



NOAA Contract Report NMFS-NWFSC-CR-2026-02

<https://doi.org/10.25923/jqs0-f478>

Monitoring the Migrations of Wild Snake River Spring/Summer Chinook Salmon Juveniles: Fish Collection and Tagging, 2025

Project **1991-028-00**, Contract **83639 REL 68**
covering the period from **January to December 2025**

February 2026

U.S. DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Northwest Fisheries Science Center

NOAA Contract Report Series NMFS-NWFSC-CR

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Recommended citation:

(Barenberg et al. 2026)¹

¹ Barenberg, A. L., J. J. Lamb, R. M. Gleason, and B. P. Sandford. 2026. Monitoring the Migrations of Wild Snake River Spring/Summer Chinook Salmon Juveniles: Fish Collection and Tagging, 2025. U.S. Department of Commerce, NOAA Contract Report NMFS-NWFSC-CR-2026-02.

<https://doi.org/10.25923/jqs0-f478>



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Monitoring the Migrations of Wild Snake River Spring/Summer Chinook Salmon Juveniles: Fish Collection and Tagging, 2025

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<https://doi.org/10.25923/jqs0-f478>

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Executive Summary

During summer 2025, we collected and tagged fish as part of a multiyear research project to assess migrational characteristics and estimate parr-to-smolt survival for wild Snake River spring/summer Chinook salmon smolts in the Snake River Basin. During each study year since 1991, we have collected wild Chinook parr in natal tributaries, implanted them with passive integrated transponder (PIT) tags, and released them near their respective collection sites.

In this report, we present data on fish collection and tagging efforts during July and August 2025. Detection data will be collected from these tagged fish as they begin migration during spring 2026. These data and the respective analyses will be presented in our 2026 *Survival and Timing* report.

- During July-August 2025, we collected a total of 6,879 wild Chinook salmon parr from seven Idaho sample locations: Marsh Creek (1,459), Cape Horn Creek (409), South Fork Salmon River (2,005), Secesh River (1,117), Lake Creek (1,369), West Fork Chamberlain Creek (13), and Chamberlain Creek (507). Of the parr collected, 5,429 were PIT-tagged and released.
- For all fish collected, we observed an overall average length of 67 mm and average weight of 3.8 g.
- We observed a mortality rate of 2% (141) for collected fish over all sample reaches combined. The main cause of mortality was associated with collection of fish (138), and we recorded three mortalities associated with anesthetizing, tagging, and handling.

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Introduction

Snake River spring/summer-run Chinook salmon *Oncorhynchus tshawytscha* was listed as threatened under the U.S. Endangered Species Act (ESA) in 1992. Since that time, this evolutionarily significant unit (ESU) has been the focus of a recovery plan to restore its populations to self-sustaining levels. The plan serves as a base of coordination for recovery efforts from federal, state, tribal, and municipal entities, as well as from private groups and individuals. Recovery efforts focus on both salmon populations and their habitats.

In its 2016 status review, the National Marine Fisheries Service (NMFS) concluded that the Snake River spring/summer Chinook salmon ESU remains at high overall risk, and that all but one population (Chamberlain Creek) remain at high risk (NMFS 2016). In this status review, NMFS (2016) reported that for most populations in the Snake River spring/summer Chinook salmon ESU, natural-origin abundance has increased over levels reported in the previous status review. However, these increases were inconsistent across populations and not substantial enough to change viability ratings.

In an analysis of potential recovery strategies, Kareiva et al. (2000) found that "modest reductions in first-year mortality or estuarine mortality would reverse current population declines" for Snake River spring/summer-run Chinook salmon. Their finding supports prioritization of the juvenile stage as an efficient approach toward allocation of resources for recovery goals.

For Pacific salmon *Oncorhynchus* spp., tagging and recapture studies have been a central component of research to improve survival of juvenile downstream migrants. When tagging studies began in the mid-1950s, researchers relied on data from methods that could only provide limited information on fish passage (ie freeze branding, index counts, etc). In the late 1980s, the passive integrated transponder (PIT) tag was introduced to the fisheries community. The PIT tag allows researchers to track and record the movements of individual fish. Because it is small and biologically inert, a PIT tag can be retained throughout the fish's life cycle. The "passive" capability of the tag, which does not require a battery, means a single tag can potentially produce multiple detections of an individual fish throughout the life-span of that fish.

Since its introduction, use of the PIT tag has expanded from about 50,000 to more than 2 million fish tagged annually within the Federal Columbia River Power System (FCRPS). These tagging efforts, along with automated data collection methods, have provided large data sets for a broad mixture of wild/natural and hatchery stocks, ages, and year classes. The Columbia Basin PIT Tag Information System (PTAGIS) was established

as a shared repository for these data (PSMFC 1996).

Construction and installation of the spillway PIT detection system at Lower Granite Dam was completed in January 2020. The new spillway system allows fish (including fish from this study) to be detected as they pass through spill bay 1 (PITAGIS interrogation site GRS). Prior to installation of the spillway system, a large number of PIT tagged fish passed Lower Granite without being detected. The new system has increased detection rates, and these higher numbers of detected fish allow for more precise estimates of survival and timing for the wild Snake River spring/summer Chinook tagged as part of this project.

Data from PIT tag detections continues to provide insight for decisions on programs to enhance juvenile passage at dams, such as spill and transportation. However, there is an ongoing need for recent data upon which to base decisions for these and other restoration and recovery efforts. Gaps remain in understanding life history patterns and survival at different points in the life cycle of Columbia Basin stocks. Our research directly addresses data gaps for wild Snake River spring/summer Chinook salmon at the parr-to-smolt stage.

The 2020 NMFS Columbia River System Biological Opinion (NMFS 2020) calls for investigations to understand the factors contributing to the expressions of life-history diversity, such as yearling vs. subyearling life-history strategies for spring/summer Chinook salmon. We need to examine factors influencing the adoption of alternative life-history patterns, and how such changes might contribute to the abundance and productivity of affected populations. This includes examining how and where potential density-dependence limitations are affecting spring/summer Chinook salmon productivity in freshwater habitats, including what is happening in the overwintering life stage. In addition, to investigate factors that contribute to the subyearling life-history pattern of spring/summer Chinook salmon and the limiting factors that determine adult returns.

Section 1.3.2.5.5 of the 2020 BiOp states that

The Action Agencies will continue to: monitor habitat status and trends (including stream temperature and flow); conduct compliance and implementation monitoring (to ensure that habitat improvement actions are implemented as planned); monitor effectiveness of their habitat mitigation efforts at a range of scales; fund fish and habitat monitoring; and, support research projects with regional partners as funding and priorities allow.

Clearly, the migratory performance of wild fish (e.g., run-timing/survival) is important and should continue to be monitored. To this end, marking wild/natural parr with

PIT tags in their natal streams during the summer of their first year of life provides the opportunity to precisely track these stocks through natal rearing streams, unimpounded sections of the Salmon and Snake Rivers, and the hydroelectric complex during their parr/smolt migrations.

This report includes information on tagging of wild Chinook salmon parr from Idaho streams during 2025. We will monitor these fish during spring and early summer 2026 as they migrate downstream towards the Pacific Ocean. Estimates of survival and timing of study fish to Lower Granite Dam, will be provided in the *Survival and Timing* component of this report, along with interrogation data at several other sites throughout the Snake and Columbia River hydropower system in 2026.

This research continues studies that began in 1991 with funding from the Bonneville Power Administration (BPA). Results from previous study years were reported by Achord et al. (1994, 1995a,b, 1996, 1997, 1998, 2000, 2001a,b, 2002, 2003a, 2004-2007a,b, 2008-2012; Lamb et al. 2013-2019a,b; 2021; 2023a,b,c; 2024). The goals of this ongoing study are to:

1. Characterize migration timing and growth and estimate parr-to-smolt survival to Lower Granite Dam for individual stream populations of wild Snake River spring/summer Chinook salmon.
2. Determine whether consistent patterns in migration timing and survival are apparent.
3. Determine which environmental factors may influence patterns in migration/survival.
4. Characterize the migrational behavior and estimated survival of different wild juvenile Chinook populations as they migrate from natal rearing areas.

This study continues to provide critical information for recovery planning and restoration efforts for these wild Chinook salmon populations, all of which remain listed as threatened under the U.S. Endangered Species Act (NMFS 2008).

Methods

During summer 2025, we tagged fish in sample reaches of seven Idaho streams (Figure 1). Fish collection followed the safe handling methods developed for this study and detailed by Achord et al. (1994; 2007b) and Matthews et al. (1997). During 2025, we continued to use the electrofishing methods described by Meyer et al. (2021) as the “100-Watt method.” This technique results in fewer delayed effects for collected fish while increasing catch per unit effort. Anesthetized fish were tagged only if they met the 55-mm minimum fork length requirement and had no observable pre-existing injuries.

In 2025, fish that measured 55-60 mm fork length (FL) were tagged using a 9-mm (HPT9) tag, while those larger than 60 mm FL were tagged with a 12-mm (ATP12) advanced performance PIT tag (Biomark, Inc. Boise, Idaho).¹ All fish were implanted with tags using pre-loaded, individual single-use hypodermic needles. This method ensured that each fish was tagged with a sterile, sharp needle, thus minimizing stress, injury, and potential disease transmission during the tagging process. A portion of tagged fish were held for 24 hours to observe any potential delayed mortality associated with tagging and handling. After recovery from the anesthetic or the 24-h hold, fish were released back to the streams where they had been originally captured.

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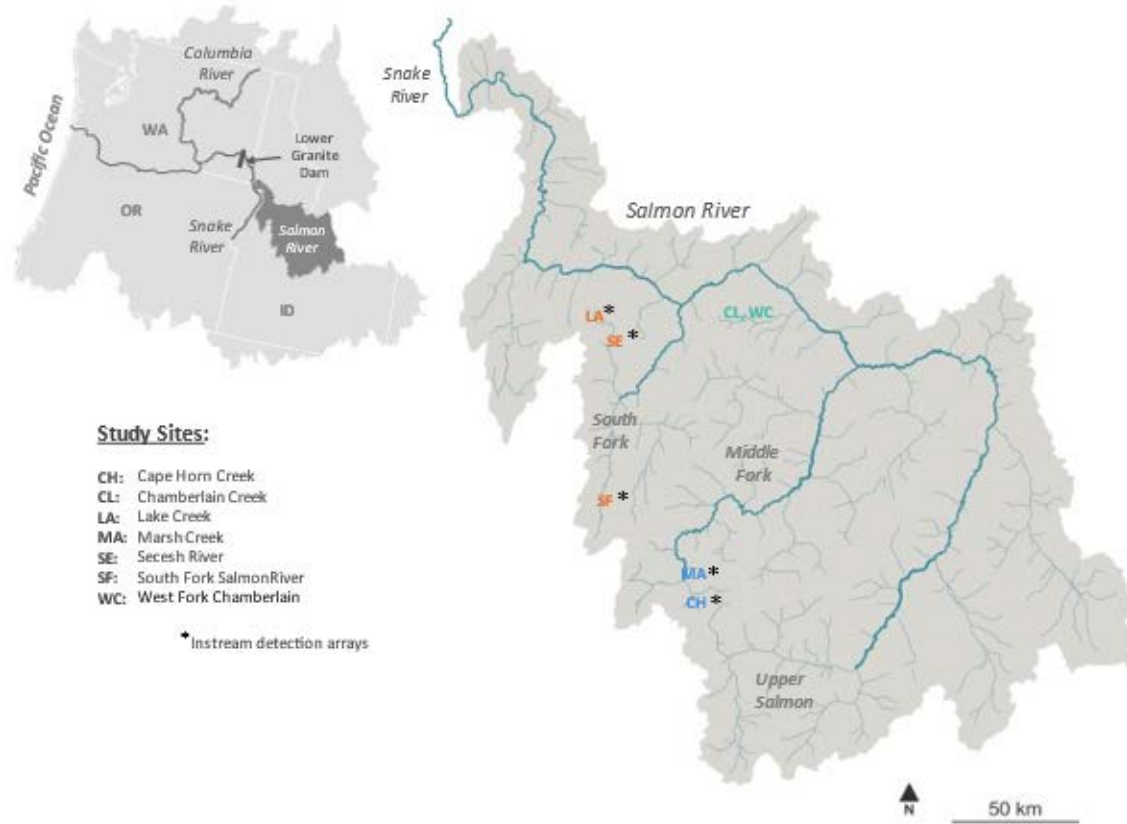


Figure 1. Map showing the streams and sample reaches where wild spring/summer Chinook salmon parr were PIT tagged during 2025.

Results

From 26 July to 17 August 2025, we collected 6,879 wild spring/summer Chinook salmon parr from seven Idaho stream populations (Figure 1). Fish were collected over a distance of 19.5 stream km and over an area of approximately 224,606 m² (Table 1). Of the 6,879 fish collected, 5,429 were injected with PIT tags.

All tagged fish were released back to their respective natal streams along with any remaining untagged live fish. Collected fish were returned to the natal stream without tagging if they had been previously tagged, were too small, injured, had matured precociously, or if sufficient numbers of fish had already been tagged. The number of tagged fish ranged from a maximum of 1,500 in South Fork Salmon River to 0 in West Fork Chamberlain (Table 1; Appendix Table 1).

In 2025, the mean fork length of all Chinook salmon parr collected was 67 mm and the mean weight was 3.8 g. For Chinook salmon parr that were tagged and released, mean fork length was 64 mm and mean weight was 3.2 g (Table 1; Appendix Table 1). Collection areas within each stream were delineated by recording the global positioning system (GPS) coordinates of each site using the Universal Transverse Mercator (UTM) coordinate system (Appendix Table 3).

Other than Chinook salmon parr, sculpin (genus *Cottus*) was the most abundant fish observed during field collection operations (Table 2). Brook trout *S. fontinalis* were found in high numbers at all locations except Chamberlain and West Fork Chamberlain. However, records of non-target species did not represent their total abundances in collection areas, as only Chinook salmon were targeted for collection. Non-target species were counted as incidental take.

Mortality associated with collection and tagging procedures in 2025 was low, but slightly higher than what has been observed in previous years (Table 3; Appendix Table 4). The overall collection, handling, and tagging mortality rate was 2.0%. Collection and handling accounted for all mortality with the exception of three tagging mortalities at three separate locations (SF Salmon, Secesh, and Lake Creek), which included a 24-h hold for a portion (10% or more) of the tagged fish to evaluate post-tagging mortality and tag retention.

Table 1. Summary of collection, PIT tagging, and release of wild Chinook salmon parr with average fork lengths and weights (includes recaptured tagged fish), approximate distances, and estimated areas sampled in Idaho streams during July and August 2025.

Tagging location	Number of fish		Average length (mm)		Average weight (g)		Collection area to stream mouth (km)	Est. stream area sampled (m ²)
	Collected	Tagged & released	Collected	Tagged	Collected	Tagged		
Marsh Creek	1,459	1,346	67	68	3.7	3.8	12-14.5	36,840
Cape Horn Creek	409	212	58	62	3.0	2.8	0.5-1.0	13,291
S Fork Salmon R	2,005	1,499	64	66	3.3	3.5	115-119.5	45,416
Secesh River	1,117	940	63	63	2.9	2.9	24.5-28	37,844
Lake Creek	1,369	955	61	63	2.8	2.9	0.5-4.5	24,931
WF Chamberlain	13	0	84	--	6.6	--	2-3	10,814
Chamberlain Creek	507	474	71	70	4.2	3.9	22-26.5	55,470
Totals/averages	6,879	5,426	67	64	3.8	3.2	19.5	224,606

Table 2. Summary of species other than Chinook salmon observed during collection operations in Idaho July – August 2025.

Sample Site	Steelhead	Unidentified Fry	Brook Trout	Bull trout	Sculpin	Dace	Sucker	White fish	Redsided Shiner	Lamprey	Pacific Giant Salamander
Marsh Creek	58	116	284	0	1198	0	0	1	0	0	0
Cape Horn Creek	30	33	107	1	550	0	0	0	0	0	0
SF Salmon River	246	519	106	0	121	406	0	4	54	0	9
Secesh River	158	293	59	0	286	190	0	0	0	470	8
Lake Creek	27	33	128	1	1,001	17	0	0	0	290	6
WF Chamberlain	104	12	0	3	973	0	0	0	0	0	0
Chamberlain	259	92	0	8	1352	0	0	21	0	0	0
Totals	882	1098	684	13	5481	613	0	26	54	760	23

Table 3. Mortality percentages for wild Chinook salmon parr collected and PIT-tagged in Idaho during July 2025.

Tagging Location	Mortality (%)		
	Collection	Tagging/24 h	Overall
Marsh Creek	2.5	0.0	2.5
Cape Horn Creek	2.7	0.0	2.7
S Fork Salmon River	1.6	0.0	1.6
Secesh River	1.5	0.1	1.6
Lake Creek	1.8	0.1	1.9
W Fork Chamberlain Creek	0.0	0.0	0.0
Chamberlain Creek	3.4	0.0	3.4
Averages	2.0	0.0	2.0

Discussion

During 2025, sampling occurred at 7 of the 16 historical study sites and crews were able to successfully collect and tag 800+ fish at four of the sites. The total number of wild Chinook salmon parr tagged was slightly higher than the 5-year average (6,879 vs. 6,345). Pre-season estimates of adult escapement provided by Idaho Department of Fish and Game (IDFG) showed that parr densities would be low at many locations, however several sites (Marsh Creek, SF Salmon, Secesh and Lake Creek) were projected to have sufficient numbers of parr to meet tagging goals. At streams with adult escapement not meeting the Critical Abundance Threshold (CAT), sampling in Idaho was prohibited. We are optimistic that new tools used for estimation of escapement and favorable adult returns should allow for more juvenile tagging in the future.

Our overall collection effort in 2025 included more area (m^2) sampled than any year since 2019. This was mostly due to the combined collaboration effort of personnel from NOAA, the Shoshone-Bannock, and Nez Perce Tribes at several study sites. Over the entirety of the sample area (224,606 m^2), we estimated an annual density of 3.06 parr/100 m^2 , which is slightly lower than the five-year average (3.82 parr/100 m^2). Past data has indicated an inverse relationship between parr density and parr-to-smolt survival (Achord et al. 2003b; Figure 2). Parr densities vary among study sites and can be biased high when using seine nets in deeper pools where parr tend to congregate. Conditions and parr densities in study reaches were not found to be favorable for seine netting and only electro-fishing was used during collection efforts.

In addition to collection and tagging of wild Chinook parr, we collected genetic samples from Chinook and steelhead (*O. mykiss*) at all locations. These samples were collected from fish already captured for tagging. The samples will be used as part of BPA project (1989-096-00) *Monitor and Evaluate the Genetic Characteristics of Supplemented Salmon and Steelhead in the Snake River Basin* and samples from South Fork Salmon River are used in parentage-based tagging (PBT) studies being conducted by IDFG.

During 2026, we will collect downstream migration data from the wild spring/summer Chinook parr collected and tagged during field operations in 2025. Analyses from these data will include estimates of parr-to-smolt survival, arrival and migration timing to Lower Granite Dam from streams with instream detection capabilities, and smolt passage timing at Lower Granite. These analyses will be included in our annual report, along with environmental data collected from each tagging location and growth data on migrants recaptured at Lower Granite Dam.

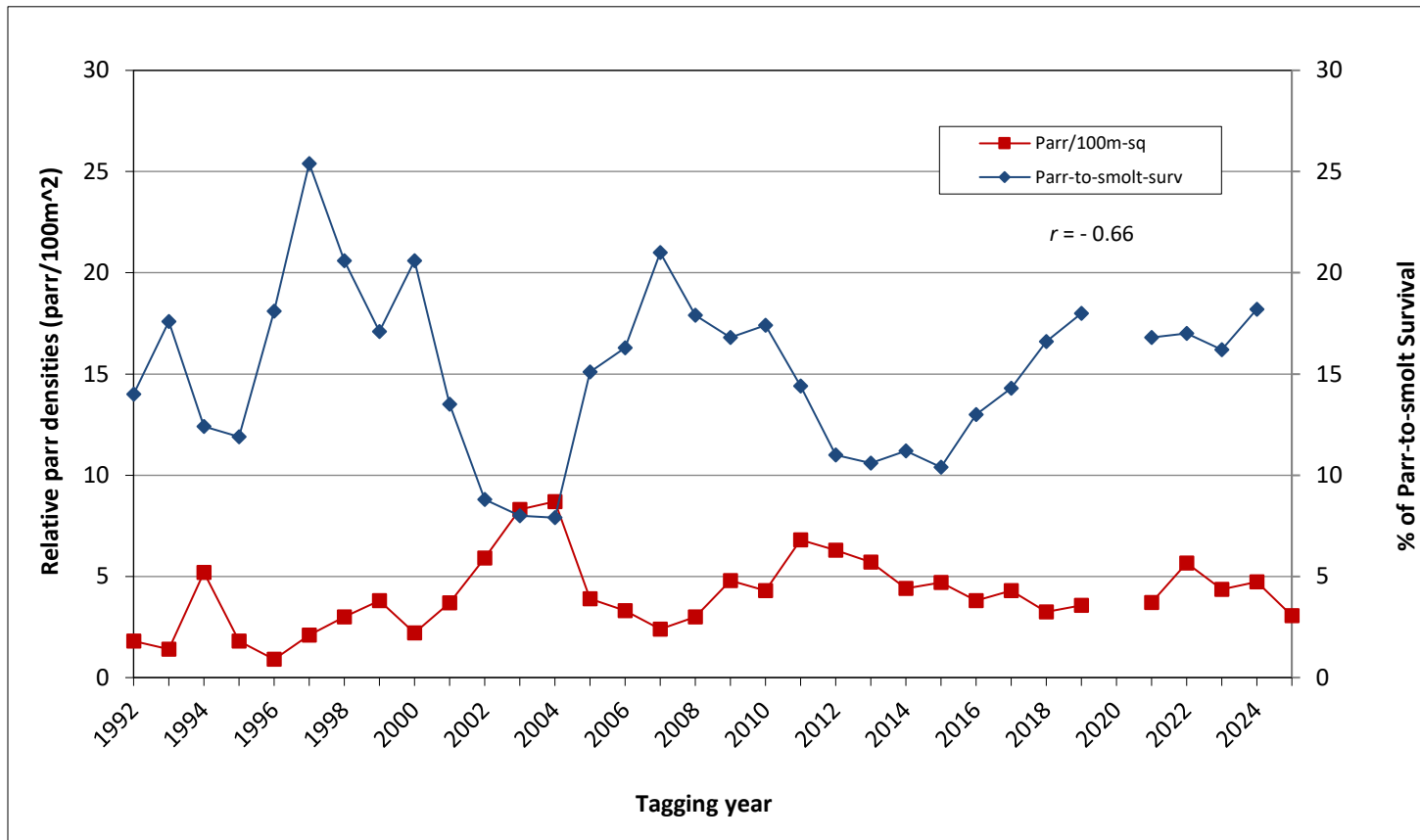


Figure 2. Annual average density of Chinook salmon parr (parr/100 m²) in Idaho streams vs. annual estimated survival of smolts from these streams to Lower Granite Dam the following year, 1992 to 2025 (excluding 2020, when no fish were collected).

Acknowledgments

We thank the Bonneville Power Administration for continual funding of this project. Thanks to Joe Vinarcsik, Kara Jaenecke, Brody Gasper, Sara Schneider, Paxton Calhoun, Stuart Munsch, Aimee Fullerton, Beth Sanderson, and Porter Good of the National Marine Fisheries Service for excellent assistance in collecting and tagging fish for this study. Special thank you to the Shoshone-Bannock and Nez Perce Tribe for offering assistance during sampling operations. For troubleshooting and maintaining PIT-tag detection arrays associated with this project, we thank the staff from Biomark, Inc.

References

- Achord, S., G. M. Matthews, D. M. Marsh, B. P. Sandford, and D. J. Kamikawa. 1994. Monitoring the migrations of wild Snake River spring and summer Chinook salmon smolts, 1992. Report of the National Marine Fisheries Service to the Bonneville Power Administration, Portland, OR.²
- Achord, S., D. J. Kamikawa, B. P. Sandford, and G. M. Matthews. 1995a. Monitoring the migrations of wild Snake River spring/summer Chinook salmon smolts, 1993. Report of the National Marine Fisheries Service to the Bonneville Power Administration, Portland, OR.
- Achord, S., D. J. Kamikawa, B. P. Sandford, and G. M. Matthews. 1995b. Monitoring the migrations of wild Snake River spring/summer Chinook salmon smolts, 1994. Report of the National Marine Fisheries Service to the Bonneville Power Administration, Portland, OR.
- Achord, S., M. B. Eppard, B. P. Sandford, and G. M. Matthews. 1996. Monitoring the migrations of wild Snake River spring/summer Chinook salmon smolts, 1995. Report of the National Marine Fisheries Service to the Bonneville Power Administration, Portland, OR.
- Achord, S., M. B. Eppard, E. E. Hockersmith, B. P. Sandford, and G. M. Matthews. 1997. Monitoring the migrations of wild Snake River spring/summer Chinook salmon smolts, 1996. Report of the National Marine Fisheries Service to the Bonneville Power Administration, Portland, OR.
- Achord, S., M. B. Eppard, E. E. Hockersmith, B. P. Sandford, and G. M. Matthews. 1998. Monitoring the migrations of wild Snake River spring/summer Chinook salmon smolts, 1997. Report of the National Marine Fisheries Service to the Bonneville Power Administration, Portland, OR.
- Achord, S., M. B. Eppard, E. E. Hockersmith, B. P. Sandford, G. A. Axel, and G. M. Matthews. 2000. Monitoring the migrations of wild Snake River spring/summer Chinook salmon smolts, 1998. Report of the National Marine Fisheries Service to the Bonneville Power Administration, Portland, OR.
- Achord, S., G. A. Axel, E. E. Hockersmith, B. P. Sandford, M. B. Eppard, and G. M. Matthews. 2001a. Monitoring the migrations of wild Snake River spring/summer Chinook salmon smolts, 1999. Report of the National Marine Fisheries Service to the Bonneville Power Administration, Portland, OR.

² Reports from the National Marine Fisheries Service Northwest Fisheries Science Center are available from our publications database (webapps.nwfsc.noaa.gov/apex/nwfsc/r/nwfsc_web_apex/scipubs/search) or from the NOAA Institutional Repository (<https://repository.library.noaa.gov/>).

- Achord, S., G. A. Axel, E. E. Hockersmith, B. P. Sandford, M. B. Eppard, and G. M. Matthews. 2001b. Monitoring the migrations of wild Snake River spring/summer Chinook salmon smolts, 2000. Report of the National Marine Fisheries Service to the Bonneville Power Administration, Portland, OR.
- Achord, S., G. A. Axel, E. E. Hockersmith, B. P. Sandford, M. B. Eppard, and G. M. Matthews. 2002. Monitoring the migrations of wild Snake River spring/summer Chinook salmon smolts, 2001. Report of the National Marine Fisheries Service to the Bonneville Power Administration, Portland, OR.
- Achord, S., E. E. Hockersmith, B. P. Sandford, R. A. McNatt, B. E. Feist, and G. M. Matthews. 2003a. Monitoring the migrations of wild Snake River spring/summer Chinook salmon smolts, 2002. Report of the National Marine Fisheries Service to the Bonneville Power Administration, Portland, OR.
- Achord, S., P. S. Levin, R. W. Zabel. 2003b. Density-dependent mortality in Pacific salmon: the ghost of impacts past? *Ecology Letters*, 6(4):335-342.
- Achord, S., R. A. McNatt, E. E. Hockersmith, B. P. Sandford, K. W. McIntyre, N. N. Paasch, J. G. Williams, and G. M. Matthews. 2004. Monitoring the migrations of wild Snake River spring/summer Chinook salmon smolts, 2003. Report of the National Marine Fisheries Service to the Bonneville Power Administration, Portland, OR.
- Achord, S., J. M. Hodge, B. P. Sandford, E. E. Hockersmith, K. W. McIntyre, N. N. Paasch, and J. G. Williams. 2005. Monitoring the migrations of wild Snake River spring/summer Chinook salmon smolts, 2004. Report of the National Marine Fisheries Service to the Bonneville Power Administration, Portland, OR.
- Achord, S., B. P. Sandford, E. E. Hockersmith, J. M. Hodge, K. W. McIntyre, N. N. Paasch, L. G. Crozier, and J. G. Williams. 2006. Monitoring the migrations of wild Snake River spring/summer Chinook salmon juveniles, 2004-2005. Report of the National Marine Fisheries Service to the Bonneville Power Administration, Portland, OR.
- Achord, S., B. P. Sandford, E. E. Hockersmith, K. W. McIntyre, N. N. Paasch, and J. G. Williams. 2007a. Monitoring the migrations of wild Snake River spring/summer Chinook salmon juveniles, 2005-2006. Report of the National Marine Fisheries Service to the Bonneville Power Administration, Portland, OR.
- Achord, S., R. W. Zabel, and B. P. Sandford. 2007b. Migration timing, growth, and estimated parr-to-smolt survival rates of wild Snake River spring/summer Chinook salmon from the Salmon River basin, Idaho, to the lower Snake River. *Transactions of the American Fisheries Society* 136:142-154.

- Achord, S., B. P. Sandford, E. E. Hockersmith, M. G. Nesbit, N. D. Dumdei, J. J. Lamb, K. W. McIntyre, N. N. Paasch, and J. G. Williams. 2008. Monitoring the migrations of wild Snake River spring/summer Chinook salmon juveniles, 2006-2007. Report of the National Marine Fisheries Service to the Bonneville Power Administration, Portland, OR.
- Achord, S., B. P. Sandford, E. E. Hockersmith, M. G. Nesbit, N. D. Dumdei, J. J. Lamb, K. W. McIntyre, N. N. Paasch, and J. G. Williams. 2009. Monitoring the migrations of wild Snake River spring/summer Chinook salmon juveniles, 2007-2008. Report of the National Marine Fisheries Service to the Bonneville Power Administration, Portland, OR.
- Achord, S., B. P. Sandford, E. E. Hockersmith, M. G. Nesbit, N. D. Dumdei, J. J. Lamb, K. W. McIntyre, N. N. Paasch, and J. G. Williams. 2010. Monitoring the migrations of wild Snake River spring/summer Chinook salmon juveniles, 2008-2009. Report of the National Marine Fisheries Service to the Bonneville Power Administration, Portland, OR.
- Achord, S., B. P. Sandford, E. E. Hockersmith, M. G. Nesbit, N. D. Dumdei, J. J. Lamb, K. W. McIntyre, N. N. Paasch, S. G. Smith, and R. W. Zabel. 2011. Monitoring the migrations of wild Snake River spring/summer Chinook salmon juveniles, 2009-2010. Report of the National Marine Fisheries Service to the Bonneville Power Administration, Portland, OR.
- Achord, S., B. P. Sandford, E. E. Hockersmith, J. J. Lamb, K. W. McIntyre, N. N. Paasch, and R. W. Zabel. 2012. Monitoring the migrations of wild Snake River spring/summer Chinook salmon juveniles, 2010-2011. Report of the National Marine Fisheries Service to the Bonneville Power Administration, Portland, OR.
- Kareiva, P., M. Marvier, and M. McClure. 2000. Recovery and management options for spring/summer Chinook salmon in the Columbia River Basin. *Science* 290:290:977-979.
- Lamb, J. J., S. Achord, B. P. Sandford, G. A. Axel, M. G. Nesbit, K. W. McIntyre, and B. L. Sanderson. 2013. Monitoring the migrations of wild Snake River spring/summer Chinook salmon juveniles, 2011-2012. Report of the National Marine Fisheries Service to the Bonneville Power Administration, Portland, OR.
- Lamb, J. J., B. P. Sandford, G. A. Axel, S.G. Smith, M. G. Nesbit, and B. L. Sanderson. 2014. Monitoring the migrations of wild Snake River spring/summer Chinook salmon juveniles, 2012-2013. Report of the National Marine Fisheries Service to the Bonneville Power Administration, Portland, OR.
- Lamb, J. J., B. P. Sandford, G. A. Axel, S.G. Smith, M. G. Nesbit, and B. L. Sanderson. 2015. Monitoring the migrations of wild Snake River spring/summer Chinook salmon juveniles, 2013-2014. Report of the National Marine Fisheries Service to the Bonneville Power Administration, Portland, OR.

- Lamb, J. J., B. P. Sandford, G. A. Axel, S. G. Smith, M. G. Nesbit, and B. L. Sanderson. 2016. Monitoring the migrations of wild Snake River spring/summer Chinook salmon juveniles, 2014-2015. Report of the National Marine Fisheries Service to Bonneville Power Administration, Portland, OR.
- Lamb, J. J., B. P. Sandford, G. A. Axel, S. G. Smith, M. G. Nesbit, and B. L. Sanderson. 2017. Monitoring the migrations of wild Snake River spring/summer Chinook salmon juveniles, 2015-2016. Report of the National Marine Fisheries Service to Bonneville Power Administration, Portland, OR.
- Lamb, J. J., B. P. Sandford, G. A. Axel, M. G. Nesbit, and B. L. Sanderson. 2018a. Monitoring the migrations of wild Snake River spring/summer Chinook salmon juveniles: fish collection and tagging, 2017. Report of the National Marine Fisheries Service to Bonneville Power Administration, Portland, OR.
- Lamb, J. J., B. P. Sandford, G. A. Axel, S. G. Smith, M. G. Nesbit, and B. L. Sanderson. 2018b. Monitoring the migrations of wild Snake River spring/summer Chinook salmon juveniles: survival and timing, 2017. Report of the National Marine Fisheries Service to Bonneville Power Administration, Portland, OR.
- Lamb, J. J., B. P. Sandford, G. A. Axel, M. G. Nesbit, and B. L. Sanderson. 2018c. Monitoring the migrations of wild Snake River spring/summer Chinook salmon juveniles: fish collection and tagging, 2018. Report of the National Marine Fisheries Service to Bonneville Power Administration, Portland, OR.
- Lamb, J. J., B. P. Sandford, G. A. Axel, S. G. Smith, M. G. Nesbit, and B. L. Sanderson. 2019a. Monitoring the migrations of wild Snake River spring/summer Chinook salmon juveniles: survival and timing, 2018. Report of the National Marine Fisheries Service to Bonneville Power Administration, Portland, OR.
- Lamb, J. J., B. P. Sandford, G. A. Axel, M. G. Nesbit, and B. L. Sanderson. 2019b. Monitoring the migrations of wild Snake River spring/summer Chinook salmon juveniles: fish collection and tagging, 2019. Report of the National Marine Fisheries Service to Bonneville Power Administration, Portland, OR.
- Lamb, J. J., B. P. Sandford, G. A. Axel, S. G. Smith, M. G. Nesbit, and B. L. Sanderson. 2021a. Monitoring the migrations of wild Snake River spring/summer Chinook salmon juveniles: survival and timing, 2020. Report of the National Marine Fisheries Service to Bonneville Power Administration, Portland, OR.
- Lamb, J. J., B. P. Sandford, G. A. Axel, M. G. Nesbit, and B. L. Sanderson. 2021b. Monitoring the migrations of wild Snake River spring/summer Chinook salmon juveniles: fish collection and tagging, 2021. Report of the National Marine Fisheries Service to the Bonneville Power Administration, Portland, OR.

- Lamb, J. J., B. P. Sandford, G. A. Axel, M. G. Nesbit, and B. L. Sanderson. 2023a. Monitoring the migrations of wild Snake River spring/summer Chinook salmon juveniles: fish collection and tagging, 2022. Report of the National Marine Fisheries Service to the Bonneville Power Administration, Portland, OR.
- Lamb, J. J., B. P. Sandford, G. A. Axel, S. G. Smith, M. G. Nesbit, and B. L. Sanderson. 2023b. Monitoring the migrations of wild Snake River spring/summer Chinook salmon juveniles: survival and timing, 2022. Report of the National Marine Fisheries Service to Bonneville Power Administration, Portland, OR.
- Lamb, J. J., B. P. Sandford, G. A. Axel, M. G. Nesbit, and B. L. Sanderson. 2023c. Monitoring the migrations of wild Snake River spring/summer Chinook salmon juveniles: fish collection and tagging, 2023. Report of the National Marine Fisheries Service to the Bonneville Power Administration, Portland, OR.
- Lamb, J. J., B. P. Sandford, G. A. Axel, S. G. Smith, M. G. Nesbit, and B. L. Sanderson. 2024. Monitoring the migrations of wild Snake River spring/summer Chinook salmon juveniles: survival and timing, 2023. Report of the National Marine Fisheries Service to Bonneville Power Administration, Portland, OR.
- Lamb, J. J., Gleason, A. L. Barenberg, and B. P. Sandford. 2024. Monitoring the migrations of wild Snake River spring/summer Chinook salmon juveniles: fish collection and tagging, 2024. Report of the National Marine Fisheries Service to Bonneville Power Administration, Portland, OR.
- PSMFC (Pacific States Marine Fisheries Commission). 1996. The Columbia Basin PIT Tag Information System. Interactive database available at www.ptagis.org.
- Matthews, G. M., N. N. Paasch, S. Achord, K. W. McIntyre, and J. R. Harmon. 1997. A technique to minimize the adverse effects associated with handling and marking salmonid smolts. *The Progressive Fish-Culturist* 59:307-309.
- Meyer, K.A., Chiamonte, L.V. and Reynolds, J.B. (2021), The 100-Watt Method: A Protocol for Backpack Electrofishing in Small Streams. *Fisheries*, 46: 125-130.
- NMFS (National Marine Fisheries Service). 2008. Endangered Species Act Section 7(a)(2) Consultation Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation: NOAA Log number F/NWR/2005/05883. 333
- NMFS (National Marine Fisheries Service). 2016. 5-Year review: Summary & evaluation of Snake River sockeye, Snake River spring/summer Chinook, Snake River fall-run Chinook, Snake River Basin steelhead. National Marine Fisheries Service, West Coast Region.

NMFS (National Marine Fisheries Service). 2020. Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response: Continued Operation and Maintenance of the Columbia River System. NMFS Consultation: WCRO 2020-00113

NWFSC (Northwest Fisheries Science Center). 2007. The baseline water quality environmental monitoring program. Online database available at www.webapps.nwfsc.noaa.gov/WaterQuality/.

Appendix: Data Tables

Appendix Table 1. Summary of numbers collected, tagged, released (with tags), and minimum, maximum, and mean lengths and weights of wild Chinook salmon parr, collected and PIT tagged in various Idaho streams, 2025. Some length-weight data includes precocious Chinook.

	Fish (n)			Collection				Tagging and release			
	Collected	Tagged	Released	Length (mm)		Weight (g)		Length (mm)		Weight (g)	
				Range	Mean	Range	Mean	Range	Mean	Range	Mean
Marsh Creek	1459	1346	1346	46-128	67	1.0-23.6	3.7	55-88	68	1.4-8.4	3.8
Cape Horn Creek	409	212	212	37-130	58	0.5-27.3	3.0	55-81	62	1.3-6.4	2.8
S Fork Salmon River	2005	1500	1499	40-135	64	0.8-32.2	3.3	55-92	66	1.8-6.9	3.5
Secesh River	1117	941	940	45-142	63	0.9-34.4	2.9	55-84	63	1.3-8.3	2.9
Lake Creek	1369	956	955	41-133	61	1.0-23.5	2.8	55-83	63	1.2-6.2	2.9
WF Chamberlain	13	0	0	56-92	84	1.7-8.1	6.6	--	--	---	--
Chamberlain Creek	507	474	474	58-129	71	1.9-26.6	4.2	58-87	70	1.9-8.2	3.9
Total or mean	6879	5429	5426	37-142	67	0.5-34.4	3.8	55-92	64	1.2-8.4	3.2

Appendix Table 2. Summary of tagging dates, times, and temperatures at capture and release with capture method, distance (rkm) from stream mouth to release point, and number of tagged fish released in 2025. Electrofishing was the only capture method used. No fish were tagged at West Fork Chamberlain Creek.

Group	Tagging			Release				n
	Date (2024)	Time (PST)	Temp (°C)	Date (2024)	Time (PST)	Temp (°C)	Location (rkm)	
Marsh Creek								
GAA-2025-207-001	26 Jul	0700	6.0	27 Jul	0635	6.0	12	105
GAA-2025-207-002	26 Jul	1000	10.0	26 Jul	1100	10.0	13	303
GAA-2025-207-004	26 Jul	1000	10.0	26 Jul	1425	14.0	14	297
GAA-2025-208-001	27 Jul	0800	10.0	27 Jul	1000	15.0	15	640
Cape Horn Creek								
GAA-2025-209-001	28 Jul	0700	6.0	28 Jul	0850	7.0	001	51
GAA-2025-209-003	28 Jul	0900	6.0	28 Jul	1100	8.0	002	161
S Fork Salmon River								
GAA-2025-216-001	4 Aug	0800	13.0	5 Aug	0700	11.0	115	135
GAA-2025-216-002	4 Aug	0800	13.0	4 Aug	1400	16.0	115	346
GAA-2025-216-003	4 Aug	0800	13.0	5 Aug	1000	12.0	116	211
GAA-2025-217-001	5 Aug	0800	11.0	5 Aug	1330	14.0	116	182
GAA-2025-217-002	5 Aug	0800	11.0	5 Aug	1000	12.0	116	113
GAA-2025-217-003	5 Aug	1000	11.0	5 Aug	1430	15.0	118	647
Secesh River								
GAA-2025-219-001	7 Aug	0800	10.0	7 Aug	1000	11.0	025	262
GAA-2025-219-002	7 Aug	0800	10.0	8 Aug	0715	7.0	026	122
GAA-2025-219-003	7 Aug	1000	10.0	7 Aug	1400	12.0	026	339
GAA-2025-220-001	8 Aug	0800	9.0	8 Aug	1000	9.0	026	217
Lake Creek								
GAA-2025-224-001	12 Aug	0800	8.0	12 Aug	1330	11.0	002	352
GAA-2025-224-002	12 Aug	0800	8.0	12 Aug	1400	11.0	004	603
WF Chamberlain								
GAA-2025-227-001	15 Aug	0800	10.0	15 Aug	1030	11.0	004	0
Chamberlain Creek								
GAA-2025-228-001	16 Aug	0800	10.0	17 Aug	0800	12.0	024	100
GAA-2025-228-003	16 Aug	0800	10.0	17 Aug	1200	12.0	025	97
GAA-2025-229-001	17 Aug	0900	12.0	17 Aug	1300	15.0	025	277

Appendix Table 3. Universal Transverse Mercator grid coordinates of Global Positioning System that identifies sampling areas at the beginning and end of daily collections in streams for each collection crew in 2025.

Streams & Dates	Section covered	UTM start		UTM end	
		Northing	Easting	Northing	Easting
Marsh Creek					
7/26/2025	left bank	4917410	11T0645832	4916629	11T0646702
7/26/2025	right bank	4917415	11T0645814	4916698	11T0646414
7/27/2025	left bank	4916657	11T0646641	4916381	11T0646988
7/27/2025	right bank	4917269	11T0646190	4916517	11T0646591
Cape Horn Creek					
7/27/2025	left bank	4917416	11T0645781	4917202	11T0645660
7/27/2025	right bank	4917379	11T0645738	4917209	11T0645670
7/28/2025	left bank	4916982	11T0644948	4916810	11T0645387
7/28/2025	right bank	4917179	11T0645638	4916809	11T0645389
South Fork Salmon River					
8/4/2025	left bank	4946784	11T0602853	4946466	11T0603019
8/4/2025	right bank	4946755	11T0602848	4946634	11T0603005
8/4/2025	left bank	4946899	11T0603298	4946918	11T0603896
8/4/2025	both banks	4946764	11T0603144	4946875	11T0604098
8/5/2025	right bank	4946629	11T0603003	4946522	11T0602952
8/5/2025	left bank	4946466	11T0603019	4946255	11T0603124
8/5/2025	right bank	4945321	11T0602915	4945133	11T0602961
Secesh River					
8/6/2025	left bank	5005940	11T0592936	5008329	11T0640585
8/6/2025	right bank	5005940	11T0592936	5008329	11T0640585
8/7/2025	left bank	5007411	11T0593416	5008831	11T0593010
8/7/2025	right bank	5007394	11T0593428	5008734	11T0593164
Lake Creek					
8/11/2025	both banks	5012021	11T0586525	5012724	11T0586000
8/12/2025	left bank	5012013	11T0585984	5014841	11T0584549
8/12/2025	right bank	5012013	11T0585984	5013184	11T0585568
8/12/2025	both banks	5013628	11T0585216	5014043	11T0584881
WF Chamberlain					
8/15/2025	left bank	5027342	11T0642121	5027562	11T0641799
8/15/2025	right bank	5027433	11T0642089	5027517	11T0641834
Chamberlain Creek					
8/16/2025	left bank	5026697	11T0642398	5026193	11T0642169
8/16/2025	right bank	5026700	11T0642373	5026189	11T0642153
8/17/2025	left bank	5026220	11T0642158	5025834	11T0641651
8/17/2025	right bank	5026189	11T0642153	5025833	11T0641563

Appendix Table 4. Summary of observed total mortality for PIT-tagged wild Chinook salmon parr collected from Idaho streams in 2025. Number rejected includes; fish too small to tag, precocious males, injured fish, and in some cases extra collected fish. Numbers of precocious males rejected for tagging are shown in parentheses.

Stream	Fish collected (n)	Fish tagged (n)	Fish rejected for tagging		Observed mortality			
			(n)	(%)	Collection and handling	Tagging and delayed	Total	
							(n)	(%)
Marsh Creek	1459	1346	77	5.3	36	0	36	2.5
Cape Horn Creek	409	212	186	45.5	11	0	11	2.7
S Fork Salmon R	2005	1500	472	23.5	32	1	33	1.6
Secesh River	1117	941	159	14.2	17	1	18	1.6
Lake Creek	1369	956	389	28.4	25	1	26	1.9
WF Chamberlain	13	0	13	N/A	0	0	0	0.0
Chamberlain Creek	507	474	17	3.4	17	0	17	3.4
Totals/averages	6879	5429	1313(63)	19.1	138	3	141	2.0



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February 2026

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