Fishery Data Series No. 25-61

Monitoring the Chinook Salmon Sport Fishery on the Nushagak River Drainage, 2025

by

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and

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December 2025

Alaska Department of Fish and Game **Divisions of Sport Fish and Commercial Fisheries**

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Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
milliliter	mL
millimeter	mm

Weights and measures (English)

cubic feet per second	ft^3/s
foot	ft
gallon	gal
inch	in
mile	mi
nautical mile	nmi
ounce	oz
pound	lb
quart	qt
yard	yd

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
degrees kelvin	K
hour	h
minute	min
second	s

Physics and chemistry

all atomic symbols	
alternating current	AC
ampere	A
calorie	cal
direct current	DC
hertz	Hz
horsepower	hp
hydrogen ion activity (negative log of)	pH
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

General

Alaska Administrative Code	AAC
all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.
all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.
at	@
compass directions:	
east	E
north	N
south	S
west	W
copyright	©
corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
District of Columbia	D.C.
et alii (and others)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.
Federal Information Code	FIC
id est (that is)	i.e.
latitude or longitude	lat or long
monetary symbols (U.S.)	$, ¢
months (tables and figures): first three letters	Jan,...,Dec
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S.C.	United States Code
U.S. state	use two-letter abbreviations (e.g., AK, WA)

Mathematics, statistics

all standard mathematical signs, symbols and abbreviations	
alternate hypothesis	H_A
base of natural logarithm	*e*
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	(F, t, χ^2, etc.)
confidence interval	CI
correlation coefficient (multiple)	R
correlation coefficient (simple)	r
covariance	cov
degree (angular)	°
degrees of freedom	df
expected value	*E*
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	log_2, etc.
minute (angular)	′
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	″
standard deviation	SD
standard error	SE
variance	
population	Var
sample	var

FISHERY DATA SERIES NO. 25-61

MONITORING THE CHINOOK SALMON SPORT FISHERY ON THE NUSHAGAK RIVER DRAINAGE, 2025

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ABSTRACT

The Chinook salmon (*Oncorhynchus tshawytscha*) sport fishery on the Nushagak River was examined from June 14 to July 11, 2025, by creel survey and angler interviews. Index counts of anglers fishing the survey area ranged from 3 on June 14 to 136 on June 23, with an average for the study period of 62 per day. Information was collected on angler-days of effort by type of angler (guided vs. unguided), gear (bait or no bait), and catch and harvest rates of Chinook salmon. Samples of harvested fish were used to determine age, sex, length, and weight characteristics of Chinook salmon in the sport harvest. These data provided information about sport fishing success as well as the composition of the harvest in the sport fishery during the months of June and July. Data collected from this onsite survey also provide documented use patterns that enable regulations to be designed to accommodate the sport fishery and maintain angling opportunity. Results will also guide review of current regulations and will be used to assess the effectiveness of current regulations.

Keywords: Chinook salmon, *Oncorhynchus tshawytscha*, creel survey, Nushagak River, Bristol Bay Management Area, angler effort, harvest, age, sex, length, sport fishery, Southwest Alaska

INTRODUCTION

This project was initiated in 2023 to allow managers to track inseason sport effort, catch, and harvest rates of Chinook salmon (*Oncorhynchus tshawytscha*) in the Nushagak River and to collect biological data from Chinook salmon harvested in the Nushagak River sport fishery.

The Nushagak River is located in Southwestern Alaska and flows approximately 390 km from its headwaters into Bristol Bay (Figure 1). The Nushagak River drainage supports the largest sport fisheries for Chinook salmon in the Bristol Bay Management Area (BBMA). Under the *Nushagak and Mulchatna King Salmon Management Plan* (5 AAC 06.361; adopted January 1992 and amended 6 times), Chinook salmon are managed to attain an inriver goal of 95,000 fish, with a sustainable escapement goal range of 55,000 to 120,000 spawning fish per year, a reasonable opportunity to harvest Chinook salmon in the inriver subsistence fishery, and a guideline harvest level in the sport fishery of 5,000 fish. Except for 2018, runs have failed to meet this 95,000-fish inriver goal every year since 2017, and since 2021, the runs have failed to meet the 55,000-fish lower end of the escapement goal range (Table 1; Borden and Adickes 2022). As a result of these recent low runs, the *Nushagak King Salmon Stock of Concern Action Plan* was created in the spring of 2023 to provide guidance to managers in achieving the established escapement goal.

Historically (2000–2014), the total harvest by commercial, subsistence, and sport fisheries averaged 54,157 Chinook salmon, and during this period total sport harvest alone averaged 6,324 Chinook salmon. (Table 1). Based on this average, the majority (66%) of the total harvest was taken by the commercial fishery, 22% was taken by the subsistence fishery, and 12% by sport anglers (Table 1). Between 2015 and 2019, the average total harvest and relative proportions were quite similar (Table 1). However, in the past 5 years (2020–2024), the average total harvest has dropped to 12,899 and the relative proportions of the harvest have changed to 42% commercial fisheries harvest, 39% subsistence harvest, and 24% sport harvest (Table 1).

Numbers of Chinook salmon in the runs to the Nushagak–Mulchatna Rivers drainage have also declined in recent years. Historically, the total run of Nushagak and Mulchatna Rivers Chinook salmon averaged 181,540 fish from 2000 through 2014, ranging from as few as 94,245 in 2010 to as many as 356,240 fish in 2004. Total run was lower on average during 2015–2019 (129,784 fish), but this average has precipitously dropped between 2020 and 2024 with 54,033 Chinook salmon (Table 1).

Due to concerns over catch-and-release mortality, the Alaska Board of Fisheries adopted regulations in 2012 requiring anglers to use single hooks and, after harvesting a bag limit of fish over 20 inches in length, to use only unbaited, single hook, artificial lures for the remainder of that day.[1] Since 2023, as a result of the newly created *Nushagak King Salmon Stock of Concern Action Plan*, sport fishery regulations have stipulated, in part, an annual bag limit of 4 Chinook salmon 20 inches or longer, only 1 of which may be over 28 inches, and a daily bag limit of 2 Chinook salmon 20 inches or longer, only 1 of which may be longer than 28 inches total length in the Nushagak River drainage.

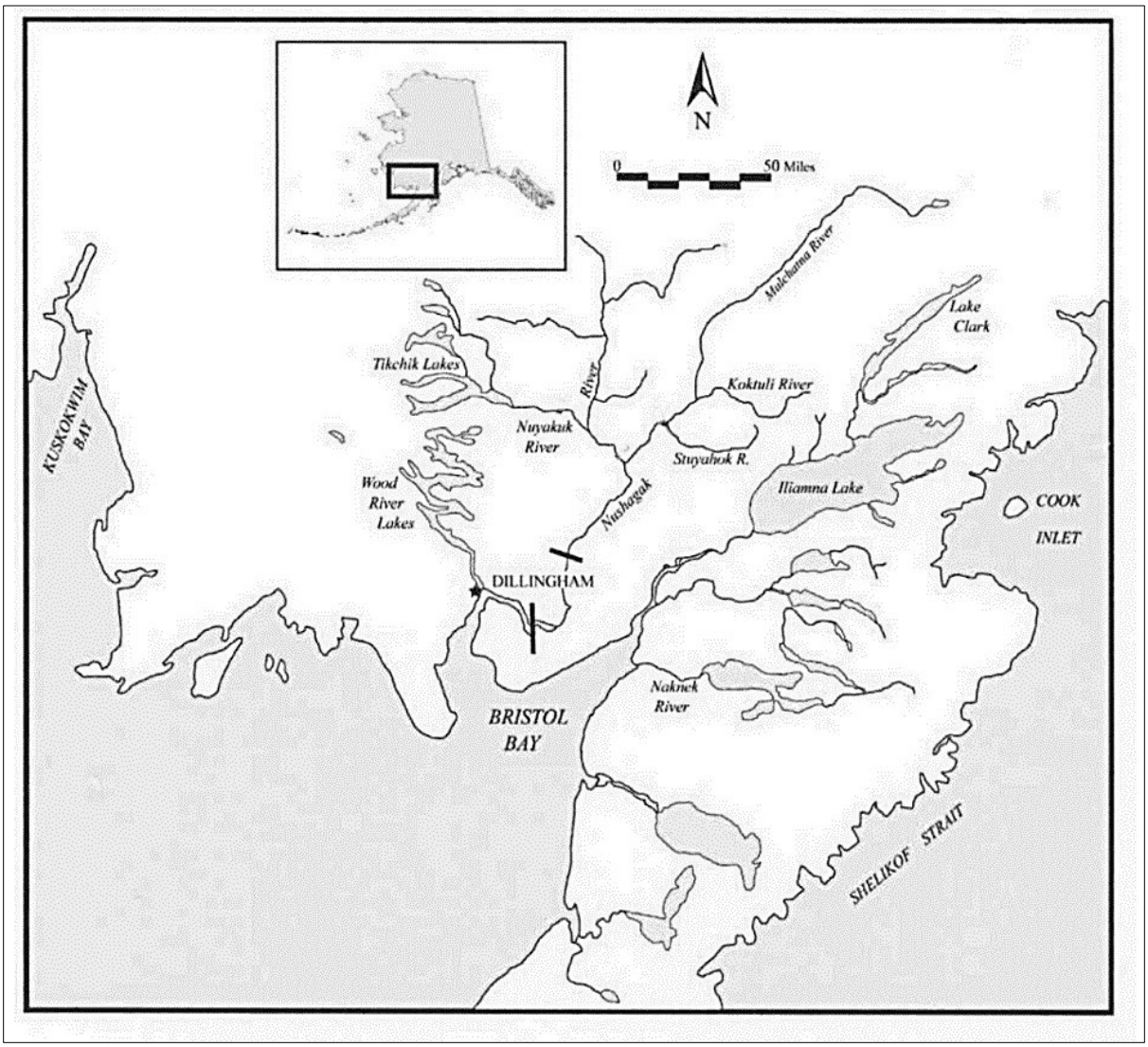

Figure 1.–Nushagak River Chinook salmon study site, located between the black bars.

[1] Southwest Alaska sport fishing regulations summary, 2024 (effective until the 2025 summary is issued) Alaska Department of Fish and Game, Division of Sport Fish, Anchorage

Table 1.–Chinook salmon commercial, subsistence, and sport harvests, and escapement for the Nushagak River drainage, 2000–2024.

		Harvests below sonar						Inriver sonar estimate	Harvests above sonar					
Year	Total run[a]	Commercial[b]		Subsistence[c]		Sport[d]			Subsistence[e]		Sport[f]		Spawning escapement[g]	Total harvest
2000	138,044	12,120		7,247		1,389		117,288	1,979		4,628		110,682	27,362
2001	213,306	11,746		7,972		1,600		191,988	3,372		4,299		184,317	28,989
2002	229,485	40,039		6,946		1,193		181,307	4,103		2,500		174,704	54,781
2003	225,594	43,485		13,399		2,203		166,507	4,448		3,752		158,307	67,287
2004	356,240	100,846		10,644		2,567		242,183	4,422		4,339		233,422	122,818
2005	307,701	62,764		7,951		2,863		234,123	4,471		5,702		223,950	83,751
2006	218,861	84,881		6,131		3,166		124,683	3,012		4,307		117,364	101,497
2007	125,435	51,831		9,564		3,581		60,459	3,411		6,088		50,960	74,475
2008	128,752	18,968		9,149		3,305		97,330	2,571		3,395		91,364	37,388
2009	117,936	24,693		9,312		2,451		81,480	2,796		3,903		74,781	43,155
2010	94,245	26,056		6,345		1,659		60,185	1,845		2,248		56,092	38,153
2011	145,232	26,927		8,485		1,542		108,278	2,981		3,302		101,995	43,237
2012	194,494	11,952		7,236		1,833		174,085	2,398		4,098		167,589	27,517
2013	132,705	10,213		6,889		1,971		113,709	4,201		4,714		104,794	27,988
2014	95,075	11,868		11,942		2,369		70,460	3,890		3,891		62,679	33,960
2015	159,695	50,675		9,505		2,514		98,019	2,209		4,720		91,090	69,623
2016	165,189	24,937		14,182		3,053		125,368	1,933		5,358		118,077	49,463
2017	100,101	33,376		8,912		2,834		56,961	1,827		3,161		51,973	50,110
2018	144,924	36,626		10,427		3,450		97,239	1,408		4,742		91,089	56,653
2019	79,014	22,725		7,162		3,600		46,763	2,967		2,706		41,090	39,160
2020	56,705	7,452		5,988		1,496		43,032	2,265		454		40,313	17,655
2021	65,521	4,820		3,922		1,575		55,222	1,297		2,472		51,453	14,086
2022	54,867	5,431		3,723		1,279		44,434	1,721		2,142		40,571	14,296
2023	40,255	6,847		1,816[h]		1,155		31,499	1,444[h]		1,601		28,454	12,863
2024	52,816	2,438		1,293[h]		1,120		34,322	1,828[h]		2,038		30,456	5,596
Average or % Total	Avg.	Avg.	%	Avg.	%	Avg.	%	Avg.	Avg.	%	Avg.	%	Avg.	Avg.
2000–2014	181,540	35,893	66	8,614	16	2,246	4	134,938	3,327	6	4,078	8	127,533	54,157
2015–2019	129,785	33,668	64	10,038	19	3,090	6	84,870	2,069	4	4,137	8	78,664	53,002
2020–2024	54,033	5,398	42	3,348	26	1,325	10	41,702	1,711	13	1,741	14	38,249	12,899

-continued-

Table 1.–Page 2 of 2.

Source: **Commercial (total Nushagak District)** 2000: Jones et al. (2014: Appendix A19); 2001–2023: Elison et al. (2024: Appendix A17); 2024: Elison et al. (2025). **Subsistence (above and below sonar)** 2000–2021: Jordan Head, Division of Commercial Fisheries, Region II, Anchorage; 2022–2024: Terri Barnett, Research Analyst III Division of Subsistence. **Sport harvests (above and below sonar)** Alaska Sport Fishing Survey database. 1996–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited September 17, 2025) http://www.adfg.alaska.gov/sf/sportfishingsurvey/. **Sonar estimates** 2000: Buck et al. (2012: Table 10): 2001–2022: Elison et al. (2022: Appendix A17); 2023–2024: Elison et al. (2025) .

[a] Total run refers to the aggregation of salmon of all ages returning from ocean feeding grounds to spawn in any given year and is determined from escapement plus harvest.

[b] Total Nushagak District commercial harvest from 2001 to present includes personal use reported from commercial harvest.

[c] Includes Nushagak River bound Chinook salmon harvests from below the sonar site.

[d] Sport harvest total for 2000–2022 is the Nushagak River sport harvest from Black Point to sonar.

[e] Includes Ekwok area, Iowithla River, Klutuk River, Koliganek area, New Stuyahok area, Portage Creek area, Kokwok area, Mulchatna River, and an unknown Nushagak River watershed site.

[f] Sport harvest total for 2000 to 2001 is 50% of the Nushagak River harvest plus harvest from Black Point to Iowithla River, Nushagak River upstream of Iowithla River, Mulchatna River system, Tikchik–Nuyakuk Rivers, and the Koktuli River harvests. Sport harvest totals for 2002–2021 are Nushagak River drainage excluding Black Point to sonar.

[g] Spawning escapement for 2000–2021 are sonar estimates minus subsistence and sport harvest above sonar.

[h] Subsistence harvest estimates preliminary.

OBJECTIVES

The objectives for the 2025 survey of the Chinook salmon sport fishery on the Nushagak River near Portage Creek are as follows:

1) Index angler-days of guided, unguided, and total angler effort in the lower Nushagak River from June 15 to July 31.
2) Index catch and harvest rates of Chinook salmon and composition of angler-days by gear (bait vs. no bait) and angler type (guided vs. unguided and Alaska resident vs. nonresident) in the lower Nushagak River from June 15 to July 31.
3) Estimate the age, sex, length, and weight compositions of Chinook salmon in the sport harvest, separately and in total, for both guided and unguided anglers in the lower Nushagak River from June 15 to July 31 such that the estimates are within 10 percentage points of the true values 90% of the time.

METHODS

STUDY SITE

The 2025 Nushagak River creel survey focused on the area between Black Point and the lower Ekwok land boundary (LELB) at latitude 59°10′25″N, longitude 157°42′35″W and was broken into 3 sublocations: (1) Black Point to the sonar site near Portage Creek, (2) the sonar site to LELB in the west channel, and (3) in the east channel from the Keefer cutoff just downstream of Portage Creek upstream to the channel convergence (Figure 2).

ANGLER EFFORT

One angler count was conducted during each sample day (Objective 1) resulting in 6 sample days per week. Sample days were selected before beginning the project, with Tuesdays selected as the single day off during the week (Appendix A1). All counts were conducted at 10:00 AM, representing what is thought to be the peak time of angling activity, and took 1.5–2.5 hours to complete. Two boats were used to conduct counts, with one boat stationed at the start of Sublocation 1 and the other stationed at the start of Sublocation 2 (Figure 2). These counts were run simultaneously. Once the Sublocation 2 count was completed, the Sublocation 3 count began. The boats maintained a safe constant cruising speed while navigating the river and counting active anglers; no stops were made until the count was completed. These counts provided an instantaneous representation of active angler effort, broken into guided and unguided anglers. Guided and unguided anglers were identified by the presence or absence of the green guide vessel decals with current year registration stickers as required for any vessel that provides commercial guiding services.

CATCH AND HARVEST RATES AND ANGLER-DAY COMPOSITIONS

Individual angler interviews were conducted every sample day. Roving surveys were utilized to locate completed-day anglers, along with a randomized selection of the guided lodges present in the fishery. Each interviewed angler was asked a series of questions to collect the following data: length of time fished, duration of trip, number and species of fish caught and harvested, bait usage, whether the services of a guide were utilized, along with demographic data. Field technicians also collected biological data (outlined in *Biological Composition of Harvested Fish* section) from all

sport harvested fish that were encountered during the interviews. This provided data on catch and harvest rates and composition (proportion) of angler-days by gear (bait usage) and angler type (guided vs. unguided; Objective 2).

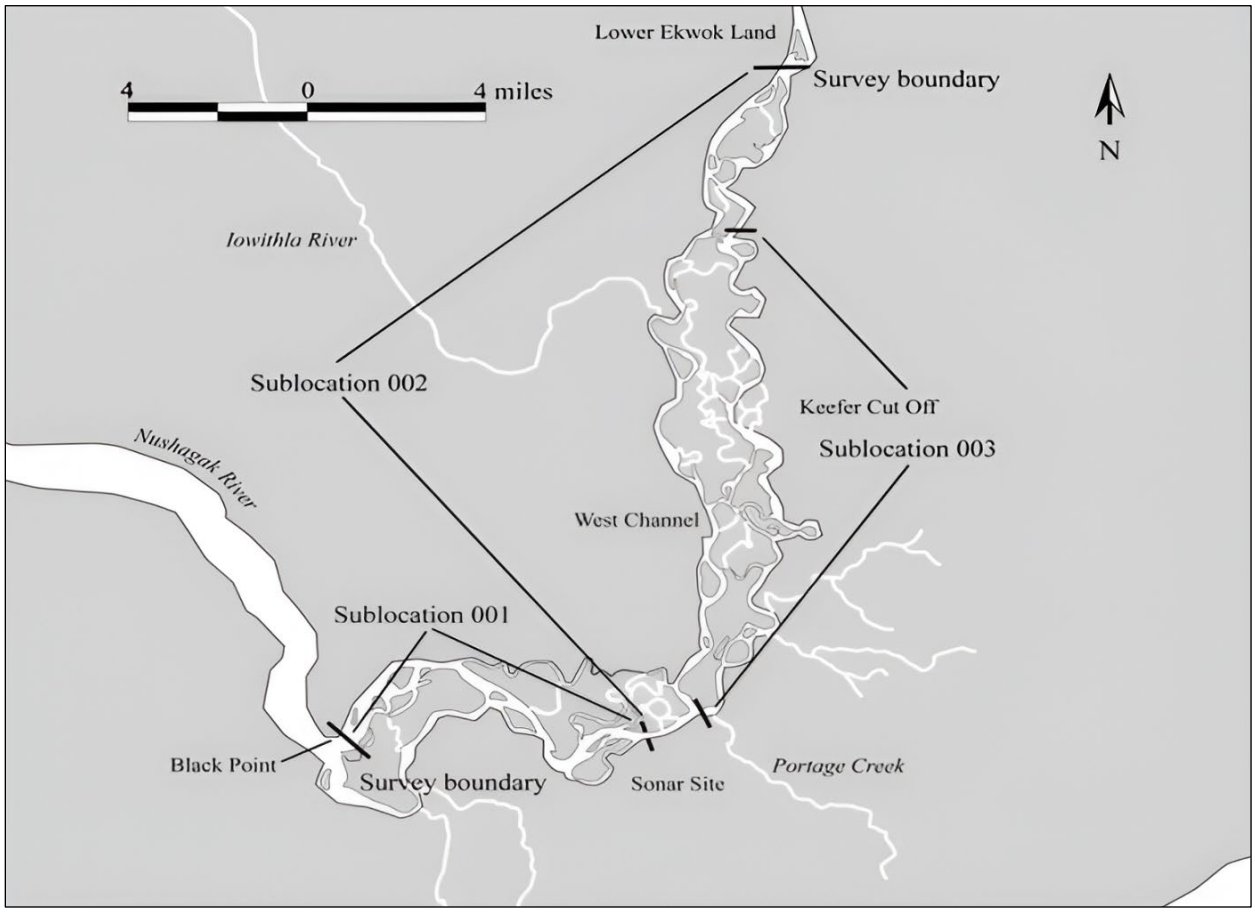

Figure 2.–Nushagak River Chinook salmon study area and sublocations.

BIOLOGICAL COMPOSITION OF HARVESTED FISH

Samples of harvested Chinook salmon provided the following data: length (mid eye to tail fork [METF]; nearest 0.1 mm), weight (nearest 0.1 kilograms), age (from scales), and sex determined from external characteristics (developing kype on males, ovipositor on females). Ages were obtained by removing 3 scales from the preferred area[2] and mounting them on an adhesive-coated card. Standard age determination procedures were used (see Jearld [1983] for a general description of the principles used). The European system of age designation was used, where the number of freshwater winter annuli precedes the decimal, and the number of marine winter annuli follows. Total age from the brood year is the sum of the 2 numerals plus 1.

[2] The left side of the fish approximately 2 rows above the lateral line and on the diagonal row downward from the posterior insertion of the dorsal fin as used on sockeye salmon by Clutter and Whitesel (1956).

DATA ANALYSIS

Angler Effort

The single angler count conducted each day represents an index of angler effort. Only a summary of the daily counts by study area, sublocation, and angler type (guided vs. unguided) was performed.

Angler Interviews

Catch and Harvest Rate

Daily and weekly estimates of catch per unit of effort (CPUE) were calculated. A unit of effort was defined as an individual angler-day. Daily CPUE on the *i*th day during the *h*th week was calculated as follows:

$$cpue_{hi} = \frac{c_{hi}}{n_{hi}} \tag{1}$$

where, c_{hi} equals the number of fish caught (both kept and released) on the *i*th day during the *h*th week of the survey, and n_{hi} is the number of complete-day anglers interviewed on the *i*th day.

Variance of daily CPUE was estimated as follows:

$$\mathrm{var}(cpue_{hi}) = \frac{\sum_{a=1}^{n_{hi}} (c_{hia} - cpue_{hi})^2}{n_{hi}(n_{hi} - 1)} \tag{2}$$

where c_{hia} is catch of angler *a* interviewed on day *i* of week *h*.

Then the weekly estimate of CPUE was calculated as follows using pooled weekly catch data:

$$cpue_h = \frac{\sum_{i=1}^{m_h} c_{hi}}{\sum_{i=1}^{m_h} n_{hi}} \tag{3}$$

where, m_h equals the number of days sampled in the lower study area during week *h* of the survey.

Variance of weekly CPUE was estimated by

$$\mathrm{var}(cpue_h) = \frac{\sum_{i=1}^{m_h} \sum_{a=1}^{n_{hi}} (c_{hia} - cpue_h)^2}{(\sum_{i=1}^{m_h} n_{hi})(\sum_{i=1}^{m_h} n_{hi} - 1)} \tag{4}$$

The standard error (SE) was estimated as the square root of the variance estimate. Harvest per unit of effort (HPUE) was estimated similarly, replacing harvest (only fish kept) for catch.

Angler Compositions

The proportion of anglers by type (guided vs. unguided), terminal gear type (bait use) z or angler demographic (Alaska resident vs. nonresident) z was estimated as follows:

$$\hat{p}_z = \frac{m_z}{m} \tag{5}$$

where m_z equals the number of the interviewed anglers whose trips were categorized as z, and m equals the total number of classifiable anglers interviewed.

No estimates of the sampling variance were calculated because these proportions were merely descriptive in nature and cannot be used to make inferences about the fishery.

Biological Composition of Harvested Fish

The proportion of harvested Chinook salmon of category (age, sex, length, or weight class) u was estimated as follows:

$$\hat{p}_u = \frac{n_u}{n} \tag{6}$$

where n_u equals the number of sampled Chinook salmon in category u, and n equals the total number of Chinook salmon sampled.

Variance of each proportion was estimated without the finite population correction factor because we do not have harvest estimates:

$$\text{var}(\hat{p}_u) = \frac{\hat{p}_u(1-\hat{p}_u)}{n-1} \tag{7}$$

Mean length- and weight-at-age of harvested Chinook salmon were estimated following standard procedures (Sokal and Rohlf 1981: Boxes 4.2 and 7.1, pages 56 and 139). The standard error was calculated as the square root of the variance estimate.

RESULTS

ANGLER EFFORT

During the 2025 sampling period (June 14–July 12), creel technicians performed 24 angler effort surveys counting a total of 1,494 anglers, completed 173 angler interviews, and observed 1,189 rod-hours of effort (Table 2). Index counts of anglers fishing in the survey area reached a peak of 136 on June 23 (Figure 3), with an average daily count for the study period of 62 anglers per sample day. Interviewed anglers were composed of 5.8% Alaska resident anglers, 92.5% nonresident U.S. anglers, and 1.7% foreign[3] anglers. Guided service was utilized by 98.3% of interviewed anglers, and 1.7% were unguided (Table 3). One angler count was partially completed on June 22 due to mechanical failure in Sublocation 003. The field crew ended the project July 12 because effort dropped below 1% of the maximum observed effort in conjunction with an

[3] Anglers who are not residents of the United States of America.

emergency order effective July 3 that restricted Chinook salmon sport fishing on the Nushagak River to catch-and-release only.

Table 2.–Summary of weekly angler and harvest data obtained on the Nushagak River during the June 14 to July 12 sampling period in 2025.

Week date range	Angler counts[a]	Inter-viewed anglers	Resident anglers	Catch[a] Released	Catch[a] Harvest	Angler-hours (rod-hours)[a]	CPUE[b]	SE (CPUE)	HPUE[c]	SE (HPUE)
Jun 14–15	14	4	0	5	0	28.0	1.3	0.5	0.0	0.0
Jun 16–22	462	47	1	59	50	339.5	2.3	0.3	1.1	0.2
Jun 23–29	666	49	1	229	52	351.0	5.7	1.2	1.1	0.1
Jun 30–Jul 6	294	52	8	19	23	362.5	0.8	0.2	0.4	0.1
Jul 7–13	58	21	0	5	7	108.0	0.6	0.2	0.3	0.1
Weekly average	–	–	–	–	–	–	2.1	–	0.6	–
Grand total	1,494	173	10	317	132	1,189.0	–	–	–	–

[a] Sums are based only on sample days and should be considered partial totals of the indices from the study.
[b] Catch per unit effort (CPUE) is the number of fish caught per angler-day.
[c] Harvest per unit effort (HPUE) is number of fish harvested per angler-day.

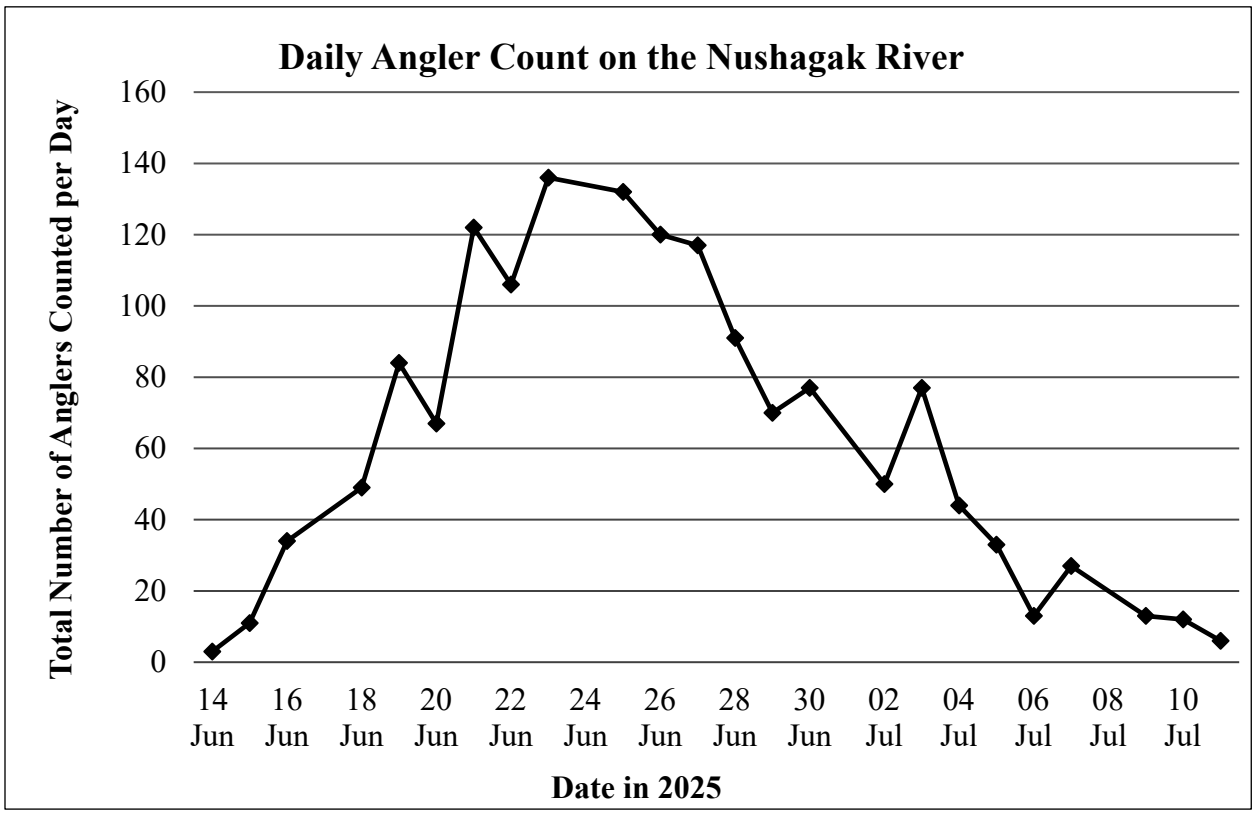

Figure 3.–Total number of anglers counted per day over all sublocations throughout the duration of the project (squares indicate sample days).

Table 3.–Summary of angler composition on the Nushagak River during the June 14 to July 12 sampling period in 2025.

Category	Angler type	Counts	Proportion (%)
Residency			
	Foreign	3	1.7
	Nonresident	160	92.5
	Alaska resident	10	5.8
Usage of guide services			
	Guided	170	98.3
	Unguided	3	1.7
Gear utilized			
	Baited and unbaited [a]	32	18.5
	Baited	115	66.5
	Unbaited	26	15.0

[a] Angler used both baited and unbaited methods during a single fishing period.

HARVEST

A total of 173 individual interviews were conducted throughout all sublocations, with biological data collected from 122 sport harvested Chinook salmon. The average weekly CPUE during the study, where effort was defined as an angler-day, was 2.1 fish per angler-day, and the average weekly HPUE was 0.6 fish per angler day (Table 2).

BIOLOGICAL COMPOSITION OF HARVESTED FISH

Age was determined from scales collected from all 122 sampled Chinook salmon. Thirty-three fish could not be aged and were removed from age analysis leaving 89 samples for age analysis. The average length of Chinook salmon in the age-sampled sport harvest was 581.1 mm (SE = 10.9 mm) from mid eye to tail fork (METF), with an average weight of 2.7 kg (SE = 0.2; Table 4).

When looking only at length, which was measured for all 122 sampled Chinook salmon, the largest was 840 mm METF and weighed 8.5 kg. METF length is measured from the mid eye whereas the regulatory size (28 inches) applies to total length, meaning a METF length equivalent to 28 inches (711 mm) would be greater than 28 inches total length. There were 13 fish (10.6% of the 122 total samples) whose METF length was greater than 711 mm, placing these fish in the regulatory size of "greater than 28 inches." Eight of these fish were female (6.7% of the 122 total). Four of the fish less than 711 mm may have reached or exceeded 28 inches if total length had been measured; 2 of these fish were female.

Of the 89 aged fish, 12 were female (13.5% of the total 89 age-sampled, SE = 3.6%). When separated by sex, males in the sport harvest had an average METF length of 564.1 mm and an average weight of 2.4 kg. Females were larger, with an average METF length of 690.1 mm and average weight of 5.1 kg. Sampled age categories included 1.1, 1.2, 1.3, and 1.4. The age category with the most samples was 1.3 with 41 fish, followed by 1.2 with 36 fish (Table 4, Figure 4).

Table 4.–Composition of sport harvested Chinook salmon sampled on the Nushagak River during the June 14 to July 12 sampling period in 2025.

		Length (mm)		Weight (kg)				
Parameter	Age	Average	SE	Average	SE	Count	Proportion of total age samples	SE
Male								
	1.1	406.8	–	0.5	–	6	–	–
	1.2	539.8	–	1.8	–	34	–	–
	1.3	593.1	–	2.8	–	32	–	–
	1.4	732.1	–	5.5	–	5	–	–
	All male	564.1	–	2.4	–	77	86.5%	3.6%
Female								
	1.1	550.5	–	2	–	1	–	–
	1.2	595.0	–	2.6	–	2	–	–
	1.3	726.7	–	5.9	–	9	–	–
	1.4	–	–	–	–	0	–	–
	All female	690.1	–	5.1	–	12	13.5%	3.6%
All[a]								
	1.1	427.3	–	0.8	–	7	7.9%	2.9%
	1.2	542.9	–	1.9	–	36	40.4%	5.2%
	1.3	622.4	–	3.5	–	41	46.1%	5.3%
	1.4	732.1	–	5.5	–	5	5.6%	2.5%
	Overall	581.1	10.9	2.7	0.2	89	–	–

Note: Counts may not sum because not all fish have an assigned age. An en dash indicates data not available or applicable.

[a] Of the 122 salmon sampled from the sport harvest, 33 could not be aged and were removed from the calculations in this table.

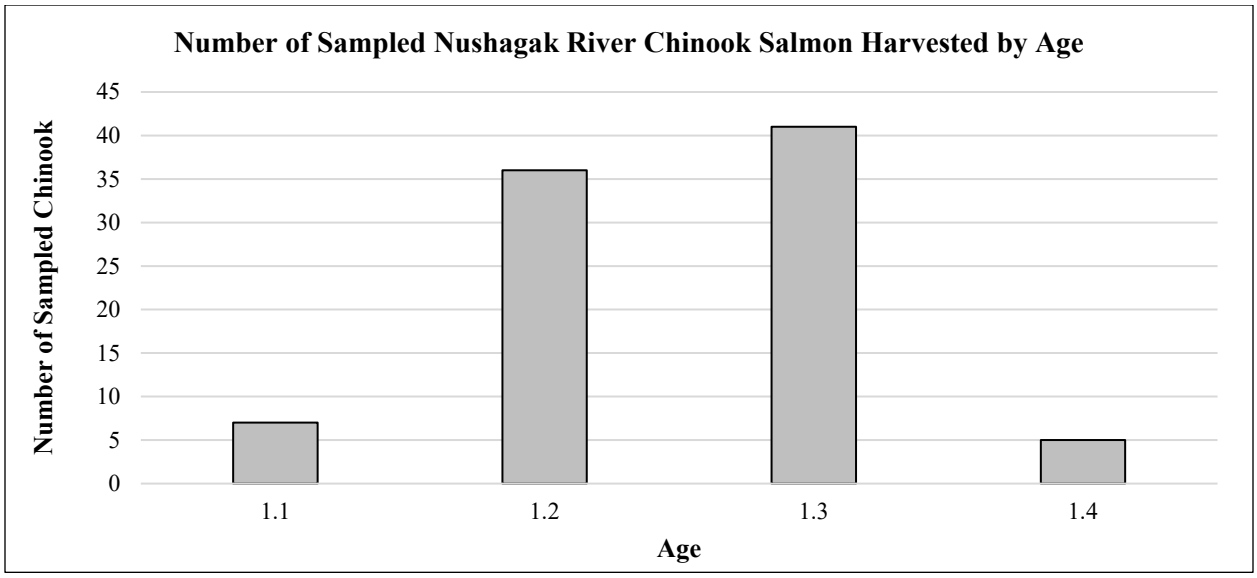

Figure 4.–Number of sampled sport harvested Chinook salmon by age.

DISCUSSION

Information on daily angler effort and the composition of Chinook salmon in the sport harvest on the Nushagak River is crucial for the management and conservation of the stock. In November of 2022, the Alaska Board of Fisheries listed Nushagak River Chinook salmon as a stock of concern. In May of 2023, the *Nushagak King Salmon Stock of Concern Action Plan* was created and resulted in the implementation of several regulation changes to provide managers with guidance to rebuild the stock. These changes included a reduction in the annual limit of sport harvested Chinook salmon over 28 inches total length from 4 to 1 in hopes of increasing the number of large females (with a higher fecundity) on the spawning grounds (Malick et al. 2023).

Fish with METF lengths greater than 711 mm place them in the >28-inch regulatory category, which now restricts harvest to an annual bag limit of 1. In the sport harvest samples for 2025, 11% of 122 samples were over 711 mm METF length, which was a 3-percentage-point reduction from 14% of 202 samples in 2024, and a 16-percentage-point reduction from 27% of 179 samples in 2023 (Table 5; Hayden-Pless and Borden 2024a; Hayden-Pless and Borden 2024b). Likewise, in 2025, 7% of fish were females greater than 711 mm METF length, which is a 3-percentage-point reduction from 10% in 2024 (Hayden-Pless and Borden 2024b), and an 11-percentage-point reduction from 18% in 2023 (Hayden-Pless and Borden 2024a). A similar creel survey on the Nushagak River in 2007 (Dye 2012), when the annual bag limit was 4 over 20 inches and the daily limit was 2 over 20 inches, with only 1 over 28 inches, recorded the female portion of the total sampled harvest as 14 percentage points higher (36%) than the total portion found in the first year of this study (22%; Table 5) and nearly double the total portion from the 2024 study period (19%; Table 5). Compared to the 2007 study, the portion of females in the sampled harvest was 21-percentage-points lower (15%), a 58% reduction of the measured level from 2007. Given the reduction in total run (Table 1) and the decline in size of Chinook salmon returning to the Nushagak River (Lewis et al. 2015), it is possible this drop in portion of females is due to differences in run composition rather than harvest regulations.

Table 5.–Comparison of proportions of total samples that were >711 mm between 2025 and previous creel surveys.

Survey year	Total samples	Number female	Percent female	Number >711 mm	Percent >711 mm	Annual bag limit	Daily bag limit
2007	231	83	36%	NA	NA	4 ≥20 inches	2 ≥20 inches, only 1 >28 inches
2023	179	39	22%	49	27%	4 ≥20 inches, only 1 >28 inches	2 ≥20 inches, only 1 >28 inches
2024	202	38	19%	28	14%	Same as 2023	Same as 2023
2025	122	18	15%	13	11%	Same as 2023	Same as 2023

Source: 2007 from Dye (2012); 2023 data from Hayden-Pless and Borden (2024a); 2024 data from Hayden-Pless and Borden (2024b). See also Appendix D1.

This multiyear project, initiated in June 2023, focused on providing an inseason in-depth representation of the sport fishery and harvest of Chinook salmon on the Nushagak River, with a glimpse into the size and age composition of the run (Appendix D1). This project provides reference data on inriver Chinook salmon numbers that can be used alongside the Portage Creek sonar data (Elison et al. 2025) to help area managers track Chinook salmon abundance and composition. An internal review of telemetry data collected from 2011 to 2014 by the Alaska Department of Fish and Game (ADF&G) Division of Commercial Fisheries found that an annual average of 57% of the Chinook salmon run migrated outside the sonar beam at Portage Creek, with an annual range of 47–65% uncounted (Maxwell et al. 2020). Inseason fishery monitoring allows the Chinook salmon stock to be assessed in real time and allows for necessary adjustments via emergency order to be made to best conserve this stock. For example, since 2023, inseason data reported by the sonar and creel survey has provided managers with data that supported restricting the sport fishery to catch and release for Chinook salmon.

Based on the composition of the sampled fish, the largest portion (46.1%) of Chinook salmon harvested in the Nushagak River sport fishery in 2025 were 5 years old (age 1.3; Figure 4, Table 4).The overall average length in 2025 was 581.1 mm (SE = 10.9), which is slightly larger than the previous year's average length of 541.6 mm, and closer to the average length for the 2023 study (597.0 mm; Appendix D1). All average lengths from the study years 2023–2025 are far less than the average in 2007 (752 mm; Dye 2012). The decrease could be for a number of reasons, including a general change in the composition of the run (perhaps fewer females) or the new regulations placed on the Nushagak River Chinook salmon anglers allowing only 1 fish over 28 inches to be harvested. It should be noted that fish returning to the Nushagak River drainage in 2024 included members of the 2019 broodstock, which experienced an unusually hot summer, with water temperature reaching 21.5°C, which resulted in high prespawning salmon mortality observed baywide (Hayden-Pless, Fishery Biologist, ADF&G, Dillingham, unpublished data).

Total angler counts hit a peak midseason on June 23 in 2025 (Appendix C1), which coincides with the peak weekly CPUE of 5.7 fish per angler-day during the project (Table 2). The maximum daily CPUE fell 3 days later on June 26 with 15.7 fish per angler day (Appendix B1). This is consistent with recent peaks, with the 2024 study period hitting its peak of counted angler effort 4 days later on June 27.

When observed angler counts are broken into sublocations, Sublocation 003 had the greatest effort during the study period, with 602 total anglers, followed by Sublocation 001 with 468 total anglers

(Appendix C1). It was noted by project staff that the overall counts on the river appeared less than the previous year, but the per angler rod-hours increased. There was a maximum count of 136 anglers on June 23 (Figure 3), with an average of 62 anglers per day, and a total angler count for the sampling period of 1,494 (Table 2). This was a reduction when compared to the 2024 and 2023 study periods, which averaged 71 and 96.7 anglers per day, respectively, and observed a total of 1,842 anglers for 2024 and 2,128 anglers for 2023[4] during the sampling period (Hayden-Pless and Borden 2024a–b). Although the 2024 study period showed an increase in total rod-hours (1,790; Hayden-Pless and Borden 2024b), when compared to the 2023 study with 1,608 rod-hours (Hayden-Pless and Borden 2024a), the 2025 study showed a reduction when compared to both previous study years (1,189 rod-hours; Table 2). It should be noted that because total angler counts and rod-hours serve as indices rather than absolute measures, direct comparison among study years should consider differences in survey effort and study period duration. In 2023, 22 angler surveys were completed (2 missed due to unsafe weather) during June 17–July 14; in 2024, 25 surveys were completed (1 missed due to unsafe weather) during June 14–July 13; and in 2025, 24 surveys were completed (with 1 partially completed due to mechanical failure) during June 14–July 12.

Since the implementation of the *Nushagak King Salmon Stock of Concern Action Plan*, overall angling effort directed toward Chinook salmon has shown a continued decline. Although reductions in harvest opportunity and conservation measures have likely contributed, other factors such as shifts in angler preference, perceived run strength, and increased utilization of alternate drainages have also influenced participation. Notably, anglers appear to be redirecting effort toward nearby systems, such as the Naknek River and the Alagnak River, offering more consistent opportunities, resulting in a redistribution rather than a complete loss of regional effort.

The project concluded July 12 after the angler counts had decreased to below 1% of the maximum observed effort. Biological sampling could no longer be conducted due to an emergency order that was issued effective July 3 restricting the Chinook salmon fishery to catch-and-release to conserve returning Chinook salmon.

ACKNOWLEDGEMENTS

Execution and completion of this project would not have been possible without the funding provided by Bristol Bay Science and Research Institute and the hard work of field technicians Nolan Cawlfield and Francesca Reyes Jacome. We thank Jiaqi Huang for his work with data analysis. We also thank the angling public, guides, and lodge operators for their patience and support during this survey.

[4] All sums for angler counts and averages, along with rod-hours are based solely on sample days and should be considered indices from the studies.

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APPENDIX A: SAMPLING SCHEDULE

Appendix A1.–Angler count schedule, 2025.

Date	Scheduled sample days	Days sampled
14 Jun	NS	X
15 Jun	X	X
16 Jun	X	X
17 Jun	NS	NS
18 Jun	X	X
19 Jun	X	X
20 Jun	X	X
21 Jun	X	X
22 Jun	X	X
23 Jun	X	X
24 Jun	NS	NS
25 Jun	X	X
26 Jun	X	X
27 Jun	X	X
28 Jun	X	X
29 Jun	X	X
30 Jun	X	X
1 Jul	NS	NS
2 Jul	X	X
3 Jul	X	X
4 Jul	X	X
5 Jul	X	X
6 Jul	X	X
7 Jul	X	X
8 Jul	NS	NS
9 Jul	X	X
10 Jul	X	X
11 Jul	X	X
12 Jul	X	–
13 Jul	X	–
14 Jul	X	–
15 Jul	NS	NS
16 Jul	X	–
17 Jul	X	–
18 Jul	X	
19 Jul	X	–
20 Jul	X	–
21 Jul	X	–
22 Jul	NS	NS
23 Jul	X	–
24 Jul	X	–
25 Jul	X	–
26 Jul	X	–
27 Jul	X	–
28 Jul	X	–
29 Jul	NS	NS
30 Jul	X	–

Note: "X" indicates a survey was either planned or conducted; "NS" means no survey was planned; an en dash indicates a planned survey was not conducted.

APPENDIX B: DAILY EFFORT DATA OF SAMPLED SPORT HARVESTED CHINOOK SALMON

Appendix B1.–Daily effort data of sampled sport harvested Chinook salmon.

		Daily				
Date	Week	Interviews conducted	CPUE[a]	SE (CPUE)	HPUE[b]	SE (HPUE)
14 Jun	1	0	NA[c]	NA[c]	NA[c]	NA[c]
15 Jun	1	4	1.3	0.5	0.0	0.0
16 Jun	2	8	2.8	0.6	1.1	0.5
18 Jun	2	16	1.6	0.6	1.3	0.6
19 Jun	2	3	1.3	0.3	1.0	0.0
20 Jun	2	7	2.9	0.9	0.7	0.3
21 Jun	2	12	2.6	0.5	1.0	0.2
22 Jun	3	1	6.0	NA[d]	1.0	NA[d]
23 Jun	3	3	3.3	0.3	1.0	0.0
25 Jun	3	6	7.7	1.4	1.7	0.2
26 Jun	3	10	15.7	4.8	0.9	0.2
27 Jun	3	4	2.0	0.7	0.8	0.3
28 Jun	3	8	2.4	0.8	0.9	0.1
29 Jun	4	18	2.3	0.4	1.1	0.2
30 Jun	4	5	1.2	0.6	0.4	0.2
2 Jul	4	5	2.4	0.4	2.0	0.3
3 Jul	4	5	2.2	1.3	0.6	0.2
4 Jul	4	10	0.0	0.0	0.0	0.0
5 Jul	4	5	0.4	0.2	0.0	0.0
6 Jul	5	22	0.5	0.1	0.4	0.1
7 Jul	5	13	0.4	0.2	0.3	0.2
9 Jul	5	5	0.6	0.4	0.0	0.0
10 Jul	5	3	1.3	0.3	1.0	0.0
11 Jul	5	0	NA[e]	NA[e]	NA[e]	NA[e]

[a] Catch per unit effort (CPUE) is the number of fish caught per angler-day.

[b] Harvest per unit effort (HPUE) is number of fish harvested per angler-day.

[c] No interviews were conducted due to unsafe operating conditions.

[d] Count was partially completed due to mechanical failure.

[e] No interview was conducted due to the observed effort dropping below 1% of the maximum effort.

APPENDIX C: DAILY OBSERVED EFFORT BY SUBLOCATION ON THE NUSHAGAK RIVER

Appendix C1.–Daily observed effort data by sublocation on the Nushagak River, June 14–July 11, 2025.

	Number of anglers			
Date	Sublocation 001	Sublocation 002	Sublocation 003	Total
14 Jun	0	0	3	3
15 Jun	1	5	5	11
16 Jun	14	10	10	34
17 Jun	19	10	20	49
19 Jun	34	13	37	84
20 Jun	19	24	24	67
21 Jun	76	24	22	122
22 Jun	76	30	NA[a]	106
23 Jun	49	12	75	136
24 Jun	39	25	68	132
26 Jun	36	32	52	120
27 Jun	43	29	45	117
28 Jun	12	12	67	91
29 Jun	9	17	44	70
30 Jun	6	37	34	77
1 Jul	28	0	22	50
3 Jul	22	25	30	77
4 Jul	12	16	16	44
5 Jul	4	10	19	33
6 Jul	10	3	0	13
7 Jul	19	4	4	27
8 Jul	6	3	4	13
10 Jul	5	7	0	12
11 Jul	5	0	1	6
Total anglers	544	348	602	1,494

[a] Count was incomplete due to mechanical failure.

APPENDIX D: COMPOSITION OF SPORT HARVESTED CHINOOK SALMON SAMPLED ON THE NUSHAGAK RIVER DURING 2023, 2024, AND 2025 SAMPLING PERIODS

Appendix D1–Composition of sport harvested Chinook salmon sampled on the Nushagak River during the 2023, 2024, and 2025 sampling periods.

		Average length (mm)			Average weight (kg)			Count			Proportion of total age samples					
		Year			Year			Year			2025[a]		2024[b]		2023[c]	
Parameter	Age	2025[a]	2024[b]	2023[c]	2025[a]	2024[b]	2023[c]	2025[a]	2024[b]	2023[c]	%	SE	%	SE	%	SE
Male																
	1.1	406.8	386.2	387	0.5	0.9	0.3	6	77	28	–	–	–	–	–	–
	1.2	539.8	578.6	542.1	1.8	3.1	2.0	34	62	59	–	–	–	–	–	–
	1.3	593.1	686.4	664.1	2.8	5.8	4.3	32	18	34	–	–	–	–	–	–
	1.4	732.1	–	759.7	5.5	–	6.6	5	0	3	–	–	–	–	–	–
	All male	564.1	498.8	548.5	2.4	2.4	2.4	77	164	140	86.5	3.6	81.2	2.8	78.2	3.1
Female																
	1.1	550.5	–	–	2.0	–	–	1	0	0	–	–	–	–	–	–
	1.2	595.0	650.5	609.5	2.6	4.5	2.2	2	11	2	–	–	–	–	–	–
	1.3	726.7	758	763	5.9	6.9	6.8	9	20	24	–	–	–	–	–	–
	1.4	–	803.8	839.9	–	8.3	9.3	0	4	10	–	–	–	–	–	–
	All female	690.1	726.6	774.2	5.1	6.2	7.0	12	38	39	13.5	3.6	18.8	2.8	21.8	3.1
All[a]																
	1.1	427.3	386.2	387	0.8	0.9	0.3	7	77	28	7.9	2.9	40.1	3.5	17.5	3.0
	1.2	542.9	589.5	541.6	1.9	3.3	2.0	36	73	61	40.4	5.2	38.0	3.5	38.1	3.9
	1.3	622.4	724.1	705	3.5	6.3	5.3	41	38	58	46.1	5.3	19.8	2.9	36.3	3.8
	1.4	732.1	803.8	821.4	5.5	8.3	8.8	5	4	13	5.6	2.5	2.1	1.0	8.1	2.2
	Overall	581.1	541.6	597	2.7	3.1	3.4	122	202	160	–	–	–	–	–	–

Note: Counts may not sum because not all fish have an assigned age. An en dash indicates data not available or applicable.

[a] Of the 122 salmon sampled from the sport harvest, 33 could not be aged and were removed from the calculations in this table.

[b] Of the 202 salmon sampled from the sp ort harvest, 10 could not be aged and were removed from the calculations in this table.

[c] Of the 179 salmon sampled from the sport harvest, 19 could not be aged and were removed from the calculations in this table.