THE STATE
of ALASKA
GOVERNOR MICHAEL J. DUNLEAVY

Department of Fish and Game

TECHNICAL MEMORANDUM

To:	Lowell Fair, Judy Lum
From:	Alaska Department of Fish and Game Randy Peterson (DSF), Sara Gilk-Baumer (DCF), Kyle Shedd (DCF), Ed Jones (DCF), Dani Evenson (DCF), Phil Richards (DCF), and Jeff Nichols (DSF)
Subject:	Harvest of Southeast Alaska Wild-Origin Chinook Salmon in the Southeast Alaska Troll and Sport Fisheries, 2005–2021
Date:	December 30, 2021
cc:	
Attachments:	Appendices A–B

This memo provides estimates of Alaska wild-origin Chinook salmon harvested in the commercial troll and sport fisheries from 2005 to 2021, along with a description of how these estimates are calculated (Appendix A).

Chinook salmon originating from Southeast Alaska (SEAK) rivers, Transboundary rivers (TBR), and SEAK hatcheries are harvested throughout SEAK in the commercial troll, net, and sport fisheries, along with stocks originating outside of Alaska (CTC 2015). Of concern are declines in abundance of SEAK and TBR wild stocks due to a decline in productivity (CTC 2021). At the October 2017 work session, the Alaska Board of Fisheries accepted ADF&G's recommendation to list the Unuk, Chilkat, and King Salmon Rivers as stock(s) of management concern (SOC) pursuant to the *Policy for the Management of Sustainable Salmon Fisheries* (5 AAC 39.222) due to the chronic inability, despite management measures, of these stocks to attain the lower bound of the escapement goal range. Declines in production have precipitated restrictions to fisheries in SEAK including SOC action plans that were designed to conserve these stocks of Chinook salmon (Lum and Fair 2018a and 2018b).

Since 1985, the Alaska Department of Fish and Game (ADF&G) has conducted stock assessments for the SEAK hatchery aggregate. This, in large part, is due to the SEAK Hatchery Add-on provision of the Pacific Salmon Treaty (PST), which stipulates that most SEAK hatchery Chinook salmon harvested in SEAK fisheries do not count against the annual harvest limit under the PST (PSC 2020; CTC 1992).

There are 34 known wild Chinook salmon stocks in SEAK, and ADF&G monitors escapement annually for 11 of them (Situk, Alsek, Chilkat, Taku, King Salmon, Stikine, Andrews, Unuk, Chickamin, Blossom and Keta stocks). Of these, 3 are TBR stocks (i.e., Alsek, Taku, and Stikine stocks) and the remaining 8 are hereto referred to as SEAK stocks. Each year ADF&G conducts juvenile tagging projects on 4 of the SEAK and TBR stocks (i.e., Chilkat, Taku, Stikine and Unuk) in which juvenile Chinook salmon are marked with adipose fin clips and injected with a coded-wire-tag (CWT). Through these projects, estimates of escapement, harvest, run, and harvest rates (see Appendix B) can be generated along with estimates of smolt abundance, marine survival and brood year exploitation rates. All SEAK and TBR Chinook stocks are not only subject to domestic management obligations but also provisions covered under Chapter 3 of the PST. Additionally, fisheries that harvest TBR stocks in the terminal and inriver areas are subject to specific obligations covered under Chapter 1 of the PST.

Separating out the harvest of hatchery and wild salmon, especially in mixed stock marine fisheries, is a difficult task. The crux of the problem is that unmarked hatchery and wild fish are visually indistinguishable. Much of the work to date relies on indirect methods to provide harvest estimates for wild stocks; however, by combining information from CWT programs with genetic mixed stock analysis (MSA), direct estimation is possible.

Coded-wire-tag methods allow for direct estimation of tagged stocks contributing to fishery harvests; however, these methods are limited to only stocks that are marked and tagged with known numbers of releases (i.e., hatchery stocks). Since 1985, ADF&G has used CWT data to estimate the contribution of SEAK hatchery Chinook salmon to the SEAK commercial and sport fisheries. Although only a portion of the SEAK hatchery production is marked and tagged, it is assumed that these fish represent the unmarked hatchery production (Bernard and Clark 1996).

ADF&G has used genetic MSA techniques to estimate the stock composition of Chinook salmon harvested in the SEAK troll and sport fisheries since 2004. Genetic MSA methods allow for direct estimation of the major stock groups contributing to fisheries, including all SEAK and TBR-origin fish (Gilk-Baumer et al. 2013). However, current genetic MSA methods are not designed to differentiate between hatchery and wild stocks originating from the same brood source. Note in this report that the genetic MSA reporting groups for the SEAK and TBR stocks were combined into one stock group, SEAK, and all other stocks originating from outside SEAK were combined to form the stock group "Other".

The harvest of SEAK and TBR wild stocks in sport and troll fisheries can be estimated by combining results from genetic MSA and CWT contributions. In this analysis, we use genetic MSA to first estimate the stock proportions of all (hatchery and wild) SEAK and TBR-origin Chinook salmon. These proportions were then multiplied by the total harvest to get an estimate of total number of SEAK and TBR fish harvested. Harvests of SEAK hatchery fish were then estimated separately using CWT recovery data. Assuming all SEAK hatchery production is adequately represented by CWTs, the harvest of wild fish was estimated by simply subtracting the harvest of SEAK hatchery fish from the total number of SEAK and TBR fish determined using genetic MSA. This method, hereafter referred to as the "subtraction method" (Figure 1), was applied to the SEAK troll fisheries in total and by season and the SEAK sport fisheries in total and by area, accounting for approximately 70% of the Chinook salmon harvested in SEAK from 2007 to 2021. This method was not used for other fisheries due to insufficient sample sizes and relatively small numbers of fish harvested.

Three types of data were needed to apply the subtraction method: 1) Chinook salmon harvest, 2) harvest of SEAK hatchery-origin fish, and 3) the proportion of SEAK Chinook salmon harvest by stock group, all 3 of which are germane to cumulative troll plus sport combined. The SEAK

Chinook salmon harvest was obtained from ADF&G fish tickets for the troll fishery; statewide harvest survey (SWHS) and the SEAK marine harvest studies program for the sport fishery; (Jennings et al. 2004, 2009a, 2009b, 2010a, 2010b, 2011a, 2011b, 2015; Romberg et al. *in prep* a, b, c, d, e; Romberg et al. 2021; Jaenicke et al. 2019); harvest of SEAK hatchery-origin fish was estimated using CWT data from the ADF&G Mark, Tag, and Age Lab (MTA Lab); and the proportion of SEAK Chinook salmon harvest by stock group was estimated by ADF&G Gene Conservation Lab (GCL) using genetic MSA. Harvest data from the troll fishery were summarized using the SEAK Add-on program (J. Carlile and D. Leonard, Division of Commercial Fisheries, ADF&G, Juneau, personal communication, 2021). Harvest data from the sport fishery were summarized by ADF&G Division of Sport Fish (M. Jaenicke and D. Tersteeg, Division of Sport Fish, ADF&G, Douglas, personal communication, 2021). Commercial troll harvest of SEAK hatchery-origin fish was calculated using CWT recovery data obtained from the MTA Lab and summarized with the SEAK Add-on program (e.g., CTC 2021; PSC 2021). Sport harvest of SEAK hatchery-origin fish was calculated using CWT recovery data collected by the SEAK marine harvest studies program (see Jaenicke et al. 2019 for methods) and summarized by ADF&G Division of Sport Fish (M. Jaenicke and D. Tersteeg, Division of Sport Fish, ADF&G, Douglas, personal communication, 2021). Genetic MSA data were obtained from the ADF&G GCL (Gilk-Baumer et al. 2013, 2017a, 2017b, 2017c, 2018, Shedd et al. 2021a, 2021b, K. Shedd, Division of Commercial Fisheries, ADF&G, Juneau, personal communication, 2021).

The subtraction method used to estimate harvest of Alaska wild Chinook salmon was:

$$Harvest\ of\ all\ fish\ =\ Harvest\ of\ wild\ +\ Harvest\ of\ hatchery$$

and therefore *Harvest of Wild* was calculated as:

$$Harvest\ of\ wild = Harvest\ of\ all\ fish\ -\ Harvest\ of\ hatchery$$

Because the *Harvest of all fish*, *Harvest of hatchery fish*, and the stock proportions of *Harvest of all fish* were estimated from numerous sources, methodology was developed to apply the above equation. A description of the method, notation, and formulae can be found in Appendix A.

A list of the fisheries analyzed are presented in Table 1. For the commercial troll fishery, fisheries were analyzed by season: early winter, late winter, spring, summer retention 1, and summer retention 2. The spring troll fishery was reported as an aggregate of spring fisheries that include spring, TBR terminal, and terminal exclusion area fisheries. Troll fisheries not analyzed in this report include experimental mark-selective fisheries (2016 and 2017), Metlakatla Indian Community Annette Island Reserve, and confiscated, which combined comprise less than one percent of the total commercial troll harvest. The sport fishery was analyzed by area: Ketchikan, northern inside (Juneau, Haines, Skagway), Petersburg and Wrangell, and outside (Craig, Sitka, Gustavus, Elfin Cove, Glacier Bay, Yakutat). For both troll and sport, it was assumed that all harvest in terminal exclusion areas was of SEAK hatchery-origin except for the Yakutat terminal exclusion areas, as these fish were assumed to be SEAK wild-origin.

Results for the troll fishery are presented in Table 2 and Figures 2–4 and further stratified by time period in Tables 4–8. Results for the sport fishery are presented in Table 3 and Figures 5–7 and additionally stratified by survey area in Tables 9–12. Results indicate considerable temporal and spatial variation in the harvest of Alaska wild Chinook salmon in the troll and sport fisheries. In the troll fishery, the percentage of Alaska wild Chinook salmon harvested varies annually from 4% to 15% (Table 2). The percentage of Alaska wild fish also varies considerably by time period in the troll fishery: from 2005 to 2021, the total percent of Alaska wild harvested in the early winter troll is 10%, late winter troll is 11%, spring troll is 21%, summer retention 1 is 6%, and summer retention 2 is 7% (Tables 4–8). The total percentage of Alaska wild Chinook salmon harvested in

the sport fishery is similarly variable, ranging from 7% to 34% (Table 3). The percentage of Alaska wild fish also varies spatially in the sport fishery: from 2005 to 2021, the total percent of Alaska wild fish harvested in the Ketchikan area is 29%, northern inside area is 40%, Petersburg and Wrangell area is 39%, and in the outside area is 6% (Tables 9–12).

The average annual harvest of Alaska wild Chinook salmon decreased in both the commercial troll and sport fisheries after the SOC action plans (Lum and Fair 2018a and 2018b) were implemented in 2018. The troll fishery harvested an average of 22,791 Alaska wild Chinook salmon annually from 2005 to 2017, as compared to 8,238 Alaska wild Chinook salmon from 2018 to 2021 (Table 2). The sport fishery harvested an average of 12,539 Alaska wild Chinook salmon annually from 2005 to 2017, as compared to 4,135 Alaska wild Chinook salmon from 2018 to 2021 (Table 3). Additionally, the average annual stock composition of Alaska wild Chinook salmon decreased in both the commercial troll and sport fisheries between the 2005 to 2017 and 2018 to 2021 time periods, from 9.7% to 6.0% in the troll fishery and from 18.3% to 12.2% in the sport fishery. There are many contributing factors driving this decrease, including: restrictions in the SOC action plans that reduced harvest in late winter and spring troll fisheries, restrictions in the SOC action plans that restricted sport fisheries in time and area, and an overall decrease in Chinook harvest due to lower treaty abundance indices and resulting all-gear catch-limits.

A limitation of applying the subtraction method is that it will occasionally result in negative estimates. Negative estimates occur when the estimate of SEAK wild harvest is less than the estimate of SEAK hatchery harvest. There were three occurrences of negative estimates: 2016 outside sport and 2005 and 2011 early winter troll. If an estimate was negative, the estimate of SEAK wild was set to zero and footnoted. No effort was made to rectify discrepancies between genetic MSA and CWT estimates.

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RESULTS

Table 1. Fishery definitions.

Gear	Fishery	Notes
Troll	Early winter	October 11 through December 31. By convention, harvest in this fishery was considered part of the following year's harvest and referred to as accounting year (i.e., accounting year (AY) = calendar year + 1).
	Late winter	January 1 through April 30 (or earlier if guideline harvest level of 45,000 was reached).
	Spring	May 1 (or earlier if the late winter fishery closes prior to April 30) through June 30. Areas open are designed to provide access to Alaska hatchery fish, and the length of the opening depends on the percentage of Alaska hatchery fish harvested.
	Terminal exclusion areas	Subset of the Spring fishery consisting of hatchery terminal areas: Hidden Falls, Neets Bay, Wrangell Narrows, and Anita Bay. Harvest in the terminal exclusion areas was considered a part of the Spring troll fishery (see Appendix A for methods).
	TBR terminal	Subset of the Spring fishery consisting of directed and non-directed troll fisheries that take place in areas near the Taku and Stikine rivers. Harvest in the TBR terminal fisheries was considered a part of the Spring troll fishery (see Appendix A for methods).
	Summer retention 1	July 1 until 70% of the remaining troll allocation is caught. The ending date of this fishery varies annually, ranging from July 4 to July 20.
	Summer retention 2	Second or third week of August until the remaining troll allocation is caught. The ending date of this fishery varies annually, ranging from August 17 to September 20. A second retention period did not occur in 2013, 2015, and 2017.
Sport	Ketchikan	Areas around Ketchikan and East Prince of Wales Island (Districts 101 and 102). Includes terminal marine shoreline harvest at Herring Cove and terminal freshwater harvest in Ketchikan Creek.
	Northern inside	Area around Juneau, Haines, and Skagway (Districts 111, 112, and 115). Includes terminal marine shoreline harvest near Macaulay Hatchery and Auke Bay and terminal freshwater harvest areas with no wild stocks.
	Petersburg - Wrangell	Areas around Petersburg and Wrangell (Districts 106, 107, and 108). Includes terminal marine and terminal marine shoreline harvest in the Wrangell Narrows Terminal Harvest Area and terminal freshwater harvest in Blind Slough.
	Outside	Areas around Craig, Sitka, Gustavus, Elfin Cove, Glacier Bay, and Yakutat (Districts 103, 113, 114, 116, 181, and 183). Includes terminal freshwater harvest in Sitka, West Prince of Wales Island, and Yakutat.

Table 2. Harvest of SEAK-origin Chinook salmon in the SEAK commercial troll fishery, AY2005–2021.

Accounting Year	Total Harvest	Sampled Harvest	SEAK				SEAK Hatchery				SEAK Wild			
			Number	SE	Percent	SE	Number	SE	Percent	SE	Number	SE	Percent	SE
2005	338,451	338,024	72,190	4,318	21%	1.3%	35,825	1,199	11%	0.4%	36,365	4,481	11%	1.3%
2006	282,315	282,258	50,664	3,728	18%	1.3%	20,830	734	7%	0.3%	29,834	3,800	11%	1.4%
2007	268,146	267,985	63,324	3,616	24%	1.4%	30,432	1,009	11%	0.4%	32,892	3,754	12%	1.4%
2008	151,936	151,852	47,839	2,233	32%	1.5%	29,212	828	19%	0.5%	18,627	2,382	12%	1.6%
2009	175,644	175,335	38,399	1,874	22%	1.1%	20,558	752	12%	0.4%	17,841	2,019	10%	1.2%
2010	195,620	195,488	50,103	2,069	26%	1.1%	21,724	733	11%	0.4%	28,379	2,195	15%	1.1%
2011	242,569	242,558	46,517	1,751	19%	0.7%	25,923	892	11%	0.4%	20,594	1,966	8%	0.8%
2012	209,074	209,061	53,347	2,224	26%	1.1%	21,295	825	10%	0.4%	32,052	2,372	15%	1.1%
2013	149,541	149,485	33,852	1,897	23%	1.3%	18,287	707	12%	0.5%	15,565	2,025	10%	1.4%
2014	355,570	355,426	40,051	2,518	11%	0.7%	18,487	753	5%	0.2%	21,563	2,628	6%	0.7%
2015	269,862	269,836	42,153	2,172	16%	0.8%	22,330	814	8%	0.3%	19,823	2,320	7%	0.9%
2016	276,432	275,943	29,672	1,617	11%	0.6%	13,916	634	5%	0.2%	15,756	1,737	6%	0.6%
2017	129,649	126,536	15,656	1,025	12%	0.8%	8,662	413	7%	0.3%	6,994	1,105	6%	0.9%
2018	107,565	107,096	20,250	1,174	19%	1.1%	9,846	476	9%	0.4%	10,405	1,267	10%	1.2%
2019	109,364	108,623	17,671	849	16%	0.8%	9,232	455	8%	0.4%	8,438	963	8%	0.9%
2020	169,916	169,797	15,772	1,092	9%	0.6%	7,769	397	5%	0.2%	8,003	1,162	5%	0.7%
2021	163,210	162,886	17,966	1,023	11%	0.6%	11,861	533	7%	0.3%	6,105	1,154	4%	0.7%
Total	3,594,864	3,588,189	655,427	9,438	18%	0.3%	326,189	3,072	9%	0.1%	329,238	9,926	9%	0.3%

Note: Total Harvest is from fish tickets and Sampled Harvest is the amount of harvest sampled for CWT and represented by genetic MSA estimates. Percent SEAK is from genetic MSA and Number SEAK is calculated by multiplying Sampled Harvest by Percent SEAK. Number SEAK hatchery is from CWT recovery data and Percent SEAK Hatchery is computed by dividing Number SEAK Hatchery by Sampled Harvest. Number and Percent SEAK Wild are calculated by subtracting SEAK Hatchery from SEAK. The *Total* row is either a sum (Total Harvest, Sampled Harvest, Number SEAK, Number SEAK Hatchery, Number SEAK Wild) or a sum divided by Sampled Harvest (Percent SEAK, Percent SEAK Hatchery, Percent SEAK Wild). Where appropriate, standard errors (SE) appear to the right of an estimate.

Table 3. Harvest of SEAK-origin Chinook salmon in the SEAK sport fishery, 2005–2021.

Year	Total Harvest	SE	SEAK				SEAK Hatchery				SEAK Wild			
			Number	SE	Percent	SE	Number	SE	Percent	SE	Number	SE	Percent	SE
2005	86,575	2,881	46,979	2,072	58%	3.3%	24,882	2,236	31%	3.0%	22,097	3,048	27%	4.4%
2006	85,794	2,954	37,326	2,174	47%	3.2%	18,069	1,798	23%	2.4%	19,258	2,821	24%	4.0%
2007	82,848	2,787	37,939	1,863	50%	3.1%	22,771	1,924	30%	2.8%	15,168	2,678	20%	4.2%
2008	49,265	2,171	33,771	1,720	75%	5.3%	18,700	1,974	42%	4.8%	15,070	2,618	34%	7.2%
2009	69,565	3,647	41,741	2,736	67%	5.9%	24,836	2,598	40%	4.8%	16,905	3,773	27%	7.6%
2010	58,503	3,728	28,110	2,694	53%	6.2%	16,258	1,779	30%	3.9%	11,852	3,228	22%	7.4%
2011	66,575	2,738	27,721	1,574	44%	3.1%	14,282	770	22%	1.5%	13,439	1,752	21%	3.5%
2012	46,495	3,285	20,263	2,274	46%	6.2%	10,255	1,191	23%	3.2%	10,008	2,567	23%	6.9%
2013	56,391	2,647	23,523	1,194	44%	3.1%	15,307	730	29%	2.0%	8,217	1,400	15%	3.7%
2014	86,942	3,122	26,392	1,429	32%	2.1%	14,901	640	18%	1.0%	11,491	1,565	14%	2.4%
2015	79,759	2,818	27,951	1,368	37%	2.2%	16,569	728	22%	1.2%	11,382	1,549	15%	2.6%
2016	68,347	2,749	15,403	895	24%	1.7%	10,535	357	16%	0.9%	4,868	963	8%	1.9%
2017	52,306	2,218	14,005	808	28%	2.1%	10,749	667	22%	1.7%	3,256	1,048	7%	2.7%
2018	30,873	1,391	14,969	867	57%	4.5%	10,180	794	39%	3.6%	4,790	1,175	18%	5.8%
2019	28,707	1,206	10,491	525	40%	2.7%	6,388	673	24%	2.8%	4,104	853	15%	3.8%
2020	33,557	1,479	9,153	468	29%	2.0%	6,487	595	21%	2.1%	2,666	757	8%	2.9%
2021	41,974	2,236	11,594	707	29%	2.4%	6,614	666	17%	1.9%	4,980	971	12%	3.1%
Total	1,024,476	11,079	427,333	6,810	42%	0.8%	247,781	5,628	24%	0.6%	179,552	8,835	18%	1.0%

Note: Total Harvest from 2005–2018 is from statewide harvest survey and 2019–2021 is from the SEAK marine sport creel program. All harvest is sampled for CWT and represented by genetic MSA estimates. Percent SEAK is from genetic MSA and Number SEAK is calculated by multiplying Total Harvest by Percent SEAK. Number SEAK Hatchery is from CWT recovery data and Percent SEAK Hatchery is computed by dividing Number SEAK Hatchery by Total Harvest. Number and Percent SEAK Wild are calculated by subtracting SEAK Hatchery from SEAK. The *Total* row is either a sum (Total Harvest, Number SEAK, Number SEAK Hatchery, Number SEAK Wild) or a sum divided by Total Harvest (Percent SEAK, Percent SEAK Hatchery, Percent SEAK Wild). Where appropriate, standard errors (SE) appear to the right of an estimate.

Table 4. Harvest of SEAK-origin Chinook salmon in the early winter troll fishery, AY2005–2021.

Accounting Year	Total Harvest	SEAK				SEAK Hatchery				SEAK Wild			
		Number	SE	Percent	SE	Number	SE	Percent	SE	Number	SE	Percent	SE
2005	12,991	2,481	337	19%	2.6%	2,626	324	20%	2.5%	0*	468	0%*	3.6%
2006	13,952	4,520	516	32%	3.7%	2,307	225	17%	1.6%	2,213	563	16%	4.0%
2007	7,642	2,545	339	33%	4.4%	1,138	141	15%	1.8%	1,407	367	18%	4.8%
2008	5,169	1,334	176	26%	3.4%	1,020	163	20%	3.2%	314	240	6%	4.6%
2009	5,511	1,632	258	30%	4.7%	1,181	182	21%	3.3%	451	316	8%	5.7%
2010	8,715	3,797	357	44%	4.1%	2,175	190	25%	2.2%	1,622	404	19%	4.6%
2011	12,867	1,225	189	10%	1.5%	1,274	186	10%	1.4%	0*	265	0%*	2.1%
2012	10,685	2,552	377	24%	3.5%	1,701	293	16%	2.7%	850	477	8%	4.5%
2013	8,188	2,549	256	31%	3.1%	1,008	208	12%	2.5%	1,541	330	19%	4.0%
2014	14,271	3,064	323	21%	2.3%	1,456	188	10%	1.3%	1,609	374	11%	2.6%
2015	24,138	2,975	409	12%	1.7%	1,022	170	4%	0.7%	1,953	443	8%	1.8%
2016	29,363	3,711	501	13%	1.7%	1,680	231	6%	0.8%	2,031	552	7%	1.9%
2017	6,573	783	141	12%	2.1%	171	55	3%	0.8%	612	151	9%	2.3%
2018	7,398	1,614	234	22%	3.2%	570	73	8%	1.0%	1,044	245	14%	3.3%
2019	5,907	2,604	233	44%	3.9%	981	120	17%	2.0%	1,623	262	27%	4.4%
2020	8,370	2,182	188	26%	2.2%	916	115	11%	1.4%	1,266	220	15%	2.6%
2021	6,312	1,991	155	32%	2.4%	1,277	155	20%	2.5%	714	219	11%	3.5%
Total	188,052	41,560	1,294	22%	0.7%	22,503	783	12%	0.4%	19,057	1,512	10%	0.8%

Note: Asterisks (*) indicate point estimates less than 0 that were set equal to 0; the standard error is from the original point estimate.

Note: Total Harvest is from fish tickets. Percent SEAK is from genetic MSA and Number SEAK is calculated by multiplying Total Harvest by Percent SEAK. Number SEAK Hatchery is from CWT recovery data and Percent SEAK Hatchery is computed by dividing Number SEAK Hatchery by Total Harvest. Number and Percent SEAK Wild are calculated by subtracting SEAK Hatchery from SEAK. The *Total* row is either a sum (Total Harvest, Number SEAK, Number SEAK Hatchery, Number SEAK Wild) or a sum divided by Total Harvest (Percent SEAK, Percent SEAK Hatchery, Percent SEAK Wild). Where appropriate, standard errors (SE) appear to the right of an estimate.

Table 5. Harvest of SEAK-origin Chinook salmon in the late winter troll fishery, 2005–2021.

Year	Total Harvest	SEAK				SEAK Hatchery				SEAK Wild			
		Number	SE	Percent	SE	Number	SE	Percent	SE	Number	SE	Percent	SE
2005	37,479	5,847	1,043	16%	2.8%	2,850	384	8%	1.0%	2,997	1,111	8%	3.0%
2006	34,970	6,260	1,135	18%	3.2%	1,686	205	5%	0.6%	4,574	1,154	13%	3.3%
2007	39,230	9,180	1,332	23%	3.4%	3,583	424	9%	1.1%	5,597	1,398	14%	3.6%
2008	16,655	5,463	764	33%	4.6%	1,834	212	11%	1.3%	3,628	793	22%	4.8%
2009	19,378	4,536	496	23%	2.6%	1,575	212	8%	1.1%	2,961	539	15%	2.8%
2010	33,821	8,325	888	25%	2.6%	3,199	288	9%	0.9%	5,126	933	15%	2.8%
2011	37,959	5,915	909	16%	2.4%	2,509	310	7%	0.8%	3,407	960	9%	2.5%
2012	37,217	9,333	1,022	25%	2.7%	4,194	408	11%	1.1%	5,140	1,101	14%	3.0%
2013	18,360	4,518	547	25%	3.0%	2,400	333	13%	1.8%	2,118	641	12%	3.5%
2014	42,263	3,807	701	9%	1.7%	1,726	246	4%	0.6%	2,081	743	5%	1.8%
2015	26,535	3,256	476	12%	1.8%	1,005	223	4%	0.8%	2,251	526	8%	2.0%
2016	22,928	2,589	401	11%	1.8%	963	178	4%	0.8%	1,626	439	7%	1.9%
2017	37,291	4,534	723	12%	1.9%	2,756	231	7%	0.6%	1,778	759	5%	2.0%
2018	4,569	832	104	18%	2.3%	174	44	4%	1.0%	658	113	14%	2.5%
2019	6,459	1,235	130	19%	2.0%	667	240	10%	3.7%	569	273	9%	4.2%
2020	7,440	1,194	151	16%	2.0%	251	78	3%	1.0%	943	170	13%	2.3%
2021	8,760	1,363	189	16%	2.2%	326	82	4%	0.9%	1,036	206	12%	2.4%
Total	431,314	78,186	3,070	18%	0.7%	31,697	1,088	7%	0.8%	46,490	3,257	11%	12.9%

Note: Total Harvest is from fish tickets. Percent SEAK is from genetic MSA and Number SEAK is calculated by multiplying Total Harvest by Percent SEAK. Number SEAK Hatchery is from CWT recovery data and Percent SEAK Hatchery is computed by dividing Number SEAK Hatchery by Total Harvest. Number and Percent SEAK Wild are calculated by subtracting SEAK Hatchery from SEAK. The *Total* row is either a sum (Total Harvest, Number SEAK, Number SEAK Hatchery, Number SEAK Wild) or a sum divided by Total Harvest (Percent SEAK, Percent SEAK Hatchery, Percent SEAK Wild). Where appropriate, standard errors (SE) appear to the right of an estimate.

Table 6. Harvest of SEAK-origin Chinook salmon in the spring troll fishery, 2005–2021.

Year	Total Harvest	SEAK				SEAK Hatchery				SEAK Wild			
		Number	SE	Percent	SE	Number	SE	Percent	SE	Number	SE	Percent	SE
2005	60,701	37,102	2,116	61%	3.5%	20,029	823	33%	1.4%	17,073	2,270	28%	3.7%
2006	37,936	24,155	1,472	64%	3.9%	10,638	507	28%	1.3%	13,517	1,557	36%	4.1%
2007	49,786	31,274	1,664	63%	3.3%	19,385	772	39%	1.6%	11,889	1,835	24%	3.7%
2008	41,132	31,239	1,363	76%	3.3%	22,440	693	55%	1.7%	8,798	1,529	21%	3.7%
2009	32,859	18,767	899	57%	2.7%	12,499	562	38%	1.7%	6,267	1,060	19%	3.2%
2010	29,785	19,309	824	65%	2.8%	11,987	484	40%	1.6%	7,322	955	25%	3.2%
2011	41,080	25,338	1,046	62%	2.5%	17,924	695	44%	1.7%	7,415	1,256	18%	3.1%
2012	25,565	15,883	752	62%	2.9%	10,470	483	41%	1.9%	5,414	894	21%	3.5%
2013	38,287	17,860	1,230	47%	3.2%	12,016	495	31%	1.3%	5,844	1,326	15%	3.5%
2014	43,808	18,949	1,101	43%	2.5%	10,356	451	24%	1.0%	8,593	1,190	20%	2.7%
2015	54,499	26,333	1,349	48%	2.5%	15,994	639	29%	1.2%	10,340	1,493	19%	2.7%
2016	42,780	17,575	1,045	41%	2.4%	9,122	468	21%	1.1%	8,453	1,145	20%	2.7%
2017	18,249	6,325	412	35%	2.3%	3,922	241	21%	1.3%	2,403	478	13%	2.6%
2018	8,395	6,451	89	77%	1.1%	4,776	229	57%	2.7%	1,675	246	20%	2.9%
2019	12,325	8,188	168	66%	1.4%	6,057	273	49%	2.2%	2,131	320	17%	2.6%
2020	13,600	4,620	199	34%	1.5%	3,414	226	25%	1.7%	1,206	301	9%	2.2%
2021	16,535	6,501	220	39%	1.3%	5,757	260	35%	1.6%	745	341	5%	2.1%
Total	567,322	315,869	4,511	56%	0.8%	196,785	2,158	35%	0.4%	119,085	5,001	21%	0.9%

Note: Total Harvest is from fish tickets. Percent SEAK is from genetic MSA and Number SEAK is calculated by multiplying Total Harvest by Percent SEAK. Number SEAK Hatchery is from CWT recovery data and Percent SEAK Hatchery is computed by dividing Number SEAK Hatchery by Total Harvest. Number and Percent SEAK Wild are calculated by subtracting SEAK Hatchery from SEAK. The *Total* row is either a sum (Total Harvest, Number SEAK, Number SEAK Hatchery, Number SEAK Wild) or a sum divided by Total Harvest (Percent SEAK, Percent SEAK Hatchery, Percent SEAK Wild). Where appropriate, standard errors (SE) appear to the right of an estimate.

Table 7. Harvest of SEAK-origin Chinook salmon in the summer retention 1 troll fishery, 2005–2021.

Year	Total Harvest	SEAK				SEAK Hatchery				SEAK Wild			
		Number	SE	Percent	SE	Number	SE	Percent	SE	Number	SE	Percent	SE
2005	151,128	21,762	3,259	14%	2.2%	7,078	622	5%	0.4%	14,684	3,318	10%	2.2%
2006	129,810	7,399	2,527	6%	1.9%	3,333	335	3%	0.3%	4,066	2,549	3%	2.0%
2007	140,549	16,725	2,811	12%	2.0%	5,385	436	4%	0.3%	11,340	2,845	8%	2.0%
2008	59,913	8,268	1,539	14%	2.6%	3,501	351	6%	0.6%	4,767	1,579	8%	2.6%
2009	84,575	8,970	1,378	11%	1.6%	3,454	349	4%	0.4%	5,516	1,421	7%	1.7%
2010	74,712	9,990	1,323	13%	1.8%	2,920	377	4%	0.5%	7,070	1,376	9%	1.8%
2011	120,916	11,633	996	10%	0.8%	3,294	401	3%	0.3%	8,339	1,074	7%	0.9%
2012	61,624	9,904	1,057	16%	1.7%	1,825	287	3%	0.5%	8,079	1,095	13%	1.8%
2013	84,650	8,926	1,312	11%	1.6%	2,864	318	3%	0.4%	6,062	1,350	7%	1.6%
2014	199,431	8,119	2,007	4%	1.0%	3,026	421	2%	0.2%	5,093	2,051	3%	1.0%
2015	164,664	9,589	1,582	6%	1.0%	4,310	420	3%	0.3%	5,279	1,637	3%	1.0%
2016	106,632	2,984	869	3%	0.8%	1,198	248	1%	0.2%	1,787	904	2%	0.8%
2017	64,423	4,014	581	6%	0.9%	1,813	237	3%	0.4%	2,200	628	3%	1.0%
2018	58,992	7,792	982	13%	1.7%	3,319	351	6%	0.6%	4,473	1,043	8%	1.8%
2019	58,558	4,719	740	8%	1.3%	1,050	190	2%	0.3%	3,669	764	6%	1.3%
2020	71,494	2,534	580	4%	0.8%	763	155	1%	0.2%	1,771	600	2%	0.8%
2021	70,465	4,248	756	6%	1.1%	2,564	370	4%	0.5%	1,684	842	2%	1.2%
Total	1,702,536	147,576	6,694	9%	0.4%	51,698	1,487	3%	0.1%	95,879	6,857	6%	0.4%

Note: Total Harvest is from fish tickets. Percent SEAK is from genetic MSA and Number SEAK is calculated by multiplying Total Harvest by Percent SEAK. Number SEAK Hatchery is from CWT recovery data and Percent SEAK Hatchery is computed by dividing Number SEAK Hatchery by Total Harvest. Number and Percent SEAK Wild are calculated by subtracting SEAK Hatchery from SEAK. The *Total* row is either a sum (Total Harvest, Number SEAK, Number SEAK Hatchery, Number SEAK Wild) or a sum divided by Total Harvest (Percent SEAK, Percent SEAK Hatchery, Percent SEAK Wild). Where appropriate, standard errors (SE) appear to the right of an estimate.

Table 8. Harvest of SEAK-origin Chinook salmon in the summer retention 2 troll fishery, 2005–2021.

Year	Total Harvest	SEAK				SEAK Hatchery				SEAK Wild			
		Number	SE	Percent	SE	Number	SE	Percent	SE	Number	SE	Percent	SE
2005	75,725	4,998	1,531	7%	2.0%	3,242	347	4%	0.5%	1,755	1,570	2%	2.1%
2006	65,590	8,330	1,947	13%	3.0%	2,865	277	4%	0.4%	5,465	1,966	8%	3.0%
2007	30,778	3,601	718	12%	2.3%	941	174	3%	0.6%	2,660	739	9%	2.4%
2008	28,983	1,536	382	5%	1.3%	416	104	1%	0.4%	1,120	396	4%	1.4%
2009	33,012	4,495	703	14%	2.1%	1,848	221	6%	0.7%	2,646	737	8%	2.2%
2010	48,455	8,681	968	18%	2.0%	1,442	206	3%	0.4%	7,240	989	15%	2.0%
2011	29,736	2,406	343	8%	1.2%	923	150	3%	0.5%	1,483	375	5%	1.3%
2012	73,970	15,675	1,442	21%	1.9%	3,105	334	4%	0.5%	12,569	1,480	17%	2.0%
2013	0	–	–	–	–	–	–	–	–	–	–	–	–
2014	55,653	6,112	710	11%	1.3%	1,924	301	3%	0.5%	4,188	771	8%	1.4%
2015	0	–	–	–	–	–	–	–	–	–	–	–	–
2016	74,240	2,812	595	4%	0.8%	954	193	1%	0.3%	1,859	626	3%	0.8%
2017	0	–	–	–	–	–	–	–	–	–	–	–	–
2018	27,742	3,561	584	13%	2.1%	1,007	211	4%	0.8%	2,554	621	9%	2.2%
2019	25,374	925	272	4%	1.1%	478	156	2%	0.6%	447	313	2%	1.2%
2020	68,893	5,242	871	8%	1.3%	2,425	252	4%	0.4%	2,817	907	4%	1.3%
2021	60,814	3,863	605	6%	1.0%	1,937	222	3%	0.4%	1,926	645	3%	1.1%
Total	698,965	72,236	3,581	10%	0.5%	23,507	879	3%	0.1%	48,729	3,687	7%	0.5%

Note: Total Harvest is from fish tickets. Percent SEAK is from genetic MSA and Number SEAK is calculated by multiplying Total Harvest by Percent SEAK. Number SEAK Hatchery is from CWT recovery data and Percent SEAK Hatchery is computed by dividing Number SEAK Hatchery by Total Harvest. Number and Percent SEAK Wild are calculated by subtracting SEAK Hatchery from SEAK. The *Total* row is either a sum (Total Harvest, Number SEAK, Number SEAK Hatchery, Number SEAK Wild) or a sum divided by Total Harvest (Percent SEAK, Percent SEAK Hatchery, Percent SEAK Wild). Where appropriate, standard errors (SE) appear to the right of an estimate.

Table 9. Harvest of SEAK-origin Chinook salmon in the Ketchikan area sport fishery, 2005–2021.

Year	Total Harvest	SE	SEAK				SEAK Hatchery				SEAK Wild			
			Number	SE	Percent	SE	Number	SE	Percent	SE	Number	SE	Percent	SE
2005	20,300	1,541	15,756	1,320	78%	8.8%	12,328	2,004	61%	10.9%	3,428	2,400	17%	14.0%
2006	12,908	982	8,643	776	67%	7.9%	5,251	1,059	41%	8.8%	3,391	1,313	26%	11.8%
2007	13,825	1,128	10,303	933	75%	9.1%	6,601	1,492	48%	11.5%	3,702	1,760	27%	14.6%
2008	11,866	1,398	10,867	1,243	92%	15.0%	6,581	1,586	55%	14.9%	4,286	2,015	36%	21.2%
2009	23,724	3,020	20,334	2,393	86%	14.9%	13,332	2,277	56%	12.0%	7,002	3,303	30%	19.1%
2010	11,517	3,020	10,009	2,428	87%	31.0%	7,085	1,463	62%	20.5%	2,925	2,835	25%	37.2%
2011	14,388	1,608	11,348	1,270	79%	12.5%	5,629	566	39%	5.9%	5,719	1,391	40%	13.8%
2012	6,214	2,860	4,940	2,102	79%	49.8%	2,619	1,133	42%	26.6%	2,321	2,389	37%	56.5%
2013	11,972	1,143	8,548	819	71%	9.7%	5,704	469	48%	6.0%	2,844	944	24%	11.4%
2014	15,916	1,698	12,211	1,195	77%	11.1%	5,908	459	37%	4.9%	6,304	1,280	40%	12.1%
2015	13,712	1,284	8,350	852	61%	8.4%	5,042	292	37%	4.1%	3,308	901	24%	9.4%
2016	7,309	822	4,249	526	58%	9.7%	2,193	211	30%	4.4%	2,056	567	28%	10.7%
2017	7,813	957	4,411	546	56%	9.8%	2,735	387	35%	6.6%	1,676	669	21%	11.8%
2018	7,389	840	5,611	590	76%	11.8%	2,497	439	34%	7.1%	3,114	735	42%	13.7%
2019	3,782	601	2,447	389	65%	14.5%	1,149	437	30%	12.5%	1,298	585	34%	19.2%
2020	3,221	437	1,414	217	44%	9.0%	879	261	27%	8.9%	535	340	17%	12.7%
2021	4,756	936	2,124	413	45%	12.4%	674	176	14%	4.6%	1,449	449	30%	13.2%
Total	190,612	6,718	141,565	5,151	74%	3.8%	86,207	4,473	45%	2.8%	55,358	6,822	29%	4.7%

Note: Total Harvest from 2005–2018 is from statewide harvest survey and 2019–2021 is from the SEAK marine sport creel program. Percent SEAK is from genetic MSA and Number SEAK is calculated by multiplying Total Harvest by Percent SEAK. Number SEAK Hatchery is from CWT recovery data and Percent SEAK Hatchery is computed by dividing Number SEAK Hatchery by Total Harvest. Number and Percent SEAK Wild are calculated by subtracting SEAK Hatchery from SEAK. The *Total* row is either a sum (Total Harvest, Number SEAK, Number SEAK Hatchery, Number SEAK Wild) or a sum divided by Total Harvest (Percent SEAK, Percent SEAK Hatchery, Percent SEAK Wild). Where appropriate, standard errors (SE) appear to the right of an estimate.

Table 10. Harvest of SEAK-origin Chinook salmon in the northern inside area sport fishery, 2005–2021.

Year	Total Harvest	SE	SEAK				SEAK Hatchery				SEAK Wild			
			Number	SE	Percent	SE	Number	SE	Percent	SE	Number	SE	Percent	SE
2005	16,307	1,062	14,898	1,003	91%	8.6%	6,663	879	41%	6.0%	8,235	1,334	50%	10.5%
2006	12,465	1,138	11,824	909	95%	11.3%	4,696	656	38%	6.3%	7,129	1,121	57%	12.9%
2007	11,672	1,061	11,015	839	94%	11.2%	5,650	994	48%	9.6%	5,365	1,301	46%	14.7%
2008	10,974	1,107	10,420	846	95%	12.3%	5,737	852	52%	9.4%	4,683	1,200	43%	15.5%
2009	12,904	1,362	12,250	1,086	95%	13.1%	7,457	1,213	58%	11.2%	4,792	1,628	37%	17.2%
2010	10,827	1,361	10,160	925	94%	14.6%	5,401	979	50%	11.0%	4,759	1,347	44%	18.3%
2011	8,093	906	7,473	647	92%	13.1%	3,926	472	49%	8.0%	3,547	801	44%	15.3%
2012	6,599	638	6,011	487	91%	11.5%	3,550	337	54%	7.3%	2,461	592	37%	13.6%
2013	8,750	768	7,867	589	90%	10.4%	5,696	518	65%	8.2%	2,171	784	25%	13.2%
2014	7,670	897	6,291	547	82%	12.0%	3,789	411	49%	7.9%	2,502	684	33%	14.3%
2015	10,158	1,088	9,218	779	91%	12.4%	6,030	646	59%	9.0%	3,188	1,012	31%	15.3%
2016	3,983	557	3,486	357	88%	15.2%	1,712	203	43%	7.9%	1,774	410	45%	17.1%
2017	3,032	556	2,778	464	92%	22.7%	2,423	487	80%	21.7%	355	673	12%	31.4%
2018	3,737	569	3,592	533	96%	20.4%	2,754	554	74%	18.6%	839	769	22%	27.6%
2019	4,127	298	3,806	271	92%	9.4%	2,475	424	60%	11.2%	1,331	504	32%	14.6%
2020	3,475	259	3,080	238	89%	9.5%	2,390	458	69%	14.1%	690	516	20%	17.0%
2021	4,193	376	3,721	360	89%	11.7%	2,176	492	52%	12.6%	1,545	610	37%	17.2%
Total	138,966	3,678	127,889	2,843	92%	3.2%	72,524	2,785	52%	2.4%	55,365	3,980	40%	4.0%

Note: Total Harvest from 2005–2018 is from statewide harvest survey and 2019–2021 is from the SEAK marine sport creel program. Percent SEAK is from genetic MSA and Number SEAK is calculated by multiplying Total Harvest by Percent SEAK. Number SEAK Hatchery is from CWT recovery data and Percent SEAK Hatchery is computed by dividing Number SEAK Hatchery by Total Harvest. Number and Percent SEAK Wild are calculated by subtracting SEAK Hatchery from SEAK. The *Total* row is either a sum (Total Harvest, Number SEAK, Number SEAK Hatchery, Number SEAK Wild) or a sum divided by Total Harvest (Percent SEAK, Percent SEAK Hatchery, Percent SEAK Wild). Where appropriate, standard errors (SE) appear to the right of an estimate.

Table 11. Harvest of SEAK-origin Chinook salmon in the Petersburg and Wrangell area sport fishery, 2005–2021.

Year	Total Harvest	SE	SEAK				SEAK Hatchery				SEAK Wild			
			Number	SE	Percent	SE	Number	SE	Percent	SE	Number	SE	Percent	SE
2005	8,988	1,323	8,590	861	96%	17.0%	2,921	189	32%	5.2%	5,669	881	63%	17.8%
2006	10,972	979	10,492	713	96%	10.7%	5,711	365	52%	5.7%	4,781	801	44%	12.1%
2007	10,797	1,005	10,133	649	94%	10.6%	6,205	178	57%	5.6%	3,928	673	36%	12.0%
2008	5,669	718	5,408	440	95%	14.4%	3,237	449	57%	10.7%	2,171	629	38%	17.9%
2009	5,328	616	4,457	345	84%	11.6%	2,366	119	44%	5.6%	2,092	365	39%	12.9%
2010	3,987	616	3,637	346	91%	16.5%	1,362	92	34%	5.8%	2,274	358	57%	17.5%
2011	3,843	662	2,934	294	76%	15.2%	1,434	156	37%	7.6%	1,500	333	39%	17.0%
2012	3,679	461	3,038	276	83%	12.8%	1,424	76	39%	5.3%	1,614	286	44%	13.8%
2013	3,657	624	3,114	415	85%	18.4%	672	58	18%	3.5%	2,441	419	67%	18.8%
2014	5,214	470	4,617	336	89%	10.3%	3,015	141	58%	5.9%	1,602	365	31%	11.8%
2015	5,045	536	4,441	319	88%	11.3%	2,015	17	40%	4.3%	2,426	320	48%	12.1%
2016	6,897	635	5,739	439	83%	10.0%	3,669	147	53%	5.3%	2,070	463	30%	11.3%
2017	4,203	323	3,737	184	89%	8.1%	3,605	211	86%	8.3%	132	280	3%	11.6%
2018	3,470	358	3,130	258	90%	11.9%	2,791	84	80%	8.6%	338	272	10%	14.7%
2019	2,398	159	2,156	112	90%	7.6%	1,667	83	70%	5.8%	489	140	20%	9.5%
2020	3,241	459	2,864	277	88%	15.2%	1,947	143	60%	9.6%	917	312	28%	18.0%
2021	2,502	343	2,344	225	94%	15.7%	1,607	86	64%	9.5%	737	241	29%	18.3%
Total	89,889	2,744	80,830	1,757	90%	3.4%	45,649	766	51%	1.8%	35,181	1,916	39%	3.8%

Note: Total Harvest from 2005–2018 is from statewide harvest survey and 2019–2021 is from the SEAK marine sport creel program. Percent SEAK is from genetic MSA and Number SEAK is calculated by multiplying Total Harvest by Percent SEAK. Number SEAK Hatchery is from CWT recovery data and Percent SEAK Hatchery is computed by dividing Number SEAK Hatchery by Total Harvest. Number and Percent SEAK Wild are calculated by subtracting SEAK Hatchery from SEAK. The *Total* row is either a sum (Total Harvest, Number SEAK, Number SEAK Hatchery, Number SEAK Wild) or a sum divided by Total Harvest (Percent SEAK, Percent SEAK Hatchery, Percent SEAK Wild). Where appropriate, standard errors (SE) appear to the right of an estimate.

Table 12. Harvest of SEAK-origin Chinook salmon in the outside area sport fishery, 2005–2021.

Year	Total Harvest	SE	SEAK				SEAK Hatchery				SEAK Wild			
			Number	SE	Percent	SE	Number	SE	Percent	SE	Number	SE	Percent	SE
2005	40,980	1,746	7,736	897	19%	2.3%	2,971	416	7%	1.1%	4,765	988	12%	2.6%
2006	49,449	2,348	6,368	1,670	13%	3.4%	2,411	1,244	5%	2.5%	3,957	2,082	8%	4.3%
2007	46,554	2,088	6,488	1,215	14%	2.7%	4,315	673	9%	1.5%	2,174	1,389	5%	3.1%
2008	20,756	1,010	7,076	709	34%	3.8%	3,146	672	15%	3.3%	3,930	977	19%	5.0%
2009	27,609	1,395	4,700	678	17%	2.6%	1,681	282	6%	1.1%	3,019	734	11%	2.8%
2010	32,172	1,597	4,304	622	13%	2.0%	2,410	238	7%	0.8%	1,894	666	6%	2.2%
2011	40,251	1,911	5,966	598	15%	1.6%	3,294	162	8%	0.6%	2,673	619	7%	1.7%
2012	30,003	1,411	6,274	661	21%	2.4%	2,662	124	9%	0.6%	3,612	673	12%	2.5%
2013	32,012	2,172	3,995	485	12%	1.7%	3,234	202	10%	0.9%	761	526	2%	2.0%
2014	58,142	2,416	3,273	449	6%	0.8%	2,189	97	4%	0.2%	1,084	459	2%	0.8%
2015	50,844	2,196	5,942	661	12%	1.4%	3,481	162	7%	0.4%	2,460	681	5%	1.5%
2016	50,158	2,483	1,929	451	4%	0.9%	2,961	142	6%	0.4%	0*	473	0%*	1.0%
2017	37,258	1,894	3,079	327	8%	1.0%	1,985	117	5%	0.4%	1,094	347	3%	1.1%
2018	16,277	882	2,636	227	16%	1.6%	2,138	353	13%	2.3%	498	419	3%	2.8%
2019	18,400	989	2,082	196	11%	1.2%	1,096	273	6%	1.5%	987	336	5%	2.0%
2020	23,620	1,311	1,794	196	8%	0.9%	1,272	235	5%	1.0%	522	306	2%	1.4%
2021	30,524	1,965	3,405	386	11%	1.5%	2,155	405	7%	1.4%	1,250	559	4%	2.0%
Total	605,008	7,520	77,049	2,945	13%	0.5%	43,401	1,825	7%	0.3%	33,648	3,465	6%	0.6%

Note: Asterisks (*) indicate point estimates less than 0 that were set equal to 0; the standard error is from the original point estimate.

Note: Total Harvest from 2005–2018 is from statewide harvest survey and 2019–2021 is from the SEAK marine sport creel program. Percent SEAK is from genetic MSA and Number SEAK is calculated by multiplying Total Harvest by Percent SEAK. Number SEAK Hatchery is from CWT recovery data and Percent SEAK Hatchery is computed by dividing Number SEAK Hatchery by Total Harvest. Number and Percent SEAK Wild are calculated by subtracting SEAK Hatchery from SEAK. The *Total* row is either a sum (Total Harvest, Number SEAK, Number SEAK Hatchery, Number SEAK Wild) or a sum divided by Total Harvest (Percent SEAK, Percent SEAK Hatchery, Percent SEAK Wild). Where appropriate, standard errors (SE) appear to the right of an estimate.
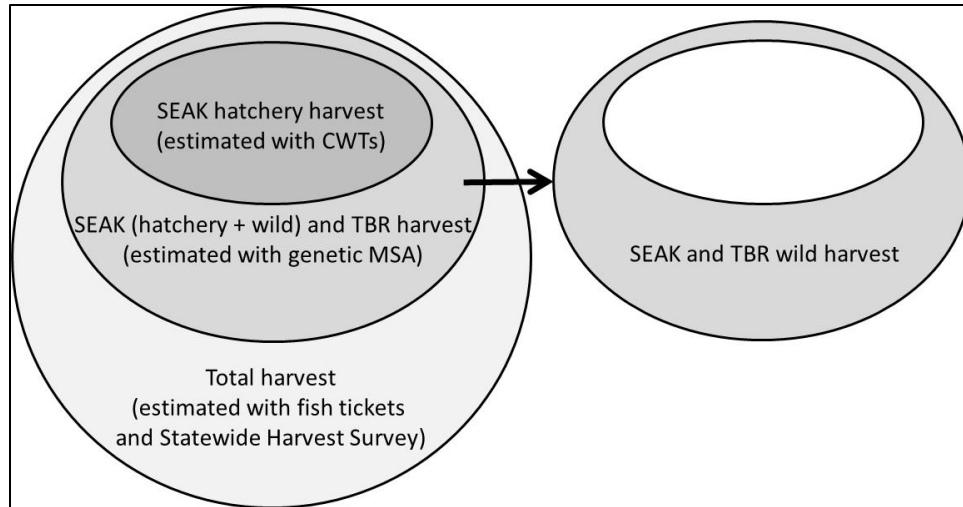
Figure 1. Conceptual diagram showing how information from fish tickets and Statewide Harvest Survey, genetic mixed stock analyses (MSA), and coded-wire-tags (CWTs) were used to estimate the Southeast Alaska (SEAK) and Transboundary River (TBR) wild component of the harvest.
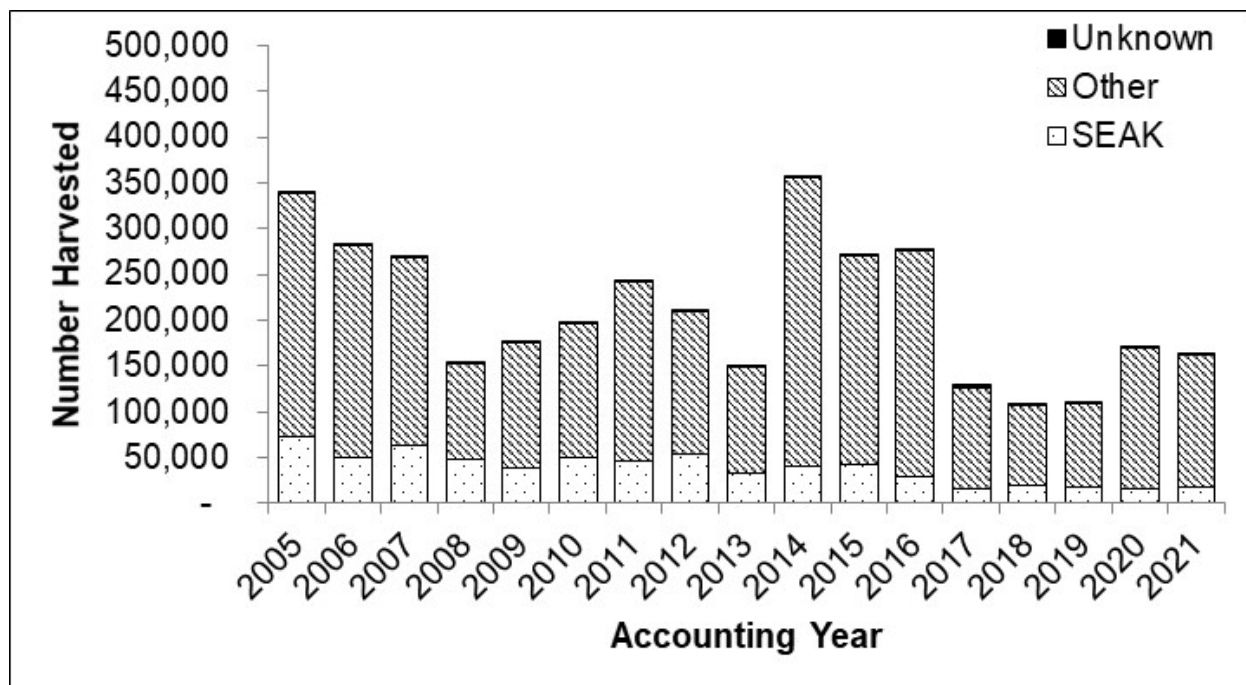
Figure 2. Number of Chinook salmon harvested in the commercial troll fishery by SEAK and other stock groups, AY2005–2021. The number of SEAK and other fish harvested was estimated using the methods described in Appendix A and the uncertainty for the number of SEAK Chinook harvested is shown in Table 2. Harvest that was not sampled was considered unknown.
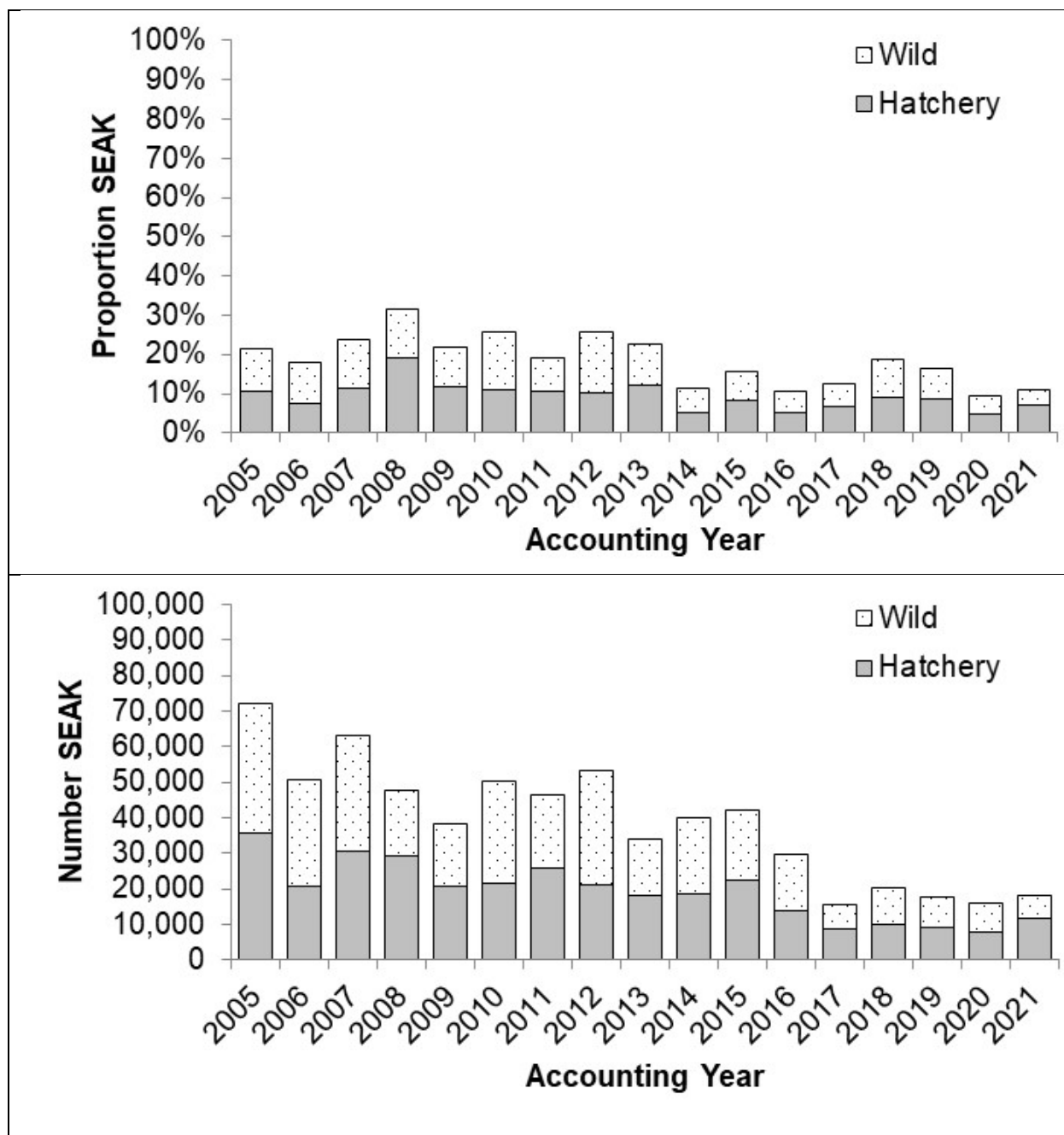
Figure 3. Proportion (top panel) and number (bottom panel) of SEAK wild- and hatchery-origin Chinook salmon harvested by the commercial troll fishery, AY2005–2021.
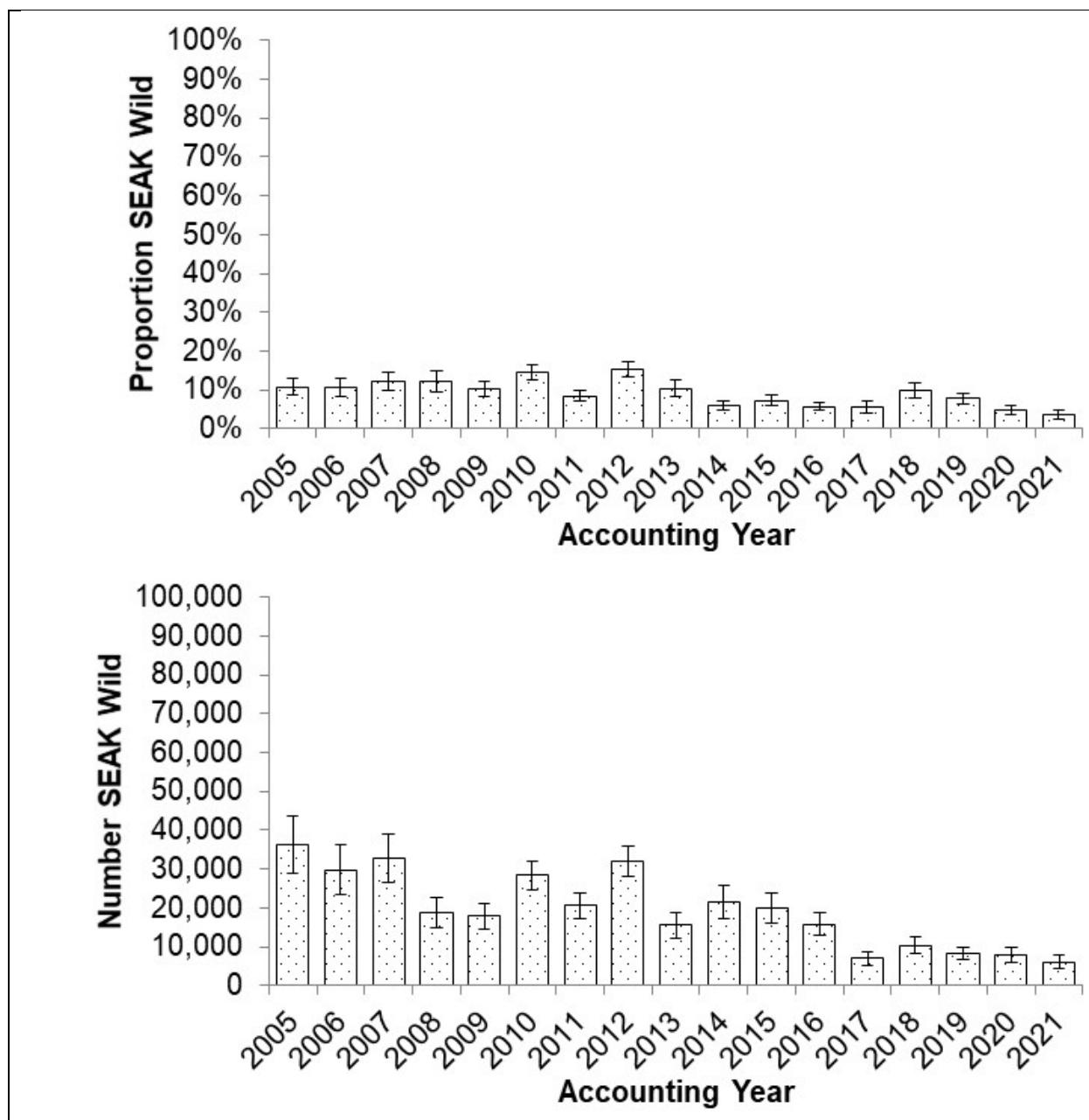
Figure 4. Proportion (top panel) and number (bottom panel) of SEAK wild-origin Chinook salmon harvested by the commercial troll fishery, AY2005–2021. Error bars represent 95% confidence intervals.
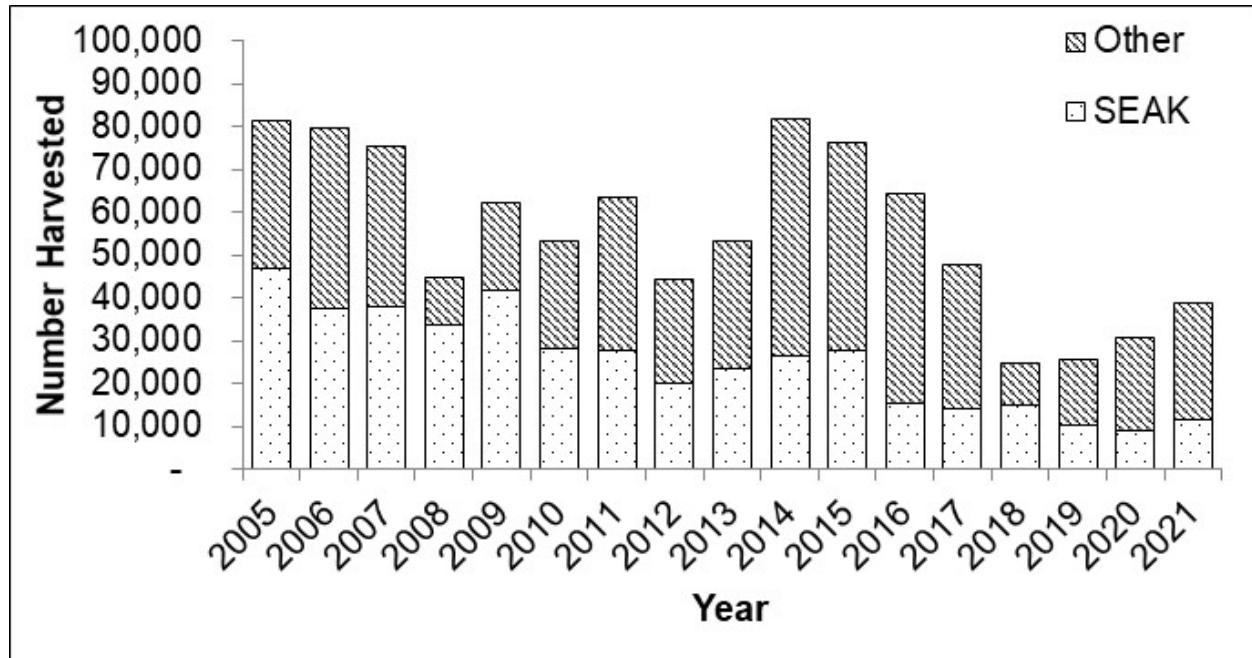
Figure 5. Number of Chinook salmon harvested in the sport fishery by SEAK and other stock groups, 2005–2021. The number of SEAK and other harvested was estimated using the methods described in Appendix A and the uncertainty for number SEAK is shown in Table 3.
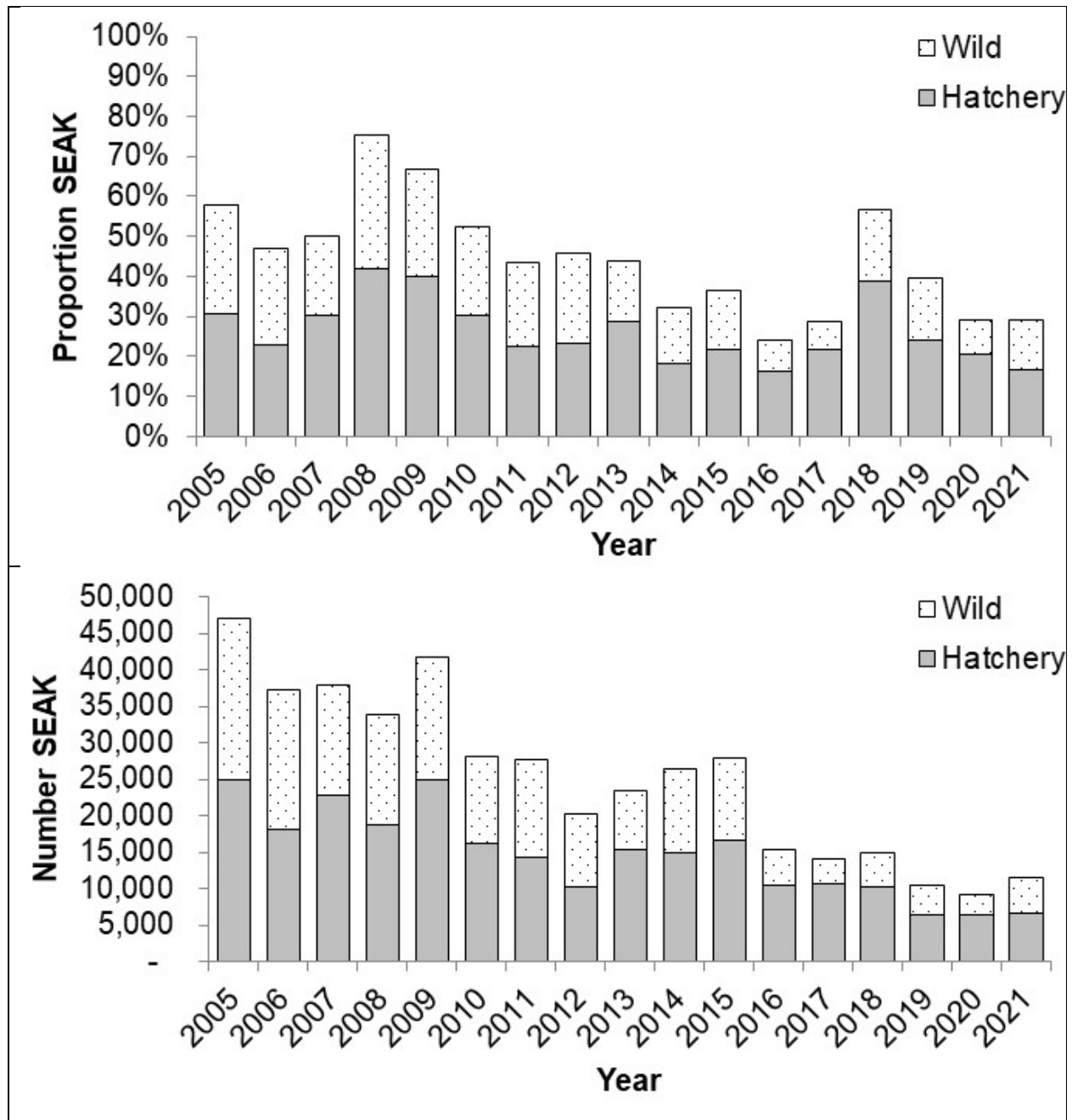
Figure 6. Proportion (top panel) and number (bottom panel) of SEAK wild- and hatchery-origin Chinook salmon harvested by the sport fishery, 2005–2021.
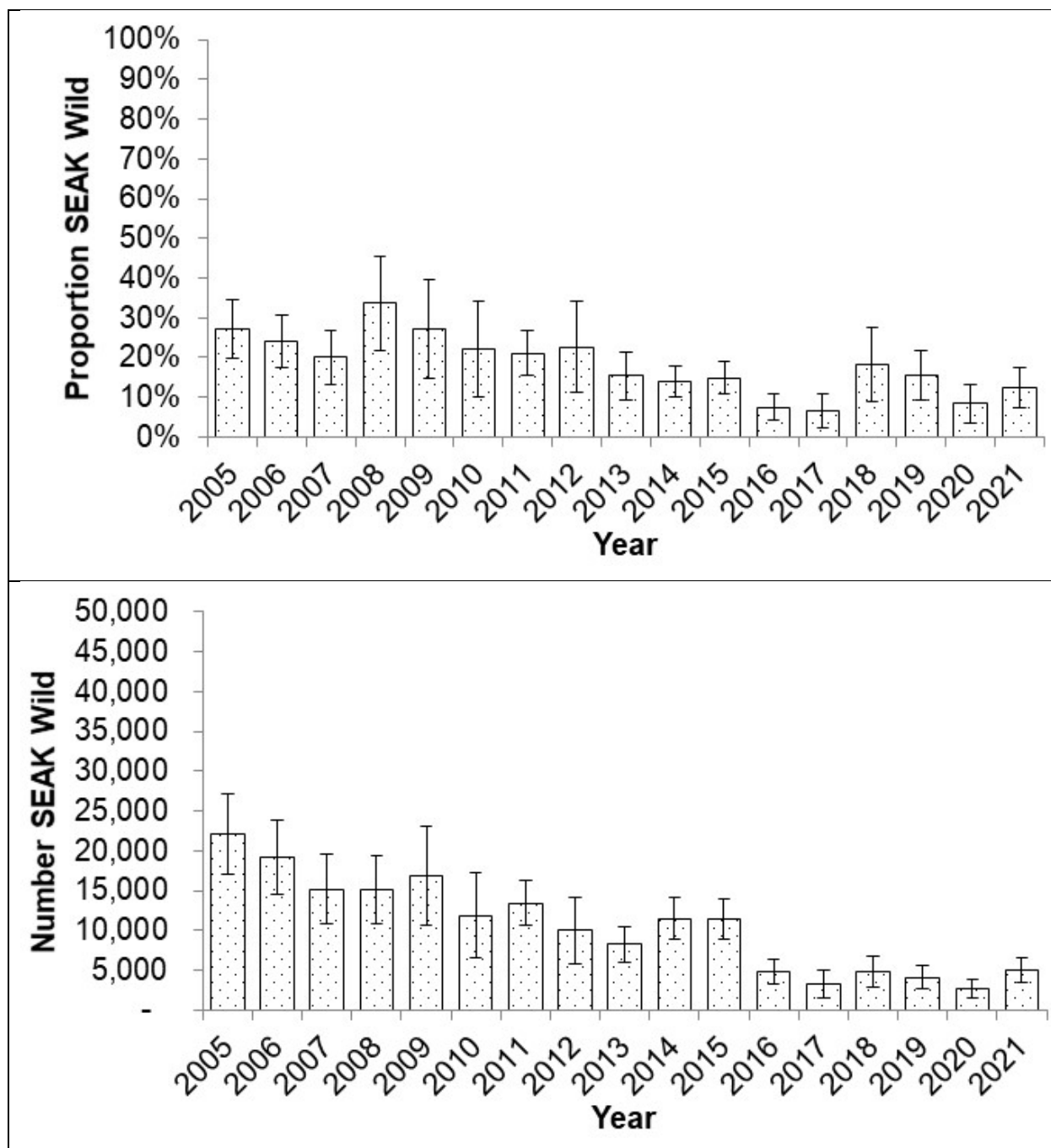
Figure 7. Proportion (top panel) and number (bottom panel) of SEAK wild-origin Chinook salmon harvested by the sport fishery, 2005–2021. Error bars represent 95% confidence intervals.

APPENDIX A. METHODS

A description of notation used herein is presented in Appendix A Table 1. All computations are stratified by fishery, F, where fishery is often defined by gear and either time or area. Except for total harvest, all computations are indexed by stock, S, and unless otherwise noted, stock refers to both SEAK- and TBR-origin fish. The number of fish harvested by stock and fishery is:

$$C_{F,S} = C_F * P_{F,S} \qquad \text{Eq. 1}$$

where C_F is catch and $P_{F,S}$ is the proportion of catch by stock as estimated using genetic mixed stock analyses (MSA). Note that if the number of reporting groups is greater than 1 (i.e. two or more reporting groups need to be combined), then

$$P_{F,S} = \sum_{i=1}^{n} P_{F,i} \qquad \text{Eq. 2}$$

Where n is the number of reporting groups to be combined. Save rounding error, the above formula to combine reporting groups (i.e. $n>1$) should yield the same estimate of $P_{F,S}$ as if $n=1$; however, the above formula for $Var(P_{F,S})$ will likely overestimate variance as if $n=1$ because the variance of genetic MSA are non-additive, which is especially pronounced when $P_i \approx 0$. Reporting groups vary by fishery and are defined by the Gene Conservation Laboratory (GCL) (Gilk-Baumer et al. 2013, 2017a, 2017b, *in prep* a, b). Also note that if the number of fisheries is greater than 1 (i.e. two or more fisheries need to be combined), then

$$P_{F,S} = \frac{\sum_{j=1}^{m} C_j P_{j,S}}{\sum_{j=1}^{m} C_j} \qquad \text{Eq. 3}$$

where m is the number of fisheries. The above formulas can be combined into a general equation for combining one or more reporting groups with one or more fisheries

$$P_{F,S} = \frac{\sum_{j=1}^{m} \sum_{i=1}^{n} C_j P_{j,i}}{\sum_{j=1}^{m} C_j} \qquad \text{Eq. 4}$$

Assuming all hatchery-origin Chinook salmon are adequately represented by CWTs, the proportion of hatchery-origin fish harvested by fishery and stock $PH_{F,S}$ is estimated as

$$PH_{F,S} = \frac{H_{F,S}}{C_F} \qquad \text{Eq. 5}$$

The proportion of wild-origin fish harvested by fishery and stock $PW_{F,S}$ is estimated as

$$PW_{F,S} = \frac{W_{F,S}}{C_F} = P_{F,S} - \frac{H_{F,S}}{C_F} \qquad \text{Eq. 6}$$

where $W_{F,S}$ is the number of wild-origin Chinook salmon and $H_{F,S}$ is the number of hatchery-origin Chinook salmon harvested by fishery and stock.

Again ***assuming*** all hatchery-origin Chinook salmon are adequately represented by CWTs (i.e. $H_{F,S}$ can be reasonably estimated)*,* the number of wild fish harvested is estimated as

$$W_{F,S} = C_{F,S} - H_{F,S} \qquad \text{Eq. 7}$$

The within stock proportion of hatchery-origin fish harvested $wH_{F,S}$ is estimated as

$$wH_{F,S} = \frac{H_{F,S}}{C_{F,S}} \qquad \text{Eq. 8}$$

And because a fish must be either of hatchery or wild-origin, the within stock proportion of wild-origin fish harvested $wW_{F,S}$ is estimated as

$$wW_{F,S} = 1 - wH_{F,S} \qquad \text{Eq. 9}$$

Since both troll and sport genetic MSA and CWT sampling programs are limited to the pre-terminal fisheries, the formulas for $C_{F,S}$ and $P_{F,S}$ require modification to account for harvest in terminal exclusion areas. All harvest in the terminal exclusion areas is assumed SEAK hatchery-origin except for in Yakutat, where terminal harvest is assumed to be SEAK wild-origin. For the spring troll fishery, which is a combination of fisheries – spring, TBR terminal, terminal exclusion areas – note the following definitions:

$$H_{F=Term,S=SEAK} = C_{F=Term} \qquad \text{Eq. 10}$$

and so

$$\widetilde{H}_{F=Spring,S} = H_{F=Spring,S} + H_{F=TBR,S} + H_{F=Term,S} \qquad \text{Eq. 11}$$

as well as

$$\widetilde{C}_{F=Spring,S} = C_{F=Spring,S} * P_{F=Spring,S} + C_{F=TBR,S} * P_{F=TBR,S} + H_{F=Term,S} \qquad \text{Eq. 12}$$

hence

$$\widetilde{P}_{F=Spring,S} = \frac{C_{F=Spring,S} + C_{F=TBR,S} + H_{F=Term,S}}{C_{F=Spring} + C_{F=TBR} + C_{F=Term}} \qquad \text{Eq. 13}$$

Similarly, each survey area in the sport fishery is a combination of pre-terminal and terminal fisheries, therefore note the following definitions:

$$H_{F=Term,S=SEAK} = C_{F=Term} \qquad \text{Eq. 14}$$

and so

$$\widetilde{H}_{F=j,S} = H_{F=j,S} + H_{j,F=Term,S} \qquad \text{Eq. 15}$$

as well as

$$\widetilde{C}_{F=j,S} = C_{F=j,S} * P_{F=j,S} + H_{j,F=Term,S} \qquad \text{Eq. 16}$$

hence

$$\widetilde{P}_{F=j,S} = \frac{C_{F=j,S} + H_{j,F=Term,S}}{C_{F=j} + C_{j,F=Term}} \qquad \text{Eq. 17}$$

where j is an index denoting area. Note for outside sport, which includes the Yakutat terminal exclusion area, additional equations similar to Eq. 14–17 are used but modified such that terminal harvest for the Yakutat area is added in but assumed to be SEAK wild. Note that the application of Eq. 13 and Eq. 17 will alter the genetic MSA estimates of stock composition.

All of the above formulas can be found in Appendix A Table 2 along with their associated formulas of variance in the case that catch is known (i.e., troll) or estimated (i.e., sport). More detailed descriptions on the derivation of these formulas are available upon request.

Appendix A. Table 1. Notation used

Symbol	Description
C_F	Number of fish harvested by fishery, either from fish tickets (commercial) or the statewide harvest survey (sport)
$C_{F=Term}$	Number of fish harvested in terminal exclusion areas. By definition, $C_{F=Term} = H_{F=Term,S=SEAK}$ and $Var(H_{F=Term,S=SEAK}) = 0$, which assumes that all fish harvested are of SEAK- and hatchery-origin. Note that fish harvested in the Yakutat terminal exclusion area are assumed to be of SEAK- and wild-origin, so $C_{F=Term(Yakutat)} = H_{F=Term(Yakutat),S=SEAK}$ and $Var(W_{F=Term(Yakutat),S=SEAK}) = 0$.
$P_{F,S}$	Proportion of fish harvested by fishery and stock
$C_{F,S}$	Number of fish harvested by fishery and stock
$H_{F,S}$	Number of hatchery fish harvested by fishery and stock
$W_{F,S}$	Number of wild fish harvested by fishery and stock
$PH_{F,S}$	Proportion of fish harvested by fishery, stock, and hatchery-origin
$PW_{F,S}$	Proportion of fish harvested by fishery, stock, and wild-origin
$wH_{F,S}$	Within stock proportion of hatchery-origin fish harvested by fishery and stock
$wW_{F,S}$	Within stock proportion of wild-origin fish harvested by fishery and stock

Appendix A. Table 2. Equations used

Statistic	Point	Variance	
		Catch known	Catch not known
$C_{F,S}$	$C_{F,S} = C_F * P_{F,S}$	$Var(C_{F,S}) = C_F^2 Var(P_{F,S})$	$Var(C_{F,S}) = C_F^2 Var(P_{F,S}) + P_{F,S}^2 Var(C_F) + Var(C_F)Var(P_{F,S})$
$W_{F,S}$	$W_{F,S} = C_{F,S} - H_{F,S}$	$Var(W_{F,S}) = C_F^2 Var(P_{F,S}) + Var(H_{F,S})$	$Var(W_{F,S}) = C_F^2 Var(P_{F,S}) + P_{F,S}^2 Var(C_F) + Var(C_F)Var(P_{F,S}) + Var(H_{F,S})$
$P_{F,S}$	$P_{F,S} = \dfrac{\sum_{j=1}^{m}\sum_{i=1}^{n} C_j P_{j,i}}{\sum_{j=1}^{m} C_j}$	$Var(P_{F,S}) = \dfrac{\sum_{j=1}^{m}\sum_{i=1}^{n} C_j^2 Var(P_{j,i})}{\left(\sum_{j=1}^{m} C_j\right)^2}$	$Var(P_{F,S}) = Var\left(\dfrac{\sum_{j=1}^{m}\sum_{i=1}^{n} C_j P_{j,i}}{\sum_{j=1}^{m} C_j}\right)$
$PH_{F,S}$	$PH_{F,S} = \dfrac{H_{F,S}}{C_F}$	$Var(PH_{F,S}) = \dfrac{1}{C_F^2} Var(H_{F,S})$	$Var(PH_{F,S}) \approx \dfrac{E(H_{F,S})^2}{E(C_F)^2} * \left[\dfrac{Var(H_{F,S})}{E(H_{F,S})^2} + \dfrac{Var(C_F)}{E(C_F)^2}\right]$
$PW_{F,S}$	$PW_{F,S} = P_{F,S} - \dfrac{H_{F,S}}{C_F}$	$Var(PW_{F,S}) = Var(P_{F,S}) + \dfrac{1}{C_F^2} Var(H_{F,S})$	$Var(PW_{F,S}) \approx Var(P_{F,S}) + \dfrac{E(H_{F,S})^2}{E(C_F)^2} * \left[\dfrac{Var(H_{F,S})}{E(H_{F,S})^2} + \dfrac{Var(C_F)}{E(C_F)^2}\right]$
$wH_{F,S}$	$wH_{F,S} \approx \dfrac{H_{F,S}}{C_{F,S}}$	$Var(wH_{F,S}) \approx \dfrac{E(H_{F,S})^2}{E(C_{F,S})^2} * \left[\dfrac{Var(H_{F,S})}{E(H_{F,S})^2} + \dfrac{Var(C_{F,S})}{E(C_{F,S})^2}\right]$	same
$wW_{F,S}$	$wW_{F,S} \approx 1 - wH_{F,S}$	$Var(wW_{F,S}) \approx Var(wH_{F,S})$	same

APPENDIX B. ESTIMATES OF HARVEST FOR THE CHILKAT, TAKU, STIKINE AND UNUK RIVER STOCKS OF CHINOOK SALMON USING CODED WIRE TAGS AND GENETIC STOCK IDENTIFICATION METHODOLGY, AY2012–2021

The tables provided in this appendix contain harvest estimates for the Chilkat, Taku, Stikine and Unuk stocks of wild Chinook salmon. These are 4 out of 34 known wild Chinook salmon populations in SEAK and CWT programs have been in place on these stocks for several decades. Harvest estimates provided here use a combination of CWT and genetic MSA results. Estimates using genetic MSA performed by the ADF&G GCL were used in Districts 108 and 111 and in other areas lacking quality CWT information, otherwise, CWT estimates using methodologies described in Bernard and Clark (1996) are provided throughout.

Information used to expand recovered CWTs is germane to the specific fishery, area, and time, and includes catch, number sampled, adipose fin clips observed, heads collected, and successfully read tags. Because catch totals are either gathered from fish tickets in commercial fisheries or estimated from catch sampling in sport fisheries, these data can often change throughout a season. In general, most sampling information is usually known soon after the sampling event and remains relatively stable.

Another important estimate used to expand wild CWTs is the mark fraction for a particular stock and brood year. Unlike hatchery programs which have a strong understanding of the fraction of the total production tagged with CWTs and marked with adipose fin clips at release (i.e., the marked fraction) at the time of tagging and marking, this is unknown in wild stock tagging programs. To solve for this, the mark fraction is estimated by sampling adults (age 3 to age 6) in their natal streams as they return to spawn. This provides accurate measures of the true marked fraction, however, it takes years to compile, and placeholder values of the marked fraction must be used for expansions until brood years are no longer active. Therefore, any estimates provided for at least the recent 2 years must always be viewed as preliminary.

In the recent decade, the CWT and adipose fin clip marked fractions for the Chilkat and Unuk stocks are on par with those seen in the SEAK hatchery program (i.e., 10%); however, this is not the case for the TBR Taku and Stikine stocks which have lower marked fractions (i.e., 1-3%). As a result, and in support of obligations defined in Chapter 1 of the PST, more detailed GSI programs were initiated in 2005 for Districts 108 and 111 to accurately delineate TBR Chinook salmon. And since Chilkat and Unuk stocks of Chinook salmon are brood stock sources used in several hatcheries in SEAK, GSI alone cannot differentiate between hatchery and wild stocks emphasizing the importance of the CWT program in place for the SEAK wild Chinook salmon stocks.

Appendix B. Table 1. Harvest estimates using CWT methodologies for the Chilkat stock of Chinook salmon in various fisheries, areas, and time periods in SEAK, 2012–2021. Estimates of total escapement, harvest and run and associated harvest rates are also shown.

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	10-yr avg
					Harvest[a]						
Winter Troll[b]	113				34	58					20
Spring Troll[b]	150	39		57		45					29
Summer R1 Troll[c]				42							4
Summer R2 Troll[c]									10	11	2
Troll Total	263	39		100	34	102			10	11	56
Early Sport[d]	307	141	360	290		125					122
Late Sport[d]	99		90		272		127		10	34	63
Sport Total	405	141	449	290	272	125	127		10	34	185
Net Total	364	218	640	316	17	11	69	87	59	28	181
Outside SEAK[e]					93						9
U.S. Total	1,032	398	1,090	706	416	239	196	87	79	73	432
Canada Total											
Total Harvest	1,032	398	1,090	706	416	239	196	87	79	73	432
Total Escapement[f]	1,723	1,719	1,529	2,452	1,380	1,173	873	2,028	3,180	2,038	1,810
Total Run	2,755	2,117	2,619	3,158	1,796	1,412	1,069	2,115	3,259	2,111	2,241
					Harvest Rate						
Winter Troll[b]	0.04				0.02	0.04					0.01
Spring Troll[b]	0.05	0.02		0.02		0.03					0.01
Summer R1 Troll[c]				0.01							0.00
Summer R2 Troll[c]									0.00	0.01	0.00
Troll Total	0.10	0.02		0.03	0.02	0.07			0.00	0.01	0.02
Early Sport[d]	0.11	0.07	0.14	0.09		0.09					0.05
Late Sport[d]	0.04		0.03		0.15		0.12		0.00	0.02	0.03
Sport Total	0.15	0.07	0.17	0.09	0.15	0.09	0.12		0.00	0.02	0.08
Net Total	0.13	0.10	0.24	0.10	0.01	0.01	0.06	0.04	0.02	0.01	0.08
Outside SEAK[e]					0.05						0.00
U.S. Total	0.37	0.19	0.42	0.22	0.23	0.17	0.18	0.04	0.02	0.03	0.19
Canada Total											
Total Harvest	0.37	0.19	0.42	0.22	0.23	0.17	0.18	0.04	0.02	0.03	0.19

[a]   Harvests are germane to Age 4 fish and older and are CWT-based.

[b]   Winter troll occurs from October of the prior year through April of the current year and spring troll occurs May through June of the current year.

[c]   Troll Summer R1 occurs in July of the current year; Troll Summer R2 occurs from August through September of the prior year.

[d]   The early sport occurs April through July of the current year; the late sport occurs in August of the prior year.

[e]   Includes fish harvested in U.S. fisheries outside of SEAK such as the high seas trawl, the Kodiak and Cook Inlet sport, the drift gillnet fishery near Cordova.

[f]   The gray cells in this row indicate escapements below the lower bound of the BEG for that particular year. The BEG range for the Chilkat stock is 1,750 to 3,500 large king salmon.

Appendix B. Table 2. Harvest estimates using CWT methodologies for the Taku stock of Chinook salmon in various fisheries, areas, and time periods in SEAK, 2012–2021. Estimates of total escapement, harvest and run and associated harvest rates are also shown.

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	10-yr avg
					Harvest[a]						
Winter Troll[b]	2,155	573	291	417		438					387
Spring Troll[b]	2,017	1,419	1,672	854	1,304	88			113	85	755
Summer R1 Troll[c]				271						201	47
Summer R2 Troll[c]											
Total Troll	4,172	1,992	1,963	1,542	1,304	527			113	286	1,190
Total Sport[d]	695	271	810	774	635	34	9	94	117	176	362
Total Net	830	502	510	534	189	269	42	317	284	241	372
Outside SEAK[e]		88				1,626	1,719		537	104	407
Terminal District 111	1,405	648	1,320	784	824	179	50	229	323	341	610
Non-Terminal	4,293	2,205	1,963	2,066	1,304	2,277	1,719	181	729	464	1,720
U.S. Total	5,698	2,853	3,283	2,850	2,128	2,456	1,770	411	1,051	806	2,330
Canada Total	2,965	738	2,472	2,447	1,630	250	7	10	94	40	1,065
Total Harvest	8,663	3,591	5,755	5,297	3,758	2,706	1,777	421	1,145	846	3,396
Total Escapement[f]	16,713	18,002	23,532	23,567	9,177	8,214	7,271	11,558	15,593	11,341	14,497
Total Run	25,376	21,593	29,287	28,864	12,935	10,920	9,048	11,979	16,738	12,187	17,893
					Harvest Rate						
Winter Troll[b]	0.08	0.03	0.01	0.01		0.04					0.02
Spring Troll[b]	0.08	0.07	0.06	0.03	0.10	0.01			0.01	0.01	0.04
Summer R1 Troll[c]				0.01						0.02	0.00
Summer R2 Troll[c]											
Total Troll	0.16	0.09	0.07	0.05	0.10	0.05			0.01	0.02	0.07
Total Sport[d]	0.03	0.01	0.03	0.03	0.05	0.00	0.00	0.01	0.01	0.01	0.02
Total Net	0.03	0.02	0.02	0.02	0.01	0.02	0.00	0.03	0.02	0.02	0.02
Outside SEAK[e]		0.004				0.15	0.19		0.03	0.01	0.02
Terminal District 111	0.06	0.03	0.05	0.03	0.06	0.02	0.01	0.02	0.02	0.03	0.03
Non-Terminal	0.17	0.10	0.07	0.07	0.10	0.21	0.19	0.02	0.04	0.04	0.10
U.S. Total	0.22	0.13	0.11	0.10	0.16	0.22	0.20	0.03	0.06	0.07	0.13
Canada Total	0.12	0.03	0.08	0.08	0.13	0.02	0.00	0.00	0.01	0.00	0.06
Total Harvest	0.34	0.17	0.20	0.18	0.29	0.25	0.20	0.04	0.07	0.07	0.19

[a] Harvests are germane to Age 4 fish and older and are CWT-based.

[b] Winter troll occurs from October of the prior year through April of the current year and spring troll occurs May through June of the current year.

[c] Troll Summer R1 occurs in July of the current year; Troll Summer R2 occurs from August through September of the prior year.

[d] Taku Chinook are inriver by mid-July and sport harvests occur primarily mid-April through June.

[e] Includes fish harvested in U.S. fisheries outside of SEAK such as the high seas trawl, the Kodiak and Cook Inlet sport, the drift gillnet fishery near Cordova.

[f] The gray cells in this row indicate escapements below the lower bound of the BEG for that particular year. The BEG range for the Taku stock is 19,000 to 36,000 large king salmon.

Appendix B. Table 3. Harvest estimates using CWT methodologies for the Stikine stock of Chinook salmon in various fisheries, areas, and time periods in SEAK, 2012–2021. Estimates of total escapement, harvest and run and associated harvest rates are also shown.

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	10-yr avg
					Harvest[a]						
Winter Troll[b]	1,721	969		354	235	356		71			371
Spring Troll[b]	1,532	1,097	1,633	1,053	339	262			208		612
Summer R1 Troll[c]	120				86			129		125	46
Summer R2 Troll[c]	999									433	143
Total Troll	4,373	2,066	1,633	1,407	659	618		200	208	558	1,172
Total Sport[d]	691	1,112	697	988	827	342	12	2	93	88	485
Total Net	1,644	1,439	1,355	597	1,153	174	27	204	305	287	718
Outside SEAK[e]		74	112	95	560	719	56	917			253
Terminal District 108	2,353	1,566	1,622	1,500	1,707	207	39	133	161	123	941
Non-Terminal	4,355	3,125	2,175	1,587	1,492	1,646	56	1,190	445	810	1,688
U.S. Total	6,708	4,691	3,797	3,087	3,199	1,853	95	1,323	606	933	2,629
Canada Total	5,210	3,445	3,526	4,258	3,235	603	165	333	389	182	2,135
Total Harvest	11,918	8,135	7,323	7,345	6,434	2,456	260	1,656	995	1,115	4,764
Total Escapement[f]	22,332	16,784	24,374	21,597	10,554	7,335	8,603	13,817	9,753	8,376	14,353
Total Run	34,250	24,919	31,697	28,942	16,988	9,791	8,863	15,473	10,748	9,491	19,116
					Harvest Rate						
Winter Troll[b]	0.05	0.04		0.01	0.01	0.04		0.00			0.02
Spring Troll[b]	0.04	0.04	0.05	0.04	0.02	0.03			0.02		0.03
Summer R1 Troll[c]	0.00				0.01			0.01		0.01	0.00
Summer R2 Troll[c]	0.03									0.05	0.01
Total Troll	0.13	0.08	0.05	0.05	0.04	0.06		0.01	0.02	0.06	0.06
Total Sport[d]	0.02	0.04	0.02	0.03	0.05	0.03	0.00	0.00	0.01	0.01	0.03
Total Net	0.05	0.06	0.04	0.02	0.07	0.02	0.00	0.01	0.03	0.03	0.04
Outside SEAK[e]		0.003	0.004	0.003	0.03	0.07	0.01	0.06			0.01
Terminal District 108	0.07	0.06	0.05	0.05	0.10	0.02	0.00	0.01	0.01	0.01	0.05
Non-Terminal	0.13	0.13	0.07	0.05	0.09	0.17	0.01	0.08	0.04	0.09	0.09
U.S. Total	0.20	0.19	0.12	0.11	0.19	0.19	0.01	0.09	0.06	0.10	0.14
Canada Total	0.15	0.14	0.11	0.15	0.19	0.06	0.02	0.02	0.04	0.02	0.11
Total Harvest	0.35	0.33	0.23	0.25	0.38	0.25	0.03	0.11	0.09	0.12	0.25

[a] Harvests are germane to Age 4 fish and older and are CWT-based.

[b] Winter troll occurs from October of the prior year through April of the current year and spring troll occurs May through June of the current year.

[c] Troll Summer R1 occurs in July of the current year; Troll Summer R2 occurs from August through September of the prior year.

[d] Stikine Chinook are inriver by mid-July and sport harvests occur primarily mid-April through June.

[e] Includes fish harvested in U.S. fisheries outside of SEAK such as the high seas trawl, the Kodiak and Cook Inlet sport, the drift gillnet fishery near Cordova.

[f] The gray cells in this row indicate escapements below the lower bound of the BEG for that particular year. The BEG range for the Stikine stock is 14,000 to 28,000 large king salmon.

Appendix B. Table 4. Harvest estimates using CWT methodologies for the Unuk stock of Chinook salmon in various fisheries, areas, and time periods in SEAK, 2012–2021. Estimates of total escapement, harvest and run and associated harvest rates are also shown.

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	10-yr avg
					Harvest[a]						
Winter Troll[b]	1,167	30	137	92	206	191	14	21	10	44	191
Spring Troll[b]	359	489	586	1,257	403	163	74	209	40	63	364
Summer R1 Troll[c]	86	24	120	334	53		125	42	59	34	88
Summer R2 Troll[c]	44	386		262		89		36		54	87
Troll Total	1,656	930	843	1,945	662	444	214	308	109	195	731
Early Sport[d]	444	521	182	299	179		63	154	215	102	216
Late Sport[d]	444	521	182	299	179		63	154	215	102	216
Sport Total	888	1,042	364	598	357		125	308	430	204	432
Net Total	217	374	398	1,298	443	68	579	200	244	263	408
Outside SEAK[e]	232			90	85	12			33		45
U.S. Total	2,992	2,347	1,605	3,931	1,547	524	918	816	816	661	1,616
Canada Total	229	73			102	20		293			72
Total Harvest	3,221	2,420	1,605	3,931	1,650	544	918	1,109	816	661	1,688
Total Escapement[f]	956	1,135	1,691	2,623	1,463	1,203	1,971	3,115	1,135	2,666	1,796
Total Run	4,177	3,555	3,296	6,554	3,113	1,747	2,889	4,224	1,951	3,328	3,483
					Harvest Rate						
Winter Troll[b]	0.31	0.01	0.04	0.01	0.07	0.11	0.01	0.01	0.01	0.01	0.06
Spring Troll[b]	0.10	0.16	0.19	0.20	0.14	0.09	0.03	0.05	0.02	0.02	0.11
Summer R1 Troll[c]	0.02	0.01	0.04	0.05	0.02		0.04	0.01	0.03	0.01	0.03
Summer R2 Troll[c]	0.01	0.13		0.04		0.05		0.01		0.02	0.03
Troll Total	0.44	0.31	0.27	0.31	0.23	0.25	0.08	0.08	0.06	0.06	0.22
Early Sport[d]	0.12	0.17	0.06	0.05	0.06		0.02	0.04	0.12	0.03	0.07
Late Sport[d]											
Sport Total	0.12	0.17	0.06	0.05	0.06		0.02	0.04	0.12	0.03	0.07
Net Total	0.06	0.12	0.13	0.21	0.15	0.04	0.20	0.05	0.14	0.08	0.13
Outside SEAK[e]	0.06			0.01	0.03	0.01			0.02		0.01
U.S. Total	0.68	0.60	0.46	0.58	0.47	0.30	0.30	0.16	0.35	0.17	0.43
Canada Total	0.06	0.02			0.03	0.01		0.07			0.02
Total Harvest	0.74	0.63	0.46	0.58	0.50	0.31	0.30	0.23	0.35	0.17	0.45

[a] Harvests are germane to Age 4 fish and older and are CWT-based.

[b] Winter troll occurs from October of the prior year through April of the current year and spring troll occurs May through June of the current year.

[c] Troll Summer R1 occurs in July of the current year; Troll Summer R2 occurs from August through September of the prior year.

[d] The early sport occurs April through July of the current year; the late sport occurs in August of the prior year.

[e] Includes fish harvested in U.S. fisheries outside of SEAK such as the high seas trawl, the Kodiak and Cook Inlet sport, the drift gillnet fishery near Cordova.

[f] The gray cells in this row indicate escapements below the lower bound of the BEG for that particular year. The BEG range for the Unuk stock is 1,800 to 3,800 large king salmon.