Copper River Fisheries Monitoring Program Report

Native Village of Eyak

Department of the Environment & Natural Resources

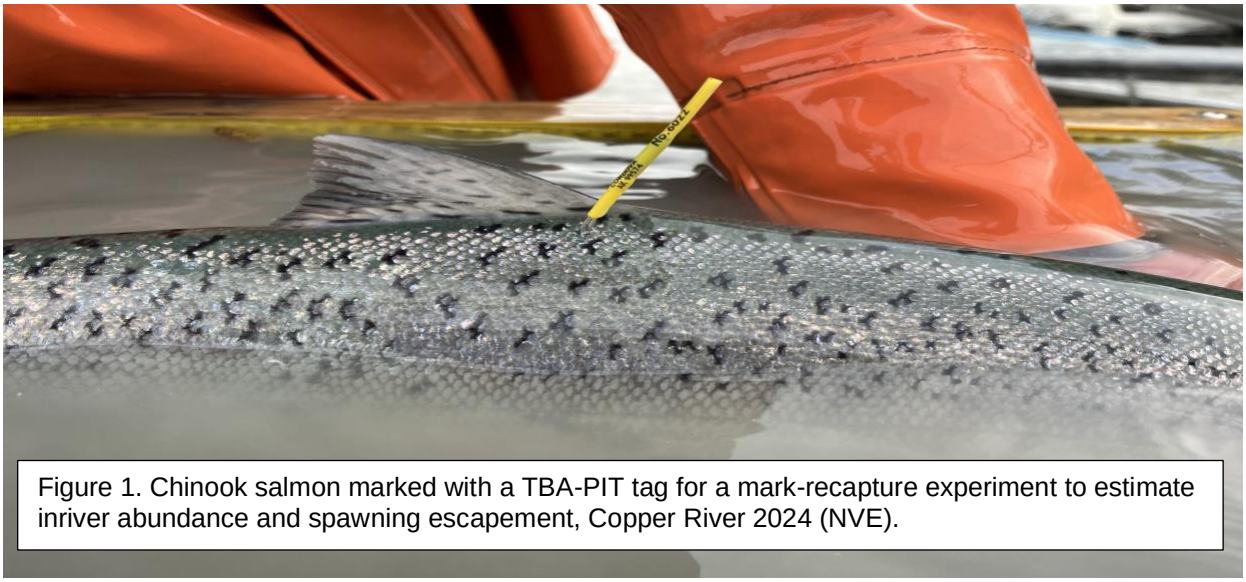


Figure 1. Chinook salmon marked with a TBA-PIT tag for a mark-recapture experiment to estimate inriver abundance and spawning escapement, Copper River 2024 (NVE).

2024 Copper River Chinook Salmon Monitoring Program Update

- 2024 Inriver Abundance Estimate = 21,069 SE = 5,984 (mark-recapture based)

This represents the estimated abundance of Chinook salmon measuring greater than 500 mm total length passing through Baird Canyon on the lower Copper River from 18 May through 07 July. Due to smaller sample sizes in some of the mark and recapture strata, the 2024 Darroch MLE estimate was less precise (i.e., larger SE and 95% CI) than abundance estimates generated by this project in recent years and did not meet the pre-season precision target.

Catch efficiencies at the Baird Canyon and Canyon Creek fishwheels were impacted by a combination of circumstances in 2024. Relatively low, but variable, water levels early in the season (May 31-June 4) created a back eddy at the FW1 site. These conditions contributed to very slow rotational speeds (0.6-0.9 RPM) relative to the season average (2.4 RPM) and likely significantly reduced catch efficiencies at a time when large numbers of fish were presumably moving through Baird Canyon. Two, there was a rapid rise in water levels from June 15-24, which by itself typically reduces catch efficiencies at the project fishwheels. However, during this period in 2024, FW4 sustained significant damage to its basket assembly and was shut down for more than 6 days to make repairs. Rotational speeds at FW4 had reached a peak of 8.6 RPM (the season average was 4.5 RPM). Most Chinook salmon captured at Canyon Creek in 2024 were caught at FW4 (618 out of 838 fish, or 74%). The timing of this outage was not ideal as a large pulse of fish were likely passing Canyon Creek at this time.

Using specific information on changes in river levels, water conditions, and fishwheel operations as a guide, the mark and recapture data was temporally stratified into a 3 row x 4 column matrix. This differs somewhat from recent years whereby data was initially stratified based on statistical week of marking and recovery. Contingency tests (chi-square) showed a significant difference in the Marked:Unmarked ratio (P=0.003) among strata, but not in the Recaptured:Not Recaptured ratio (P=0.052). Since the latter test close to being significant, and past studies have shown variable mark and recapture rates over time, a temporally stratified Darroch MLE was considered appropriate (as opposed to a pooled Petersen estimator). Using SPAS and a Darroch MLE (M=1466, C=838, R=57), we estimated **21,069 Chinook salmon (SE=5984, 95% CI = 9340-32,797) passed above Baird Canyon from May 18 to July 7, 2024**. In comparison, and using the same sample sizes, a pooled Petersen estimator produced an abundance estimate of N=21,220 (SE=2612, 95% CI = 16,100–26,340). The Petersen estimate was 151 fish (0.7%) greater than the Darroch estimate.

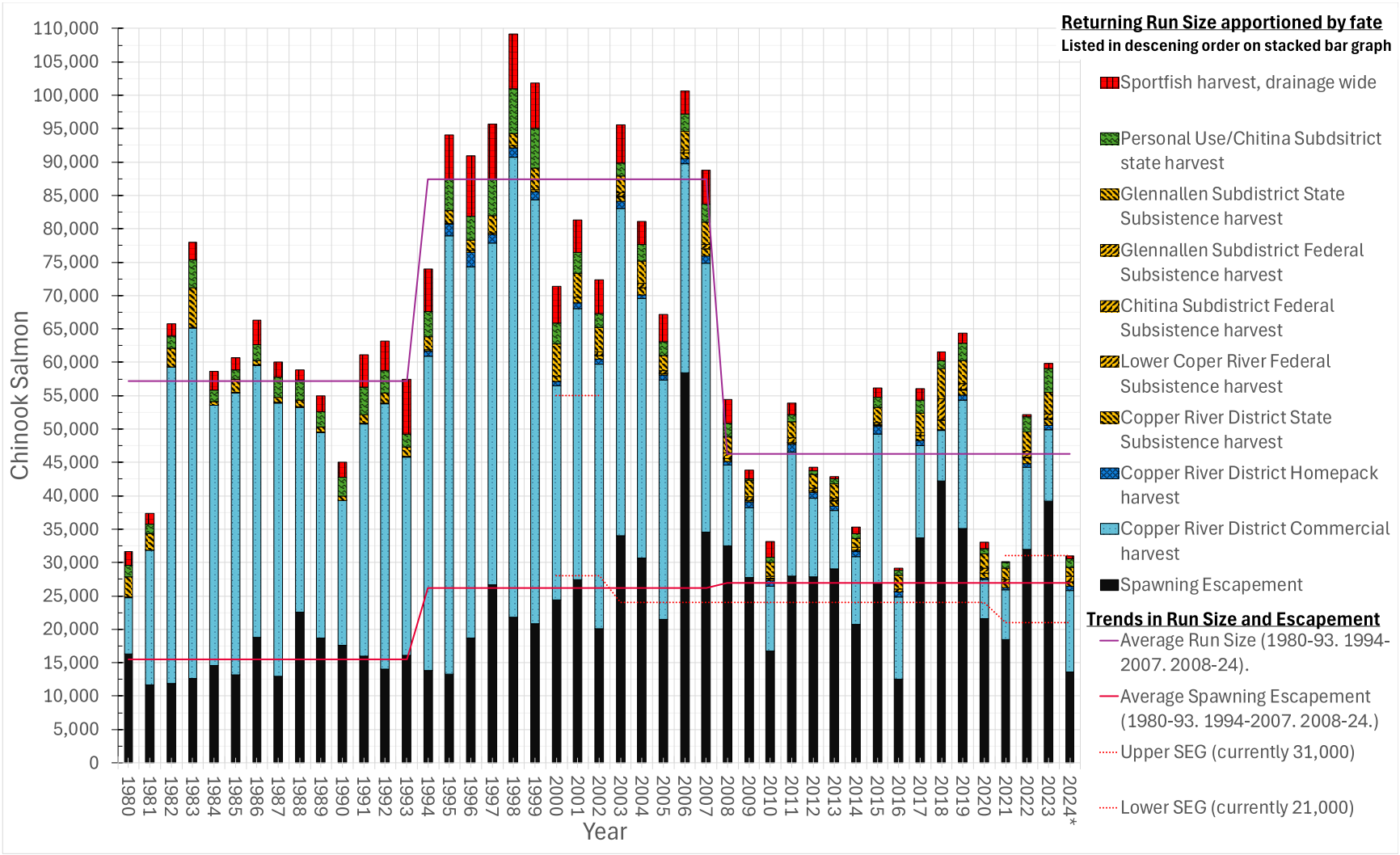


Figure 2. Chinook salmon run size apportioned by end destination 1980-2024, Copper River, AK. *2024 Upper Copper River subsistence, sport & personal use harvest estimated from the previous 5-year average divided by half to reflect state harvest restrictions. The 1980 - 1998 Chinook salmon escapement and run size estimates are based on modeling by ADF&G. The 1999 - 2024 escapment and run size estimates are abundance-based using mark-recapture data (Joy et al. 2021, Hansen and Somerville 2024, Piché et al. 2024).

Table 1. Copper River Chinook salmon run size, abundance, harvest, and spawning escapement.

Year	**Run Size Estimate**	**Copper River District Harvest** Commercial, Home Pack, Subsistence	**In-river Abundance Estimate**	Standard Error (SE)	**Upper Copper River District Harvest** Personal Use, Subsistence, Sport	**Spawning Escapement Estimate**
1980	31,829*	8,473	/	/	6,903	16,319*
1981	37,448*	20,226	/	/	5,537	11,655*
1982	65,801*	47,422	/	/	6,466	11,896*
1983	78,000*	52,579	/	/	12,784	12,639*
1984	58,685*	39,025	/	/	5,056	14,585*
1985	60,865*	42,302	/	/	5,226	13,218*
1986	66,194*	40,756	/	/	6,716	18,808*
1987	60,199*	41,050	/	/	6,082	12,941*
1988	58,889*	30,800	/	/	5,548	22,552*
1989	55,063*	30,919	/	/	5,394	18,639*
1990	44,986*	21,762	/	/	5,657	17,602*
1991	61,170*	34,923	/	/	10,268	15,940*
1992	63,245*	39,952	/	/	9,266	13,987*
1993	58,403*	29,847	/	/	11,497	16,070*
1994	74,198*	47,976	/	/	12,163	13,868*
1995	94,334*	67,517	/	/	13,308	13,290*
1996	91,041*	58,091	/	/	14,182	18,688*
1997	95,791*	52,716	/	/	16,376	26,644*
1998	109,069*	70,533	/	/	16,810	21,863*
1999	101,788	64,976	32,090	3,814	15,933	16,157
2000	71,413	33,447	38,047	7,675	13,555	24,492
2001	81,337	42,312	39,778	8,262	11,570	28,208
2002	72,404	40,874	32,873	8,863	11,404	21,574
2003	95,578	50,814	44,764	12,506	10,748	34,043
2004	81,098	40,534	40,564	4,650	9,926	30,645
2005	67,117	36,784	30,333	1,529	8,856	21,528
2006	100,656	32,867	67,789	4,779	9,353	58,454
2007	88,787	42,438	46,349	3,283	11,792	34,565
2008	54,417	13,074	41,343	2,166	8,879	32,485
2009	43,887	11,486	32,401	2,365	4,623	27,781
2010	33,150	10,827	22,323	2,492	5,577	16,771
2011	53,883	19,994	33,889	3,329	5,895	27,993
2012	44,306	12,854	31,452	5,242	3,617	27,911
2013	42,825	10,244	32,581	4,425	3,569	28,727
2014	35,286	11,128	24,158	2,100	3,449	20,709
2015	56,124	23,818	32,306	3,977	5,542	26,607
2016	29,157	13,148	16,009	1,193	3,524	12,485
2017	56,081	15,356	40,725	4,187	7,070	33,655
2018	61,583	9,059	52,524	4,034	10,322	42,202
2019	64,412	20,698	43,714	3,143	8,569	35,078
2020	33,055	6,762	26,293	2,863	4,706	21,600
2021	30,070	8,414	21,656	1,919	3,225	18,323
2022	52,166	13,686	38,480	2,960	6,473	32,004
2023	61,535	12,227	49,308	5,540	8,436	39,220
2024	34,499	13,430	21,069	5,984	3,923	13,647

Copper River Sustainable Escapement Goal (SEG) = 21,000-31,000 Chinook salmon.

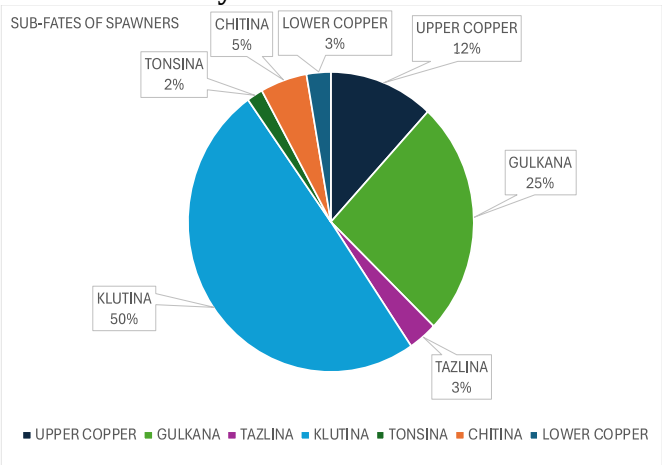
- *1980-1998 Spawning escapement and run size based on model (Joy et al 2021).
- 1999-2024 Spawning escapement estimated by subtracting Upper Copper River District harvest from inriver abundance estimate (Botz et al. 2024, Hansen and Somerville 2024, Piché et al. 2024).

Figure 3. Sockeye salmon radiotagged for spawning distribution, stock-specific run timing & bioenergetics study, Copper River 2024, (NVE & ADF&G & PWSSC Joint Study).

2024 Copper River Sockeye Salmon Monitoring Program Update

- 1100 Sockeye salmon were captured in NVE research fishwheels, radiotagged, and released in Baird Canyon. The tagging effort was distributed evenly across the run, using Miles Lake sonar passage to inform daily tag deployment. Tagging occurred from May 15 to August 01 (NVE).
- All tagged fish were sampled for genetics, fat content, and length (NVE).
- 13 Fixed towers tracked the time, date, & direction of individual tagged salmon as they migrated past (NVE & ADF&G).
- 60+ hours of aerial telemetry surveys throughout the entire Copper River drainage located precise locations of tagged salmon (ADF&G).
- Tributary crews searched for tagged fish on select spawning grounds to inspect spawning success and body condition in the Klutina drainage & Tanada drainage. (Prince William Sound Science Center)

2024 Preliminary results:



50% returned to the Klutina River Drainage
25% Gulkana River Drainage
12% Upper Copper Drainages = all spawning areas upstream of Copper River confluence with the Gulkana River.
5% Chitina River Drainages
3% Tazlina River Drainage
3% Lower Copper River Drainages = all spawning areas downstream of Wood Canyon and above Miles Lake.
2% Tonsina River Drainages

Figure 4. Sub fates of radiotagged spawning sockeye salmon, Copper River, 2024.

Thank you for your support: Funding for the 2024 Copper River Salmon Monitoring Program has been generously provided by the Fisheries Resource Monitoring Program & The Partners for Fisheries Monitoring Program; USFWS-Tribal Wildlife Grant; The Alaska Sustainable Salmon Fund; U.S. Department of Commerce, National Oceanic and Atmospheric Administration, The Alaska Department of Fish and Game Division of Sport Fish and Commercial Fisheries Division; and the Native Village of Eyak Tribal Council.

Literature Cited:

Botz, J., H. Scannell, M. Olson, J. Morella, and R. Ertz. 2024. 2023 Prince William Sound area finfish management report. Alaska Department of Fish and Game, Fishery Management Report No. 24-15, Anchorage.

Joy, P., J. W. Savereide, M. Tyers, and S. J. Fleischman. 2021. Run reconstruction, spawner–recruit analysis, and escapement goal recommendation for Chinook salmon in the Copper River. Alaska Department of Fish and Game, Fishery Manuscript No. 21-01, Anchorage.

Piché, M.J., J.C. Whissel, and J.J. Smith. 2024. Estimating the in-river abundance of Copper River Chinook salmon, 2023 Annual Report. U.S. Fish and Wildlife Service - Office of Subsistence Management, Fisheries Resource Monitoring Program (Study No. 20-504), Anchorage, Alaska.

Hansen, T.R. and M.A. Somerville. 2024. Fishery management report for the recreational fisheries of the Upper Copper/Upper Susitna River management area, 2023. Alaska Department of Fish and Game, Fishery Management Report No. 24-30, Anchorage.

Hansen, T.R., M.J. Piché and P. Rand. Unpublished. 2025 Spawning distribution and stock-specific run timing of Sockeye Salmon, Copper River. Alaska Sustainable Salmon Fund. Project No 56015.