.004 and 0.008 for 2024 and 2025, respectively. In both 2024 and 2025 there was a distinct increase in Chinook salmon bycatch rate at the end of the B season. In 2024 the bycatch rate in weeks 41 and 42 were both ~0.03 and in 2025 the bycatch rate was 0.08 in weeks 43 and 44.

Sampling & Genotyping Summary

Samples were collected from the Chinook salmon bycatch by the Observer Program for analysis at AFSC Auke Bay Laboratories (ABL). Samples of caudal fin clips and scales were collected from the Chinook salmon bycatch throughout 2024 and 2025. Fin clips were stored in coin envelopes which were labeled, allowed to dry, and shipped to ABL for analysis. Scales were collected as an additional source for genetic analysis and aging. In 2024, of the 8,049 Chinook salmon taken in the bycatch of BSAI pollock trawl fisheries (NMFS 2023, NMFS 2026a), 762 were sampled by the Observer Program (NMFS 2025) and received by ABL genetics program; of those samples, 745 were successfully genotyped for an overall genotyped sampling rate of 9.3% (“A” season N = 512 fish, 9.7% genotyping rate; “B” season N = 233 fish, 8.4% genotyping rate). In 2025, of the 8,049 Chinook salmon taken in the bycatch of BSAI pollock trawl fisheries (NMFS 2023, NMFS 2026a), 1,664 were sampled by the Observer Program (NMFS 2025) and received by ABL genetics program; of those samples, 1,545 were successfully genotyped for an overall genotyped sampling rate of 7.8% (“A” season N = 1,228 fish, 8.7% genotyping rate; “B” season N = 317 fish, 5.5% genotyping rate). The prolonged government furlough in early 2026 led to a delay in samples being transmitted from the observer program to

the genetics program. The genetics program received 189 Chinook samples on 5/6/2026 which could not be analyzed in time for this report but will be integrated into the annual technical memorandum.

Potential biases primarily introduced through spatial and temporal aspects of genetic sample collection from the bycatch are well documented and have the potential to affect resulting stock composition estimates (Pella and Geiger 2009). The distributions of 2024 and 2025 Chinook salmon bycatch genetic samples were evaluated by comparing the collection of genetic samples among NMFS statistical areas and throughout the fishing season (Fig. 3).

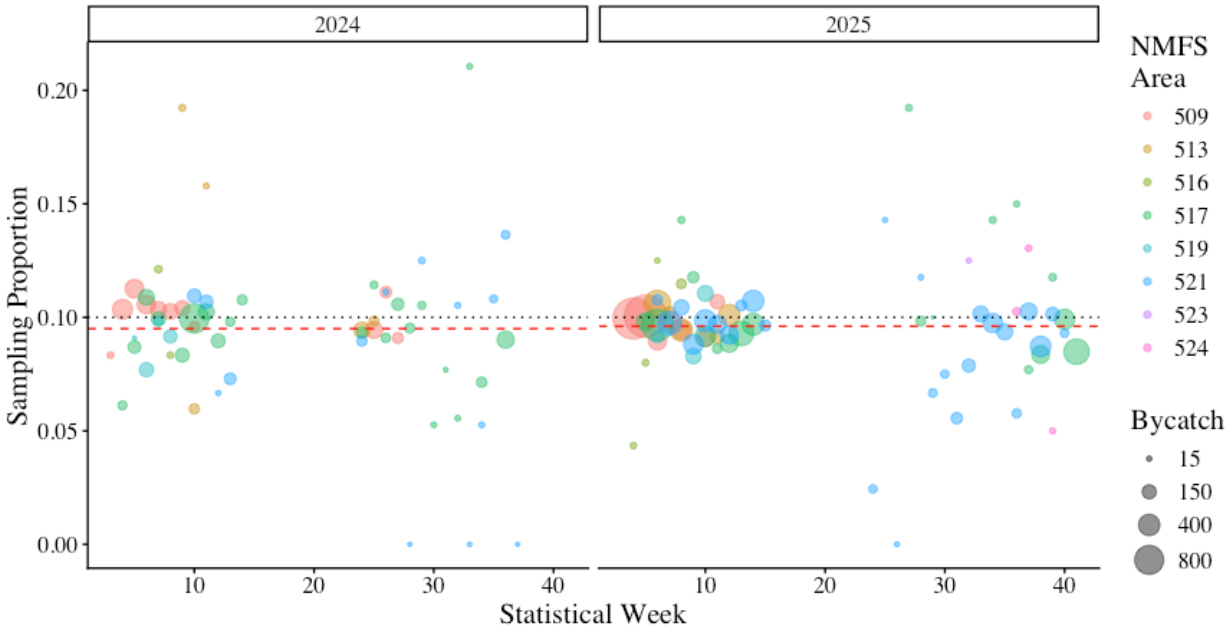

***Figure 3**: Proportion of Chinook salmon bycatch sampled for genetic analysis by statistical week and NMFS Statistical Areas. The size of the circles corresponds to the number of fish caught. The red dashed line is the realized mean sampling proportion over NMFS areas and statistical weeks, and the black dotted line is the target of 10% (1 in 10 Chinook salmon encountered).*

The spatial and temporal distribution of the genetic samples from the 2024 and 2025 Bering Sea pollock fishery were representative of the total bycatch. In 2024, during the B season there was slight undersampling of NMFS area 517 and oversampling of NMFS area 521 (Fig. 3). In 2025, again we see slight undersampling of NMFS area 521 in the B season. In each case the under or oversampled catches were small in magnitude.

Genetic Stock Composition

Overall

In both 2024 and 2025 the stock composition results indicate that, on average, 82.1% of the Chinook salmon bycatch from the "A" and "B" seasons originated from Alaska river systems flowing into the Bering Sea with the largest contributions from the Kuskokwim / Bristol Bay region (48.7% in 2024 and 63.7% in 2025) and the North Alaska Peninsula (28.8% in 2024 and 14.9% in 2025; Table 1). The combined Alaska and Canada Yukon River accounted for ~1% of the Chinook salmon bycatch in 2024 and 7.3% in 2025. With a total bycatch of 8,049 Chinook salmon in 2024 and 19,797 in 2025, this equates to an estimated 3,920 and 12,619 Kuskokwim / Bristol Bay Chinook salmon in 2024 and 2025, respectively; and 2,322 and 2,945 North Alaska Peninsula Chinook salmon (Table 1). The remaining ~18% of the bycatch in both years predominantly originated from southern regions, with British Columbia contributing the most (10.5% in 2024 and 5.6% in 2025), followed by the West Coast US (4.0% in 2024 and 2.5% in 2025) and Southeast AK (4.5% in 2024 and 2.2% in 2025; Table 1).

When the new reporting groups were aggregated to match those from prior years, stock composition estimates were generally similar to the long-term trends (Fig. 4A; Guthrie et al. 2010-2015, 2016a-2022a, Guyon et al. 2010). The proportion of Coastal Western Alaska has decreased from a high of 68% in 2011 to a low of 23.7% in 2017 and has since increased reaching 66% in 2025. The total number of Coastal Western Alaska fish caught was the third largest of the time series, smaller only to catches in 2011 and 2020 (Fig. 4B). Both the proportion and number of Middle Yukon fish that were caught as bycatch in 2025 was large compared to those values from 2011-2024; however, the proportion was slightly larger than that observed in 2014 (3.2%) and the number was only marginally higher than that observed in 2020 (668). The Yukon Canada group also showed an increase in the proportion and number of fish compared to recent years (2020-2024) with the values observed in 2025 more similar to years prior to 2017 (Fig. 4B). The proportion of North Alaska Peninsula peaked in 2022 at 44% of the bycatch, but the overall bycatch has been relatively consistent through the time series, averaging 2,821 fish since 2011. Northwest GOA, prior to 2022 averaged 2.9%; however, since then has averaged

0.8%. Coastal Southeast Alaska appears to have gone through multiple cycles of increases and decreases, but averages 2.8% of

***Table 1**: Stock composition estimates from the 2024 and 2025 BSAI pollock trawl fishery. The estimated number of fish, 90% credible interval around the estimated number of fish, mean stock proportion, 90% credible interval for the proportion, and Z=0 (the probability that no fish from the genetic group were caught as bycatch).*

Region	Est. num.	Est. CI	Mean	5%	95%	Z=0
2024: PSC = 8,049, n = 745						
Russia	32	10-65	0.004	0.001	0.008	0.00
Seward Pen./Norton Sound	106	0-269	0.013	0.000	0.033	0.15
Yukon Alaska	12	0-55	0.002	0.000	0.007	0.40
Yukon Canada	74	37-123	0.009	0.005	0.015	0.00
Kuskokwim/Bristol Bay	3,920	3,645-4,189	0.487	0.453	0.520	0.00
North Alaska Peninsula	2,322	2,110-2,540	0.288	0.262	0.316	0.00
Chignik/Kodiak	11	1-32	0.001	0.000	0.004	0.00
Cook Inlet	24	5-54	0.003	0.001	0.007	0.00
Copper	1	0-5	0.000	0.000	0.001	0.81
Alsek/Situk	21	4-49	0.003	0.000	0.006	0.00
Southeast AK	362	274-460	0.045	0.034	0.057	0.00
British Columbia	842	696-1,000	0.105	0.086	0.124	0.00
West Coast U.S.	321	235-417	0.040	0.029	0.052	0.00
2025: PSC = 19,797, n = 1,545						
Russia	77	36-131	0.004	0.002	0.007	0.00
Seward Pen./Norton Sound	442	225-676	0.022	0.011	0.034	0.00
Yukon Alaska	856	661-1,116	0.043	0.033	0.056	0.00
Yukon Canada	588	456-731	0.030	0.023	0.037	0.00
Kuskokwim/Bristol Bay	12,619	12,153-13,062	0.637	0.614	0.660	0.00
North Alaska Peninsula	2,945	2,662-3,247	0.149	0.134	0.164	0.00
Chignik/Kodiak	27	6-62	0.001	0.000	0.003	0.00
Cook Inlet	180	113-262	0.009	0.006	0.013	0.00
Copper	34	7-75	0.002	0.000	0.004	0.00
Alsek/Situk	6	0-29	0.000	0.000	0.001	0.51
Southeast AK	426	318-553	0.022	0.016	0.028	0.00
British Columbia	1,113	919-1,316	0.056	0.046	0.066	0.00
West Coast U.S.	485	367-613	0.025	0.019	0.031	0.00

the total bycatch which represents an average of 491 Chinook salmon since 2011. Southern stock proportions peaked in 2017, with British Columbia accounting for 36% of the bycatch and West Coast US representing 18.8%. The estimated stock proportion of British Columbia in 2025 was the lowest of the time period and the fourth lowest total number of fish. The West Coast US group displayed a similar pattern; the stock proportion in 2025 was the lowest of the time period while the total number of Chinook salmon was the third lowest since 2011.

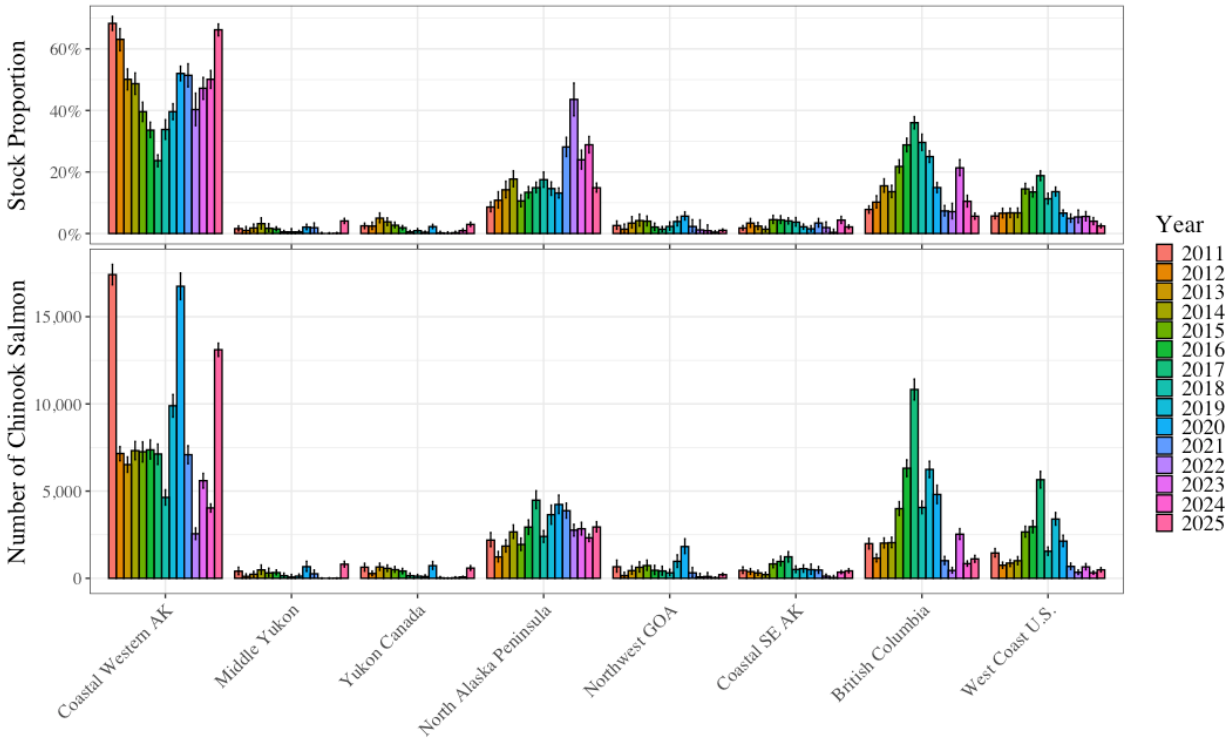

***Figure 4**: Annual stock composition estimates (top) and estimated total number of Chinook salmon bycatch (bottom) from 2011-2025 with their credible intervals from the Bering Sea and Aleutian Islands pollock fishery. Stocks that consistently represent <1% of the stock mixture have been removed (e.g., Russia, Copper and Northeast GOA). The Templin et al. (2011) genetic baseline was used to produce estimates from 2011-2023, and a new baseline (Barclay in prep) was used for 2024 and 2025 with baseline collections aggregated to match prior reporting groups.*

Temporal Trends

Historically, there have been differences in the relative proportion of regional groups contributing to the bycatch in the A and B seasons. With the new baseline, we observed a decrease in the contribution of the Kuskokwim/Bristol Bay reporting group between the A and B seasons, decreasing 23.3% and 4% in 2024 and 2025, respectively. The Yukon Alaska group showed a slight increase of 0.5% and 0.2% in 2024 and 2025. To evaluate trends between seasons, results from the new baseline groups were reaggregated to reflect the historic reporting groups analyzed. Stocks that show a generally increasing proportion from the A season to the B season are from the southern portion of the range; West Coast US, British Columbia, Coastal Southeast AK, and Northwest GOA (Fig. 5). West Coast US averaged 4.23% in the A season and 19.4% in the B season, while British Columbia increased from an average of 15.0% to 22.6% and Coastal Southeast AK from 2.1% to 5.3%. Northwest GOA increases from 0.6% to 6.0%; however, there is substantial interannual variability. Those stocks that show a general decreasing

trend are Alaska groups whose watersheds drain into the Bering Sea (Fig. 5). Coastal Western Alaska displays a drop in stock proportion from 49.1% to 39.9% on average while North Alaska Peninsula drops from 24.8% to 3.83% and Yukon Canada from 2.4% to 0.9%.

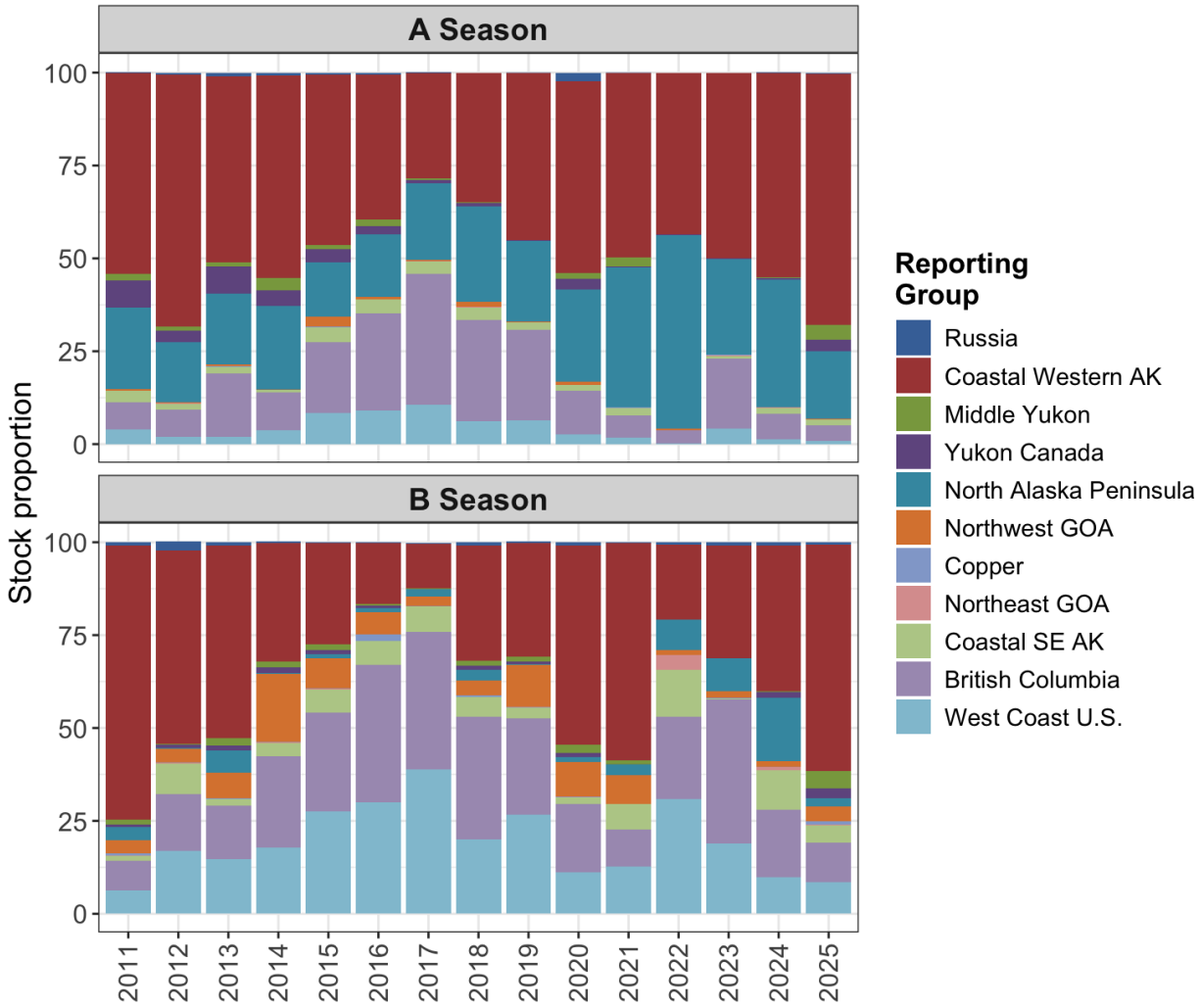

***Figure 5**: Regional stock composition estimates of salmon from the A and B seasons of the Bering Sea and Aleutian Island pollock trawl fishery from 2011-2025. The Templin et al. (2011) genetic baseline was used to produce estimates from 2011-2023, and a new baseline (Barclay in prep) was used for 2024 and 2025 with baseline collections aggregated to match prior reporting groups. Southern stocks consistently represent a larger proportion of the bycatch in the B season.*

Season specific stock composition estimates for 2024 and 2025 appear to be generally similar to estimates from 2011 to 2023 (Fig. 5) with some exceptions. The contribution of the Middle Yukon group, as previously mentioned, was slightly higher in 2025 than in prior years in both the A and B seasons. In 2024, the proportion of North Alaska Peninsula fish in the B season was the largest of the time series, however it fits the pattern of increasing contributions from 2022

and 2023. In 2025, however, it returned to a much smaller proportion than what was caught in the A season. It should be noted that management measures for chum salmon bycatch in the Bering Sea were being considered over this time span and operational decisions in where and when fishing occurred (e.g., fishing further to the northwest) may have influenced the proportion of North Alaska Peninsula Chinook salmon caught in the B season.

Spatial Trends

To evaluate differences in the stock composition of bycatch in different areas within the Bering Sea the bycatch was divided into four subareas based on prior analyses: CVOA, NMFS509, Northwest (NW; West of 167°W), and Southeast (SE; East of 167°W). Estimates for the CVOA, NMFS509 and SE strata are all similar when analyzed for the A and B seasons combined. This stems from the fact that there is overlap in these spatial strata, and they make use of overlapping sets of genetic samples within each mixture. The CVOA and SE results are nearly identical in overall stock proportions; however, the numbers of fish differ because the CVOA represents only a portion of the area East of 167°W. By contrast, more substantial differences in the stock proportions are found between the bycatch in the NW and SE fishing grounds (Appendix I). All Alaska stocks with watersheds draining into the Bering Sea, except for North Alaska Peninsula, comprised larger proportions of the catch in the NW fishing grounds bycatch. Seward Pen./Norton Sound increased 1.5% from the SE to NW fishing grounds in 2024, but only 0.4% in 2025. The difference was more pronounced for the Yukon stocks with Yukon AK increasing 1.2% and 6.6% between the SE and NW fishing grounds in 2024 and 2025, respectively. There was a 93% probability that no fish from Yukon Canada were caught as bycatch in the SE area in either 2024 or 2025; however, this group comprised 3.0% and 6.0% in the NW area in 2024 and 2025, respectively. The Kuskokwim/Bristol Bay stock group comprised 6% more of the bycatch in the NW than SE area.

To illustrate the distribution of Yukon origin fish encountered in the bycatch in 2025, Chinook salmon were assigned to their most likely stock of origin. Only fish with a high probability (>80%) of assignment to the Yukon reporting groups were used to evaluate their spatial distribution in the fishing grounds (n = 106). The majority of these individuals were captured West of 167°W (Fig. 6), despite very large numbers of Chinook salmon being caught in statistical areas to the southeast. In time, increased resolution of the new baseline will aid in the

development of stock specific distribution models that may better inform the avoidance of Western Alaska Chinook salmon stocks.

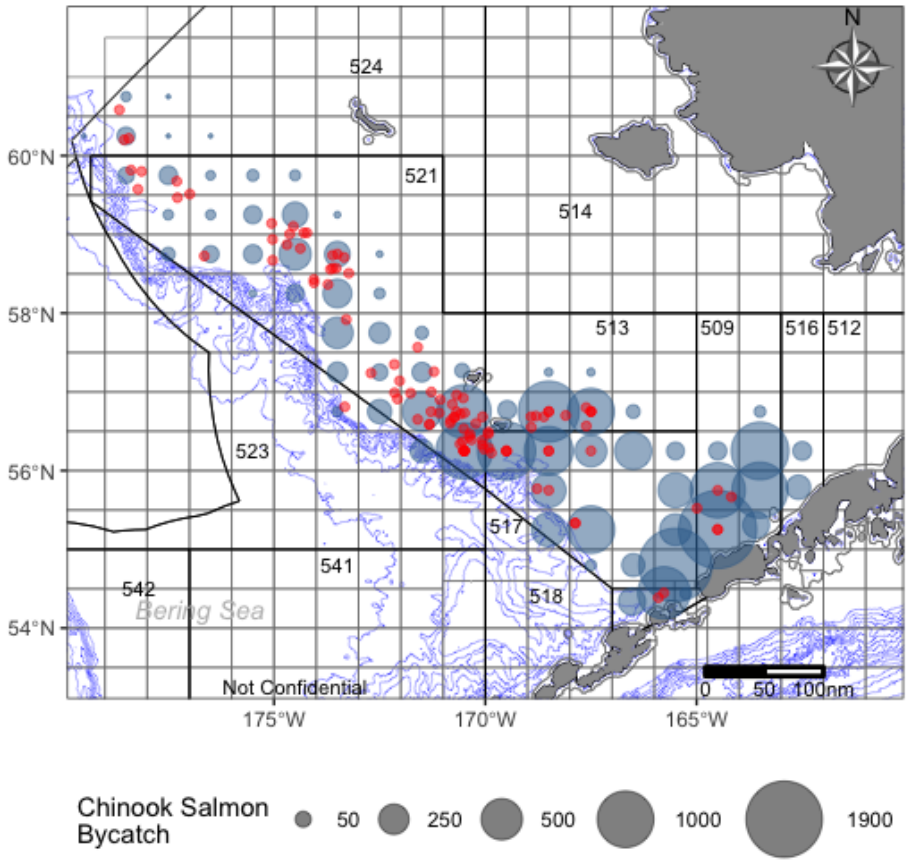

***Figure 6**: Total Chinook salmon bycatch (blue circles) and capture location of Yukon River origin Chinook salmon (red circles) from the 2025 BSAI pollock fishery. Total bycatch within each ADFG groundfish statistical area is displayed with a blue circle with diameter proportional to the total bycatch caught. Yukon origin Chinook salmon are more commonly encountered in the western fishing grounds despite larger total catches off the Alaska Peninsula.*

BSAI Summary

Stock composition estimates of the Chinook salmon bycatch inform pollock and salmon fishery managers of the biological effects of the incidental take of salmon in the trawl fishery (Ianelli and Stram 2015). The incidental harvest of Chinook salmon in the Bering Sea pollock fishery averaged 32,049 salmon per year between 1991 and 2023 (33-year average), with a peak of 122,195 in 2007 and a low of 4,961 in 2000 (Fig. 1; NMFS 2024, NMFS 2026a). The Bering Sea Chinook salmon bycatch has abated in more recent years; in 2025, a total of 19,797 Chinook

salmon were caught, below the 33-year average, but slightly above the average since 2011. The proportions of Chinook salmon originating from Alaska rivers, particularly Coastal Western Alaska and North Alaska Peninsula, accounted for most of the catches in early years of the time series, reached a low in 2017 and has since increased. Development of new genetic baselines with increased resolution in Western Alaska has partially answered a long-standing question about the stocks contributing to the large proportion of the Coastal Western Alaska group. In 2024 and 2025, the Kuskokwim/Bristol Bay reporting group was by far the largest contributor to the previously defined Coastal Western Alaska group. It was estimated that in 2025, 856 (661-1,116 90% CI) Chinook salmon from the US portion of the Yukon River were caught as bycatch in the pollock fishery. Comparing estimates made between the new reporting groups and when the new baseline was aggregated to match the prior reporting groups an (e.g., an estimate made for the Middle Yukon and with the lower Yukon included in the Coastal Western Alaska group) showed that the majority of these fish were bound for the middle river (808, 648-979 90% CI). Both the proportion and number of Chinook salmon from the Yukon Canada group was similar to estimates between 2011 and 2016. After three years of large proportions of North Alaska Peninsula between 2021 and 2024, the proportion in 2025 returned to the average between 2011-2020. Despite the overall increase in proportion of North Alaska Peninsula over that time period, with an overall decrease in the total Chinook salmon bycatch, the total number of North Alaska Peninsula caught as bycatch has remained relatively stable through time. The relative proportion of Alaska and southern stocks in the total bycatch is largely a product of the relative proportion of bycatch occurring in the A and B seasons. In 2025, we continued to observe the pattern of higher proportions of Alaska stocks in the A season and increasing relative proportions of southern stocks in the B season.

Gulf of Alaska pollock trawl fishery

The Gulf of Alaska (GOA) is a known as a feeding habitat for multiple brood years of Chinook salmon (*Oncorhynchus tshawytscha*) originating from many different localities along the west coast of North America. Pacific salmon (*Oncorhynchus* spp.) are prohibited species in the federally managed Gulf of Alaska groundfish fisheries, which are subject to management rules (NPMFC 2024b) that are in part designed to reduce prohibited species catch, hereafter referred to

as “bycatch”. Determining the stock composition of bycatch in federally managed fisheries is essential to understanding the effects that these fisheries have on Chinook salmon stock groups. This section of the report provides genetic stock identification results for Chinook salmon bycatch samples collected in the GOA from the trawl fisheries for walleye pollock (*Gadus chalcogrammus*). The National Marine Fisheries Service (NMFS) and Alaska Department of Fish and Game (ADF&G) geographical statistical areas associated with the groundfish fishery are used to describe the spatial distribution of the Chinook salmon bycatch and genetic samples. All analyses used two new Chinook salmon baselines developed in conjunction with the Alaska Department of Fish and Game to further resolve Coastal Western Alaska stock groups (Appendix III). While this newly developed baseline can further resolve stocks south of Alaska, the baseline has yet to be published and is undergoing peer review. For the purpose of the current report, collections in the new baseline were aggregated to reflect the reporting groups used in prior reports (Templin et al. 2011), with minor changes to Western Alaska groups (see Appendix III), to estimate the stock compositions of samples from the Chinook salmon bycatch of the federally managed GOA trawl fisheries (Guthrie et al. 2013, 2016b-22b; Guyon et al. 2014, 2015a,b; Larson et al. 2013). The objective of this report is to present stock composition estimates for samples collected from the bycatch of the 2024 and 2025 GOA federal pollock directed trawl fisheries. Stock composition estimates have been applied to bycatch numbers; however, it is important to understand the limitations of each sample set for applying estimates to the entire bycatch or comparing estimates among sample sets or years. Amendment 93 to the GOA groundfish fishery management plan required industry to retain all Chinook salmon caught as bycatch in the GOA pollock trawl fishery. This retention requirement was aimed at providing observers with complete access to the bycatch to support genetic stock composition analyses. However, Amendment 93 did not mandate complete observer coverage, and not all GOA pollock trips were observed at-sea. Consequently, the North Pacific Groundfish and Halibut Observer Program (Observer Program) lacked the ability to know in advance the times and locations of all GOA pollock deliveries. Recognizing these limitations in the GOA, starting in 2014, the Observer Program implemented a simple random sampling protocol with respect to trip for the collection of genetic samples in the GOA (Faunce et al. 2014). This method randomly samples from trips and censuses the salmon bycatch encountered in each associated delivery to the processor (Faunce 2015). In 2025, the Observer Program implemented a systematic random

sampling protocol where one out of every 10 Chinook salmon encountered was sampled, mirroring the sampling design in the BSAI. Samples of axillary process tissue or fin clips for genetic analysis were collected throughout 2024 and 2025 from the GOA pollock trawl fishery. Tissues (fin clips) were stored in coin envelopes that were labeled, dried, and shipped to the AFSC's Auke Bay Laboratories (ABL). Scales were collected as an additional source of tissue for genetic analysis, and for aging.

Catch Summary

Temporal Trends

In 2024 and 2025, 25,771 and 13,197 Chinook salmon were caught in the GOA pollock trawl fisheries, respectively (NMFS 2025, NMFS 2026b). The total bycatch in the pollock directed fisheries in 2024 was the fifth highest since 1991, but in 2025 bycatch decreased to near the median over the time period - 14,837 Chinook salmon (Fig. 7).

Spatial Trends

As is typical in the GOA pollock fishery, the majority of the bycatch occurred in three areas: Shumagin Islands, Shelikof Strait and southeast of Kodiak Island (Fig. 8). There was also some bycatch that occurred south of Akutan in the Western GOA during the B season and south of Middleton Island in NMFS Area 640.

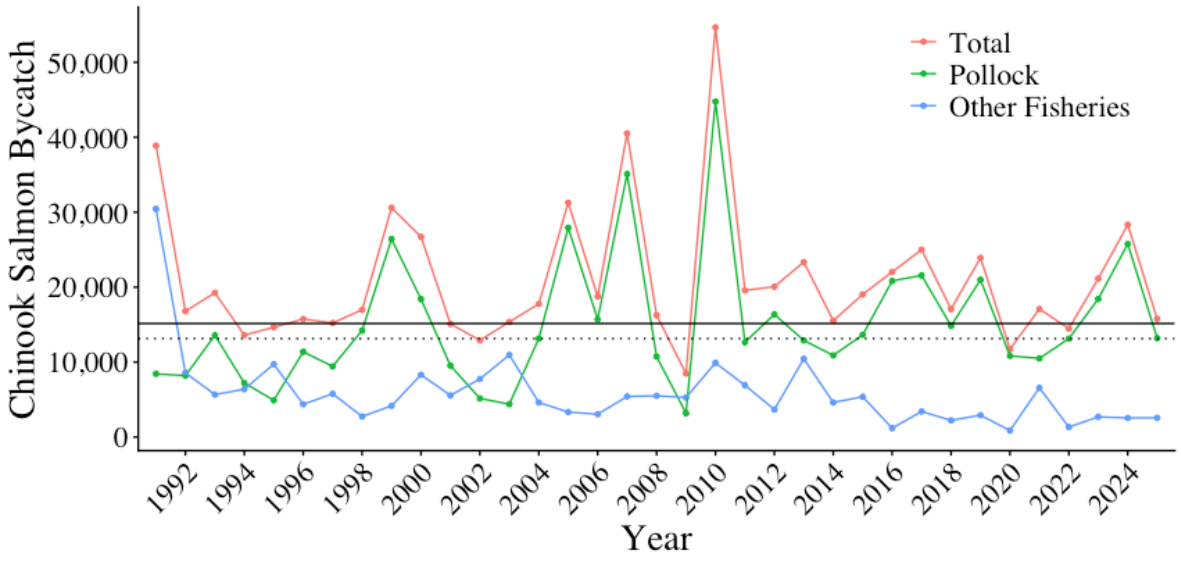

***Figure 7**: Chinook salmon prohibited species catch (bycatch) for Gulf of Alaska pollock-directed trawl, other ground fish, and all fisheries. The solid horizontal line represents the mean PSC and the dashed line represents the median PSC from 1991 to 2025 for the pollock-directed trawl fishery.*

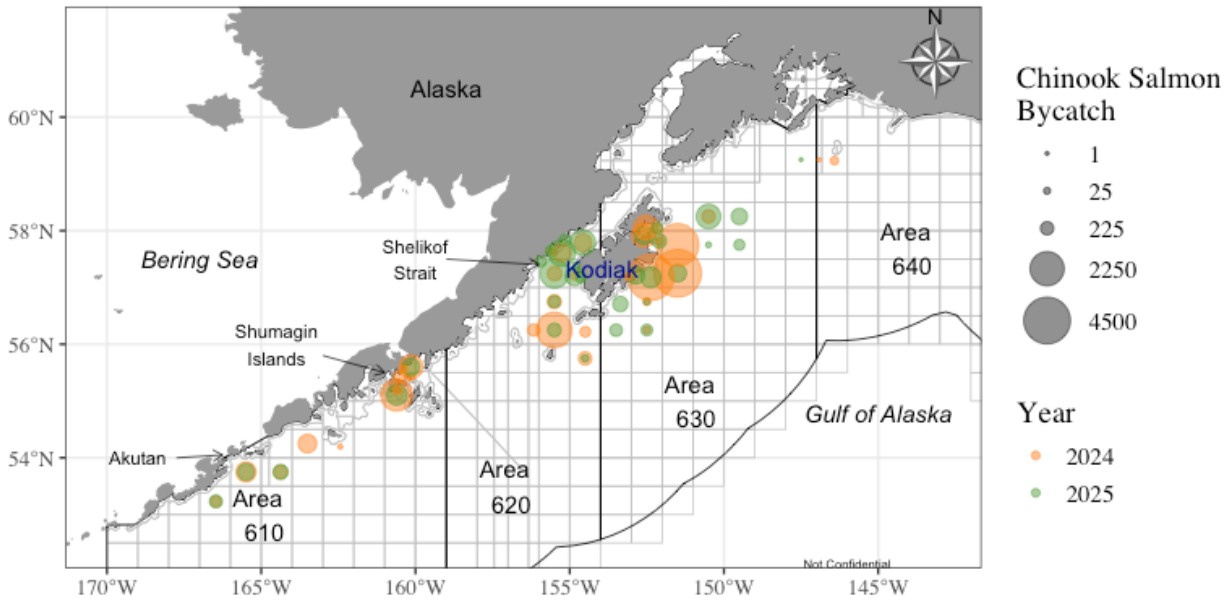

***Figure 8**: Location of Chinook salmon prohibited species catch (bycatch) in the Gulf of Alaska pollock trawl fishery in 2024 (yellow) and 2025 (green). Map of Chinook salmon bycatch by NMFS management areas (outlined in black) and ADF&G groundfish statistical areas (outlined in light gray) where circles represent the amount of total bycatch.*

Sampling & Genotyping Summary

Potential spatial and temporal biases associated with the 2024 and 2025 Chinook salmon GOA bycatch sample sets were evaluated visually by comparing the genetic sample distribution with the estimated overall bycatch distribution. In 2024, when the sampling was done randomly with respect to trip, there is much higher variance in sampling across the year (Fig. 9, upper panels). The sampling rate was variable, but mostly over 10%. In the A season, there was some over representation of NMFS area 620 and underrepresentation of NMFS area 630. There was some bias where large catches in NMFS areas had large sampling rates, particularly for NMFS area 630 in the B season. Modification of the sampling design in 2025 resulted in better representation of the catches among statistical areas and weeks (Fig. 9, lower panels).

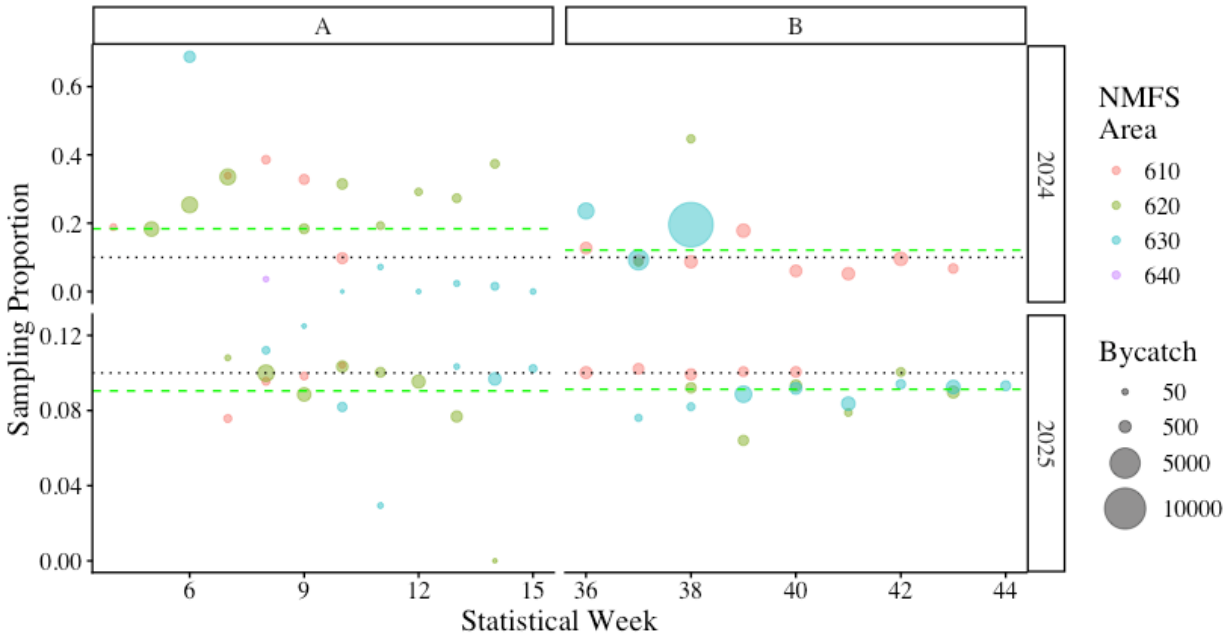

***Figure 9**: Proportion of GOA Chinook salmon bycatch sampled for genetic analysis by statistical week and NMFS Statistical Areas. The size of the circles corresponds to the number of fish caught. The green dashed line is the realized mean sampling proportion over NMFS areas and statistical weeks, and the black dotted line is the target of 10%.*

The genotyped (genetic) sample set for the 2024 and 2025 GOA Chinook salmon bycatch was 2,542 and 1,099 fish, respectively which represents 9.9% and 8.3% of the total bycatch in 2024 and 2025.

Genetic Stock Composition

Overall Trends

The stock composition results indicate that, in both 2024 and 2025, almost 95% of the bycatch in the GOA originated from three regions south and east of the Alaska Peninsula with the British Columbia region contributing the most (an average of 46.1%), followed by the West Coast US (28.6%), and Coastal Southeast Alaska (20.2%) regions (Table 2). Notably, there is a very high probability (>77%) that no fish from Western Alaska system were caught in the GOA in either year (Z=0 column). This is consistent with prior estimates from the pollock fishery in the GOA (Fig. 10).

***Table 2**: Stock composition estimates from the 2024 and 2025 Gulf of Alaska pollock trawl fishery. The estimated number of fish, 90% credible interval around the estimated number of fish, mean stock proportion, 90% credible interval for the proportion, and Z=0 (the probability that no fish from the genetic group were caught as bycatch).*

Region	Est. num.	Est. CI	Mean	5%	95%	Z=0
2024: PSC = 25,771, n = 2,542						
Russia	0	0-1	0.000	0.000	0.000	0.94
Seward Pen./Norton Sound	0	0-2	0.000	0.000	0.000	0.89
Yukon Alaska	1	0-4	0.000	0.000	0.000	0.80
Yukon Canada	0	0-1	0.000	0.000	0.000	0.94
Kuskokwim/Bristol Bay	1	0-3	0.000	0.000	0.000	0.84
North Alaska Peninsula	1	0-4	0.000	0.000	0.000	0.80
Chignik/Kodiak	42	20-71	0.002	0.001	0.003	0.00
Cook Inlet	457	372-552	0.018	0.014	0.021	0.00
Copper	205	150-268	0.008	0.006	0.010	0.00
Alsek/Situk	69	40-107	0.003	0.002	0.004	0.00
Southeast AK	5,329	4,960-5,713	0.207	0.192	0.222	0.00
British Columbia	11,710	11,236-12,186	0.454	0.436	0.473	0.00
West Coast U.S.	7,955	7,584-8,330	0.309	0.294	0.323	0.00
2025: PSC = 13,197, n = 1,099						
Russia	0	0-1	0.000	0.000	0.000	0.94
Seward Pen./Norton Sound	1	0-3	0.000	0.000	0.000	0.87
Yukon Alaska	1	0-6	0.000	0.000	0.000	0.78
Yukon Canada	0	0-1	0.000	0.000	0.000	0.93
Kuskokwim/Bristol Bay	1	0-4	0.000	0.000	0.000	0.82
North Alaska Peninsula	1	0-6	0.000	0.000	0.000	0.77
Chignik/Kodiak	29	9-59	0.002	0.001	0.004	0.00
Cook Inlet	531	425-647	0.040	0.032	0.049	0.00
Copper	243	174-322	0.018	0.013	0.024	0.00
Alsek/Situk	28	8-59	0.002	0.001	0.004	0.00
Southeast AK	2,751	2,506-3,002	0.208	0.190	0.227	0.00
British Columbia	6,157	5,824-6,496	0.467	0.441	0.492	0.00
West Coast U.S.	3,453	3,182-3,738	0.262	0.241	0.283	0.00

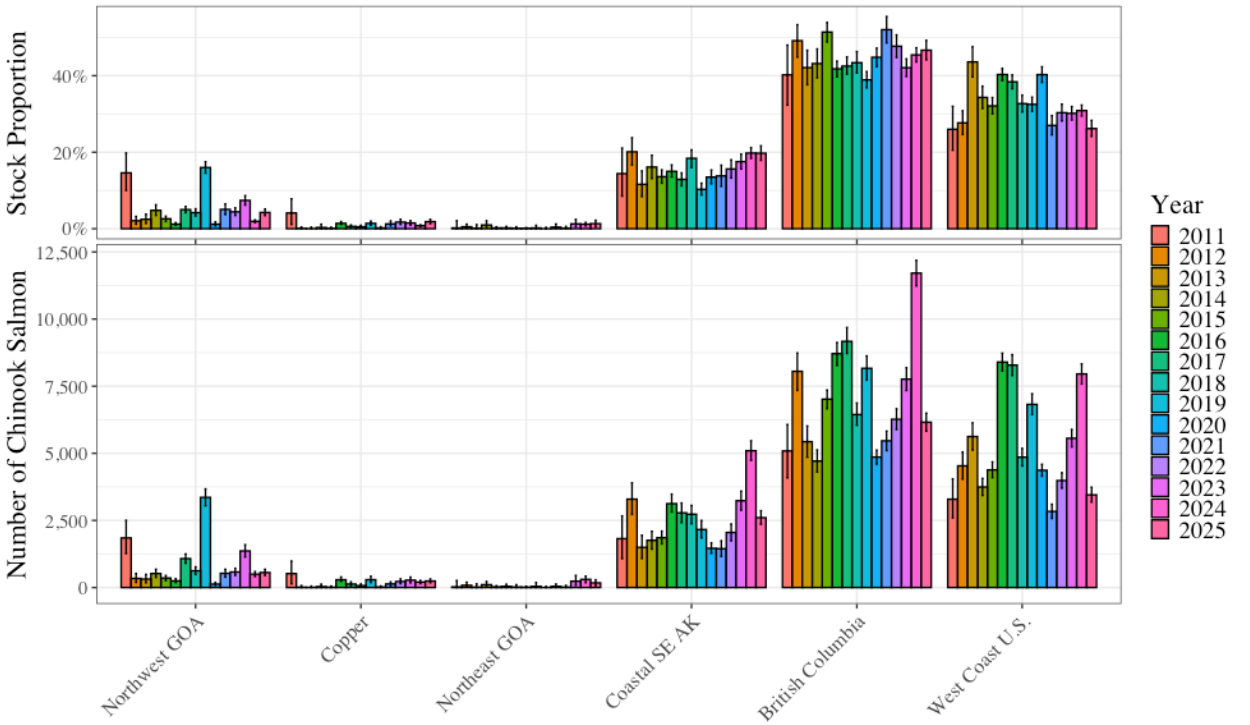

***Figure 10**: Yearly stock composition estimates (2011-2025) with 95% credible intervals of Chinook salmon bycatch based on available genetic samples from the Gulf of Alaska (GOA) pollock trawl fishery. The Templin et al. 2011 genetic baseline was used from 2011-2023, and a new baseline (Barclay in prep) was used for 2024 and 2025 with baseline collections aggregated to match prior reporting groups. See text for variation in sampling design across years.*

The stock composition estimates in 2024 and 2025 were similar to estimates from the previous 13 years (Fig. 10). The British Columbia stock group increased from a low of 39% in 2019 to a high of 52% in 2021 and has fluctuated around the long-term mean of 44.8%. The very large overall bycatch in the GOA in 2024 made for the largest catch of British Columbia origin Chinook salmon in the timeseries. The proportion of West Coast US Chinook salmon has been generally low over the last five years, averaging 28.9% compared to 35.8% between 2014 and 2020. Because of the declining overall contribution of this group, the total number of West Coast US origin Chinook salmon was the third largest in 2024. Alternatively, Coastal Southeast Alaska has increased from a low of 10.3% in 2019, to its largest proportion and overall bycatch number, 19.8% and 5,329 fish in 2024. The proportion of Northwest GOA Chinook salmon in the bycatch in 2024 and 2025, 1.9% and 4.2% respectively, was similar to the long-term average of 5.5% between 2011 and 2023.

Spatial Trends

Analyses were performed on the three areas where bycatch has historically been highest within the trawl fishery: Shumagin Islands, Shelikof Strait and southeast of Kodiak Island. Bycatch from the Shumagin Islands was composed of a higher proportion of British Columbia fish (average of 61.4%) compared to Shelikof Strait (46.3%) and SE Kodiak Island (44.9%; Fig. 11). Whereas, both SE Kodiak Island and Shelikof Strait bycatch was characterized by higher proportions of West Coast US Chinook salmon (averaging 36.4% and 24.9% respectively) than Shelikof Strait (8.5%). Coastal Southeast Alaska was lowest SE of Kodiak Island (averaging 15.8%) compared to ~28% of the bycatch both South of the Shumagin Islands and within Shelikof Strait.

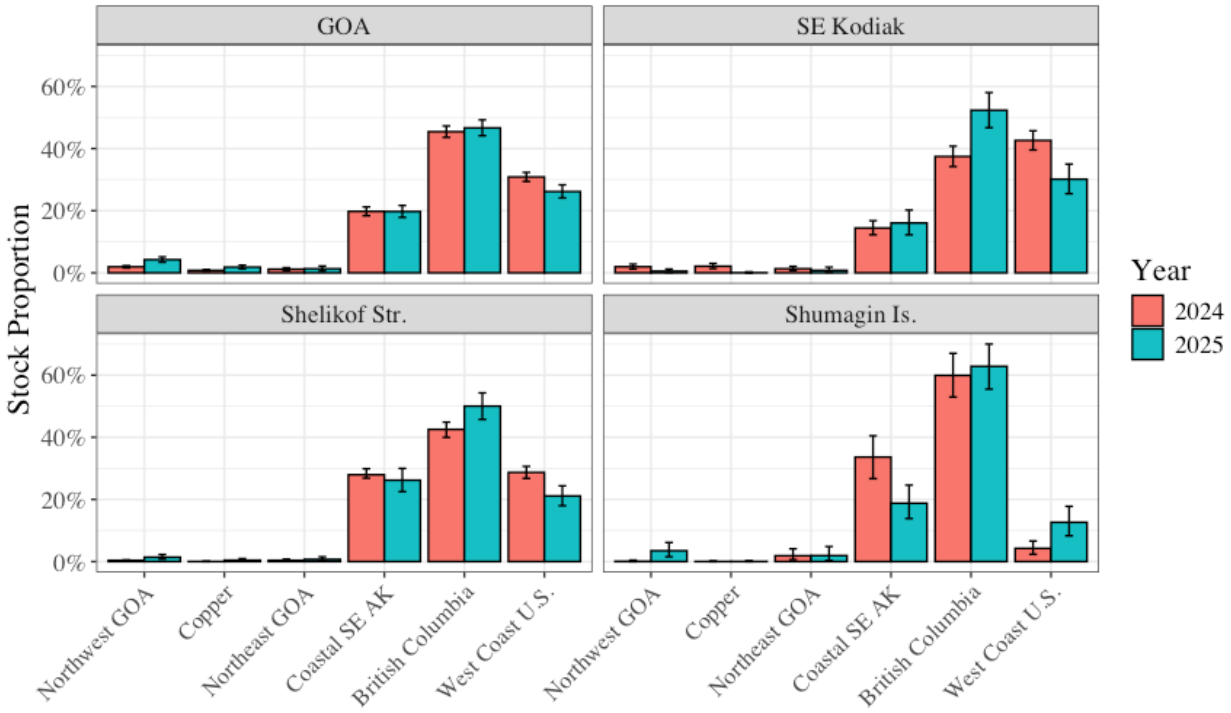

***Figure 11**: Stock composition estimates with 90% credible intervals of Chinook salmon bycatch samples from four spatial strata from the 2024 and 2025 GOA pollock trawl fishery.*

'Lightning Strikes' - Large hauls of Chinook Bycatch

In 2024 there were two deliveries of pollock that had especially high numbers of Chinook salmon bycatch. The fleet describes these events as 'Lightning strikes', in which the bycatch rate of salmon increases drastically over a small number of hauls. According to the Alaska Groundfish Data Bank press release (https://alaskagroundfishdatabank.org/wp-

content/uploads/2024/09/revised-agdb-salmon-statement_september-25-2024.pdf), in September of 2024 a vessel noticed a considerable number of Chinook salmon in their haul and notified a fishing vessel making a tow through the same aggregation of pollock. That vessel subsequently pulled its net. The fleet voluntarily stood down until NOAA observers could count and sample the two hauls. NMFS ultimately closed the Central Gulf pollock fishery as these lightning strikes led to an exceedance of the Chinook salmon cap; An estimated total of 20,332 Chinook salmon were caught as bycatch with a cap of 18,316.[2] The observer program exhaustively sampled the Chinook salmon from these hauls, which facilitated evaluating the stock composition of the lightning strikes. Analysis of these two hauls, indicated the vast majority were of British Columbia and West Coast US origin (Table 3). Comparing the composition of the individual hauls with different spatial strata (GOA, Central Gulf, and SE Kodiak) demonstrated relatively similar stock compositions. The lightning strike hauls were most similar in composition to the SE Kodiak estimate, which had a slightly lower proportion of Southeast Alaska origin Chinook salmon relative to other areas analyzed (Fig. 11). These results are consistent with individual hauls being a mixture of different stocks that reflect the stock composition of the broader area and time when the haul was conducted. While ages for these fish are not available, it was reported that most of these fish were of uniform size suggesting they might be the same cohort of fish; however, the stock compositions indicated that any size differences between these hauls and the overall bycatch did not reflect differences in stock composition.

[2] https://www.fisheries.noaa.gov/sites/default/files/akro/car142_goa_salmon2024.html

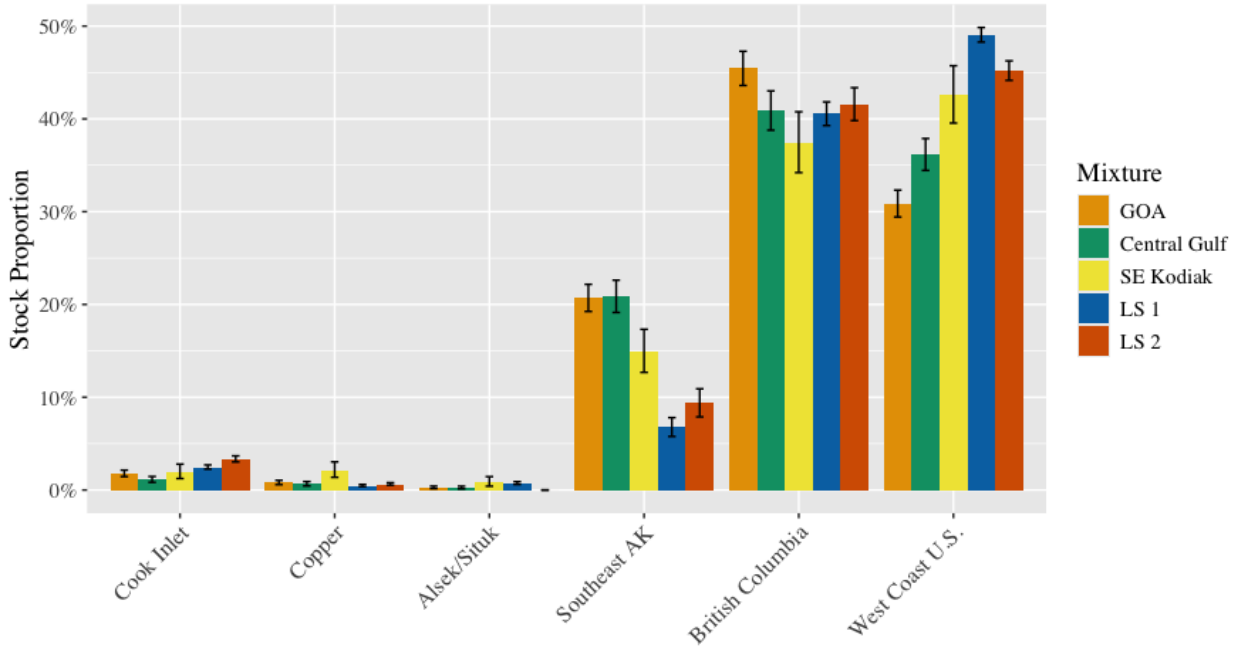

***Figure 12**: Stock composition estimates with 90% credible intervals of Chinook salmon bycatch samples from five fisheries mixtures from 2024 Gulf of Alaska pollock trawl fishery including two lightning strike hauls. Genetic proportions were relatively similar across spatial strata with lightning strike hauls most closely resembling the mixture from SE Kodiak.*

GOA Summary

A genetic analysis of samples from the Chinook salmon bycatch of the 2024 and 2025 Gulf of Alaska trawl fisheries for walleye pollock was undertaken to determine stock composition. Samples were genotyped for 233 single nucleotide polymorphism DNA markers and mixture proportions were estimated using a new genetic baseline. In 2024, genetic samples were collected from Chinook salmon taken in the bycatch of the GOA pollock trawl fisheries using a simple random sample protocol with trip being the primary unit, while in 2025 the total bycatch was sampled at a rate of one in every 10 Chinook salmon caught. Based on analysis of 3,641 Chinook salmon samples from 2024 and 2025, British Columbia, West Coast US, and Coastal Southeast Alaska stock groups were the largest contributors, comprising nearly 95% of the total bycatch (Table 2). The stock composition estimates for Chinook salmon bycatch samples collected from federally managed trawl fisheries in the GOA continue to show that the vast majority of Chinook salmon that are encountered originate from three stock groups that are located south and east of the Alaska Peninsula. This pattern is consistent for samples analyzed across finer-scale area and time strata within the GOA.

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Appendix I - BSAI GSI Estimates

GSI estimates for primary analyses of the Chinook Salmon PSC in the Bering Sea midwater pollock trawl fishery.

A/B-season 2024 (PSC = 8,049; n = 745)

Region	Est. num.	Est. CI	Mean	5%	95%	Z=0
Russia	32	10-65	0.004	0.001	0.008	0.00
Seward Pen./Norton Sound	106	0-269	0.013	0.000	0.033	0.15
Yukon Alaska	12	0-55	0.002	0.000	0.007	0.40
Yukon Canada	74	37-123	0.009	0.005	0.015	0.00
Kuskokwim/Bristol Bay	3,920	3,645-4,189	0.487	0.453	0.520	0.00
North Alaska Peninsula	2,322	2,110-2,540	0.288	0.262	0.316	0.00
Chignik/Kodiak	11	1-32	0.001	0.000	0.004	0.00
Cook Inlet	24	5-54	0.003	0.001	0.007	0.00
Copper	1	0-5	0.000	0.000	0.001	0.81
Alsek/Situk	21	4-49	0.003	0.000	0.006	0.00
Southeast AK	362	274-460	0.045	0.034	0.057	0.00
British Columbia	842	696-1,000	0.105	0.086	0.124	0.00
West Coast U.S.	321	235-417	0.040	0.029	0.052	0.00

A/B-season 2025 (PSC = 19,797; n = 1545)

Region	Est. num.	Est. CI	Mean	5%	95%	Z=0
Russia	77	36-131	0.004	0.002	0.007	0.00
Seward Pen./Norton Sound	442	225-676	0.022	0.011	0.034	0.00
Yukon Alaska	856	661-1,116	0.043	0.033	0.056	0.00
Yukon Canada	588	456-731	0.030	0.023	0.037	0.00
Kuskokwim/Bristol Bay	12,619	12,153-13,062	0.637	0.614	0.660	0.00
North Alaska Peninsula	2,945	2,662-3,247	0.149	0.134	0.164	0.00
Chignik/Kodiak	27	6-62	0.001	0.000	0.003	0.00
Cook Inlet	180	113-262	0.009	0.006	0.013	0.00
Copper	34	7-75	0.002	0.000	0.004	0.00
Alsek/Situk	6	0-29	0.000	0.000	0.001	0.51
Southeast AK	426	318-553	0.022	0.016	0.028	0.00
British Columbia	1,113	919-1,316	0.056	0.046	0.066	0.00
West Coast U.S.	485	367-613	0.025	0.019	0.031	0.00

A-season 2024 (PSC = 5,287; n = 512)

Region	Est. num.	Est. CI	Mean	5%	95%	Z=0
Russia	10	1-30	0.002	0.000	0.006	0.00
Seward Pen./Norton Sound	46	0-147	0.009	0.000	0.028	0.21
Yukon Alaska	10	0-43	0.002	0.000	0.008	0.47
Yukon Canada	31	10-63	0.006	0.002	0.012	0.00
Kuskokwim/Bristol Bay	2,853	2,645-3,052	0.540	0.500	0.577	0.00
North Alaska Peninsula	1,811	1,634-1,992	0.343	0.309	0.377	0.00
Chignik/Kodiak	1	0-5	0.000	0.000	0.001	0.82
Cook Inlet	2	0-9	0.000	0.000	0.002	0.66
Copper	1	0-5	0.000	0.000	0.001	0.82
Alsek/Situk	1	0-3	0.000	0.000	0.001	0.87
Southeast AK	93	54-145	0.018	0.010	0.027	0.00
British Columbia	364	271-468	0.069	0.051	0.089	0.00
West Coast U.S.	65	29-111	0.012	0.005	0.021	0.00

A-season 2025 (PSC = 13,984; n = 1228)

Region	Est. num.	Est. CI	Mean	5%	95%	Z=0
Russia	45	17-85	0.003	0.001	0.006	0.00
Seward Pen./Norton Sound	331	154-515	0.024	0.011	0.037	0.00
Yukon Alaska	623	440-962	0.045	0.031	0.069	0.00
Yukon Canada	431	329-546	0.031	0.024	0.039	0.00
Kuskokwim/Bristol Bay	9,052	8,643-9,423	0.647	0.618	0.674	0.00
North Alaska Peninsula	2,541	2,295-2,790	0.182	0.164	0.200	0.00
Chignik/Kodiak	1	0-5	0.000	0.000	0.000	0.81
Cook Inlet	30	7-64	0.002	0.001	0.005	0.00
Copper	1	0-5	0.000	0.000	0.000	0.81
Alsek/Situk	1	0-4	0.000	0.000	0.000	0.87
Southeast AK	207	137-296	0.015	0.010	0.021	0.00
British Columbia	589	453-735	0.042	0.032	0.053	0.00
West Coast U.S.	133	79-202	0.010	0.006	0.014	0.00

B-season 2024 (PSC = 2,762; n = 233)

Region	Est. num.	Est. CI	Mean	5%	95%	Z=0
Russia	23	5-53	0.008	0.002	0.019	0.00
Seward Pen./Norton Sound	60	0-168	0.022	0.000	0.061	0.24
Yukon Alaska	18	0-69	0.007	0.000	0.025	0.27
Yukon Canada	46	17-86	0.017	0.006	0.031	0.00
Kuskokwim/Bristol Bay	1,011	849-1,173	0.366	0.307	0.425	0.00
North Alaska Peninsula	469	364-582	0.170	0.132	0.211	0.00
Chignik/Kodiak	12	1-34	0.004	0.000	0.012	0.00
Cook Inlet	31	7-67	0.011	0.003	0.024	0.00
Copper	1	0-6	0.000	0.000	0.002	0.81
Alsek/Situk	23	5-53	0.008	0.002	0.019	0.00
Southeast AK	291	217-375	0.105	0.079	0.136	0.00
British Columbia	504	396-622	0.183	0.143	0.225	0.00
West Coast U.S.	272	192-363	0.099	0.070	0.131	0.00

B-season 2025 (PSC = 5,813; n = 317)

Region	Est. num.	Est. CI	Mean	5%	95%	Z=0
Russia	37	7-86	0.006	0.001	0.015	0.00
Seward Pen./Norton Sound	4	0-24	0.001	0.000	0.004	0.76
Yukon Alaska	276	166-410	0.047	0.029	0.071	0.00
Yukon Canada	152	78-246	0.026	0.013	0.042	0.00
Kuskokwim/Bristol Bay	3,529	3,267-3,782	0.607	0.562	0.651	0.00
North Alaska Peninsula	132	63-221	0.023	0.011	0.038	0.00
Chignik/Kodiak	37	8-87	0.006	0.001	0.015	0.00
Cook Inlet	203	117-306	0.035	0.020	0.053	0.00
Copper	48	11-104	0.008	0.002	0.018	0.00
Alsek/Situk	9	0-42	0.002	0.000	0.007	0.48
Southeast AK	272	158-409	0.047	0.027	0.070	0.00
British Columbia	622	449-816	0.107	0.077	0.140	0.00
West Coast U.S.	491	356-646	0.085	0.061	0.111	0.00

CVOA A/B-season 2024 (PSC = 3,496; n = 420)

Region	Est. num.	Est. CI	Mean	5%	95%	Z=0
Russia	8	1-23	0.002	0.000	0.007	0.00
Seward Pen./Norton Sound	11	0-54	0.003	0.000	0.015	0.55
Yukon Alaska	3	0-17	0.001	0.000	0.005	0.70
Yukon Canada	0	0-1	0.000	0.000	0.000	0.94
Kuskokwim/Bristol Bay	1,595	1,461-1,729	0.456	0.418	0.495	0.00
North Alaska Peninsula	766	661-876	0.219	0.189	0.251	0.00
Chignik/Kodiak	9	1-24	0.002	0.000	0.007	0.00
Cook Inlet	20	5-43	0.006	0.001	0.012	0.00
Copper	1	0-4	0.000	0.000	0.001	0.83
Alsek/Situk	16	3-37	0.005	0.001	0.011	0.00
Southeast AK	262	205-327	0.075	0.059	0.094	0.00
British Columbia	566	467-672	0.162	0.134	0.192	0.00
West Coast U.S.	239	176-309	0.068	0.050	0.088	0.00

CVOA A/B-season 2025 (PSC = 6,265; n = 610)

Region	Est. num.	Est. CI	Mean	5%	95%	Z=0
Russia	0	0-1	0.000	0.000	0.000	0.93
Seward Pen./Norton Sound	187	17-360	0.030	0.003	0.057	0.01
Yukon Alaska	130	38-392	0.021	0.006	0.063	0.00
Yukon Canada	0	0-1	0.000	0.000	0.000	0.93
Kuskokwim/Bristol Bay	3,893	3,609-4,164	0.621	0.576	0.665	0.00
North Alaska Peninsula	868	731-1,012	0.139	0.117	0.162	0.00
Chignik/Kodiak	20	4-47	0.003	0.001	0.008	0.00
Cook Inlet	58	25-100	0.009	0.004	0.016	0.00
Copper	1	0-5	0.000	0.000	0.001	0.83
Alsek/Situk	1	0-3	0.000	0.000	0.000	0.87
Southeast AK	222	154-305	0.035	0.025	0.049	0.00
British Columbia	573	451-703	0.091	0.072	0.112	0.00
West Coast U.S.	312	230-404	0.050	0.037	0.064	0.00

NMFS 509 A/B season 2024 (PSC = 3,266; n = 313)

Region	Est. num.	Est. CI	Mean	5%	95%	Z=0
Russia	0	0-1	0.000	0.000	0.000	0.93
Seward Pen./Norton Sound	4	0-25	0.001	0.000	0.008	0.77
Yukon Alaska	9	0-46	0.003	0.000	0.014	0.56
Yukon Canada	0	0-1	0.000	0.000	0.000	0.93
Kuskokwim/Bristol Bay	1,408	1,260-1,556	0.431	0.386	0.476	0.00
North Alaska Peninsula	1,190	1,052-1,331	0.364	0.322	0.408	0.00
Chignik/Kodiak	1	0-5	0.000	0.000	0.002	0.81
Cook Inlet	5	0-22	0.001	0.000	0.007	0.47
Copper	1	0-5	0.000	0.000	0.002	0.82
Alsek/Situk	1	0-3	0.000	0.000	0.001	0.87
Southeast AK	133	93-183	0.041	0.028	0.056	0.00
British Columbia	394	304-494	0.121	0.093	0.151	0.00
West Coast U.S.	120	70-181	0.037	0.021	0.055	0.00

NMFS 509 A/B season 2025 (PSC = 5,283; n = 451)

Region	Est. num.	Est. CI	Mean	5%	95%	Z=0
Russia	0	0-1	0.000	0.000	0.000	0.93
Seward Pen./Norton Sound	135	16-301	0.025	0.003	0.057	0.01
Yukon Alaska	92	30-265	0.017	0.006	0.050	0.00
Yukon Canada	0	0-1	0.000	0.000	0.000	0.93
Kuskokwim/Bristol Bay	3,239	2,991-3,475	0.613	0.566	0.658	0.00
North Alaska Peninsula	1,265	1,101-1,436	0.240	0.208	0.272	0.00
Chignik/Kodiak	1	0-6	0.000	0.000	0.001	0.81
Cook Inlet	4	0-19	0.001	0.000	0.004	0.55
Copper	1	0-6	0.000	0.000	0.001	0.80
Alsek/Situk	1	0-4	0.000	0.000	0.001	0.86
Southeast AK	114	46-183	0.022	0.009	0.035	0.00
British Columbia	359	257-473	0.068	0.049	0.090	0.00
West Coast U.S.	73	33-124	0.014	0.006	0.023	0.00

NW A/B-season 2024 (PSC = 2,582; n = 235)

Region	Est. num.	Est. CI	Mean	5%	95%	Z=0
Russia	22	5-51	0.009	0.002	0.020	0.00
Seward Pen./Norton Sound	47	0-145	0.018	0.000	0.056	0.26
Yukon Alaska	32	0-127	0.013	0.000	0.049	0.14
Yukon Canada	77	38-126	0.030	0.015	0.049	0.00
Kuskokwim/Bristol Bay	1,420	1,252-1,581	0.550	0.485	0.612	0.00
North Alaska Peninsula	880	749-1,016	0.341	0.290	0.393	0.00
Chignik/Kodiak	1	0-5	0.000	0.000	0.002	0.81
Cook Inlet	2	0-10	0.001	0.000	0.004	0.65
Copper	1	0-5	0.000	0.000	0.002	0.81
Alsek/Situk	1	0-3	0.000	0.000	0.001	0.87
Southeast AK	42	14-82	0.016	0.005	0.032	0.00
British Columbia	45	14-88	0.017	0.005	0.034	0.00
West Coast U.S.	13	1-35	0.005	0.000	0.014	0.01

NW A/B-season 2025 (PSC = 10,222; n = 771)

Region	Est. num.	Est. CI	Mean	5%	95%	Z=0
Russia	80	37-137	0.008	0.004	0.013	0.00
Seward Pen./Norton Sound	36	0-167	0.004	0.000	0.016	0.46
Yukon Alaska	802	620-1,028	0.078	0.061	0.101	0.00
Yukon Canada	610	476-758	0.060	0.047	0.074	0.00
Kuskokwim/Bristol Bay	6,716	6,384-7,022	0.657	0.625	0.687	0.00
North Alaska Peninsula	1,211	1,018-1,419	0.118	0.100	0.139	0.00
Chignik/Kodiak	1	0-7	0.000	0.000	0.001	0.79
Cook Inlet	136	77-210	0.013	0.008	0.021	0.00
Copper	35	8-77	0.003	0.001	0.008	0.00
Alsek/Situk	6	0-29	0.001	0.000	0.003	0.50
Southeast AK	182	106-272	0.018	0.010	0.027	0.00
British Columbia	339	230-464	0.033	0.023	0.045	0.00
West Coast U.S.	68	27-124	0.007	0.003	0.012	0.00

SE A/B-season 2024 (PSC = 5,467; n = 510)

Region	Est. num.	Est. CI	Mean	5%	95%	Z=0
Russia	11	1-31	0.002	0.000	0.006	0.00
Seward Pen./Norton Sound	15	0-70	0.003	0.000	0.013	0.54
Yukon Alaska	6	0-40	0.001	0.000	0.007	0.63
Yukon Canada	0	0-1	0.000	0.000	0.000	0.93
Kuskokwim/Bristol Bay	2,514	2,321-2,708	0.460	0.425	0.495	0.00
North Alaska Peninsula	1,442	1,278-1,611	0.264	0.234	0.295	0.00
Chignik/Kodiak	11	1-32	0.002	0.000	0.006	0.00
Cook Inlet	25	6-56	0.005	0.001	0.010	0.00
Copper	1	0-5	0.000	0.000	0.001	0.81
Alsek/Situk	21	4-48	0.004	0.001	0.009	0.00
Southeast AK	323	243-412	0.059	0.044	0.075	0.00
British Columbia	790	652-937	0.145	0.119	0.171	0.00
West Coast U.S.	308	226-400	0.056	0.041	0.073	0.00

SE A/B-season 2025 (PSC = 9,575; n = 774)

Region	Est. num.	Est. CI	Mean	5%	95%	Z=0
Russia	0	0-1	0.000	0.000	0.000	0.93
Seward Pen./Norton Sound	292	111-483	0.030	0.012	0.050	0.00
Yukon Alaska	111	43-263	0.012	0.004	0.027	0.00
Yukon Canada	0	0-1	0.000	0.000	0.000	0.93
Kuskokwim/Bristol Bay	5,971	5,642-6,291	0.624	0.589	0.657	0.00
North Alaska Peninsula	1,721	1,510-1,941	0.180	0.158	0.203	0.00
Chignik/Kodiak	25	6-58	0.003	0.001	0.006	0.00
Cook Inlet	45	13-89	0.005	0.001	0.009	0.00
Copper	1	0-6	0.000	0.000	0.001	0.80
Alsek/Situk	1	0-4	0.000	0.000	0.000	0.86
Southeast AK	268	193-355	0.028	0.020	0.037	0.00
British Columbia	739	593-897	0.077	0.062	0.094	0.00
West Coast U.S.	402	299-517	0.042	0.031	0.054	0.00

Appendix II - GOA GSI Estimates

GSI estimates for primary analyses of the Chinook Salmon PSC in the Gulf of Alaska midwater pollock trawl fishery.

GOA 2024 (PSC = 25,771; n = 2,542)

Region	Est. num.	Est. CI	Mean	5%	95%	Z=0
Russia	0	0-1	0.000	0.000	0.000	0.94
Seward Pen./Norton Sound	0	0-2	0.000	0.000	0.000	0.89
Yukon Alaska	1	0-4	0.000	0.000	0.000	0.80
Yukon Canada	0	0-1	0.000	0.000	0.000	0.94
Kuskokwim/Bristol Bay	1	0-3	0.000	0.000	0.000	0.84
North Alaska Peninsula	1	0-4	0.000	0.000	0.000	0.80
Chignik/Kodiak	42	20-71	0.002	0.001	0.003	0.00
Cook Inlet	457	372-552	0.018	0.014	0.021	0.00
Copper	205	150-268	0.008	0.006	0.010	0.00
Alsek/Situk	69	40-107	0.003	0.002	0.004	0.00
Southeast AK	5,329	4,960-5,713	0.207	0.192	0.222	0.00
British Columbia	11,710	11,236-12,186	0.454	0.436	0.473	0.00
West Coast U.S.	7,955	7,584-8,330	0.309	0.294	0.323	0.00

GOA 2025 (PSC = 13,197; n = 1099)

Region	Est. num.	Est. CI	Mean	5%	95%	Z=0
Russia	0	0-1	0.000	0.000	0.000	0.94
Seward Pen./Norton Sound	1	0-3	0.000	0.000	0.000	0.87
Yukon Alaska	1	0-6	0.000	0.000	0.000	0.78
Yukon Canada	0	0-1	0.000	0.000	0.000	0.93
Kuskokwim/Bristol Bay	1	0-4	0.000	0.000	0.000	0.82
North Alaska Peninsula	1	0-6	0.000	0.000	0.000	0.77
Chignik/Kodiak	29	9-59	0.002	0.001	0.004	0.00
Cook Inlet	531	425-647	0.040	0.032	0.049	0.00
Copper	243	174-322	0.018	0.013	0.024	0.00
Alsek/Situk	28	8-59	0.002	0.001	0.004	0.00
Southeast AK	2,751	2,506-3,002	0.208	0.190	0.227	0.00
British Columbia	6,157	5,824-6,496	0.467	0.441	0.492	0.00
West Coast U.S.	3,453	3,182-3,738	0.262	0.241	0.283	0.00

South of Akutan 2024 (PSC = 960; n = 179)

Region	Est. num.	Est. CI	Mean	5%	95%	Z=0
Russia	0	0-0	0.000	0.000	0.000	0.96
Seward Pen./Norton Sound	0	0-1	0.000	0.000	0.001	0.93
Yukon Alaska	0	0-2	0.000	0.000	0.002	0.87
Yukon Canada	0	0-0	0.000	0.000	0.000	0.96
Kuskokwim/Bristol Bay	0	0-1	0.000	0.000	0.001	0.90
North Alaska Peninsula	0	0-2	0.000	0.000	0.002	0.87
Chignik/Kodiak	11	4-21	0.011	0.004	0.022	0.00
Cook Inlet	73	50-100	0.076	0.052	0.104	0.00
Copper	24	13-39	0.025	0.014	0.041	0.00
Alsek/Situk	7	2-16	0.008	0.002	0.017	0.00
Southeast AK	218	186-254	0.227	0.194	0.265	0.00
British Columbia	411	353-468	0.428	0.368	0.487	0.00
West Coast U.S.	216	173-262	0.225	0.180	0.273	0.00

South of Akutan 2025 (PSC = 908; n = 80)

Region	Est. num.	Est. CI	Mean	5%	95%	Z=0
Russia	0	0-1	0.000	0.000	0.001	0.93
Seward Pen./Norton Sound	1	0-3	0.001	0.000	0.003	0.88
Yukon Alaska	1	0-6	0.001	0.000	0.007	0.77
Yukon Canada	0	0-1	0.000	0.000	0.001	0.94
Kuskokwim/Bristol Bay	1	0-5	0.001	0.000	0.006	0.82
North Alaska Peninsula	1	0-7	0.001	0.000	0.008	0.75
Chignik/Kodiak	11	1-31	0.012	0.001	0.034	0.00
Cook Inlet	222	159-290	0.244	0.175	0.319	0.00
Copper	104	60-156	0.114	0.066	0.172	0.00
Alsek/Situk	1	0-6	0.001	0.000	0.007	0.85
Southeast AK	98	54-149	0.108	0.059	0.164	0.00
British Columbia	241	170-320	0.266	0.187	0.352	0.00
West Coast U.S.	227	162-298	0.250	0.178	0.328	0.00

South of Shumagin 2024 (PSC = 3,240; n = 221)

Region	Est. num.	Est. CI	Mean	5%	95%	Z=0
Russia	0	0-1	0.000	0.000	0.000	0.93
Seward Pen./Norton Sound	1	0-4	0.000	0.000	0.001	0.86
Yukon Alaska	1	0-8	0.000	0.000	0.002	0.74
Yukon Canada	0	0-1	0.000	0.000	0.000	0.93
Kuskokwim/Bristol Bay	1	0-6	0.000	0.000	0.002	0.80
North Alaska Peninsula	1	0-8	0.000	0.000	0.002	0.74
Chignik/Kodiak	1	0-6	0.000	0.000	0.002	0.80
Cook Inlet	2	0-11	0.001	0.000	0.003	0.64
Copper	1	0-6	0.000	0.000	0.002	0.80
Alsek/Situk	1	0-4	0.000	0.000	0.001	0.86
Southeast AK	1,150	923-1,373	0.355	0.285	0.424	0.00
British Columbia	1,942	1,716-2,172	0.599	0.530	0.670	0.00
West Coast U.S.	138	76-215	0.043	0.023	0.066	0.00

South of Shumagin 2025 (PSC = 1,220; n = 120)

Region	Est. num.	Est. CI	Mean	5%	95%	Z=0
Russia	0	0-1	0.000	0.000	0.001	0.95
Seward Pen./Norton Sound	0	0-2	0.000	0.000	0.002	0.89
Yukon Alaska	1	0-5	0.001	0.000	0.004	0.77
Yukon Canada	0	0-1	0.000	0.000	0.001	0.95
Kuskokwim/Bristol Bay	1	0-4	0.000	0.000	0.003	0.84
North Alaska Peninsula	1	0-4	0.001	0.000	0.003	0.79
Chignik/Kodiak	1	0-3	0.000	0.000	0.002	0.85
Cook Inlet	42	19-74	0.035	0.016	0.061	0.00
Copper	1	0-3	0.000	0.000	0.002	0.84
Alsek/Situk	0	0-2	0.000	0.000	0.002	0.89
Southeast AK	253	190-325	0.207	0.156	0.266	0.00
British Columbia	767	677-854	0.629	0.555	0.700	0.00
West Coast U.S.	154	101-217	0.126	0.083	0.178	0.00

South East of Kodiak 2024 (PSC = 14,156; n = 670)

Region	Est. num.	Est. CI	Mean	5%	95%	Z=0
Russia	0	0-2	0.000	0.000	0.000	0.92
Seward Pen./Norton Sound	1	0-5	0.000	0.000	0.000	0.85
Yukon Alaska	2	0-11	0.000	0.000	0.001	0.71
Yukon Canada	0	0-2	0.000	0.000	0.000	0.92
Kuskokwim/Bristol Bay	1	0-8	0.000	0.000	0.001	0.78
North Alaska Peninsula	2	0-11	0.000	0.000	0.001	0.72
Chignik/Kodiak	1	0-8	0.000	0.000	0.001	0.78
Cook Inlet	275	175-395	0.019	0.012	0.028	0.00
Copper	302	194-429	0.021	0.014	0.030	0.00
Alsek/Situk	121	58-204	0.009	0.004	0.014	0.00
Southeast AK	2,113	1,795-2,452	0.149	0.127	0.173	0.00
British Columbia	5,302	4,843-5,771	0.375	0.342	0.408	0.00
West Coast U.S.	6,034	5,598-6,473	0.426	0.395	0.457	0.00

South East of Kodiak 2025 (PSC = 2,878; n = 245)

Region	Est. num.	Est. CI	Mean	5%	95%	Z=0
Russia	0	0-1	0.000	0.000	0.000	0.95
Seward Pen./Norton Sound	0	0-2	0.000	0.000	0.001	0.89
Yukon Alaska	1	0-4	0.000	0.000	0.001	0.80
Yukon Canada	0	0-1	0.000	0.000	0.000	0.94
Kuskokwim/Bristol Bay	1	0-3	0.000	0.000	0.001	0.85
North Alaska Peninsula	1	0-4	0.000	0.000	0.001	0.80
Chignik/Kodiak	7	1-21	0.003	0.000	0.007	0.00
Cook Inlet	8	1-22	0.003	0.000	0.008	0.00
Copper	1	0-9	0.001	0.000	0.003	0.73
Alsek/Situk	6	0-19	0.002	0.000	0.007	0.15
Southeast AK	478	365-602	0.166	0.127	0.209	0.00
British Columbia	1,507	1,345-1,670	0.523	0.467	0.580	0.00
West Coast U.S.	868	733-1,008	0.301	0.255	0.350	0.00

Shelikof Strait 2024 (PSC = 3,538; n = 1,006)

Region	Est. num.	Est. CI	Mean	5%	95%	Z=0
Russia	0	0-0	0.000	0.000	0.000	1.00
Seward Pen./Norton Sound	0	0-0	0.000	0.000	0.000	1.00
Yukon Alaska	0	0-0	0.000	0.000	0.000	0.99
Yukon Canada	0	0-0	0.000	0.000	0.000	1.00
Kuskokwim/Bristol Bay	0	0-0	0.000	0.000	0.000	0.99
North Alaska Peninsula	0	0-0	0.000	0.000	0.000	0.99
Chignik/Kodiak	2	2-3	0.001	0.001	0.001	0.00
Cook Inlet	12	11-15	0.003	0.003	0.004	0.00
Copper	1	1-2	0.000	0.000	0.001	0.00
Alsek/Situk	0	0-0	0.000	0.000	0.000	1.00
Southeast AK	1,010	992-1,076	0.283	0.272	0.304	0.00
British Columbia	1,518	1,415-1,619	0.425	0.400	0.449	0.00
West Coast U.S.	1,024	953-1,095	0.287	0.268	0.306	0.00

Shelikof Strait 2025 (PSC = 4,052; n = 427)

Region	Est. num.	Est. CI	Mean	5%	95%	Z=0
Russia	0	0-1	0.000	0.000	0.000	0.94
Seward Pen./Norton Sound	0	0-3	0.000	0.000	0.001	0.88
Yukon Alaska	1	0-4	0.000	0.000	0.001	0.80
Yukon Canada	0	0-1	0.000	0.000	0.000	0.95
Kuskokwim/Bristol Bay	1	0-3	0.000	0.000	0.001	0.84
North Alaska Peninsula	1	0-5	0.000	0.000	0.001	0.79
Chignik/Kodiak	1	0-3	0.000	0.000	0.001	0.84
Cook Inlet	57	31-91	0.014	0.008	0.022	0.00
Copper	18	4-39	0.004	0.001	0.010	0.00
Alsek/Situk	4	0-16	0.001	0.000	0.004	0.45
Southeast AK	1,087	936-1,243	0.268	0.231	0.307	0.00
British Columbia	2,027	1,854-2,200	0.500	0.458	0.543	0.00
West Coast U.S.	856	729-988	0.211	0.180	0.244	0.00

Appendix III - GSI Methods

DNA was extracted from axillary process tissues with Machery-Nagel (Allentown, PA) kits. SNP genotyping was performed using Genotyping-in-Thousands by Sequencing (GTseq; Campbell et al. 2015) chemistry that uses short-read sequencing on an Illumina platform to interrogate the 233 SNP DNA markers represented in a new Chinook salmon baseline. The SNP baseline contains genetic information for populations of Chinook salmon across the north Pacific rim grouped into 13 geographic regions (also known as stock groups or reporting groups). Proof tests, in a forthcoming manuscript, show the baselines to be suitable for stock composition analysis using these 13 regional reporting groups (Barclay et al. *in prep*). Briefly, we use a multistage GSI approach with a rangewide baseline of 508 populations genotyped at 81 SNPs and within Alaska with a regional Alaska focused baseline containing 258 populations genotyped at 233 SNPs. This multistage approach and new baseline facilitate accurate estimation of the stock contribution of 82 fine-scale reporting groups. Because the baseline has yet to undergo peer review and be published, for the purpose of this report we aggregate the baseline to resemble the prior baseline with minor modifications to resolve the Yukon River in coastal Western Alaska.

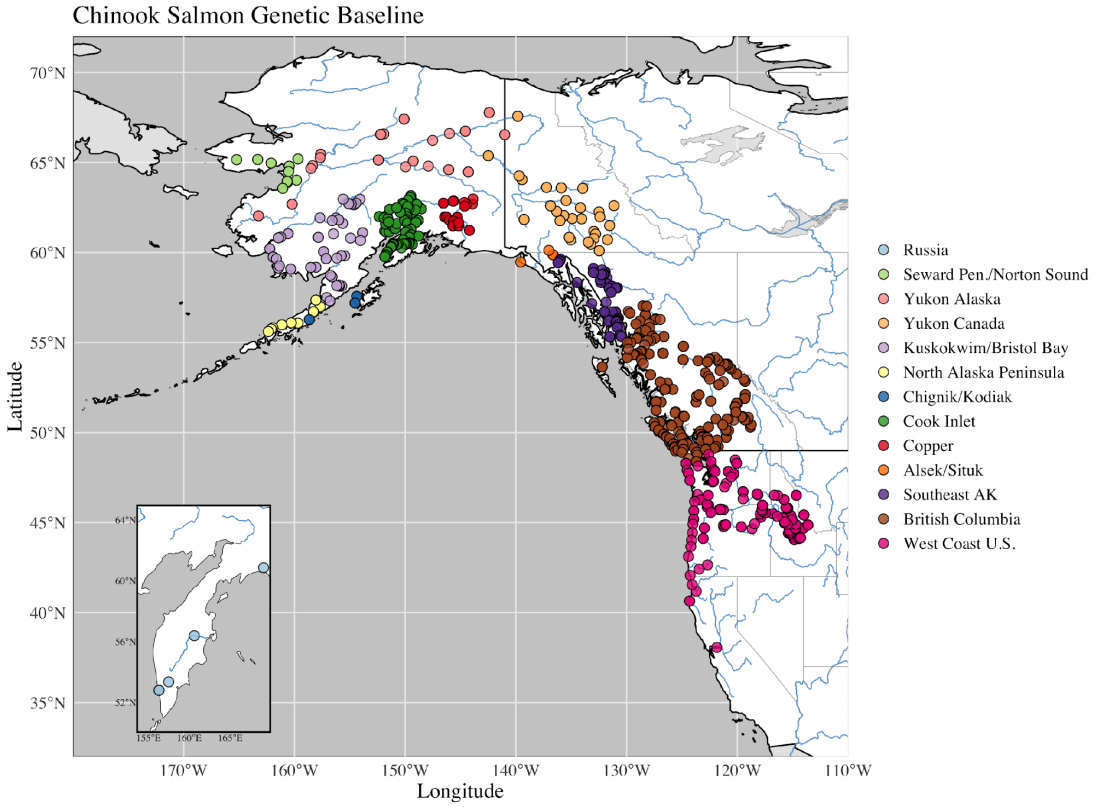

***Figure 12**: Map of Chinook salmon genetic baseline collections colored by the thirteen reporting group used to analyze the 2024 and 2025 bycatch from the pollock directed fisheries in the Bering Sea/Aleutian Islands and Gulf of Alaska.*

Sequencing libraries were prepared using the GT-seq protocol (Campbell et al. 2015). PCR was performed on extracted DNA with primers that amplify 233 SNP loci (Appendix 5). These PCR products were then indexed in a barcoding PCR, normalized using SequalPrep plates (Invitrogen) and each 96 well plate was subsequently pooled after Sequel prep normalization. Next, a double-sided bead size selection was performed using AMPure XP beads (Beckman Coulter), using ratios of beads to library of 0.5× to remove non-target larger fragments and then 1.2× to retain the desired amplicon. Libraries were sequenced on a MiSeq (Illumina) using a single 150-cycle lane run with 2 × 75 bp paired-end (PE) chemistry. PE reads for each individual were joined with FLASH2 (Magoč & Salzberg, 2011; https://github.com/dstreett/FLASH2). Merged reads were genotyped with the R package GTscore (McKinney; https://github.com/gjmckinney/GTscore). Individuals with low quality multilocus genotypes (< 80% of loci scored) were discarded. We re-genotype 3% of all individuals as quality control measures.

Mixtures were created by separating sampled fish into spatial and temporal groups from observer data from the AKFIN database. Genetic stock identification was performed with the conditional genetic stock identification model in the R package Ms.GSI (Hsu and Habitch 2023; https://github.com/boppingshoe/Ms.GSI). To ensure convergence to the posterior distribution, 6 separate chains of 150,000 iterations (burn-in of 37,500) with thinning of 1 in 10 iterations were run, with each chain starting at disparate values of stock group proportions. The convergence of chains for each reporting group estimate was assessed with the Gelman-Rubin statistic (Gelman and Rubin 1992) estimated with the gelman.diag function in the coda library (Plummer et al. 2006) within R.