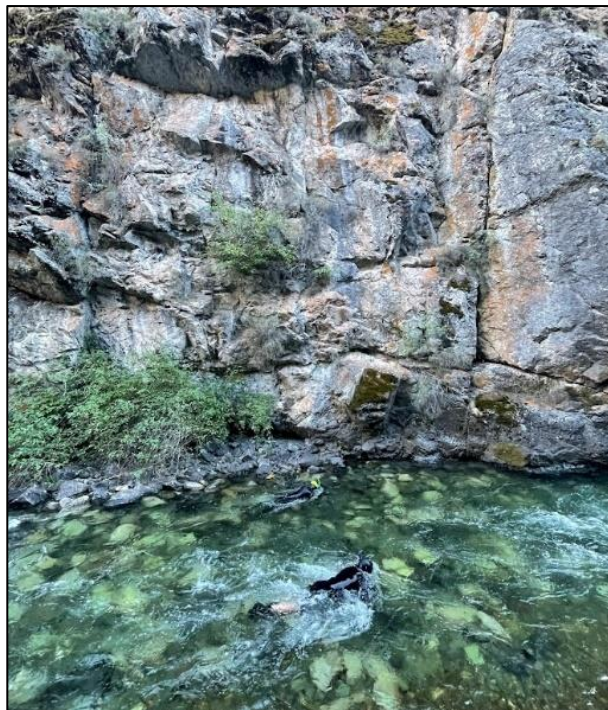




**IDAHO ANADROMOUS PARR MONITORING  
2023 ANNUAL REPORT**



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# **Idaho Anadromous Parr Monitoring**

## **2023 Annual Report**

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## ABSTRACT

Idaho Department of Fish and Game monitors occupancy, density, and spatial structure of anadromous salmonid parr and resident fish using snorkel surveys. In this report, we summarize snorkel methods and results from 2023 surveys. Idaho Department of Fish and Game crews surveyed 445 total snorkel transects in the Clearwater and Salmon River basins in 2023. Survey transects are classified as either core ( $n = 161$ ), non-core/resident trend ( $n = 52$ ), intensive ( $n = 84$ ) or extensive ( $n = 148$ ). Across core transects mean density of steelhead *Oncorhynchus mykiss* in the Clearwater River basin ( $n = 49$ ) was 1.74 fish per 100m<sup>2</sup> (SD = 3.3) while mean density of Chinook Salmon *O. tshawytscha* was 10.27 fish per 100m<sup>2</sup> (SD = 17.0). Steelhead occupied 80% (0.8) and Chinook Salmon occupied 70% (0.7) of core sites snorkeled in the Clearwater basin. Across core transects, mean density of steelhead in the Salmon River basin ( $n = 96$ ) was 1.3 fish per 100m<sup>2</sup> (SD = 2.6) while mean density of Chinook Salmon was 5.5 fish per 100m<sup>2</sup> (SD = 9.1). Steelhead occupied 60% and Chinook Salmon occupied 70% of core sites snorkeled in the Salmon River Basin. At intensive sites in the Potlatch River subbasin, mean steelhead density was 1.4 fish per 100m<sup>2</sup> (SD = 2.3; occupancy = 0.7) and in the North Fork of the Salmon River subbasin mean steelhead density was 2.6 fish per 100m<sup>2</sup> (SD = 4.1; occupancy = 0.7). Chinook Salmon were not observed during intensive surveys in the Potlatch River subbasin. However, mean Chinook Salmon density was 0.6 fish per 100m<sup>2</sup> (SD = 1.3; occupancy = 0.2) from intensive surveys in the North Fork of the Salmon River subbasin. In the Clearwater River basin, mean density of steelhead across extensive surveys was 1.4 fish per 100m<sup>2</sup> (SD = 0.5) and mean Chinook Salmon density was 0.1 fish per 100m<sup>2</sup> (SD = 0.1). In the Salmon River Basin, mean steelhead densities from extensive sites were 0.5 fish per 100m<sup>2</sup> (SD = 0.4) and mean Chinook Salmon densities were 0.2 fish per 100m<sup>2</sup> (SD = 0.2).

Snorkel surveys provide valuable information that can be used to address ESA reporting needs, identify critical habitat, and help prioritize future restoration actions. Idaho Department of Fish and Game's core snorkel survey dataset is the most spatially and temporally robust information on salmonid distribution and abundance in the state and should continue to be surveyed.

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## INTRODUCTION

Populations of Chinook Salmon *Oncorhynchus tshawytscha* and steelhead *O. mykiss* in the Snake River basin declined substantially following the construction of hydroelectric dams in the Snake and Columbia rivers. Snake River steelhead were listed as threatened under the ESA in 1997 (Busby et al. 1996). Within the Snake River basin steelhead distinct population segment (DPS), the Interior Columbia Basin Technical Recovery Team (ICBTRT) delineated six MPGs: Lower Snake River, Grande Ronde River, Imnaha River, Clearwater River, Salmon River, and Hells Canyon Tributaries (ICBTRT 2003, 2005). However, the Hells Canyon MPG is considered extirpated (Table 1). Snake River Chinook Salmon were listed as threatened in 1992 under the Endangered Species Act (ESA). Within the Snake River Chinook Salmon evolutionarily significant unit (ESU), there are seven major population groups (MPGs): Lower Snake River, Grande Ronde/Imnaha rivers, South Fork Salmon River, Middle Fork Salmon River, Upper Salmon River, Dry Clearwater, and the Wet Clearwater (Table 2). However, the Dry Clearwater and the Wet Clearwater MPGs were re-established with out-of-basin stocks after extirpation and are not listed under the ESA. A total of 28 extant demographically independent populations of Chinook Salmon have been identified.

The Idaho Department of Fish and Game (IDFG) anadromous fish program's long-range goal is to rebuild and preserve Idaho's Chinook Salmon and steelhead runs to healthy and harvestable levels to provide benefits for all users (IDFG 2019). Key objectives to achieve the management goal are: 1) maintain genetic and life history diversity of naturally occurring and hatchery produced fish; 2) rebuild naturally reproducing populations of anadromous fish to utilize existing and potential habitat at an optimal level; 3) improve overall life cycle survival sufficient for delisting and recovery by addressing key limiting factors identified in all of the "H's": hydropower, habitat, harvest, and hatchery; 4) allow consumptive harvest through sport and treaty fishing; and 5) coordinate Pacific Northwest regional management with Idaho anadromous management to ensure achievement of Idaho management objectives and the long-range program goal (IDFG 2019). Management to achieve these goals requires an understanding of how salmonid populations function as well as periodic status assessments (McElhany et al. 2000). Specific data on some Snake River steelhead and Chinook Salmon populations were identified as lacking in 2003, particularly key parameters such as abundance, age composition, genetic diversity, recruits per spawner, and survival rates (ICBTRT 2003). The department continues to work to fill these gaps through pertinent data collection on natural-origin abundance and spawning escapements, but more information on individual populations could improve future management and status assessments (Ford 2011, 2022).

Snorkel surveys are widely used for monitoring fish populations because they are a versatile and cost-effective technique. Snorkel surveys can be efficient where environmental conditions limit the effectiveness of other techniques, such as electrofishing (Schill and Griffith 1984; Bonneau et al. 1995). Gear and personnel requirements are comparatively modest, so logistical demands are reduced, and remote locations become feasible to sample (Hankin and Reeves 1988; Thurow 1994). Counts taken through underwater observations are non-lethal and less intrusive than other field methods and are an appropriate means to monitor fishes listed under the Endangered Species Act (e.g., Chinook Salmon, steelhead, and Bull Trout *Salvelinus confluentus*). In addition, steelhead spawning cannot be directly assessed in many Idaho streams in an efficient manner because springtime water conditions make it difficult to observe fish or redds. Therefore, snorkel survey data describing juvenile densities and distribution are particularly important for steelhead.

Freshwater salmonid production can fluctuate greatly between years. Snorkel surveys provide information related to the density (relative abundance), distribution, and historical trends of Idaho's wild Chinook Salmon and steelhead populations. Snorkel survey data from sites that are distributed probabilistically across the landscape can also be used to address ESA reporting needs, identify critical habitat, and help prioritize future restoration actions. Valuable abundance and distribution information on resident salmonids are also collected during monitoring (Copeland and Meyer 2011); for example, approximately 20 surveys per year are specifically conducted to monitor resident salmonids, with funding from Dingell-Johnson Act and IDFG license funds (Appendix A3).

The snorkel program addresses three specific questions relative to population status and the effectiveness of our monitoring techniques.

1. How is relative density of anadromous salmonid parr changing over time?
2. Using site specific data, what is the distribution and relative abundance of steelhead and Chinook Salmon within the populations identified in the recovery plans?
3. What major and minor spawning habitats do rearing juvenile anadromous salmonids occupy?

In this report, we summarize the results of snorkel surveys conducted by IDFG in anadromous waters during 2023 and compare them to prior years.

## **METHODS**

Snorkel sites were chosen using either historic knowledge of high-quality habitat deemed by experienced biologists (core sites) or from a probabilistic design using GIS (intensive and extensive sites). A transect is then established at the site and is defined as the stretch of stream in which records of occurrences or counts of fish are conducted. A transect will have upstream and downstream boundaries located at hydraulic controls - defined as any definite change in stream gradient that spans the entire wetted width (e.g. riffles, runs, pools) - and are typically 100 m in length (Apperson et al. 2015).

Survey transects for 2023 were selected based on the Idaho Anadromous Parr Monitoring 2022 Annual Report Appendices A1-A3 survey schedules (Ballinger et al. 2022). Transects selected for 2024 will be based upon Appendices A1-A3 survey schedules in this report. This appendix contains the transects not completed in recent years that should be prioritized for survey in 2024.

We describe here the two different types of surveys used to monitor salmonid parr population status and the effectiveness of our snorkel technique: 1) Trend surveys, which consist of core, noncore, and resident transects; and 2) probabilistic surveys, which consist of intensive and extensive transects.

## **Trend Surveys**

### **Core**

Core transects are subsets of long-established transects that were subjectively selected because they represent suitable Chinook Salmon and steelhead habitat. These transects were originally developed by the General Parr Monitoring (GPM) program, which was a focused effort by IDFG to measure the juvenile response of naturally produced anadromous populations to off-site mitigation habitat actions and improvements (Rich et al. 1990). Core trend transects were defined as locations where at least one survey had been conducted within each 5-year period during 1984-2011. Core trend transects also included corridor surveys (see “Snorkel Methods”) in the Middle Fork Salmon River, which had been completed for many consecutive years, and therefore were deemed important to IDFG management programs. Core transect data are used to evaluate how the abundance of anadromous salmonid parr is changing over time. We identified 218 core trend transects (Stiefel et al. 2014). Based on logistical difficulty, core transects are surveyed annually, biennially, or triennially during the months of June, July, and August. Regular monitoring of these transects provides the “core” of Idaho’s monitoring of the abundance trend of juvenile anadromous salmonids. These data are summarized by steelhead major population group (i.e., Clearwater, Salmon, and Hells Canyon).

### **Non-core**

Non-core survey panels are performed for other purposes as deemed necessary for IDFG regional fishery management needs. Non-core transects are surveyed opportunistically. They are surveyed as time allows and are not necessarily surveyed on a consistent basis. As such, they are not relied on to provide statewide status and trend information for Chinook Salmon or steelhead.

### **Resident**

Resident snorkel survey panels are conducted to address monitoring needs for resident salmonids (e.g., Westslope Cutthroat Trout *O. lewisi*, Bull Trout, and Mountain Whitefish *Prosopium williamsoni*). These surveys also provide valuable anadromous fishes data. Resident transects are surveyed opportunistically. They are surveyed as time allows and are not necessarily surveyed on a consistent basis. As such, they are not relied on to provide statewide status and trend information for Chinook Salmon or steelhead.

## **Probabilistic Surveys (GRTS)**

In 2007, a probabilistic approach was adopted for establishing transects to obtain a spatially-balanced and representative set of sample transects. A generalized random-tessellation stratified (GRTS) design (Stevens and Olsen 2004) was used to obtain estimates of steelhead parr density at the population scale. The GRTS design randomly selects a suite of transects that are spatially distributed evenly across the available distribution of Chinook Salmon and steelhead parr (Stevens and Olsen 2004). Crews are provided an ordered list of transects “such that each successive site on the list maintains the spatial balance of the full set of sites in the sample” (Stevens and Olsen 2004). The crew then surveys or attempts to survey higher priority transects before lower priority transects are surveyed. Extra transects, up to two times the sample goals, are included on the transect list in case some sites cannot be sampled.

## **Intensive**

Panels of intensive transects were developed to evaluate the relationship between fish density from snorkel surveys and juvenile steelhead emigrant abundance derived from rotary screw traps over several years. Intensive panel surveys were conducted annually, upstream of associated screw traps, and generally consisted of at least 20 transects. In 2023, most intensive surveys were discontinued because enough data was collected to show a significant relationship between fish densities from snorkel surveys and juvenile steelhead emigrant abundance at rotary screw traps (Poole and Copeland, in press). However, monitoring continued in the Potlatch River to support data collection for the Intensively Monitored Watershed (IMW) and in the North Fork Salmon River subbasin to evaluate restoration actions implemented in those areas.

In this report, we utilized data generated from intensive transect surveys to develop maps displaying the density and distribution of steelhead and Chinook Salmon in basins where rotary screw traps are operated (Figures 9-12). Resulting maps are at a population scale finer than extensive transects, which generally followed ICBTRT's (2003, 2005) steelhead population delineations.

## **Extensive**

Extensive snorkel survey panels were established to better inform local management and ESA status assessments of occupancy and distribution information from individual steelhead sub-population and spawning aggregates as defined by the ICBTRT (2003, 2005; Table 1). Extensive panel transects can be utilized for opportunistic events or for special data needs such as visiting watersheds with sparse data, providing recent data to inform future restoration or watershed status assessment, or to evaluate post fire conditions. More extensive panel transects were selected in 2023 to expand data on steelhead distribution, occupancy, and density across the landscape, and areas where data was limited or outdated were selected for surveying.

### **Snorkel Methods**

Idaho Department of Fish and Game holds a statewide training each year to ensure all staff understand survey methods and protocols to limit bias in the dataset. The number of snorkelers for a survey varies depending on four factors: 1) the width of the stream channel, 2) underwater visibility, 3) prevalence of physical obstructions in a transect, and 4) the number of snorkelers available. Snorkelers proceed slowly upstream, avoiding sudden movements. A designated data recorder follows the snorkelers from a central position downstream and directs the survey by making sure all areas of the site are surveyed, keeping snorkelers in formation, and adjusting the number of snorkelers in the site as stream width changes. If a site is not conducive to snorkeling in an upstream direction due to excessive depth and/or velocity, the transect is surveyed by floating from the upstream boundary to the downstream boundary (see *Corridor Surveys*; Apperson et al. 2015). Coordination is ongoing between adjacent snorkelers as site width changes, fish move across lanes, or large schools of fish span multiple lanes.

Unless otherwise noted, six salmonid species were observed in all major basins: Chinook Salmon, Brook Trout *Salvelinus fontinalis*, Bull Trout, Mountain Whitefish, steelhead, and Westslope Cutthroat Trout. All salmonids are counted by species. Trout and char are reported by 1-inch size classes and salmon species are reported by age, either as young-of-the-year (age 0) or yearlings (age 1). Trout fry (*Oncorhynchus spp* less than 75 mm) are not distinguishable to the species level and are recorded separately (Apperson et al. 2015). Any non-salmonid fishes,

amphibians, and bivalve invertebrates are recorded if present and identified to the lowest taxon possible without compromising the survey of salmonid abundance.

Transect length, wetted width, water temperature, conductivity, visibility, and percent habitat type (pocket water, riffle, run, pool, glide) are recorded for each transect. Specific methods used to conduct fish abundance surveys by snorkeling are detailed by Apperson et al. (2015) and that document should be used as the primary methods reference for this report. Exceptions or additions to protocols outlined in Apperson et al. (2015) are described in this report.

### **Analytical Methods**

Snorkel data from all survey types are stored and managed by IDFG in the Department's Lakes and Streams Database (LSDB) and are accessible with IDFG permission from the Idaho Fish and Wildlife Information System (IFWIS; <https://idfg.idaho.gov/ifwis/fishsurvey>). Data is originally collected on individual snorkelers' PVC arm cuffs or called out directly to the data recorder and compiled onto a paper data sheet before leaving a site. Data sheets are organized by subbasin and scanned into the IDFG file system as the subbasin is completed. Data is keypunched into the LSDB where it is archived and accessible for future analysis. All data is checked for accuracy and completeness at multiple stages: transcription from arm cuff to datasheet, keypunch from datasheet to LSDB, additional LSDB review by crew leads, and when data is pulled from LSDB for annual analysis.

Densities for all species are expressed as number of fish/100 m<sup>2</sup> in each transect. Transect area where the entire stream width is surveyed is calculated by measuring a minimum of three wetted widths, including transect start and end points. The average wetted width is then multiplied by total transect length to calculate the transect area (Apperson et al. 2015).

Corridor sites are surveyed snorkeling downstream due to increased flow and depth making upstream movement difficult. However, the entire stream width may not be surveyed at corridor sites. Transect area for surveys where the entire stream width cannot be snorkeled is calculated (Apperson et al. 2015) by multiplying visibility by the number of snorkelers and then by transect length (e.g., 3.1 m visibility X 3 snorkelers X 102 m transect length = 948.6 m).

Occupancy of steelhead and Chinook Salmon is calculated for transects based on presence and absence of each species. This metric refers to the proportion of transects in which a specific species was encountered in comparison to the total number of transects surveyed in that basin. Standard deviation is calculated for occupancy by treating occupancy as a binomial random variable and multiplying the probability that a transect is occupied by the probability that it is not and dividing by the sample size. For the purposes of this report, it provides a metric that describes the amount of available habitat occupied by Chinook Salmon and steelhead.

$$SD = \sqrt{(P(t_i=1) * P(t_i=0))/(n-1)},$$

where  $P(t_i=1)$  is the probability that a transect is occupied by the species of interest,  $P(t_i=0)$  is the probability that a transect is not occupied by the species of interest, and  $n$  is the sample size.

Trend data since 2012 (excluding 2020 due to the Covid-19 pandemic) for core transects in the Clearwater and Salmon river basins, including mean fish densities and standard deviations, are reported along with the respective 5-year running mean and standard deviation for comparison.



Maps are provided to better visualize anadromous parr distribution and relative abundance of Chinook Salmon and steelhead at transects in each subbasin. These maps were drafted using ArcMap 10.8 to display the densities in intensive and extensive GRTS survey transects. Intensive surveys were conducted in the Clearwater basin on the Potlatch River and in the Salmon River basin on the North Fork Salmon River. Extensive surveys were conducted in the Clearwater River basin on the Potlatch River, Canyon Creek (Lochsa River tributary), and Ten Mile Creek (South Fork Clearwater River tributary). Extensive surveys conducted in the Salmon River basin were on the South Fork Salmon River downstream of the East Fork South Fork confluence, Yankee Fork Salmon River, and Slate Creek (Salmon River tributary near Clayton, Idaho). Graduated symbols were used to illustrate densities, which were classified using defined intervals based on species distribution and range. The intervals were: 0.001–2.49, 2.50–4.99, 5.00–9.99, 1–14.99, 15.00–19.99, 20.00–24.99 fish observed/100m<sup>2</sup>.

## RESULTS

During 2023, a total of 445 snorkel surveys were completed. Thirty-five transects were not surveyed (9 core, 3 non-core, 5 intensive, 14 extensive and 4 resident sites) due to high and low water, limited site access, steep terrain, and reduced visibility. Detailed results for surveyed transects are expansive and are therefore presented in appendices (Appendix B for core trend transects, C for non-core trend and resident trend transects, D for intensive transects, and E for extensive transects). Density and distribution maps by species (Chinook Salmon and steelhead) were provided for intensive and extensive snorkel surveys completed in 2023 (Figures 9-24).

### Trend Surveys

#### **Core**

A total of 49 core trend transects were surveyed in the Clearwater River basin in 2023. Mean steelhead density was 1.7 fish/100 m<sup>2</sup> (SD = 3.33; Figure 1; Appendix B1) and mean Chinook Salmon density was 10.3 fish/100 m<sup>2</sup> (SD = 17.01; Figure 2; Appendix B1). Mean steelhead density in 2023 was 113.1% of the five-year mean (2017–2022; 1.5 fish/100 m<sup>2</sup>; SD = 2.3). Mean Chinook Salmon density was 568.7% of the five-year mean (1.8 fish/100 m<sup>2</sup>; SD = 5.5). Mean density for Chinook Salmon was higher due to the Nez Perce Tribe releasing Chinook Salmon parr a few days before the survey in Crooked River (Jenifer Harris, Nez Perce Tribe, personal communication). Steelhead and Chinook Salmon occupancy was 0.7 for Clearwater River basin core trend transects.

A total of 109 core trend transects were surveyed in the Salmon River basin in 2023. Mean steelhead density was 1.3 fish/100 m<sup>2</sup> (SD = 2.63; Figure 1; Appendix B2) and mean Chinook Salmon density was 5.5 fish/100 m<sup>2</sup> (SD = 9.12; Figure 2; Appendix B2). Mean steelhead density in 2023 was 58.6% of the five-year mean (2017–2022; 2.3 fish/100 m<sup>2</sup>; SD = 4.6). Mean Chinook Salmon density in 2023 was 192.9% of the five-year mean (2.8 fish/100 m<sup>2</sup>; SD = 6.3). Steelhead occupancy was 0.6 and Chinook Salmon occupancy was 0.7 for Salmon River basin core trend transects.

Three core trend transects were surveyed in the Hells Canyon portion of the Snake River basin, Idaho in 2023. Mean steelhead density was 11.9 fish/100 m<sup>2</sup> (SD = 8.2; Figure 1; Appendix B3) and mean Chinook Salmon density was 0.6 fish/100 m<sup>2</sup> (SD = 0.8; Figure 2; Appendix B3). The Hell Canyon core transects were surveyed inconsistently between 2014 and 2022. Therefore, the average five-year mean is representative of the average fish densities from 2014, 2015, 2018,

2021, and 2022. Mean steelhead density in 2023 was 63.3% of the five-year mean (14.9 fish/100 m<sup>2</sup>; SD = 5.0). Mean Chinook Salmon density in 2023 was 45.2% of the five-year mean (2.7 fish/100 m<sup>2</sup>; SD = 1.0). Steelhead occupancy was 1.0 and Chinook Salmon occupancy was 0.7 for the Hells Canyon core trend transects.

### **Non-core and Resident**

In the Clearwater River basin, 9 non-core trend transects were surveyed during 2023 (Appendix C1). Mean steelhead density was 0.9 fish/100 m<sup>2</sup> (SD = 0.84) and mean Chinook Salmon density was 0.2 fish/100 m<sup>2</sup> (SD = 0.45). Steelhead occupancy was 0.8 and Chinook Salmon occupancy was 0.3 for Clearwater River basin non-core transects.

In the Salmon River basin, 28 non-core trend transects were surveyed during 2023 (Appendix C2). Mean steelhead density was 6.0 fish/100 m<sup>2</sup> (SD = 8.89) and occupancy was 0.9. Chinook Salmon were not observed during surveys.

A total of 15 resident trend transects were surveyed in 2023: four transects in the Clearwater River basin (Appendix C3) and 11 in the Salmon River basin (Appendix C4). In the Clearwater River basin, mean steelhead density was 1.4 fish/100 m<sup>2</sup> (SD = 0.84) and mean Chinook Salmon density was 0.4 fish/100 m<sup>2</sup> (SD = 0.24). Steelhead and Chinook Salmon occupancy was 1.0 in the Clearwater River basin. In the Salmon River basin, mean steelhead density was 1.1 fish/100 m<sup>2</sup> (SD = 1.46) and mean Chinook Salmon density was 3.4 fish/100 m<sup>2</sup> (SD = 5.11). Steelhead occupancy was 0.8 and Chinook Salmon occupancy was 0.6.

### **Probabilistic Surveys (GRTS)**

#### **Intensive**

In the Potlatch River basin, 58 intensive GRTS transects were surveyed during 2023 (Appendix D1). Mean steelhead density in these transects was 1.4 fish/100 m<sup>2</sup> (SD = 2.26) with an occupancy of 0.7 (Figures 3, 6). Chinook Salmon were not observed in the Potlatch River basin in 2023.

In the North Fork Salmon River basin, 26 intensive GRTS transects were surveyed during 2023 (Appendix D2). Mean steelhead density was 2.6 fish/100 m<sup>2</sup> (SD = 4.18) and mean Chinook Salmon density was 0.6 fish/100 m<sup>2</sup> (Figures 3, 7; SD = 1.27). Steelhead occupancy was 0.7 and Chinook Salmon occupancy was 0.2 in the Salmon River basin (Figure 8).

#### **Extensive**

In the Potlatch River basin, 36 extensive GRTS transects were surveyed during 2023 (Appendix E1). Mean steelhead density in these transects was 1.6 fish/100 m<sup>2</sup> (SD = 6.07) with an occupancy of 0.4 (Figures 4, 9). Chinook Salmon were not observed in the Potlatch River basin in 2023.

In the Canyon Creek basin, 23 extensive GRTS transects were surveyed during 2023 (Appendix E2). Mean steelhead density in these transects was 0.8 fish/100 m<sup>2</sup> (SD = 1.43) and mean Chinook Salmon density was <0.1 fish/100 m<sup>2</sup> (Figure 4; SD = 0.28). Steelhead occupancy was 0.4 and Chinook Salmon occupancy was <0.1 in Canyon Creek watershed (Figure 10-11).

In the Tenmile creek basin, 21 extensive GRTS transects were surveyed during 2023 (Appendix E3). Mean steelhead density in these transects was 1.8 fish/100 m<sup>2</sup> (SD = 2.45) and mean Chinook Salmon density was 0.3 fish/100 m<sup>2</sup> (Figure 4; SD = 0.64). Steelhead occupancy was 0.5 and Chinook Salmon occupancy was 0.2 for Tenmile Creek watershed (Figure 12-13).

In the Yankee Fork Salmon River basin, 29 extensive GRTS transects were surveyed during 2023 (Appendix E4). Mean steelhead density in these transects was 0.9 fish/100 m<sup>2</sup> (SD = 0.55) and mean Chinook Salmon density was < 0.1 fish/100 m<sup>2</sup> (Figure 5; SD = 0.30). Steelhead occupancy was 0.6 and Chinook Salmon occupancy was 0.1 in the Yankee Fork Salmon River basin (Figure 14-15).

In the South Fork Salmon River basin downstream of the East Fork South Fork confluence, 21 extensive GRTS transects were surveyed in 2023 (Appendix E5). Mean steelhead density in these transects was 0.3 fish/100 m<sup>2</sup> (SD = 0.14) and mean Chinook Salmon density was 0.4 fish/100 m<sup>2</sup> (Figure 5; SD = 0.26). Steelhead occupancy was 0.4 and Chinook Salmon occupancy was 0.3 for the South Fork Salmon River basin (Figure 16-17).

In the Slate Creek basin, 18 extensive GRTS transects were surveyed during 2023 (Appendix E5). Mean steelhead density in these transects was 0.2 fish/100 m<sup>2</sup> (Figure 5; SD = 0.34) and occupancy was 0.4 (Figure 18). Chinook Salmon were not observed in the Slate Creek basin.

## DISCUSSION

In 2023, runoff in the spring was late which resulted in high flows and low visibility at several sites. Despite these conditions, snorkel crews completed most planned core, non-core, and resident sites. Several GRTS extensive surveys were also completed since intensive surveys and resights were no longer a priority. Any trend surveys that were not completed in 2023 will be prioritized in 2024.

Snorkel survey data are used for many purposes, ranging from reporting spatial distribution of salmonids for ESA status reviews (Heller et al. 2022, Ballinger et al 2023) to assessing habitat prioritization and how anthropogenic modifications to salmonid habitat may affect threatened populations. For example, in the East Fork Potlatch River, maps have shown a gradient of steelhead densities, with greater densities and occupancy higher in the watershed. This has led to prioritizing habitat restoration work in the lower East Fork Potlatch River watershed, with the goal of restoring densities to that of the upper reaches (Potlatch Implementation Group 2019). The IDFG's core snorkel survey dataset is the most spatially and temporally robust information on salmonid distribution and relative trends in the state and should continue to be surveyed. Outside of their primary purpose, other survey types (e.g. intensive surveys) may serve as ancillary data for gaps in the spatial and temporal extent of core surveys, as methods are standardized across survey types.

Abundance data can be hard to obtain because it is typically expensive, difficult to collect, and time consuming. However, relative abundance data is often used as a proxy for abundance data because it is less demanding and inexpensive (Stephens et al. 2015). Although cost-effective and spatially extensive, snorkel data are biased low and error is difficult to measure because there are numerous factors that can influence fish detection such as physical structure, fish size, visibility, snorkeler experience, and fish behavior. Density data from core snorkel surveys show trends assumed to represent the population, but fish densities should be viewed as minimum

density within a transect (as opposed to an absolute density). Gross trend information from snorkeling can serve as an indicator for assessing fish populations, but because bias and error is difficult to account for, snorkeling data should not be extrapolated or interpolated to areas outside of transects. Observer error and bias for snorkeling efforts in Idaho have yet to be fully analyzed, but mark-resight data, local studies (Hand et al. 2022), and studies from other regions (Thurrow et al. 2006, Korman et al. 2011, Staton et al. 2022) propose fish species, body size, water visibility, habitat type (riffle, run, pool), and sampling method as variables most influential to snorkel detectability. However, these studies also suggest that intra-annual variables such as flow, temperature, and fish behavior can also affect accuracy in observing fish.

In an attempt to account for site-specific error and inter- and intra-annual variability in snorkel data, mark-resight surveys began in 2007 at select transects. In 2019, a more standardized approach was adopted, and crews (1) began conducting mark-resights at similar times and locations each year, (2) attempted to conduct a greater number of resights each year, and (3) spread resight surveys throughout the season to account for varying water levels and a crews' experience (Roth et al 2019). Despite this approach, crews were continually unable to mark enough fish and survey enough transects to meet sampling recommendations. With the continual decline of juvenile steelhead abundances in survey locations, lower numbers of marked fish could lead to major changes in sightability based on seeing or not seeing a single fish, leaving a large potential for error. Mark-resight surveys require substantial time and labor but are important when considering bias and accuracy of snorkel survey data. These surveys were suspended in 2022 and current efforts are being allocated to analyzing existing sightability data to determine its applicability for modeling detectability at various snorkel locations to reduce survey biases.

Annual occupancy data from snorkel surveys is one of our best ongoing metrics for evaluating juvenile anadromous salmonid spatial structure, especially for steelhead. However, occupancy should be considered a coarse metric that depicts large areas distilled to a single proportion. The distribution maps presented in Figures 9-24 provide a landscape level perspective of the areas inhabited by steelhead and Chinook Salmon in Idaho as well as their relative densities. In the future, occupancy data from snorkel surveys could be a valuable tool in helping predict species distribution, identify limiting abiotic and biotic factors, and detect areas where overlap and separation occurs among species. This data is also valuable for programs needing to identify areas that should be prioritized for habitat restoration projects for Columbia basin anadromous fish.

Of IDFG's current snorkel transect types (core, non-core, resident, intensive, and extensive), core snorkel transects provide our longest, most consistent data series to track fish density and occupancy changes over time. Mean steelhead density in core transects decreased in the Clearwater and Salmon River basin from 2022 to 2023. In the Clearwater River basin, steelhead density is similar to the 5-year mean; however, in the Salmon River basin, mean steelhead density was below the 5-year average. Chinook Salmon densities in core transects increased in 2023 and were above the 5-year mean for both the Clearwater and Salmon River basins. However, Clearwater estimates were influenced by releases of hatchery fish (adult outplants in 2021 and parr releases in 2023) and redd counts in the Salmon River in 2022 were significantly greater than the previous 5 years due to increased adult escapement. Overall, the running 5-year means for steelhead in both basins has been relatively less than the running 5-year means for Chinook Salmon. Though this could be from lower steelhead escapement, there could also be a sight ability difference between steelhead and Chinook Salmon.

Snorkel surveys are a useful tool to track relative density and occupancy at a landscape scale over time. Routine snorkel surveys of core transects will provide continuous monitoring of density and occupancy trends, while other survey types supplement that data with statewide distribution, relationships to other juvenile data collection methods (rotary screw traps), and detectability estimates.

### **RECOMMENDATIONS**

1. Maintain long-term time series of core surveys.
2. Explore utility of using GRTS extensive surveys for steelhead distribution, occupancy, and density expansions outside of sites surveyed.
3. Analyze and report distribution and density of steelhead parr by major and minor spawning aggregations (MSAs).
4. Investigate ways to account for error bias in snorkel data relative abundance estimates by using spatially replicated temporal data.

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## TABLES

Table 1. Major population groups and independent populations within the Snake River steelhead distinct population segment (DPS) (Evolutionary Significant Unit; Interior Columbia Basin Technical Recovery Team 2003, 2009; Ford 2022; National Marine Fisheries Science 2016).

<b>Snake River steelhead DPS</b>	
<b>Major population group</b>	<b>Population name</b>
Lower Snake River	1. Tucannon River 2. Asotin Creek
Grande Ronde River	3. Lower Grande Ronde River 4. Joseph Creek 5. Wallowa River 6. Upper Grande Ronde River
Imnaha River	7. Imnaha River
Clearwater River	8. Lower Clearwater River
	9. North Fork Clearwater River (extirpated)
	10. Lolo Creek
	11. Lochsa River
	12. Selway River
Salmon River	13. South Fork Clearwater River
	14. Little Salmon and Rapid Rivers
	15. Chamberlain Creek
	16. South Fork Salmon River
	17. Secesh River
	18. Panther Creek
	19. Lower Middle Fork Salmon River
	20. Upper Middle Fork Salmon River
	21. North Fork Salmon River
	22. Lemhi River
	23. Pahsimeroi River
	24. East Fork Salmon River
25. Upper Salmon River	
Hells Canyon Tributaries (extirpated) <sup>a</sup>	

<sup>a</sup> Reintroduced fish may exist in some extirpated areas except the North Fork Clearwater River.

Table 2. Major population groups and independent populations within the Snake River spring-summer Chinook Salmon evolutionary significant unit (ESU; ICBTRT 2003, 2005, 2009; Ford 2011, 2015; NMFS 2011, 2016).

Snake River spring-summer Chinook Salmon ESU	
Major population group	Population name
Lower Snake River	1. Tucannon River
	2. Asotin Creek (extirpated) <sup>a</sup>
Grande Ronde/Imnaha Rivers	3. Wenaha River
	4. Lostine River
	5. Minam River
	6. Catherine Creek
	7. Upper Grande Ronde River
	8. Imnaha River
	9. Big Sheep Creek (extirpated) <sup>a</sup>
	10. Lookingglass Creek (extirpated) <sup>a</sup>
South Fork Salmon River	11. Little Salmon River
	12. South Fork Salmon River Mainstem
	13. Secesh River
	14. East Fork South Fork Salmon River
Middle Fork Salmon River	15. Chamberlain Creek
	16. Middle Fork Salmon River below Indian Creek
	17. Big Creek
	18. Camas Creek
	19. Loon Creek
	20. Middle Fork Salmon River above and including Indian Creek
	21. Sulphur Creek
	22. Bear Valley Creek
23. Marsh Creek	
Upper Salmon River	24. Panther Creek (extirpated) <sup>a</sup>
	25. North Fork Salmon River
	26. Lemhi River
	27. Salmon River Lower Mainstem below Redfish Lake
	28. Pahsimeroi River
	29. East Fork Salmon River
	30. Yankee Fork Salmon River
	31. Valley Creek
	32. Salmon River Upper Mainstem above Redfish Lake
Dry Clearwater River (extirpated) <sup>a</sup>	33. Potlatch River (extirpated) <sup>a</sup>
	34. Lapwai Creek (extirpated) <sup>a</sup>
	35. Lawyer Creek (extirpated) <sup>a</sup>
	36. Upper South Fork Clearwater River (extirpated) <sup>a</sup>
Wet Clearwater River (extirpated) <sup>a</sup>	37. Lower North Fork Clearwater River (extirpated)
	38. Upper North Fork Clearwater River (extirpated)
	39. Lolo Creek (extirpated) <sup>a</sup>
	40. Lochsa River (extirpated) <sup>a</sup>
	41. Meadow Creek (extirpated) <sup>a</sup>
	42. Moose Creek (extirpated) <sup>a</sup>
	43. Upper Selway River (extirpated) <sup>a</sup>

<sup>a</sup> Reintroduced fish may exist in some extirpated areas except the North Fork Clearwater River.

## FIGURES

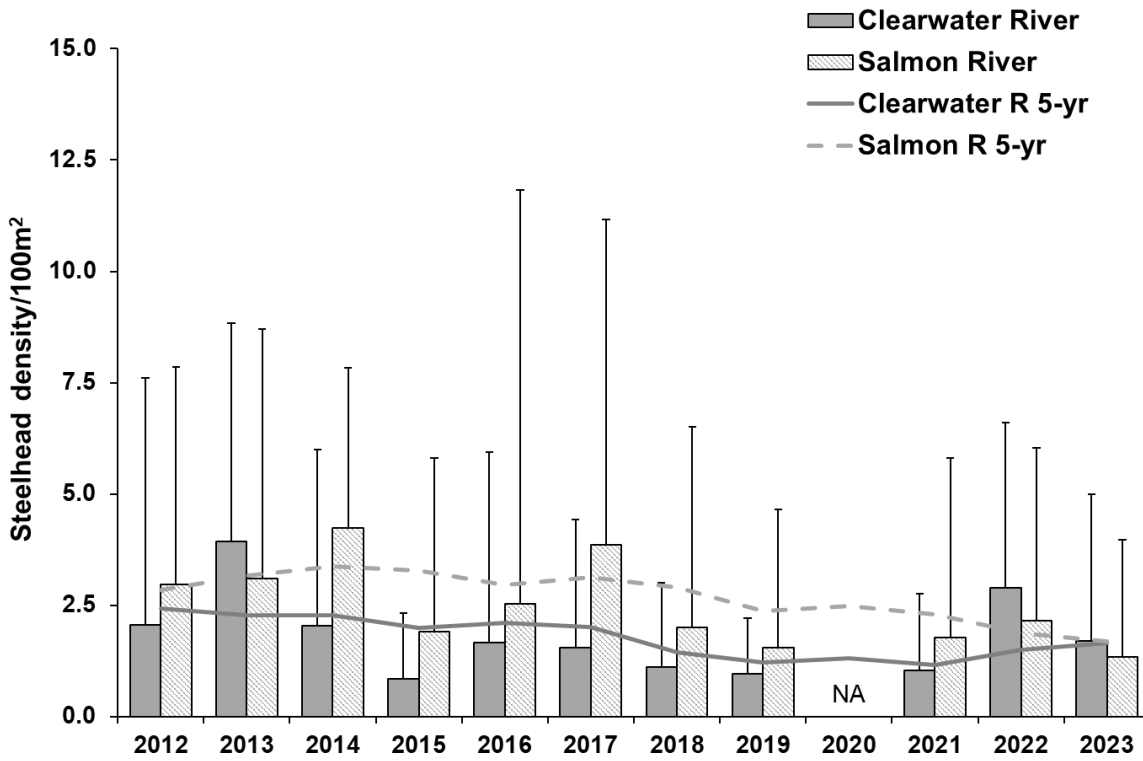


Figure 1. Mean steelhead densities (number per 100 m<sup>2</sup>) and 5-year running means observed during 2012–2023 in core trend snorkel survey transects in the Clearwater and Salmon River basins, Idaho. Running mean values are the average steelhead density over the previous five-year period. Snorkel surveys were not conducted in 2020. Error bars represent standard deviation.

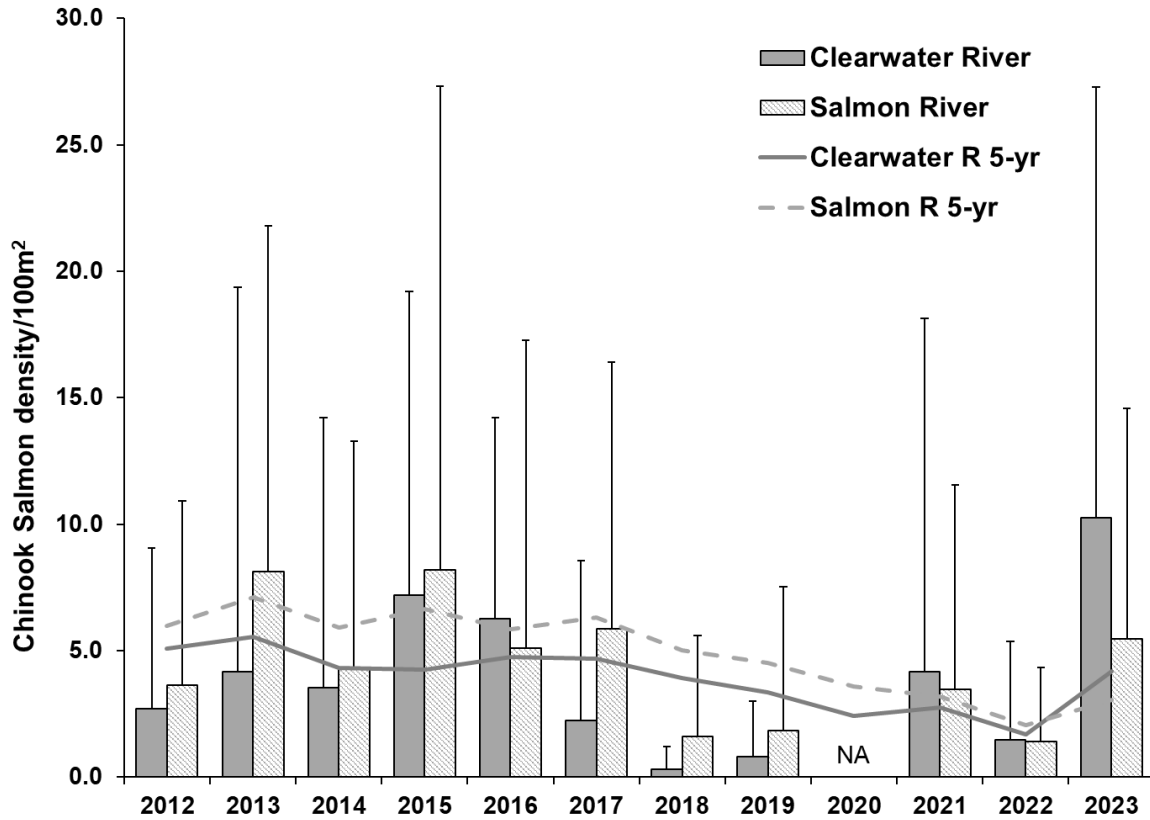


Figure 2. Mean Chinook salmon densities (number per 100 m<sup>2</sup>) and 5-year running means observed during 2012–2023 in core trend snorkel survey transects in the Clearwater and Salmon River basins, Idaho. Running mean values are the average Chinook density over the previous five-year period. Snorkel surveys were not conducted in 2020. Error bars represent standard deviation.

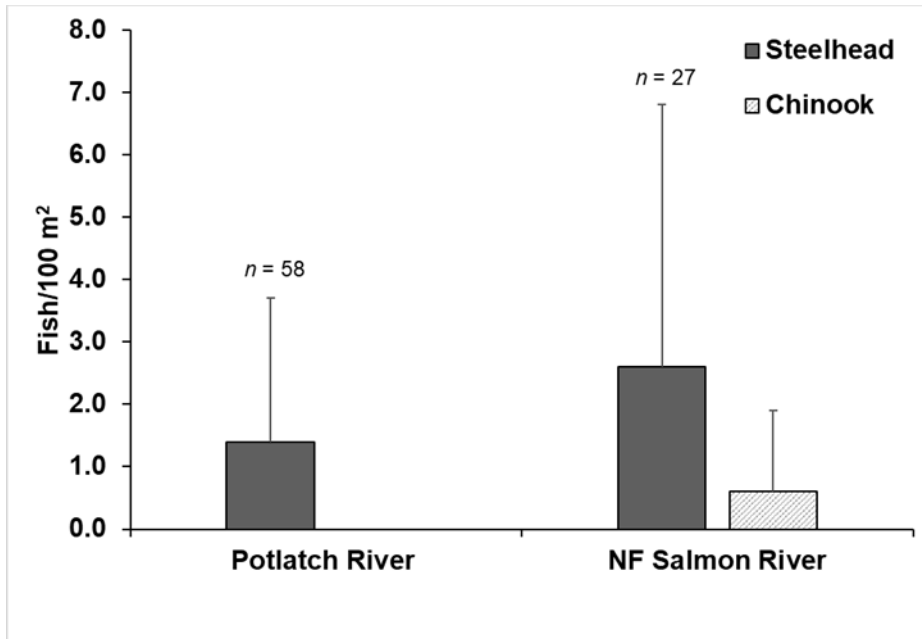


Figure 3. Mean densities of steelhead and Chinook Salmon per 100 m<sup>2</sup> observed during 2023 snorkel surveys at intensive transects in the Clearwater River and Salmon River basin, Idaho. Chinook Salmon were not observed in the Potlatch River. Error bars represent standard deviation and “n” is the number of transects surveyed.

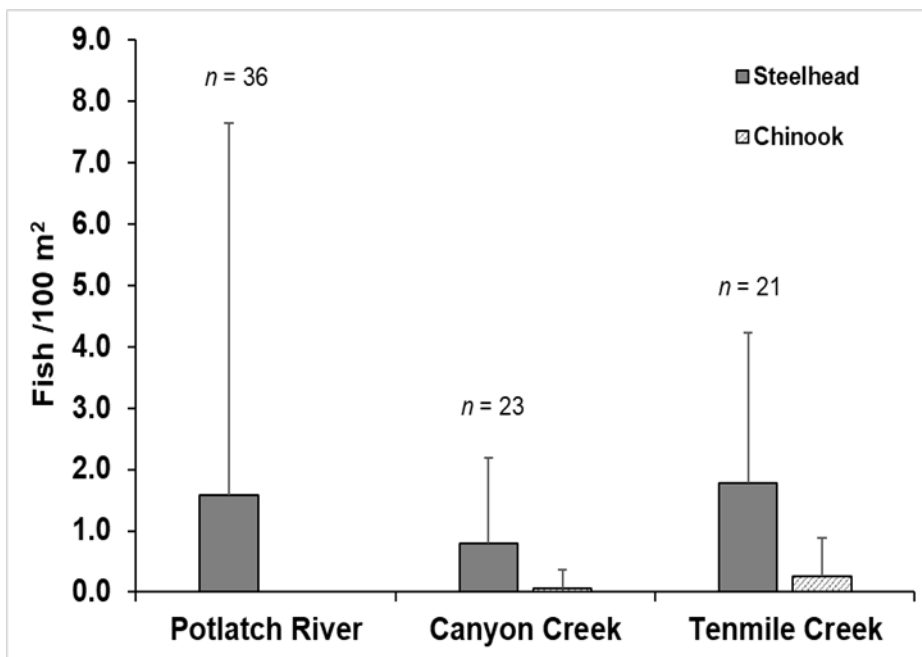


Figure 4. Mean densities of steelhead and Chinook Salmon per 100 m<sup>2</sup> observed during 2023 snorkel surveys at extensive transects in the Clearwater River basin, Idaho. No Chinook were observed in the Potlatch River. Error bars represent standard deviation and “n” is the number of transects surveyed.



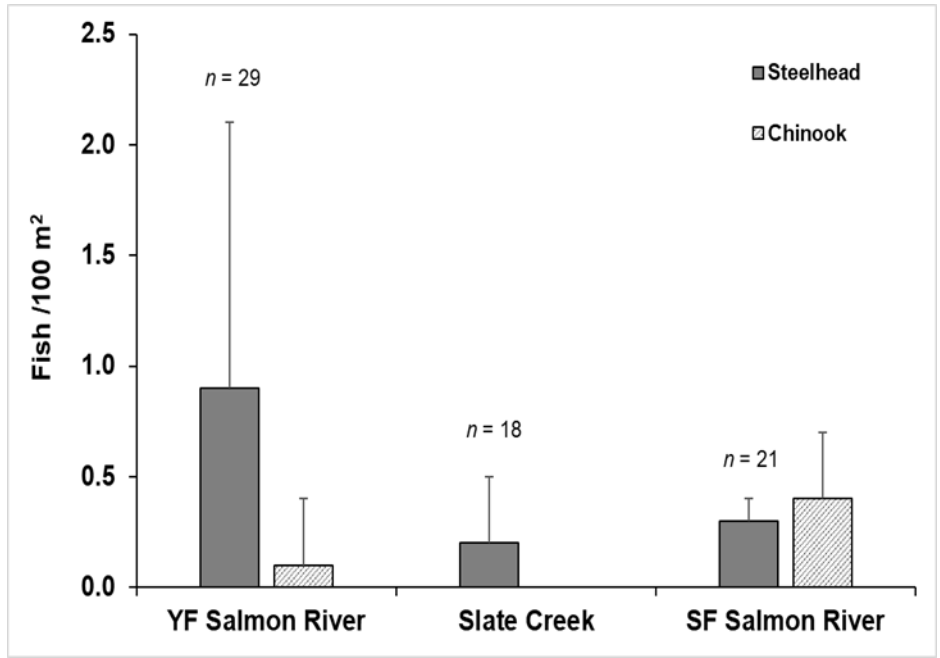


Figure 5. Mean densities of steelhead and Chinook Salmon per 100 m<sup>2</sup> observed during 2023 snorkel surveys at extensive transects in the Salmon River basin, Idaho. No Chinook Salmon were observed in Slate Creek. Error bars represent standard deviation and “n” is the number of transects surveyed.

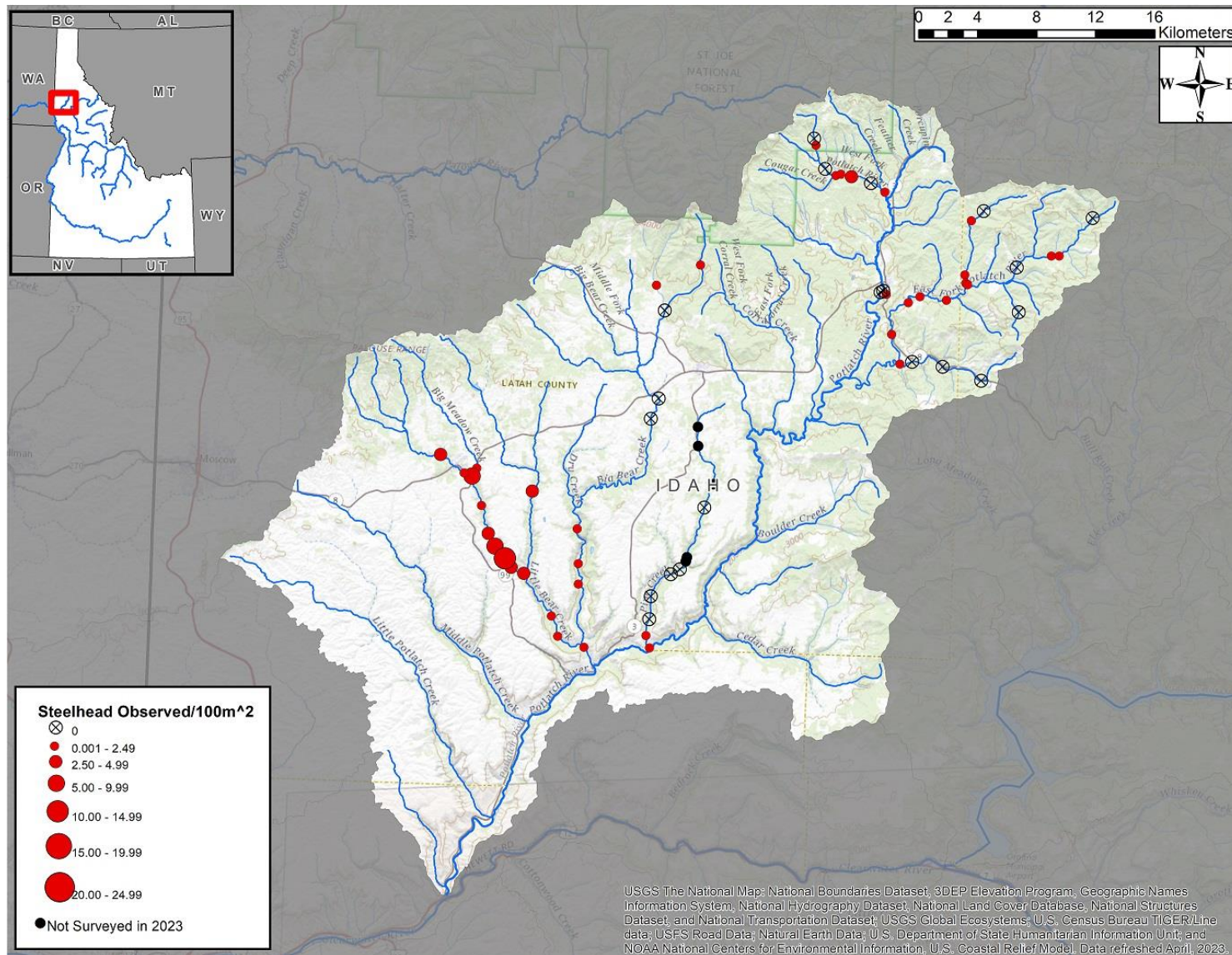


Figure 6. Map displaying the densities and distribution of steelhead observed in 2023 throughout the Potlatch River (Clearwater River basin), Idaho, during intensive GRTS snorkel surveys.



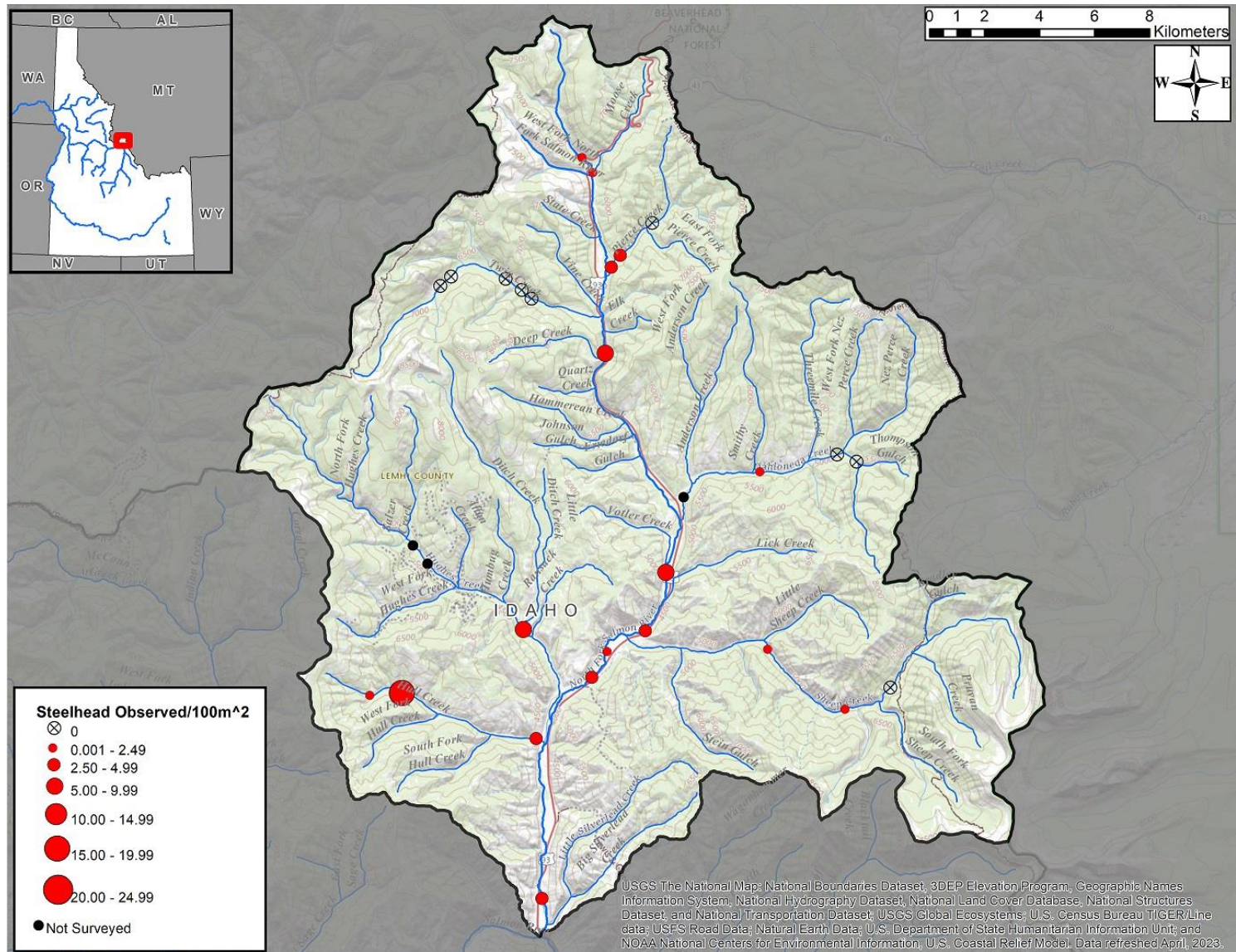


Figure 7. Map displaying the densities and distribution of steelhead observed in 2023 throughout the North Fork Salmon River (Salmon River basin), Idaho, during intensive GRTS snorkel surveys.



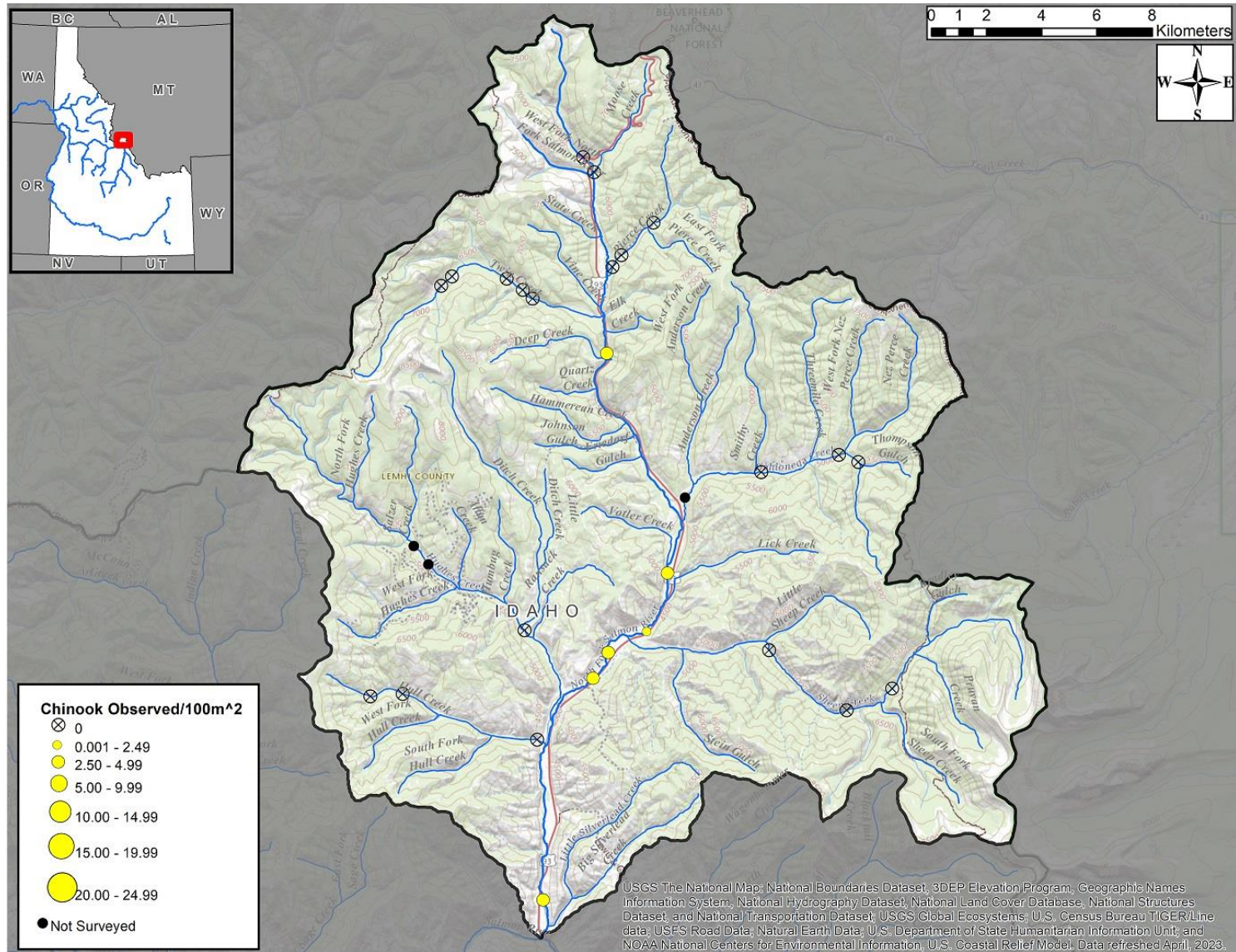


Figure 8. Map displaying the densities and distribution of Chinook Salmon observed in 2023 throughout the North Fork Salmon River (Salmon River basin), Idaho, during intensive GRTS snorkel surveys.





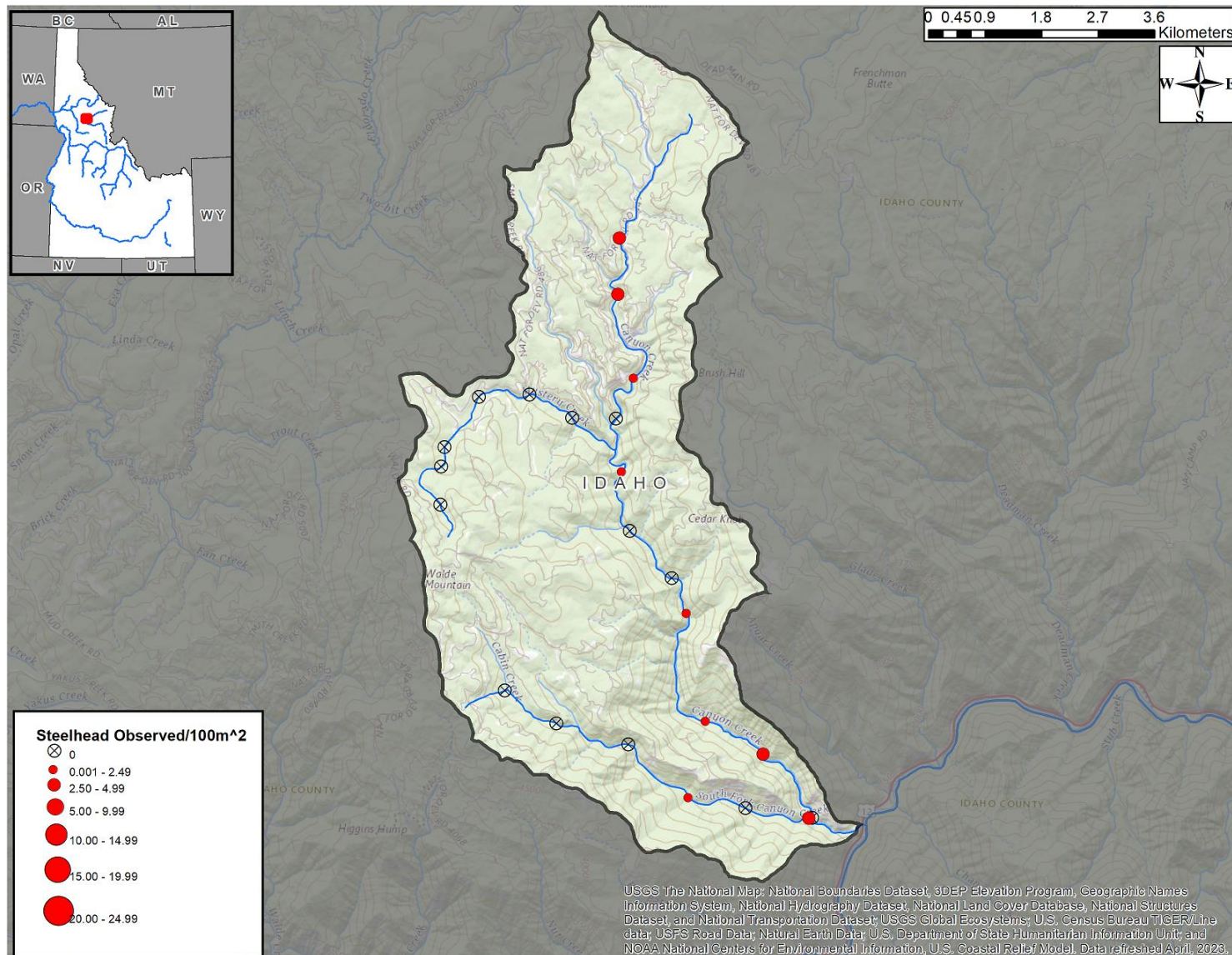


Figure 10. Map displaying the densities and distribution of steelhead observed in 2023 throughout Canyon Creek (Clearwater River basin), Idaho, during extensive GRTS snorkel surveys.

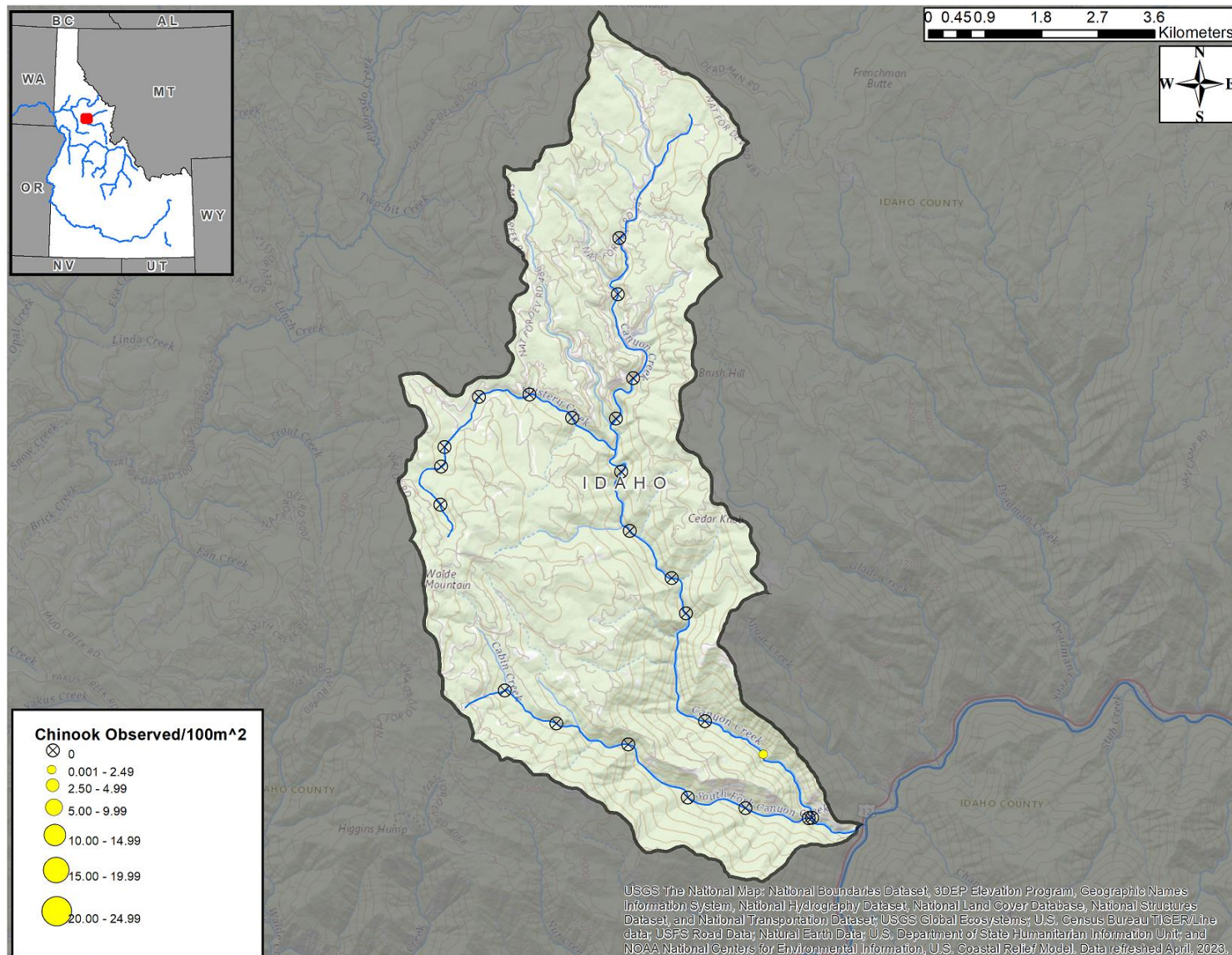


Figure 11. Map displaying the densities and distribution of Chinook Salmon observed in 2023 throughout Canyon Creek (Clearwater River basin), Idaho, during extensive GRTS snorkel survey



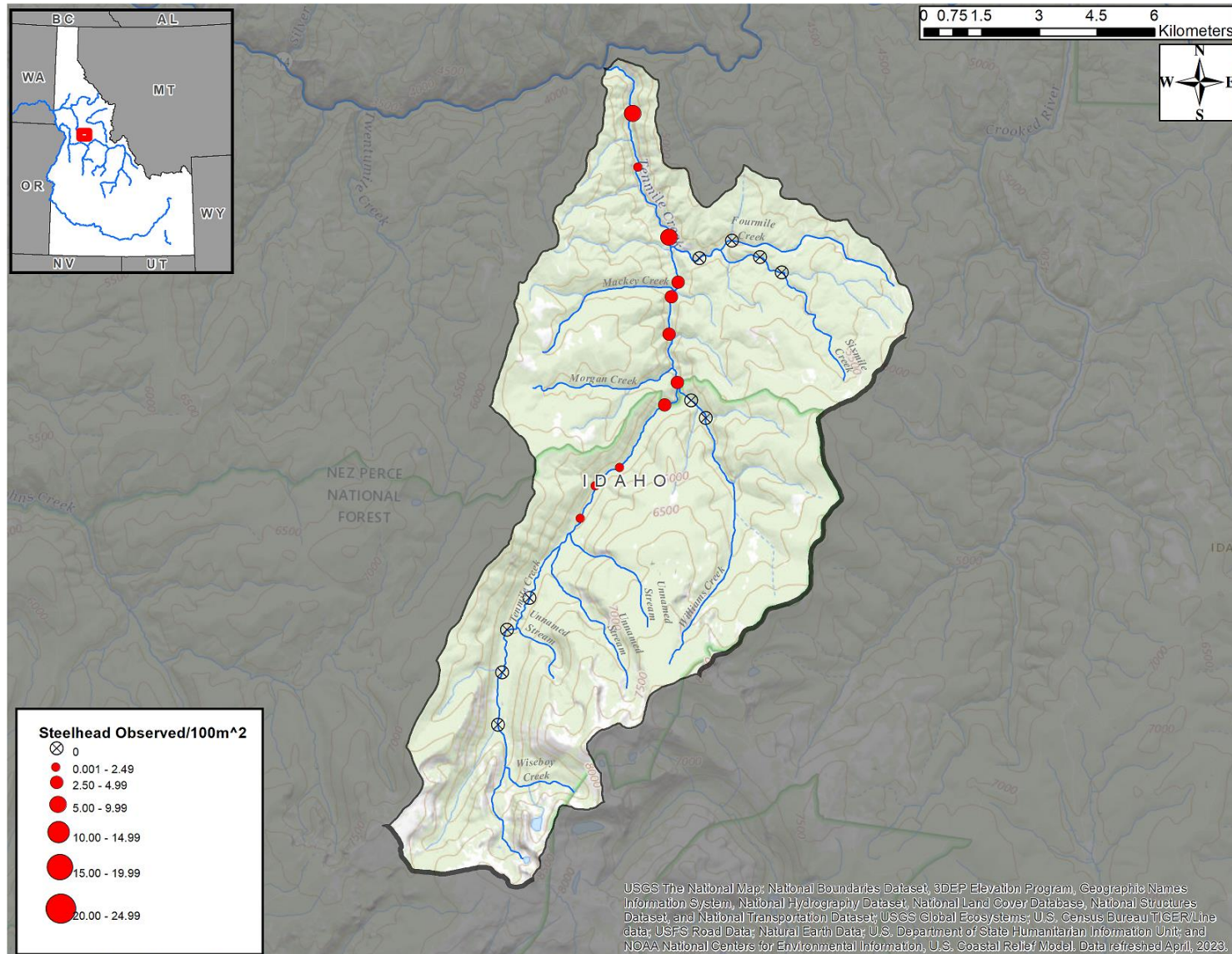


Figure 12. Map displaying the densities and distribution of steelhead observed in 2023 throughout Tenmile Creek (Clearwater River basin), Idaho, during extensive GRTS snorkel surveys.



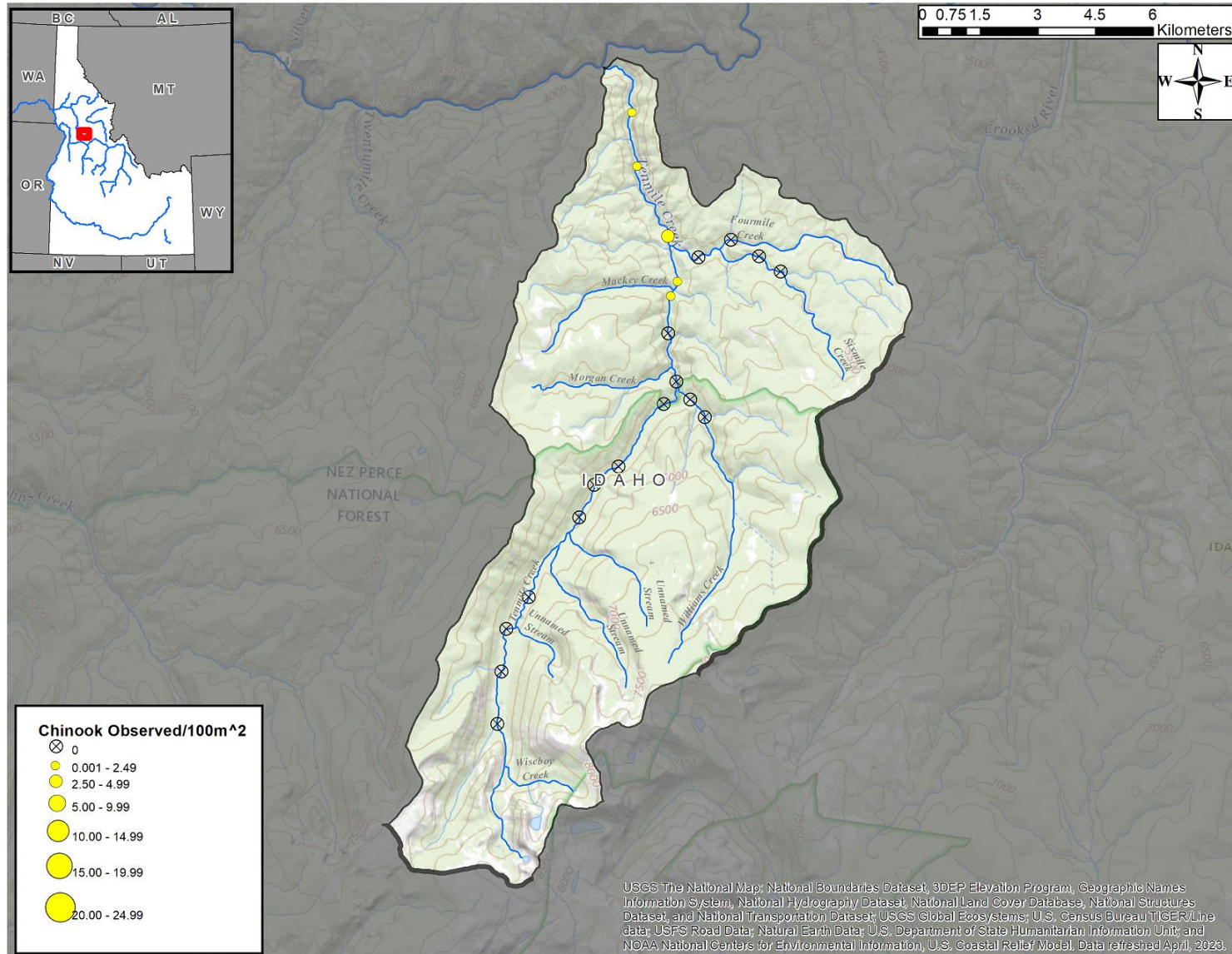


Figure 13. Map displaying the densities and distribution of Chinook Salmon observed in 2023 throughout Tenmile Creek (Clearwater River basin), Idaho, during extensive GRTS snorkel surveys

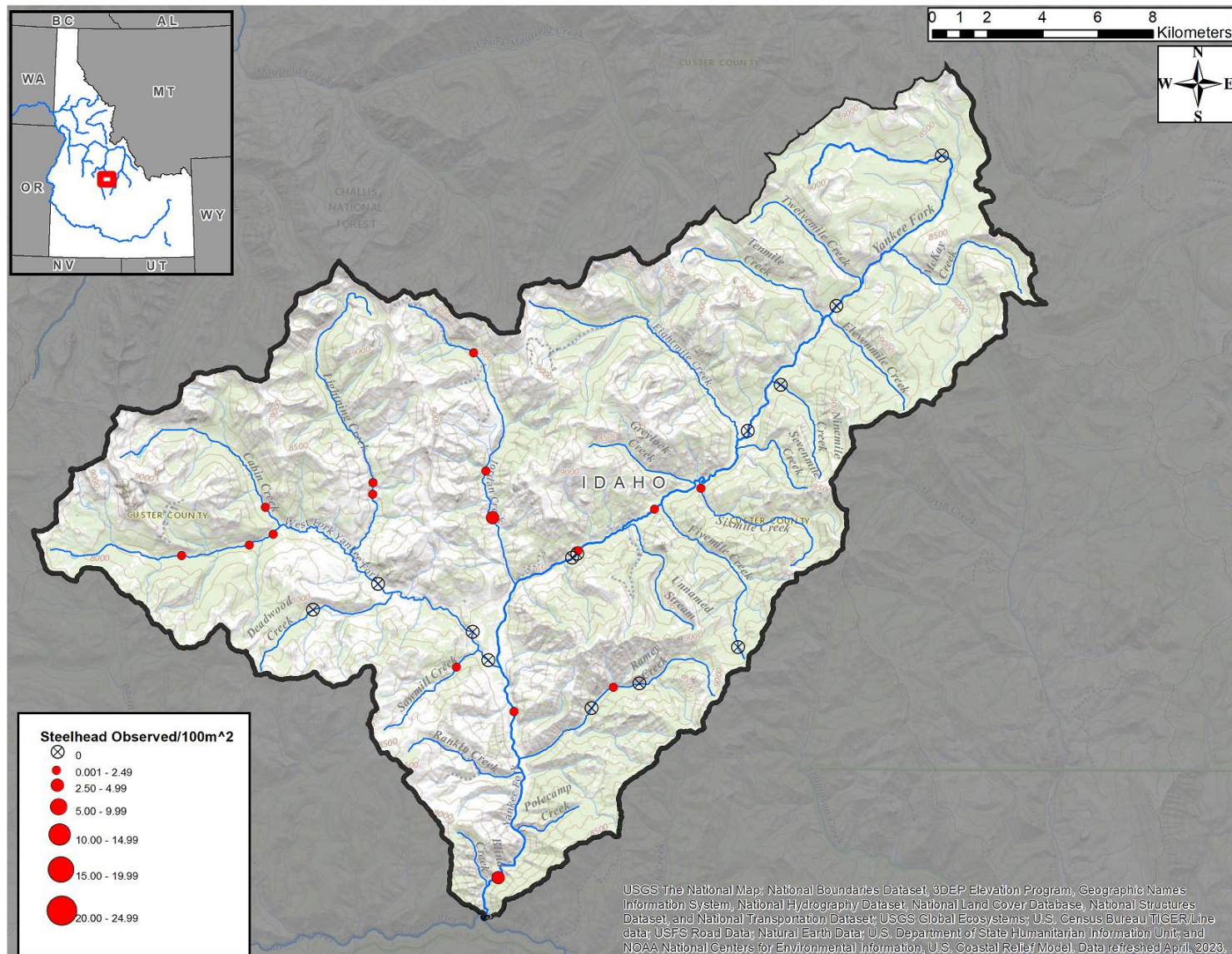


Figure 14. Map displaying the densities and distribution of steelhead observed in 2023 throughout the Yankee Fork of the Salmon River (Salmon River basin), Idaho, during extensive GRTS snorkel surveys.



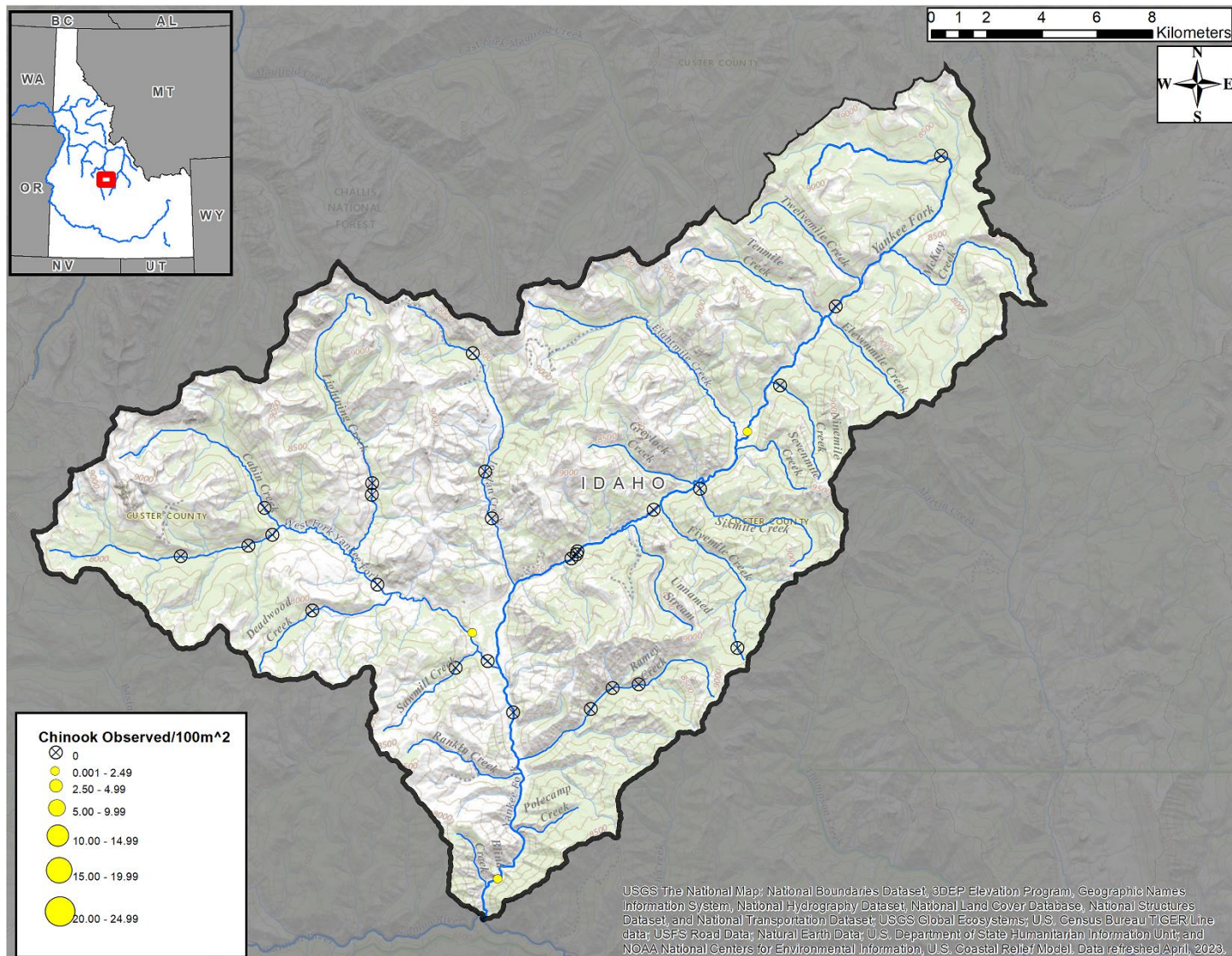


Figure 15. Map displaying the densities and distribution of Chinook observed in 2023 throughout the Yankee Fork of the Salmon River (Salmon River basin), Idaho, during extensive GRTS snorkel surveys.

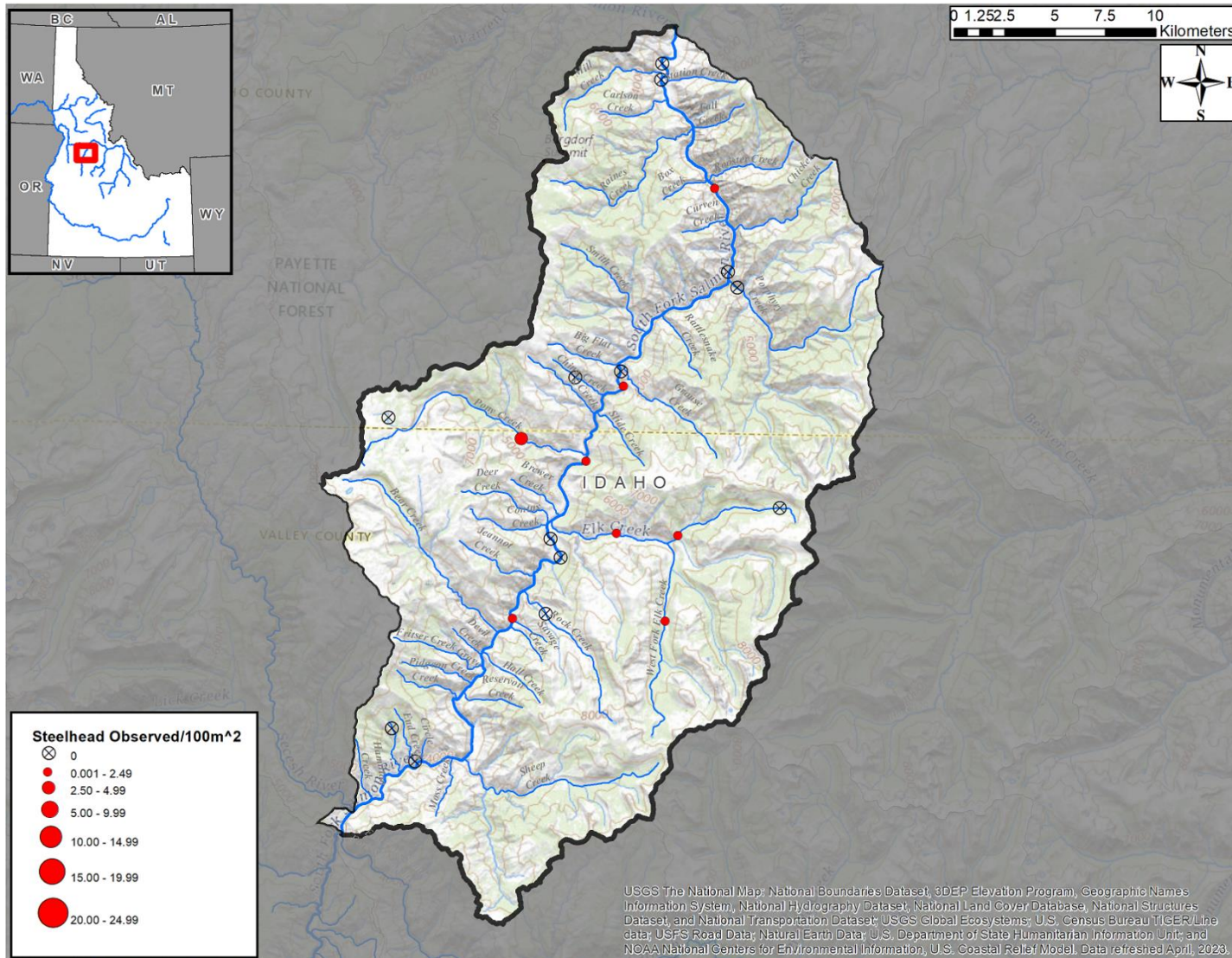


Figure 16. Map displaying the densities and distribution of steelhead observed in 2023 throughout South Fork Salmon River basin downstream of the East Fork South Fork confluence (Salmon River basin), Idaho, during extensive GRTS snorkel surveys.



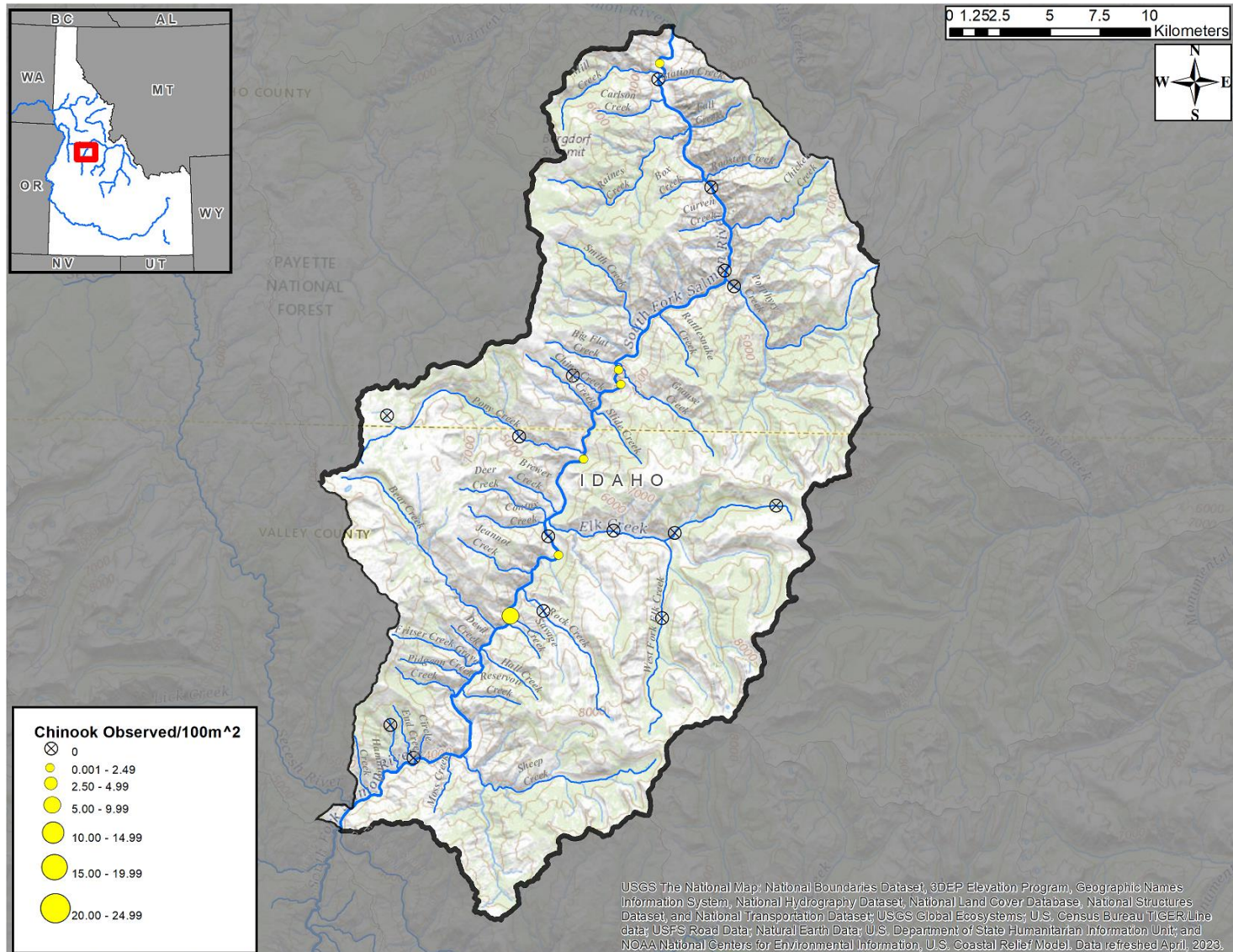


Figure 17. Map displaying the densities and distribution of Chinook Salmon observed in 2023 throughout South Fork Salmon River (Salmon River basin), Idaho, during extensive GRTS snorkel surveys.



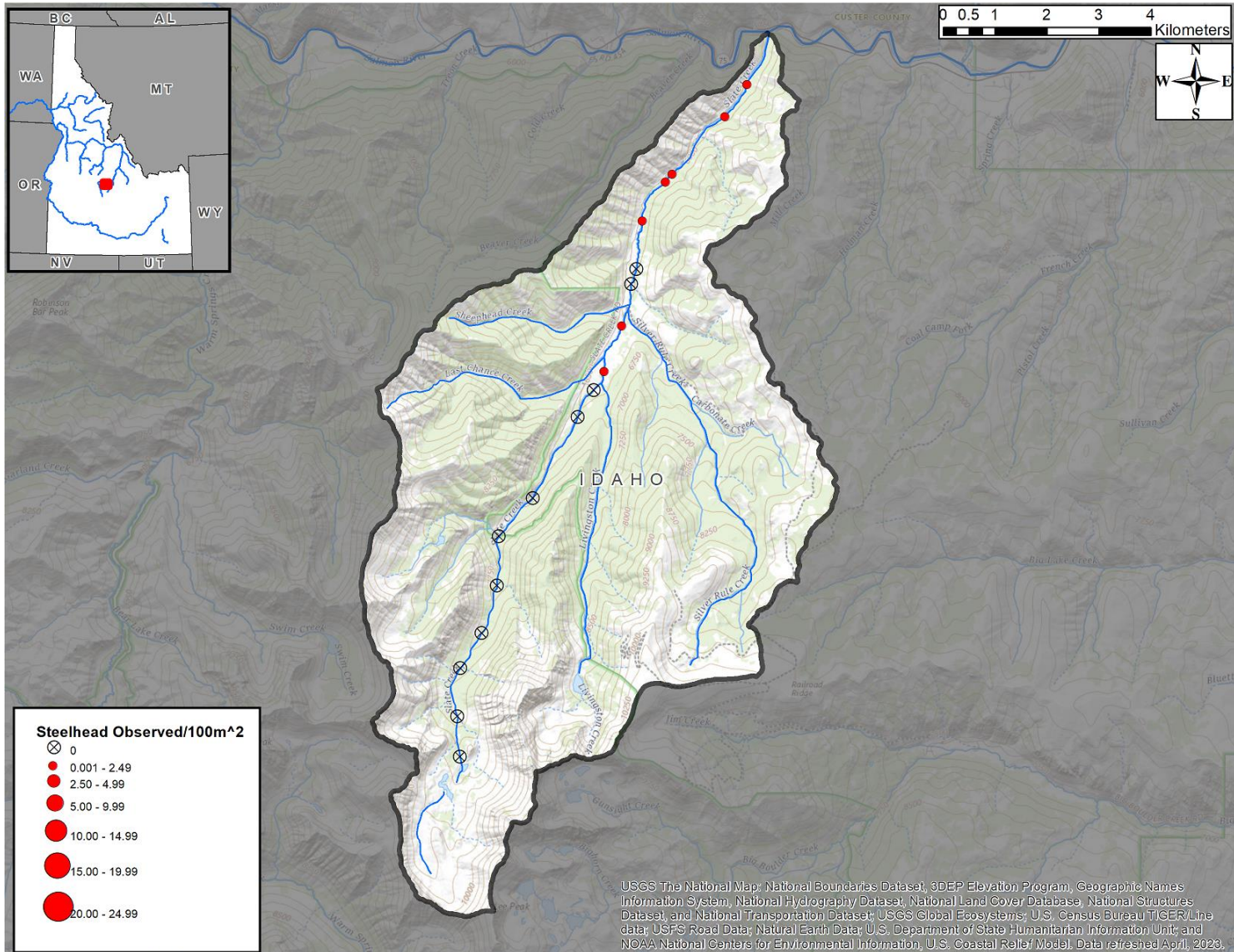


Figure 18. Map displaying the densities and distribution of steelhead observed in 2023 throughout Slate Creek (Salmon River basin), Idaho, during extensive GRTS snorkel surveys

## **APPENDICES**

APPENDIX A: IDFG CORE, NON-CORE, AND RESIDENT FISH SNORKEL TRANSECT  
DETAILS



Appendix A1. IDFG core trend snorkel survey transects  $n = 216$  by Snake River Steelhead major and independent population. Middle Fork Salmon River and its tributaries are surveyed by regional management crews funded by the Dingell-Johnson Act and License funds.

<b>Steelhead major and independent population</b>	<b>Stream name</b>	<b>Stratum</b>	<b>Transect name</b>	<b>Survey frequency</b>	<b>Last surveyed</b>	<b>Next scheduled survey</b>
<b>Hells Canyon Tributaries</b>						
Hells Canyon (SNHCT-s)	Granite Creek	---	1	Annual	2023	2024
	Granite Creek	---	3	Annual	2021	2024
	Sheep Creek	---	1	Annual	2023	2024
	Sheep Creek	---	2	Annual	2023	2024
Independent Population Total:			4			
MPG Total:			4			
<b>Clearwater River</b>						
Lower Clearwater River (CRLMA-s)	Big Canyon Creek	---	1	Annual	2021	2024
Independent Population Total:			1			
South Fork Clearwater River (CRSFC-s)	American River	2	1	Annual	2023	2024
	American River	3	2	Triennial	2023	2026
	Crooked River	1	BOULDER-A	Annual	2023	2024
	Crooked River	1	BOULDER-B	Triennial	2023	2026
	Crooked River	1	SILL-LOG-B	Triennial	2023	2026
	Crooked River	2	CONTROL1	Triennial	2021	2024
	Crooked River	2	CONTROL2	Triennial	2021	2024
	Crooked River	2	TREAT2	Annual	2023	2024
	Crooked River	3	NATURAL1	Annual	2023	2024
	Crooked River	C	CAN2	Triennial	2021	2024
	Crooked River	C	CAN3	Annual	2023	2024
	East Fork Crooked River	H	EF1	Annual	2022	2023
	East Fork Crooked River	H	EF2	Triennial	2022	2025
	Johns Creek	1	1	Triennial	2021	2024
	Johns Creek	2	3	Triennial	2023	2026
	Red River	1	CNTL 1	Annual	2023	2024
	Red River	1	CNTL 2	Annual	2023	2024
	Red River	2	CNTL 2	Annual	2023	2024
	Red River	2	TREAT 2	Annual	2023	2024
	Red River	4	CNTL 2	Annual	2023	2024
	Red River	4	TREAT 2	Annual	2023	2024
	Red River	5	CNTL 2	Annual	2023	2024
	Red River	5	TREAT 2	Annual	2023	2024
	Relief Creek	1	1A	Triennial	2021	2024
	Relief Creek	1	1B	Triennial	2023	2026
	Tenmile Creek	---	1	Triennial	2021	2024

## Appendix A1. Continued

<b>Steelhead major and independent population</b>	<b>Stream name</b>	<b>Stratum</b>	<b>Transect name</b>	<b>Survey frequency</b>	<b>Last surveyed</b>	<b>Next scheduled survey</b>
	West Fork Crooked River	H	WF1	Annual	2021	2024
	West Fork Crooked River	H	WF2	Triennial	2021	2024
Independent Population Total:			28			
Lochsa River (CRLOC-s)	Brushy Fork	3	1	Biennial	2022	2024
	Brushy Fork	3	2	Annual	2022	2024
	Colt Creek		BRIDGE	Biennial	2023	2025
	Crooked Fork Creek	1	2A	Biennial	2023	2025
	Crooked Fork Creek	2	3A	Biennial	2023	2025
	Crooked Fork Creek	2	4A	Biennial	2023	2025
	Crooked Fork Creek	3	1	Biennial	2023	2025
	Crooked Fork Creek	3	2	Biennial	2023	2025
	Crooked Fork Creek	3	2B	Annual	2023	2024
	Crooked Fork Creek	4	1B	Annual	2023	2024
	Fish Creek	---	1	Annual	2023	2024
	Fish Creek	---	2	Annual	2023	2024
	Lochsa River	---	L1	Annual	2023	2024
	Lochsa River	---	L2	Biennial	2023	2025
	Lochsa River	---	L3	Biennial	2023	2025
	Lochsa River	---	L4	Annual	2023	2024
	Old Man Creek	---	1	Triennial	2023	2026
	Postoffice Creek	---	1	Triennial	2022	2025
	Postoffice Creek	---	2	Triennial	2022	2025
	Warm Springs Creek	---	1	Biennial	2023	2025
	White Sands Creek	---	LWRMONITOR	Biennial	2023	2025
Independent Population Total:			21			
Selway River (CRSEL-s)	Bear Creek	---	1	Annual	2022	2024
	Bear Creek	---	2	Annual	2022	2024
	Deep Creek	---	CACTUS	Annual	2023	2024
	Deep Creek	---	SCIMITAR	Annual	2023	2024
	East Fork Moose Creek	---	3	Annual	2022	2024
	Meadow Creek	---	1	Annual	2023	2024
	Moose Creek	---	1	Annual	2022	2024
	Moose Creek	---	2	Annual	2022	2024
	Running Creek	---	1	Annual	2022	2024
	Running Creek	---	2	Annual	2022	2024
	Selway River	---	HELLSHALF	Annual	2023	2024
	Selway River	---	LITTLE-CW	Annual	2023	2024
	Selway River	---	MAG-XING	Annual	2023	2024
	Selway River	---	RUNNING CR	Annual	2022	2024
	Three Links Creek	---	1	Annual	2022	2024
	White Cap Creek	3	1	Annual	2023	2024

Appendix A1. Continued

<b>Steelhead major and Independent population</b>	<b>Stream name</b>	<b>Stratum</b>	<b>Transect name</b>	<b>Survey frequency</b>	<b>Last surveyed</b>	<b>Next scheduled survey</b>
	White Cap Creek	3	2	Annual	2023	2024
	White Cap Creek	3	3	Annual	2023	2024
Independent Population Total:			18			
MPG Total:			68			
<b>Salmon River</b>						
Little Salmon River (SRLSR-s)	Boulder Creek	ABOVE	1	Annual	2023	2024
	Boulder Creek	ABOVE	2	Annual	2023	2024
	Boulder Creek	BELOW	3	Annual	2023	2024
	Boulder Creek	BELOW	5	Annual	2023	2024
	Hazard Creek	---	HAZ1	Annual	2023	2024
	Little Salmon River	---	1	Annual	2023	2024
	Little Salmon River	---	2	Annual	2023	2024
	Rapid River	BLW W FK	RAP2	Annual	2023	2024
	Slate Creek	---	1	Triennial	2023	2026
	Slate Creek	---	2	Triennial	2023	2026
	Slate Creek	---	3	Triennial	2023	2026
	Slate Creek	---	4	Triennial	2023	2026
	Slate Creek	---	6	Triennial	2023	2026
	South Fork White Bird Creek	---	SF-#2	Triennial	2022	2025
	South Fork White Bird Creek	---	SF-#3	Triennial	2022	2025
	West Fork Rapid River	BLW FALLS	RAP1	Annual	2023	2024
	White Bird Creek	---	1	Triennial	2022	2025
Independent Population Total:			17			
South Fork Salmon River (SFMAL-s)	East Fork South Fork Salmon	ABV JHNSN	3	Biennial	2023	2025
	East Fork South Fork Salmon	BLW JHNSN	6	Biennial	2023	2025
	East Fork South Fork Salmon	BLW JHNSN	7	Biennial	2023	2025
	Johnson Creek	LOWER IV	L2	Triennial	2022	2025
	Johnson Creek	LOWER IV	L3	Triennial	2022	2025
	Johnson Creek	MID LOWIII	PW3B	Triennial	2022	2025
	Johnson Creek	MID UPR II	PW3A	Triennial	2022	2025
	Johnson Creek	UPPER I	M1	Triennial	2023	2026
	Johnson Creek	UPPER I	M2	Triennial	2023	2026
	Johnson Creek	UPPER I	M3	Triennial	2023	2026
	Johnson Creek	UPPER I	PW1A	Triennial	2022	2025
	Rock Creek	UPPER I	M1	Triennial	2022	2025
	Sand Creek	UPPER I	M2	Triennial	2022	2025
	South Fork Salmon River	---	11	Annual	2023	2024
	South Fork Salmon River	---	14	Annual	2023	2024
	South Fork Salmon River	---	16	Annual	2023	2024
	South Fork Salmon River	---	5	Annual	2023	2024
	South Fork Salmon River	---	7	Annual	2023	2024
	South Fork Salmon River	---	POVERTY	Annual	2023	2024

Appendix A1. Continued

Steelhead major and independent population	Stream name	Stratum	Transect name	Survey frequency	Last surveyed	Next scheduled survey
	South Fork Salmon River	---	STOLLE1	Annual	2023	2024
	South Fork Salmon River	---	STOLLE2	Annual	2023	2024
Independent Population Total:			21			
Secesh River (SFSEC-s)	Lake Creek	---	BURGDORF	Annual	2023	2024
	Lake Creek	---	WILLOW CR	Annual	2023	2024
	Lick Creek	---	L3	Annual	2023	2024
	Secesh River	---	GROUSE	Annual	2023	2024
	Secesh River	---	LONG-GULCH	Annual	2023	2024
Independent Population Total:			5			
Chamberlain Creek (SRCHA-s)	Bargamin Creek	---	1	Biennial	2018	2024
	Bargamin Creek	---	2	Biennial	2018	2024
	Chamberlain Creek	---	CHA1	Biennial	2023	2025
	Chamberlain Creek	---	CHA4	Biennial	2022	2024
	Sheep Creek	---	L1	Biennial	2018	2024
	Sheep Creek	---	L2	Biennial	2018	2024
	West Fork Chamberlain Cr.	---	CHA2	Biennial	2022	2024
	West Fork Chamberlain Cr.	---	CHA3	Biennial	2022	2024
Independent Population Total:			8			
Lower Middle Fork Salmon River (Loon Creek and below; MFBIG-s)	Big Creek	LOWER	L1	Annual	2021	2024
	Big Creek	MIDDLE	Cabin Cr	Biennial	2022	2024
	Big Creek	MIDDLE	TAYLOR 1	Biennial	2022	2024
	Big Creek	UPPER	LOGAN CR	Biennial	2023	2025
	Camas Creek	---	2	Biennial	2023	2025
	Camas Creek	---	CAM1	Biennial	2023	2025
	Loon Creek	C CHANNEL	2	Biennial	2021	2024
	Loon Creek	LN1	3	Biennial	2021	2024
	Loon Creek	PACK BR	1	Biennial	2021	2024
	Middle Fork Salmon River	2	HOSPPL	Annual	2023	2024
	Middle Fork Salmon River	2	HOSPRUN	Annual	2023	2024
	Middle Fork Salmon River	2	TAPPANPOOL	Annual	2023	2024
	Middle Fork Salmon River	2	TAPPANRUN	Annual	2021	2024
	Middle Fork Salmon River	3	AIRSTRIP	Annual	2023	2024
	Middle Fork Salmon River	3	FLYING-B	Annual	2023	2024
	Middle Fork Salmon River	3	SURVEY	Annual	2023	2024
	Middle Fork Salmon River	4	BIG-CR-BR	Annual	2023	2024
	Middle Fork Salmon River	4	GOATPOOL	Annual	2023	2024
	Middle Fork Salmon River	4	GOATRUN	Annual	2023	2024
	Middle Fork Salmon River	4	LITOUZEL	Annual	2023	2024
	Middle Fork Salmon River	4	LOVEBAR	Annual	2023	2024
	Middle Fork Salmon River	4	OTTERBAR	Annual	2023	2024
	Middle Fork Salmon River	4	SHIPISLAND	Annual	2023	2024

Appendix A1. Continued

Steelhead major and independent population	Stream name	Stratum	Transect name	Survey frequency	Last surveyed	Next scheduled survey
	Monumental Creek	---	MON1	Triennial	2023	2026
	Monumental Creek	---	MON2	Triennial	2023	2026
	Monumental Creek	---	MON3	Triennial	2023	2026
	Monumental Creek	---	MON5	Triennial	2023	2026
	West Fork Monumental Creek	---	MON4	Triennial	2023	2026
Independent Population Total:			28			
Upper Middle Fork Salmon River (above Loon Creek; MFUMA-s)	Beaver Creek	---	A	Annual	2023	2024
	Beaver Creek	---	B	Annual	2023	2024
	Cape Horn Creek	1	A	Annual	2023	2024
	Cape Horn Creek	2	B	Annual	2023	2024
	Elk Creek	---	1A	Annual	2023	2024
	Elk Creek	---	1B	Annual	2023	2024
	Elk Creek	---	2A	Annual	2023	2024
	Elk Creek	---	2B	Annual	2023	2024
	Knapp Creek	1	A	Annual	2023	2024
	Knapp Creek	1	B	Annual	2023	2024
	Knapp Creek	1	LCKD FENCE	Annual	2023	2024
	Marble Creek	UPPER	MAR1	Biennial	2023	2025
	Marble Creek	UPPER	MAR1B	Biennial	2023	2025
	Marble Creek	UPPER	MAR2	Biennial	2023	2025
	Marsh Creek	1	A	Annual	2023	2024
	Marsh Creek	1	B	Annual	2023	2024
	Marsh Creek	3	A	Annual	2023	2024
	Marsh Creek	4	B	Annual	2023	2024
	Marsh Creek	5	A	Annual	2023	2024
	Middle Fork Salmon River	1	BOUNDARY	Annual	2022	2024
	Middle Fork Salmon River	1	ELKHORN	Annual	2023	2024
	Middle Fork Salmon River	1	GRDLHOLE	Annual	2023	2024
	Middle Fork Salmon River	1	GREYHOUND	Annual	2023	2024
	Middle Fork Salmon River	1	INDIAN	Annual	2022	2024
	Middle Fork Salmon River	1	RAPID-R	Annual	2023	2024
	Middle Fork Salmon River	1	SHEEPEATER	Annual	2023	2024
	Middle Fork Salmon River	1	VELVET	Annual	2023	2024
	Middle Fork Salmon River	2	COUGAR	Annual	2023	2024
	Middle Fork Salmon River	2	LJACKASS	Annual	2023	2024
	Middle Fork Salmon River	2	MARBLPL	Annual	2023	2024
	Middle Fork Salmon River	2	PUNGO	Annual	2023	2024
	Middle Fork Salmon River	2	ROCK IS	Annual	2023	2024
	Middle Fork Salmon River	2	WHITEYCX	Annual	2023	2024
Independent Population Total:			34			

Appendix A1. Continued

<b>Steelhead major and independent population</b>	<b>Stream name</b>	<b>Stratum</b>	<b>Transect name</b>	<b>Survey frequency</b>	<b>Last surveyed</b>	<b>Next scheduled survey</b>
Panther Creek (SRPAN-s)	Horse Creek	---	L1	Triennial	2021	2024
	Horse Creek	---	L2	Triennial	2021	2024
	Panther Creek	ABOVE	PC9	Annual	2023	2024
	Panther Creek	DS-BIGD	PC4	Annual	2023	2024
	Panther Creek	DS-BLACKB	PC6	Annual	2023	2024
	Panther Creek	DS-CLEAR	PC1	Annual	2023	2024
Independent Population Total:			6			
North Fork Salmon River (SRNFS-s)	North Fork Salmon River	2	DAHLONEGA	Annual	2022	2024
	Pine Creek	---	BRIDGE	Annual	2023	2024
	Pine Creek	---	SAWMILL CR	Triennial	2021	2024
	North Fork Salmon River	2	HUGHES	Triennial	2021	2024
Independent Population Total:			4			
Lemhi River (SRLEM-s)	Big Springs Creek	LEM1	A	Biennial	2023	2025
	Hayden Creek	HC2	B	Biennial	2023	2025
	Hayden Creek	HC3	B	Biennial	2023	2025
	Lemhi	1	LEM3A	Biennial	2022	2024
Independent Population Total:			4			
Pahsimeroi River (SRPAH-s)	Pahsimeroi River	LOWER	DWTNLANE	Biennial	2023	2025
Independent Population Total:			1			
East Fork Salmon River (SREFS-s)	East Fork Salmon River	ABOVE-WEIR	2	Biennial	2023	2025
	East Fork Salmon River	ABOVE-WEIR	3	Biennial	2023	2025
	Morgan Creek	UPPER	BLM CAMP	Triennial	2021	2024
Independent Population Total:			3			
Upper Salmon River (SRUMA-s)	Alturas Lake Creek	2	2B	Annual	2023	2024
	Redfish Lake Creek	---	LOWER	Annual	2023	2024
	Redfish Lake Creek	---	WEIR DS	Annual	2023	2024
	Salmon River	1	RBNSN-BAR	Annual	2022	2024
	Salmon River	2	2B	Annual	2023	2024
	Salmon River	3	3B	Annual	2023	2024
	Salmon River	3	3BRA	Annual	2023	2024
	Salmon River	4	4B	Annual	2023	2024
	Salmon River	7	7A	Annual	2023	2024
	Valley Creek	1	B	Annual	2023	2024
	Valley Creek	3	A	Annual	2023	2024
	Valley Creek	3	B	Annual	2023	2024
	Valley Creek	6	B	Annual	2023	2024
	Independent Population Total:			13		
MPG Total:			144			
Snake River DPS Total:			216			

Appendix A2. IDFG non-core trend snorkel survey transects n = 103 by Snake River Steelhead major and independent population. Middle Fork Salmon River and its tributaries are surveyed by regional management crews funded by the Dingell-Johnson Act and License funds.

<b>Steelhead major and independent population</b>	<b>Stream name</b>	<b>Stratum</b>	<b>Transect name</b>	<b>Survey frequency</b>	<b>Last surveyed</b>	<b>Next scheduled survey</b>
<b>Hells Canyon Tributaries</b>						
Hells Canyon (SNHCT-s)	Granite Creek	---	2	Opportunistic	2013	
Independent Population Total:			1			
MPG Total:			1			
<b>Clearwater River</b>						
Lower Clearwater River (CRLMA-s)	East Fork Potlatch River	---	PF14	Opportunistic	2023	2024
	East Fork Potlatch River	---	PF15	Opportunistic	2023	2024
	East Fork Potlatch River	---	PF16	Opportunistic	2023	2024
	East Fork Potlatch River	---	PF17	Opportunistic	2023	2024
	East Fork Potlatch River	---	PF18	Opportunistic	2023	2024
	East Fork Potlatch River	---	PF19	Opportunistic	2023	2024
	East Fork Potlatch River	---	1	Opportunistic	2023	2024
	East Fork Potlatch River	---	2	Opportunistic	2023	2024
Independent Population Total:	East Fork Potlatch River	---	3	Opportunistic	2023	2024
			9			
South Fork Clearwater River (CRSFC-s)	American River	2	1/8MABVEFK	Opportunistic	2018	
	American River	2	ABV CATTLE			
	American River	2	GRD	Variable	2018	
	American River	2	FLAT IRON			
	American River	2	RIDGE	Variable	2018	
	American River	2	GUNTLEYS	Variable	2018	
	American River	3	STOCK SIGN	Variable	2018	
	American River	1	2.25U	Variable	2018	
	American River	1	2.65U	Variable	2018	
	American River	1	GRAVEL PIT	Variable	2018	
	American River	3	.5MI BELOW			
	American River	3	BOXSING	Variable	2018	
	American River	3	BUFFALO PIT	Variable	2018	
	Crooked River	3	NATURAL3	Variable	2012	
	Crooked River	4	MEANDER2	Variable	2011	
	Crooked River	1	CONTROL2	Variable	2009	
	Johns Creek	2	4	Variable	2013	
	Red River	1	SHISSLER CR	Variable	2018	
	Red River	1	UPPER			
	Red River	1	SHISSLER	Variable	2018	
	Red River	3	BELOW WEIR	Variable	2018	
	Red River	3	OLD BRIDGE	Variable	2018	
	Red River	4	BOULDER POOL	Variable	2018	
	Red River	6	CSUP 3	Variable	2011	

Appendix A2. Continued

Steelhead major and independent population	Stream name	Stratum	Transect name	Survey frequency	Last surveyed	Next scheduled survey
	Red River	6	CSUP 5	Opportunistic	2011	
	Relief Creek	2	2A	Opportunistic	2011	
	Relief Creek	2	2B	Opportunistic	2011	
	South Fork Clearwater River	---	103.2KM	Opportunistic	2009	
	South Fork Clearwater River	---	83.9KM	Opportunistic	2009	
	South Fork Clearwater River	---	88.7KM	Opportunistic	2009	
	South Fork Clearwater River	---	93.9KM	Opportunistic	2009	
	South Fork Clearwater River	---	98.7KM	Opportunistic	2009	
	Tenmile Creek	---	2	Opportunistic	2013	
Independent Population Total:			30			
Lochsa River (CRLOC-s)	Colt Killed Creek	---	LWRMONITOR	Opportunistic	2016	
	Fire Creek	---	1	Opportunistic	2017	
	Fire Creek	---	2	Opportunistic	2017	
	Hopeful Creek	1	1-BOOGIEDN	Opportunistic	2011	
	Split Creek	---	1	Opportunistic	2017	
	Split Creek	---	2	Opportunistic	2017	
Independent Population Total:			6			
Selway River (CRSEL-s)	East Fork Moose Creek	---	2	Opportunistic	2015	
	Gedney Creek	---	2	Opportunistic	2018	
	Marten Creek	---	1	Opportunistic	2017	
	Meadow Creek	---	2	Opportunistic	2018	
	OHara Creek	---	1	Opportunistic	2011	
	OHara Creek	---	2	Opportunistic	2021	
	Selway River	---	abv rodeo rapid	Opportunistic	2022	
	Selway River	---	above wolf cr. Rpd	Opportunistic	2022	
	Selway River	---	blw Rodeo rapid	Opportunistic	2022	
	Selway River	---	blw 3 links rpd	Opportunistic	2022	
	Selway River	---	Moose creek		2022	
	Selway River	---	confluence	Opportunistic		
	Selway River	---	Selway lodge	Opportunistic	2022	
	Selway River	---	1 mi. blw wt cap	Opportunistic	2022	
	Selway River	---	½ mile below		2022	
	Selway River	---	Running	Opportunistic		
	Selway River	---	½ mi. blw wt cap	Opportunistic	2022	
	Selway River	---	Abv goat cr	Opportunistic	2022	
	Selway River	---	Archer	Opportunistic	2022	
	Selway River	---	below ham rapid	Opportunistic	2022	
	Selway River	---	Blw pebbibone cr	Opportunistic	2022	
	Selway River	---	cougar bluff	Opportunistic	2022	



Appendix A2. Continued

<b>Steelhead major and independent population</b>	<b>Stream name</b>	<b>Stratum</b>	<b>Transect name</b>	<b>Survey frequency</b>	<b>Last surveyed</b>	<b>Next scheduled survey</b>
	Selway River	---	DIVIDE	Opportunistic	2022	
	Selway River	---	dry bar	Opportunistic	2022	
	Selway River	---	rattlesnake	Opportunistic	2022	
	Selway River	---	BadLuck CR	Annual	2022	2024
	Selway River	---	@ Lower Tango	Annual	2022	2024
	Selway River	---	Big bend	Annual	2022	2024
	Selway River	---	Osprey Is	Opportunistic	2022	
Independent Population Total:			28			
MPG Total:			73			
<b>Salmon River</b>						
Little Salmon River (SRLSR-s)	Hazard Creek	---	HAZ2	Opportunistic	2023	2024
	Rapid River	ABV W FK	4	Annual	2023	2024
	Rapid River	ABV W FK	CASTLE CR	Annual	2023	2024
	Rapid River	ABV W FK	COPPER CR	Annual	2023	2024
	Rapid River	ABV W FK	CORA CLIFF	Annual	2023	2024
	Rapid River	ABV W FK	PARADISE	Annual	2023	2024
	Rapid River	BLW W FK	CLIFF HANG	Annual	2023	2024
Independent Population Total:			7			
	South Fork Salmon River	---	BLW HAMILTON	Opportunistic	2023	2024
Independent Population Total:			1			
Secesh River (SFSEC-s)	Lick Creek	---	L1	Opportunistic	2023	2024
Independent Population Total:			1			
Lower Middle Fork Salmon River (Loon Creek and below; MFBIG-s)	Camas Creek	---	Upper	Annual	2021	2024
	Middle Fork Salmon River	Lower	HANPOL	Annual	2023	2024
	Middle Fork Salmon River	Middle	AIRSTP	Biennial	2023	2024
Independent Population Total:			4			
Upper Middle Fork Salmon River (above Loon Creek; MFUMA-s)	Indian Creek	---	Lower	Annual	2023	2024
	Indian Creek	---	Upper	Annual	2023	2024
	Middle Fork Salmon River	Upper	Mahoney Camp	Annual	2023	2024
	Middle Fork Salmon River	Middle	WCPB	Annual	2023	2024
	Middle Fork Salmon River	Upper	LICRGS	Annual	2023	2024
Independent Population Total:			5			
Panther Creek (SRPAN-s)	Panther Creek	DS Clear	PC-1	Opportunistic	2022	

Appendix A2. Continued.

<b>Steelhead major and independent population</b>	<b>Stream name</b>	<b>Stratum</b>	<b>Transect name</b>	<b>Survey frequency</b>	<b>Last surveyed</b>	<b>Next scheduled survey</b>
Independent Population Total:	Panther Creek	Above	US Cabin Cr	Opportunistic	2021	
Lemhi River (SRLEM-s)	Big Springs Creek	---	BSC BRIDGE	Annual	2023	2024
Independent Population Total:	Lemhi River	LEM2	B	Biennial	2021	2024
			2			
Pahsimeroi River (SRPAH-s)	Pahsimeroi River	1	Ponds	Annual	2023	2024
Independent Population Total	Pahsimeroi River	Weir	Weir	Annual	2022	2024
			2			
Upper Salmon River (SRUMA-s)	Hannah Slough	---	UPS Garden Cr	Annual	2023	2024
Independent Population Total:	Thompson Creek	Below	1	Opportunistic	2023	
			2			
MPG Total:			27			
Snake River DPS Total			104			

Appendix A3. IDFG resident fish trend snorkel survey transects n = 26 by Snake River Steelhead major and independent population. Middle Fork Salmon River and its tributaries are surveyed by regional management crews funded by the Dingell-Johnson Act and License funds.

<b>Steelhead major and independent population</b>	<b>Stream name</b>	<b>Stratum</b>	<b>Transect name</b>	<b>Survey frequency</b>	<b>Last surveyed</b>	<b>Next scheduled survey</b>
<b>Clearwater River</b>						
South Fork Clearwater River (CRSFC-s)	Crooked River	1	SILL-LOG-A	Triennial	2023	2026
	Moores Creek	---	2	Triennial	2023	2026
Independent Population Total:			2			
Lochsa River (CRLOC-s)	Squaw Cr (Waw'aalamnime)	---	7	Annual	2023	2024
Independent Population Total:			1			
Selway River (CRSEL-s)	Little Clearwater River	---	1	Annual	2023	2024
	Little Clearwater River	---	2	Annual	2023	2024
	North Fork Moose Creek	---	4	Annual	2021	2024
	Selway River	---	BEAVERPT	Annual	2023	2024
Independent Population Total:			4			
MPG Total:			7			
<b>Salmon River</b>						
South Fork Salmon River (SFMAI-s)	East Fork South Fork Salmon	ABV JHNSN	SUGAR CR	Biennial	2023	2025
	East Fork South Fork Salmon	BLW JHNSN	MP 35.8	Biennial	2023	2025
Independent Population Total:			2			
Secesh River (SFSEC-s)	Secesh River	---	U-SCSH-MDW	Annual	2023	2024
Independent Population Total:			1			
Lower Middle Fork Salmon River (Loon Creek and below; MFBIG-s)	Big Creek	UPPER	NEAR FORD	Biennial	2023	2025
	Camas Creek	---	1	Triennial	2021	2024
	Camas Creek	---	L1-MOUTH	Annual	2021	2024
	Loon Creek	---	L1-BRIDGE	Annual	2021	2024
	Loon Creek	---	L2-RUN	Annual	2021	2024
Independent Population Total:			5			
Upper Middle Fork Salmon River (above Loon Creek; MFUMA-s)	Bear Valley Creek	1	A	Triennial	2021	2024
	Bear Valley Creek	2	B	Triennial	2021	2024
	Bear Valley Creek	3	A	Triennial	2021	2024
	Bear Valley Creek	9	B	Triennial	2021	2024
	Marble Creek	Lower	L1	Annual	2023	2024
	Pistol Creek	---	L1/Lower	Annual	2023	2024
	Pistol Creek	---	L2/Upper	Annual	2023	2024
Independent Population Total:			7			
Panther Creek (SRPAN-s)	Panther Creek	Above	PC10	Annual	2023	2024

Appendix A3. Continued

<b>Steelhead major and independent population</b>	<b>Stream name</b>	<b>Stratum</b>	<b>Transect name</b>	<b>Survey frequency</b>	<b>Last surveyed</b>	<b>Next scheduled survey</b>
Independent Population Total:			1			
Lemhi River (SRLEM-s)	Bear Valley Creek	HC1	B-LOWER	Triennial	2023	2026
	Bear Valley Creek	HC1	CAMP	Triennial	2023	2026
Independent Population Total:			2			
Upper Salmon River (SRUMA-s)	Thompson Creek	ABOVE	TWO-POLE	Biennial	2023	2025
Independent Population Total:			1			
MPG Total:			19			
Snake River DPS Total:			26			

APPENDIX B: SALMONID DENSITIES OBSERVED BY SNORKELING IN IDFG CORE  
TRANSECTS, 2023

Appendix B1. Densities (fish/100 m<sup>2</sup>) of salmonids observed in 2023 at 49 core trend transects snorkeled throughout the Clearwater River basin, Idaho. Trout fry = all trout <50 mm that could not be distinguished between steelhead and Westslope Cutthroat Trout. Dashes represent transects in which no fish of a given type were observed. Transect names separated by a slash indicated stratum and transect names. Transects with no slash indicate systems in which only one strata is present.

Stream	Transect	Density (Fish/100m <sup>2</sup> )								Visibility (m)	Temp (C)
		Trout fry	Steelhead	Chinook Salmon	WS Cutthroat Trout	Bull Trout	Brook Trout	Whitefish	Coho		
American River	2/1	-	-	44.16	0.54	-	2.17	1.08	-	2.1	12.0
American River	3/2	-	0.09	28.77	0.09	-	0.18	0.35	-	1.8	13.0
Colt Creek	99/BRIDGE	-	-	-	3.18	-	-	-	-	2.4	11.0
Colt Killed Creek	99/LWRMONITOR	-	0.48	-	0.42	-	-	0.06	-	4.8	19.0
Crooked Fork	1/2A	-	-	-	3.76	0.31	-	-	-	2.6	10.0
Crooked Fork	2/3A	-	0.29	-	1.18	-	-	-	-	4.3	10.0
Crooked Fork	2/4A	-	0.19	-	2.41	-	-	-	-	3.5	11.0
Crooked Fork	3/1	-	2.80	-	0.60	-	-	0.07	-	3.9	15.0
Crooked Fork	3/2	-	1.45	0.60	0.26	-	-	0.26	-	4.2	13.0
Crooked Fork	3/2B	-	4.34	2.17	1.18	0.50	-	0.77	-	3.2	18.0
Crooked Fork	4/1B	-	1.24	0.06	0.43	0.12	-	0.19	-	2.5	12.0
Crooked River	1/BOULDER-A	-	10.49	39.30	0.62	-	-	-	-	0.8	11.0
Crooked River	1/BOULDER-B	-	-	18.32	0.50	-	-	-	-	1.0	10.0
Crooked River	1/SILL LOG-A	-	-	61.38	2.06	-	-	0.21	0.41	9.0	14.0
Crooked River	1/SILL LOG-B	-	-	64.27	0.63	-	-	-	-	1.0	9.0
Crooked River	2/TREAT2	-	0.30	38.55	0.44	-	-	-	-	0.6	12.0
Crooked River	3/NATURAL1	-	0.65	34.48	-	-	-	-	0.09	0.8	15.0
Crooked River	C/CAN3	-	0.14	30.66	-	-	-	-	-	0.8	14.0
Deep Creek	99/CACTUS	-	6.34	13.17	9.51	-	-	1.46	-	3.3	16.0
Deep Creek	99/SCIMITAR	-	15.76	3.01	6.26	-	-	-	-	3.0	16.0
East Fork Potlatch	128	1.02	-	-	-	-	1.36	-	-	2.1	13.0
East Fork Potlatch	PFI 9	0.77	0.19	-	-	-	0.38	-	-	1.4	13.8
Fish Creek	99/1	-	5.86	0.06	2.38	-	-	-	-	4.5	17.0
Fish Creek	99/2	-	3.62	-	2.07	0.05	-	0.05	-	4.4	18.0
Johns Creek	2/3	-	2.37	-	0.52	-	-	-	-	4.5	12.0
Lochsa River	99/L1	-	0.04	0.02	0.04	-	-	0.02	-	3.8	19.0
Lochsa River	99/L2	-	-	0.02	0.28	-	-	0.41	-	5.4	20.0
Lochsa River	99/L3	-	0.21	0.02	0.27	-	-	0.52	-	NA	17.0
Lochsa River	99/L4	-	0.12	0.57	0.28	0.02	-	0.07	-	5.2	17.0
Meadow Creek	99/1	-	1.07	11.19	0.77	-	-	0.20	-	2.3	16.0
Moores Creek	99/2	-	0.46	-	5.75	-	-	-	-	3.0	11.0
Old Man Creek	99/1	-	6.74	0.16	2.57	-	-	1.60	-	5.0	18.0
Red River	1/CNTL 1	-	-	11.12	-	-	11.42	0.30	-	1.9	11.0

## Appendix B1. Continued

Stream	Transect	WS								Visibility (m)	Temp (C)
		Trout fry	Steelhead	Chinook Salmon	Cutthroat Trout	Bull Trout	Brook Trout	Whitefish	Coho		
Red River	1/CNTL 2	-	-	0.17	-	-	0.86	-	-	2.0	13.0
Red River	2/CNTL 2	-	-	1.36	-	-	-	-	-	1.4	11.0
Red River	2/TREAT 2	-	-	0.37	0.37	-	-	-	-	1.3	10.0
Red River	4/CNTL 2	-	0.24	35.61	0.12	-	0.12	0.12	-	1.8	14.0
Red River	4/TREAT 2	-	0.23	27.71	0.23	-	0.56	0.11	-	1.7	14.0
Red River	5/CNTL 2	-	-	10.82	-	-	0.14	0.88	0.27	1.4	12.0
Red River	5/TREAT 2	-	0.11	16.67	0.11	-	0.11	0.11	-	1.4	12.0
Relief Creek	1/1B	-	-	2.11	6.33	-	-	-	-	0.9	10.0
Selway River	99/HELLSHALF	-	2.84	1.22	0.89	0.16	-	0.89	-	2.9	12.0
Selway River	99/LITTLE-CW	-	1.04	2.08	1.43	-	-	0.78	-	2.9	15.0
Selway River	99/MAG-XING	-	1.01	1.26	0.40	0.04	-	0.22	-	2.5	15.0
Warm Springs Creek	99/1	-	0.39	-	0.24	-	-	-	-	4.3	16.0
Waw'aalamnime Creek	99/7	-	11.77	1.86	2.79	0.31	-	-	-	2.5	14.0
White Cap Creek	3/1	-	1.04	-	1.20	-	-	-	-	3.2	22.0
White Cap Creek	3/2	-	0.06	-	0.36	-	-	-	-	4.1	19.0
White Cap Creek	3/3	-	1.19	-	0.14	-	-	-	-	3.8	17.0
	<b>Mean</b>	<b>0.04</b>	<b>1.74</b>	<b>10.27</b>	<b>1.30</b>	<b>0.03</b>	<b>0.35</b>	<b>0.22</b>	<b>0.02</b>	<b>2.86</b>	<b>14.08</b>
	<b>Standard Deviation</b>	<b>0.18</b>	<b>3.33</b>	<b>17.01</b>	<b>1.99</b>	<b>0.10</b>	<b>1.66</b>	<b>0.39</b>	<b>0.07</b>	<b>1.62</b>	<b>3.13</b>
	<b>Proportion Occupied</b>	<b>0.04</b>	<b>0.71</b>	<b>0.69</b>	<b>0.84</b>	<b>0.16</b>	<b>0.20</b>	<b>0.49</b>	<b>0.06</b>		

Appendix B2. Densities (fish/100 m<sup>2</sup>) of salmonids observed in 2023 at 109 core trend transects snorkeled throughout the Salmon River basin, Idaho. Trout fry = all trout <50 mm that could not be distinguished between steelhead and Westslope Cutthroat Trout. Dashes represent transects in which no fish of a given type were observed. Transect names separated by a slash indicated stratum and transect names. Transects with no slash indicate systems in which only one strata is present.

Fish (Density/100m <sup>2</sup> )											
Stream	Transect	Trout fry	Steelhead	Chinook Salmon	WS Cutthroat Trout	Bull Trout	Brook Trout	Whitefish	Visibility (m)	Temp (C)	
Alturas Lake Creek	2B	2.92	-	0.78	-	-	1.43	2.47	1.7	20.0	
Beaver Creek	A	0.39	1.57	12.54	0.65	-	0.20	0.39	2.8	15.0	
Beaver Creek	B	-	0.59	11.42	-	-	0.70	0.16	4.4	16.9	
Big Creek	LOGAN CREEK	-	0.65	11.76	0.33	0.11	-	0.87	5.9	13.9	
Big Springs Creek	A	-	0.49	0.69	-	-	0.88	-	0.8	11.6	
Boulder Creek	ABOVE/1	0.75	1.50	-	-	0.38	0.13	-	3.8	9.8	
Boulder Creek	ABOVE/2	-	2.64	-	-	-	-	-	2.3	10.5	
Boulder Creek	BELOW/3	1.78	4.89	2.44	2.67	-	0.22	-	2.9	13.0	
Boulder Creek	BELOW/5	0.14	3.42	1.64	1.50	-	-	-	1.6	12.5	
Camas Creek	2	0.14	-	0.07	0.35	0.07	-	0.42	2.9	17.7	
Camas Creek	CAM1	-	2.82	6.35	1.65	0.12	-	0.12	1.4	16.6	
Cape Horn Creek	A	0.46	-	1.22	-	-	0.15	0.15	3.4	7.4	
Cape Horn Creek	B	24.59	-	23.01	-	-	0.20	0.40	5.7	9.0	
Chamberlain Creek	CHA1	1.67	0.44	38.60	1.82	0.29	-	0.80	2.0	13.4	
East Fork Salmon River	2	-	0.05	-	-	-	-	0.05	3.2	11.6	
East Fork Salmon River	3	-	-	0.05	0.10	0.05	-	-	3.9	9.4	
East Fork South Fork Salmon River	ABV JHNSN>3	0.46	0.92	2.54	3.46	0.46	-	-	2.0	11.3	
East Fork South Fork Salmon River	BLW JHNSN>6	0.20	0.49	18.44	0.90	0.03	-	1.72	2.9	14.5	
East Fork South Fork Salmon River	BLW JHNSN>7	-	1.16	5.95	4.44	0.14	-	1.78	3.3	15.6	
Elk Creek	1A	1.07	-	17.77	-	-	0.89	14.02	3.9	17.6	
Elk Creek	1B	0.19	-	8.65	-	-	0.52	15.55	4.2	17.9	
Elk Creek	2A	0.06	-	16.50	0.37	-	3.24	2.81	3.1	11.5	
Elk Creek	2B	1.35	-	19.78	-	-	-	7.42	2.7	18.0	
Hayden Creek	B	-	1.26	-	0.13	0.51	0.13	0.13	2.3	10.0	
Hayden Creek	B	-	0.74	-	-	0.19	-	0.19	2.9	9.7	
Hazard Creek	HAZ1	3.17	9.63	-	1.09	0.11	-	-	2.9	16.7	
Johnson Creek	M1	-	-	-	-	-	10.42	-	3.2	13.4	
Johnson Creek	M2	-	-	-	-	-	4.19	-	3.2	14.1	
Johnson Creek	M3	-	-	-	-	-	2.7	-	2.1	17.5	



## Appendix B2. Continued

Stream	Transect	WS							Visibility (m)	Temp (C)
		Trout fry	Steelhead	Chinook Salmon	Cutthroat Trout	Bull Trout	Brook Trout	Whitefish		
Knapp Creek	A	0.37	1.31	24.31	0.56	-	7.48	-	4.2	20.0
Knapp Creek	B	0.15	-	-	-	-	1.02	-	2.6	11.4
Knapp Creek	LCKD FENCE	0.49	1.62	5.34	-	-	5.18	-	2.9	20.4
Lake Creek	BURGDORF	-	-	1.64	-	-	4.45	-	3.5	9.6
Lake Creek	WILLOW CR	2.66	-	0.82	-	0.82	2.05	-	2.4	11.1
Lick Creek	L3	3.73	6.53	-	4.20	-	-	1.09	3.6	13.9
Little Salmon River	1	1.66	3.04	0.37	0.18	-	0.37	-	1.9	16.9
Little Salmon River	2	1.18	2.98	0.28	0.55	0.07	-	0.49	2.1	17.8
Marble Creek	MAR1	-	-	-	-	-	-	-	2.9	8.8
Marble Creek	MAR1B	0.01	-	-	0.02	-	-	-	2.7	9.5
Marble Creek	MAR2	-	-	-	-	0.22	-	-	1.8	8.6
Marsh Creek	A	0.04	0.24	16.94	0.12	-	-	1.45	2.8	12.5
Marsh Creek	B	-	1.00	0.68	-	-	-	1.62	2.0	9.1
Marsh Creek	A	-	0.64	30.09	0.11	-	6.14	0.21	2.4	14.7
Marsh Creek	B	-	-	26.00	-	-	1.65	2.96	2.4	11.5
Marsh Creek	A	0.09	-	29.23	-	-	0.79	0.87	2.1	9.3
Middle Fork Salmon River	ELKHORN	-	0.31	-	0.92	-	-	-	2.4	12.5
Middle Fork Salmon River	GRDLHOLE	-	0.12	-	0.58	-	-	1.28	1.7	16.0
Middle Fork Salmon River	GREYHOUND	-	0.32	2.00	0.32	-	-	0.21	2.4	15.0
Middle Fork Salmon River	RAPID-R	-	1.13	-	1.69	-	-	1.83	2.4	15.0
Middle Fork Salmon River	SHEEPEATER	-	0.12	1.72	-	-	-	0.37	2.0	14.0
Middle Fork Salmon River	VELVET	-	7.24	-	3.86	-	-	0.97	1.4	NA
Middle Fork Salmon River	COUGAR	-	-	-	1.25	-	-	0.31	1.6	15.0
Middle Fork Salmon River	HOSPPL	-	-	-	2.01	-	-	0.22	1.4	18.0
Middle Fork Salmon River	HOSPRUN	-	-	-	0.76	-	-	-	1.5	18.0
Middle Fork Salmon River	LJACKASS	-	0.38	0.38	2.25	-	-	-	1.2	NA
Middle Fork Salmon River	MARBLPL	-	0.28	1.58	0.83	-	-	-	1.9	16.0
Middle Fork Salmon River	PUNGO	-	1.86	6.96	1.16	-	-	-	1.4	13.0
Middle Fork Salmon River	ROCK IS	-	0.14	-	0.27	-	-	0.27	1.5	16.0
Middle Fork Salmon River	TAPPANPOOL	-	-	-	0.91	-	-	-	1.6	17.0
Middle Fork Salmon River	WHITEYCX	-	-	-	1.81	-	-	-	1.9	16.0
Middle Fork Salmon River	AIRSTRIP	-	-	0.15	0.61	-	-	0.30	1.5	NA

## Appendix B2. Continued

Stream	Transect	WS							Visibility (m)	Temp (C)
		Trout fry	Steelhead	Chinook Salmon	Cutthroat Trout	Bull Trout	Brook Trout	Whitefish		
Middle Fork Salmon River	FLYING-B	-	-	-	-	-	-	-	1.9	18.0
Middle Fork Salmon River	SURVEY	-	-	-	0.39	0.20	-	0.59	1.7	NA
Middle Fork Salmon River	BIG-CR-BR	-	-	-	0.11	-	-	0.11	1.5	18.5
Middle Fork Salmon River	GOATPOOL	-	-	0.13	0.27	-	-	0.40	1.4	18.5
Middle Fork Salmon River	GOATRUN	-	0.16	-	0.16	-	-	0.47	1.3	18.5
Middle Fork Salmon River	LITOUZEL	-	-	-	-	-	-	-	1.7	18.0
Middle Fork Salmon River	LOVEBAR	-	-	0.40	0.20	-	-	0.20	1.4	17.5
Middle Fork Salmon River	OTTERBAR	-	-	-	0.94	-	-	-	1.3	17.5
Middle Fork Salmon River	SHIPISLAND	-	-	-	0.23	-	-	0.35	1.7	17.5
Monumental Creek	MON1	-	0.10	-	0.50	-	-	-	3.0	8.3
Monumental Creek	MON2	0.10	1.00	1.10	1.00	-	-	0.10	2.4	12.9
Monumental Creek	MON3	-	-	9.04	4.38	-	-	-	3.0	15.0
Monumental Creek	MON5	-	0.22	9.82	0.11	-	-	1.85	2.5	12.4
Pahsimeroi River	DWTNLANE	0.57	5.34	17.64	2.43	-	1.30	7.04	2.0	16.1
Panther Creek	PC9	-	1.12	-	-	-	-	-	0.6	17.1
Panther Creek	PC4	2.64	0.49	2.89	0.37	-	-	0.68	1.3	16.0
Panther Creek	PC6	2.29	1.64	6.55	0.33	-	-	1.47	1.4	17.9
Panther Creek	PC1	0.64	0.77	-	0.13	-	-	1.15	1.3	16.0
Pine Creek	BRIDGE	-	6.67	-	1.67	-	-	-	1.0	15.3
Rapid River	BLW W FK/RAP2	1.95	8.79	-	-	0.16	-	-	3.6	12.9
Redfish Lake Creek	LOWER	0.10	1.10	0.10	0.10	-	-	0.30	2.3	18.5
Redfish Lake Creek	WEIR DS	-	0.10	-	-	-	-	0.10	3.0	21.0
Salmon River	2B	0.20	0.50	2.00	0.10	-	-	1.40	1.8	19.0
Salmon River	3B	0.0	0.0	0.7	-	-	-	-	1.8	11.0
Salmon River	3BRA	1.63	1.23	8.88	0.18	0.03	-	1.33	1.9	18.0
Salmon River	4B	-	0.10	1.17	0.10	-	-	1.31	2.1	13.0
Salmon River	7A	1.65	-	2.55	-	-	0.68	0.40	2.1	14.0
Secesh River	GROUSE	0.24	0.16	0.24	-	0.08	0.08	0.24	4.0	10.5
Secesh River	LONG-GULCH	0.06	0.29	14.36	-	0.23	0.12	0.06	3.1	16.8
SF Salmon River	5	-	-	10.45	-	-	-	1.98	2.7	17.7
SF Salmon River	7	0.31	-	5.89	-	-	-	4.08	2.4	14.7
SF Salmon River	11	0.85	1.20	11.16	0.38	-	-	2.37	2.9	19.3
SF Salmon River	14	1.02	-	8.86	-	-	-	1.89	3.1	21.2
SF Salmon River	16	0.08	0.46	5.56	0.10	-	-	0.94	3.2	18.5
SF Salmon River	POVERTY	6.45	-	8.76	-	-	-	0.34	3.0	18.9

## Appendix B2. Continued

Stream	Transect	WS							Visibility (m)	Temp (C)
		Trout fry	Steelhead	Chinook Salmon	Cutthroat Trout	Bull Trout	Brook Trout	Whitefish		
SF Salmon River	STOLLE1	-	-	0.11	-	-	-	0.69	3.5	11.3
SF Salmon River	STOLLE2	0.20	-	9.97	-	-	-	4.54	2.2	13.8
Slate Creek	99/1	-	2.37	0.32	-	0.08	-	-	1.4	17.0
Slate Creek	99/2	-	10.47	1.26	-	-	-	-	1.4	17.0
Slate Creek	99/3	-	15.60	1.95	-	-	-	-	2.8	16.0
Slate Creek	99/4	-	8.43	0.87	-	0.15	-	-	2.7	14.0
Slate Creek	99/6	-	4.25	1.63	-	0.28	-	-	3.8	12.0
Valley Creek	B	0.30	1.82	41.67	-	-	1.29	6.16	2.7	18.2
Valley Creek	B	0.15	0.29	4.56	-	-	2.79	1.76	1.7	10.8
Valley Creek	A	-	-	9.87	-	0.08	0.88	3.34	1.9	12.3
Valley Creek	B	0.45	0.15	5.65	0.30	-	1.19	0.45	2.6	10.3
West Fork Monumental Creek	MON4	-	0.73	40.15	0.73	-	-	-	2.5	15.7
West Fork Rapid River	BLW FALLS/RAP 1	3.27	7.22	-	0.14	0.27	-	-	2.7	11.0
	<b>Mean</b>	<b>0.69</b>	<b>1.33</b>	<b>5.46</b>	<b>0.55</b>	<b>0.05</b>	<b>0.58</b>	<b>1.03</b>	<b>2.4</b>	<b>14.7</b>
	<b>Standard Deviation</b>	<b>2.52</b>	<b>2.63</b>	<b>9.12</b>	<b>0.98</b>	<b>0.12</b>	<b>1.59</b>	<b>2.34</b>	<b>0.9</b>	<b>3.4</b>
	<b>Proportion Occupied</b>	<b>0.45</b>	<b>0.61</b>	<b>0.65</b>	<b>0.57</b>	<b>0.24</b>	<b>0.29</b>	<b>0.61</b>		

Appendix B3. Densities (fish/100 m<sup>2</sup>) of salmonids observed in 2023 at three core trend transects snorkeled throughout the Hells Canyon portion of the Snake River basin, Idaho. Trout fry = all trout <50 mm that could not be distinguished between steelhead and Westslope Cutthroat Trout. Dashes represent transects in which no fish of a given type were observed. Transect names separated by a slash indicated stratum and transect names. Transects with no slash indicate systems in which only one strata is present.

		Density (fish/100m <sup>2</sup> )							Visibility	Temp
Stream	Transect	Trout fry	Steelhead	Chinook Salmon	WS Cutthroat Trout	Bull Trout	Brook Trout	Whitefish	(m)	(C)
Granite Creek	99/1	-	2.86	0.36	-	-	-	-	4.0	12.0
Sheep Creek	1	-	13.97	-	-	-	-	-	4.0	12.0
Sheep Creek	2	-	18.98	1.52	-	-	-	-	6.0	14.0
	<b>Mean</b>	-	<b>11.94</b>	<b>0.63</b>	-	-	-	-	<b>4.7</b>	<b>12.7</b>
	<b>Standard Deviation</b>	-	<b>8.25</b>	<b>0.79</b>	-	-	-	-	<b>1.2</b>	<b>1.2</b>
	<b>Proportion Occupied</b>	-	<b>1.00</b>	<b>0.67</b>	-	-	-	-		

APPENDIX C: SALMONID DENSITIES OBSERVED BY SNORKELING IN IDFG NON-CORE  
TRANSECTS, 2023

Appendix C1. Densities (fish/100 m<sup>2</sup>) of salmonids observed in 2023 at nine non-core transects snorkeled throughout the Clearwater River basin, Idaho. Trout fry = all trout <50 mm that could not be distinguished between steelhead and Westslope Cutthroat Trout. Dashes represent transects in which no fish of a given type were observed. Transect names separated by a slash indicated stratum and transect names. Transects with no slash indicate systems in which only one strata is present. \*Unknown density due to missing transect length.

		Density (fish/100m <sup>2</sup> )									
		WS								Visibility	Temp
Stream	Transect	Trout fry	Steelhead	Chinook Salmon	Cutthroat Trout	Bull Trout	Brook Trout	Coho	Whitefish	(m)	(C)
EF Potlatch River	1	1.02	-	-	-	-	1.36	-	-	2.1	13.0
EF Potlatch River	2	-	-	-	-	-	-	-	-	1.4	15.0
EF Potlatch River	3	-	1.53	-	-	-	-	-	-	1.2	12.0
EF Potlatch River	PFI 4	-	0.73	-	-	-	-	-	-	0.8	12.0
EF Potlatch River	PFI 5	2.81	0.94	-	-	-	1.88	-	-	1.7	17.0
EF Potlatch River	PFI 6	0.46	1.15	-	-	-	0.41	-	-	1.5	13.0
EF Potlatch River	PFI 7	1.01	0.50	-	-	-	-	-	-	1.8	13.0
EF Potlatch River	PFI 8	-	2.60	-	-	-	0.43	-	-	1.3	15.0
EF Potlatch River	PFI 9	0.77	0.19	-	-	-	0.38	-	-	1.4	13.8
	<b>Mean</b>	<b>0.67</b>	<b>0.85</b>	<b>0.24</b>	-	-	<b>0.51</b>	-	-	<b>1.5</b>	<b>13.8</b>
	<b>Standard Deviation</b>	<b>0.91</b>	0.84	<b>0.45</b>	-	-	<b>0.67</b>	-	-	<b>0.4</b>	<b>1.6</b>
	<b>Proportion Occupied</b>	<b>0.56</b>	<b>0.78</b>	<b>0.33</b>	-	-	<b>0.60</b>	-	-		

Appendix C2. Densities (fish/100 m<sup>2</sup>) of salmonids observed in 2023 at 28 non-core transects snorkeled throughout the Salmon River basin, Idaho. Trout fry = all trout <50 mm that could not be distinguished between steelhead and Westslope Cutthroat Trout. Dashes represent transects in which no fish of a given type were observed. Transect names separated by a slash indicated stratum and transect names. Transects with no slash indicate systems in which only one strata is present.

		Density (Fish/100m <sup>2</sup> )							Visibility (m)	Temp (C)
Stream	Transect	Trout fry	Steelhead	Chinook Salmon	WS Cutthroat Trout	Bull Trout	Brook Trout	Whitefish		
Allison Creek	AC01	-	3.39	-	0.31	-	-	-	1.9	18.0
Allison Creek	AC02	-	3.41	-	-	-	-	-	1.1	17.0
Big Springs Creek	BSC BRIDGE	-	2.37	-	-	-	-	0.16	1.3	17.5
French Creek	FC01	-	1.87	0.68	0.17	-	0.17	-	2.7	16.0
French Creek	FC02	-	6.89	-	-	0.16	-	-	3.4	15.0
Halls Gulch	.2KABV1CR	-	45.77	-	-	-	-	-	0.3	18.0
Hannah Slough	UPS GARDEN CREEK	0.46	4.50	17.52	-	-	-	1.47	3.3	13.3
Hazard Creek	HAZ2	1.63	10.37	-	-	-	-	-	2.5	15.7
Indian Creek	LOWER	-	2.03	0.63	0.25	-	-	0.13	2.8	12.0
Indian Creek	UPPER	-	1.42	0.16	-	-	-	-	2.8	14.0
Lick Creek	L1	1.09	0.72	6.23	4.93	-	0.07	0.58	2.3	17.3
Middle Fork Salmon River	HANPOL	-	0.28	-	0.28	-	-	0.65	1.5	18.0
Middle Fork Salmon River	AIRSTP	-	-	-	0.63	-	-	0.16	1.6	19.0
Middle Fork Salmon River	MAHONEY CAMP	-	-	-	4.67	-	-	0.33	1.5	15.5
Middle Fork Salmon River	WCPB	-	-	-	0.40	-	-	-	2.1	17.0
Middle Fork Salmon River	LICRGS	-	0.33	-	1.47	-	-	0.65	1.8	18.0
Pahsimeroi River	PONDS	-	2.38	8.74	-	-	0.95	5.09	2.5	14.2
Rapid River	ABV W FK/4	0.08	5.20	-	-	0.08	-	-	3.6	10.0
Rapid River	ABV W FK/CASTLE CREEK	0.10	6.75	-	4.27	0.20	-	-	2.7	12.1
Rapid River	ABV W FK/COPPER CR	0.34	5.02	-	1.29	0.12	-	-	2.4	10.0
Rapid River	ABV W FK/CORA CLIFF	0.90	4.29	-	0.11	0.11	-	-	2.8	9.5
Rapid River	ABV W FK/PARADISE	-	3.73	-	0.97	0.97	-	-	2.4	8.5
Rapid River	BLW W FK/CLIFF HANG	1.49	6.39	-	0.83	0.50	-	-	2.5	13.4
South Fork Salmon River	BLW HAMILTON	0.03	0.10	2.81	0.26	-	-	2.76	3.9	15.1
Thompson Creek	BELOW	0.99	8.33	1.39	-	-	-	-	1.4	12.2
Wind River	BELFA113PL	-	16.33	-	0.56	-	-	-	3.8	17.0
Wind River	PLABVFALLS	-	11.64	-	0.83	-	-	-	4.1	16.0
Wind River	1st Bridge	-	13.01	-	0.11	-	-	-	4.3	15.0
	<b>Mean</b>	<b>0.25</b>	<b>5.95</b>	<b>1.36</b>	<b>0.80</b>	<b>0.08</b>	<b>0.04</b>	<b>0.43</b>	<b>2.5</b>	<b>14.8</b>
	<b>Standard Deviation</b>	<b>0.49</b>	<b>8.89</b>	<b>3.76</b>	<b>1.41</b>	<b>0.20</b>	<b>0.18</b>	<b>1.09</b>	<b>1.0</b>	<b>2.9</b>
	<b>Proportion Occupied</b>	<b>0.36</b>	<b>0.89</b>	<b>0.29</b>	<b>0.64</b>	<b>0.25</b>	<b>0.11</b>	<b>0.36</b>		



Appendix C3. Densities (fish/100 m<sup>2</sup>) of salmonids observed in 2023 at four resident trend transects snorkeled throughout the Clearwater River basin, Idaho. Trout fry = all trout <50 mm that could not be distinguished between steelhead and Westslope Cutthroat Trout. Dashes represent transects in which no fish of a given type were observed.

Stream	Transect	Density (fish/100m <sup>2</sup> )								Visibility (m)	Temp (C)
		Trout fry	Steelhead	Chinook Salmon	WS Cutthroat Trout	Bull Trout	Brook Trout	Coho	Whitefish		
Little Clearwater	1	-	1.96	0.48	0.73	-	-	-	0.97	3.1	15.0
Little Clearwater	2	-	1.03	0.17	-	-	-	-	0.17	3.2	15.0
Selway River	BEAVER PT.	-	0.36	0.12	0.30	0.06	-	-	0.30	3.7	17.0
Waw'aalamnime Crk	7	-	2.17	0.62	1.24	0.31	-	-	-	2.5	14.0
	<b>Mean</b>	-	<b>1.37</b>	<b>0.35</b>	<b>0.57</b>	<b>0.09</b>	-	-	<b>0.36</b>	<b>3.2</b>	<b>15.3</b>
	<b>Standard Deviation</b>	-	<b>0.84</b>	<b>0.24</b>	<b>0.54</b>	<b>0.15</b>	-	-	<b>0.42</b>	<b>0.5</b>	<b>1.3</b>
	<b>Proportion Occupied</b>	-	<b>1.00</b>	<b>1.00</b>	<b>0.75</b>	<b>0.50</b>	-	-	<b>0.75</b>		

Appendix C4. Densities (fish/100 m<sup>2</sup>) of salmonids observed in 2023 at 11 resident trend transects snorkeled throughout the Salmon River basin, Idaho. Trout fry = all trout <50 mm that could not be distinguished between steelhead and Westslope Cutthroat Trout. Dashes represent transects in which no fish of a given type were observed. Transect names separated by a / indicated stratum and transect names. Transects with no / indicate systems in which only one strata is present.

		Density (fish/100m <sup>2</sup> )									
Stream	Transect	Trout fry	Steelhead	Chinook Salmon	WS			Whitefish	Visibility (m)	Temp (C)	
					Cutthroat Trout	Bull Trout	Brook Trout				
Bear Valley Creek	B-LOWER	-	0.30	-	1.10	2.70	-	-	4.1	10.5	
Bear Valley Creek	CAMP	-	-	-	-	1.18	-	-	4.2	9.0	
Big Creek	NEAR FORD	2.43	-	9.47	0.17	-	0.25	-	3.0	14.3	
East Fork South Fork Salmon River	MP 35.8	0.16	0.38	10.88	0.63	0.05	-	7.47	2.9	15.2	
East Fork South Fork Salmon River	SUGAR CR	0.19	0.85	4.61	1.98	0.38	-	0.19	2.1	10.2	
Marble Creek	L1	-	0.18	0.36	-	-	-	0.18	1.6	16.0	
Panther Creek	PC10	-	1.12	-	0.56	-	2.51	-	1.3	15.6	
Pistol Creek	L1	-	4.46	4.46	1.62	-	-	0.41	2.1	NA	
Pistol Creek	L2	-	2.56	-	0.28	-	-	0.28	2.1	NA	
Secesh River	U-SCSH-MDW	0.34	0.04	13.48	-	-	0.53	-	2.7	12.7	
Thompson Creek	TWO-POLE	-	2.56	-	0.21	-	-	-	1.5	12.6	
	<b>Mean</b>	<b>0.28</b>	<b>1.13</b>	<b>3.93</b>	<b>0.60</b>	<b>0.39</b>	<b>0.30</b>	<b>0.78</b>	<b>2.5</b>	<b>12.9</b>	
	<b>Standard Deviation</b>	<b>0.72</b>	<b>1.46</b>	<b>5.11</b>	<b>0.69</b>	<b>0.84</b>	<b>0.75</b>	<b>2.23</b>	<b>1.0</b>	<b>2.6</b>	
	<b>Proportion Occupied</b>	<b>0.36</b>	<b>0.82</b>	<b>0.55</b>	<b>0.73</b>	<b>0.36</b>	<b>0.27</b>	<b>0.45</b>			

APPENDIX D: SALMONID DENSITIES OBSERVED BY SNORKELING IN IDFG INTENSIVE  
PANEL TRANSECTS, 2023

Appendix D1. Densities (fish/100 m<sup>2</sup>) of salmonids observed in 2023 at 58 intensive panel transects snorkeled throughout the Potlatch River basin, Idaho. Trout fry = all trout <50 mm that could not be distinguished between steelhead and Westslope Cutthroat Trout. Dashes represent transects in which no fish of a given type were observed.

		Density (Fish/100m <sup>2</sup> )								Visibility	Temp
Stream	Transect	Trout fry	Steelhead	Chinook Salmon	WS Cutthroat Trout	Bull Trout	Brook Trout	Whitefish	Coho	(m)	(C)
Big Bear Creek	30690	-	-	-	-	-	-	-	-	1.0	25.0
Big Bear Creek	91154	-	0.40	-	-	-	-	-	-	1.0	21.0
Big Bear Creek	107538	-	1.69	-	-	-	-	-	-	1.2	19.0
Big Bear Creek	119826	-	0.19	-	-	-	-	-	-	0.7	23.0
Big Bear Creek	169954	-	-	-	-	-	-	-	-	1.4	21.0
Big Meadow Creek	281106	-	1.39	-	-	-	-	-	-	0.4	17.0
Bloom Creek	78705	-	-	-	-	-	6.49	-	-	1.4	10.4
Bobs Creek	37745	-	0.99	-	-	-	9.95	-	-	1.4	16.0
Bobs Creek	54129	-	1.50	-	-	-	17.52	-	-	1.2	10.0
Bobs Creek	86897	-	-	-	-	-	5.23	-	-	0.9	10.0
Bobs Creek	103281	-	0.47	-	-	-	5.20	-	-	0.8	16.0
East Fork Big Bear Creek	36882	-	-	-	-	-	-	-	-	1.0	15.5
East Fork Big Bear Creek	126946	-	0.50	-	-	-	-	-	-	0.8	12.0
East Fork Potlatch River	2929	-	0.77	-	-	-	1.79	-	-	1.3	11.0
East Fork Potlatch River	34786	-	1.45	-	-	-	-	-	-	2.1	18.5
East Fork Potlatch River	95089	-	-	-	-	-	44.20	-	-	1.6	10.0
East Fork Potlatch River	130018	-	0.12	-	-	-	-	-	-	1.4	14.5
East Fork Potlatch River	134001	-	0.99	-	-	-	0.49	-	-	0.9	12.3
East Fork Potlatch River	136049	-	1.96	-	-	-	0.78	-	-	1.0	10.0
East Fork Potlatch River	144241	-	-	-	-	-	0.37	-	-	1.3	10.0
East Fork Potlatch River	182242	-	0.30	-	-	-	-	-	-	1.2	18.0
East Fork Potlatch River	457698	-	0.15	-	-	-	0.15	-	-	1.0	14.5
East Fork Potlatch River	NewEFK2021	-	0.62	-	-	-	-	-	-	2.0	15.0
East Fork Potlatch River	Trout Fry Meadows 4	-	0.39	-	-	-	0.13	-	-	1.1	15.0
Little Bear Creek	13330	-	1.81	-	-	-	1.21	-	-	2.3	16.0
Little Bear Creek	144402	-	1.03	-	-	-	0.17	-	-	1.9	16.5
Little Bear Creek	158226	-	4.35	-	-	-	-	-	-	0.4	21.0
Little Bear Creek	177170	-	2.15	-	-	-	-	-	-	1.6	16.0
Pine Creek	98018	-	-	-	-	-	-	-	-	0.9	14.0
Pine Creek	153570	-	-	-	-	-	-	-	-	1.5	18.5
Pine Creek	181266	0.20	-	-	-	-	-	-	-	0.8	19.5
Pine Creek	229090	-	-	-	-	-	-	-	-	1.2	14.0

## Appendix D1. Continued

Stream	Transect	WS								Visibility (m)	Temp (C)
		Trout fry	Steelhead	Chinook Salmon	Cutthroat Trout	Bull Trout	Brook Trout	Whitefish	Coho		
Pine Creek	364258	0.19	0.19	-	-	-	-	-	-	1.0	18.5
Pine Creek	393698	6.38	-	-	-	-	-	-	-	1.0	19.5
Pine Creek	413410	-	0.34	-	-	-	-	-	-	1.4	19.0
Potlatch River	49170	0.08	-	-	-	-	0.08	-	-	0.7	17.0
Ruby Creek	31714	-	-	-	-	-	2.40	-	-	1.0	13.0
Ruby Creek	67554	-	-	-	-	-	2.18	-	-	1.4	17.8
Ruby Creek	NewRuby2021	-	-	-	-	-	2.80	-	-	1.3	NA
Schwartz Creek	57362	-	1.65	-	-	-	1.32	-	-	1.2	13.0
West Fork Little Bear Creek	60434	-	1.46	-	-	-	-	-	-	0.7	15.0
West Fork Little Bear Creek	136210	-	4.27	-	-	-	-	-	-	2.0	16.0
West Fork Little Bear Creek	150034	-	9.44	-	-	-	-	-	-	0.7	16.0
West Fork Little Bear Creek	224274	-	4.17	-	-	-	-	-	-	NA	NA
West Fork Little Bear Creek	267282	-	4.34	-	-	-	-	-	-	2.0	19.0
West Fork Little Bear Creek	363026	-	0.20	-	-	-	-	-	-	0.4	16.0
West Fork Little Bear Creek	422930	-	8.07	-	-	-	-	-	-	1.1	20.0
West Fork Little Bear Creek	467986	-	10.55	-	-	-	-	-	-	1.1	20.0
West Fork Little Bear Creek	Dutch Flat Dam Restoration	-	4.02	-	-	-	1.34	-	-	NA	16.0
West Fork Potlatch River	16354	-	0.92	-	-	-	-	-	-	2.3	17.7
West Fork Potlatch River	89221	-	1.49	-	-	-	4.46	-	-	1.3	16.0
West Fork Potlatch River	121989	1.02	-	-	-	-	8.19	-	-	1.2	11.3
West Fork Potlatch River	237538	-	2.53	-	-	-	3.16	-	-	1.5	17.7
West Fork Potlatch River	384133	1.50	-	-	-	-	6.50	-	-	1.4	15.1
West Fork Potlatch River	393186	-	-	-	-	-	1.03	-	-	1.8	13.0
West Fork Potlatch River	417762	-	-	-	-	-	0.42	-	-	1.5	17.8
West Fork Potlatch River	458722	-	1.48	-	-	-	6.67	-	-	2.3	16.3
West Fork Potlatch River	499682	-	1.24	-	-	-	0.25	-	-	1.8	19.0
	<b>Mean</b>	<b>0.16</b>	<b>1.37</b>	-	-	-	<b>2.32</b>	-	-	<b>1.3</b>	<b>16.1</b>
	<b>Standard Deviation</b>	<b>0.86</b>	<b>2.26</b>	-	-	-	<b>6.43</b>	-	-	<b>0.5</b>	<b>3.5</b>
	<b>Proportion Occupied</b>	<b>0.10</b>	<b>0.66</b>	-	-	-	<b>0.48</b>	-	-		

Appendix D2. Densities (fish/100 m<sup>2</sup>) of salmonids observed in 2023 at 26 intensive panel transects snorkeled throughout the North Fork Salmon River basin, Idaho. Trout fry = all trout <50 mm that could not be distinguished between steelhead and Westslope Cutthroat Trout. Dashes represent transects in which no fish of a given type were observed.

		Density (Fish/100m <sup>2</sup> )									
Stream	Transect	Trout fry	Steelhead	Chinook Salmon	WS		Bull Trout	Brook Trout	Whitefish	Visibility (m)	Temp (C)
					Cutthroat Trout						
Dahlonaga Creek	3039	-	-	-	-	-	0.34	-	-	0.5	8.6
Dahlonaga Creek	29663	-	0.23	-	-	-	-	-	-	0.9	8.8
Dahlonaga Creek	68575	-	-	-	-	-	-	-	-	1.1	8.0
Hughes Creek	110303	-	5.90	-	-	-	-	-	-	3.3	11.3
Hull Creek	81631	1.64	18.58	-	-	-	-	2.19	-	1.6	11.3
Hull Creek	216895	-	0.60	-	-	-	-	-	-	1.5	11.0
Hull Creek	245471	2.10	4.90	-	-	-	-	-	-	1.7	10.0
Moose Creek	11743	-	1.14	-	-	-	0.76	-	-	2.1	6.3
North Fork Salmon River	20959	-	3.24	3.16	0.83	-	-	-	2.49	2.4	13.5
North Fork Salmon River	21471	8.64	8.36	2.51	2.09	0.14	-	-	0.28	2.3	12.0
North Fork Salmon River	24287	-	2.85	0.38	0.09	-	-	-	0.76	1.4	10.0
North Fork Salmon River	61151	-	3.26	2.75	0.17	-	0.17	-	0.58	1.4	12.5
North Fork Salmon River	93919	0.66	1.77	3.29	0.20	0.20	-	-	0.59	2.1	14.5
North Fork Salmon River	106207	-	8.81	3.89	0.46	0.11	-	-	0.46	1.4	14.3
North Fork Salmon River	118239	-	0.50	-	0.74	-	-	-	-	2.2	5.0
North Fork Sheep Creek	44767	-	-	-	-	-	3.71	-	-	2.6	9.6
Pierce Creek	44511	-	-	-	9.33	-	-	-	-	1.7	9.0
Pierce Creek	110047	-	2.81	-	-	-	-	-	-	1.0	9.6
Pierce Creek	241119	-	4.72	-	0.34	-	-	-	-	1.5	8.4
Sheep Creek	20191	-	0.41	-	0.14	0.41	-	-	-	2.3	8.0
Sheep Creek	77535	-	0.30	-	-	2.26	-	-	-	2.7	8.5
Twin Creek	15839	-	-	-	-	2.91	-	-	-	2.5	7.6
Twin Creek	32223	-	-	-	-	2.50	-	-	-	2.5	7.3
Twin Creek	56799	-	-	-	-	1.48	-	-	-	2.7	8.6
Twin Creek	97759	-	-	-	-	1.36	-	-	-	2.3	6.8
Twin Creek	114143	-	-	-	-	1.43	-	-	-	2.4	7.8
	<b>Mean</b>	<b>0.50</b>	<b>2.63</b>	<b>0.61</b>	<b>0.55</b>	<b>0.68</b>	<b>0.09</b>	<b>0.20</b>		<b>1.9</b>	<b>9.6</b>
	<b>Standard Deviation</b>	<b>1.74</b>	<b>418</b>	<b>1.27</b>	<b>1.84</b>	<b>1.07</b>	<b>0.43</b>	<b>0.52</b>		<b>0.7</b>	<b>2.4</b>
	<b>Proportion Occupied</b>	<b>0.15</b>	<b>0.65</b>	<b>0.23</b>	<b>0.38</b>	<b>0.50</b>	<b>0.08</b>	<b>0.23</b>			

APPENDIX E: SALMONID DENSITIES OBSERVED BY SNORKELING IN IDFG EXTENSIVE PANEL TRANSECTS, 2023



Appendix E1. Densities (fish/100 m<sup>2</sup>) of salmonids observed in 2023 at 36 extensive panel transects snorkeled throughout the Potlatch River basin, Idaho. Trout fry = all trout <50 mm that could not be distinguished between steelhead and Westslope Cutthroat Trout. Dashes represent transects in which no fish of a given type were observed.

Stream	Transect	Density (Fish/100m <sup>2</sup> )							Visibility (m)	Temp (C)	
		Trout fry	Steelhead	Chinook Salmon	WS Cutthroat Trout	Bull Trout	Brook Trout	Whitefish			Coho
Big Bear Creek	447506	-	0.32	-	-	-	-	-	-	0.5	17.0
Big Meadow Creek	166418	-	1.65	-	-	-	-	-	-	1.8	15.0
Big Meadow Creek	176658	-	2.80	-	-	-	-	-	-	1.9	13.0
Cedar Creek	141026	-	-	-	-	-	-	-	-	0.8	16.0
Cedar Creek	497378	-	-	-	-	-	-	-	-	1.0	15.0
Cedar Creek	497378	-	-	-	-	-	-	-	-	1.0	15.0
Corral	48098	-	-	-	-	-	-	-	-	0.9	15.0
Corral	105442	-	-	-	-	-	-	-	-	0.7	18.5
Corral	125922	-	-	-	-	-	-	-	-	1.2	15.0
Corral	355298	-	-	-	-	-	-	-	-	1.1	16.0
Cougar Creek	131042	-	1.49	-	-	-	0.75	-	-	0.6	10.0
Cougar Creek	131090	-	-	-	-	-	10.05	-	-	2.6	9.0
Cougar Creek	262162	-	36.20	-	-	-	1.34	-	-	2.6	9.0
East Fork Corral Creek	449506	-	-	-	-	-	-	-	-	0.7	17.0
Feather Creek	122850	-	-	-	-	-	1.89	-	-	1.5	11.0
Feather Creek	155618	-	2.48	-	-	-	0.83	-	-	1.8	12.0
Fry Creek	392162	7.42	-	-	-	-	-	-	-	1.0	13.0
Middle Fork Big Bear Creek	40978	-	0.56	-	-	-	-	-	-	0.8	17.0
Porcupine Creek	302961	-	-	-	-	-	3.85	-	-	1.2	10.0
Porcupine Creek	1063533	-	-	-	-	-	-	-	-	0.9	14.0
Potlatch River	48866	-	0.25	-	-	-	-	-	-	1.9	20.0
Potlatch River	75746	-	0.24	-	-	-	-	-	-	1.7	16.0
Potlatch River	102114	-	-	-	-	-	-	-	-	1.2	17.0
Potlatch River	111586	2.60	0.11	-	-	-	-	-	-	1.8	17.0
Potlatch River	114402	-	-	-	-	-	-	-	-	2.1	20.0
Potlatch River	127970	-	0.24	-	-	-	-	-	-	1.4	16.5
Potlatch River	144354	-	-	-	-	-	-	-	-	1.8	20.0
Potlatch River	147474	-	-	-	-	-	1.20	-	-	1.1	15.0
Potlatch River	151266	-	-	-	-	-	-	-	-	1.1	19.0
Potlatch River	193506	0.07	0.81	-	-	-	-	-	-	1.8	15.0
Potlatch River	229394	-	6.44	-	-	-	0.92	-	-	1.3	16.0
Potlatch River	347874	-	-	-	-	-	-	-	-	1.5	19.0

Appendix E1. Continued

Stream	Transect	WS								Visibility (m)	Temp (C)
		Trout fry	Steelhead	Chinook Salmon	Cutthroat Trout	Bull Trout	Brook Trout	Whitefish	Coho		
Potlatch River	499569	-	2.71	-	-	-	12.18	-	-	0.4	13.0
Middle Fork Big Bear Creek	204818	-	0.57	-	-	-	-	-	-	NA	16.0
West Fork Corral Creek	285666	-	-	-	-	-	-	-	-	0.8	13.0
West Fork Corral Creek	302050	-	-	-	-	-	-	-	-	1.5	17.0
	<b>Mean</b>	<b>0.28</b>	<b>1.58</b>	-	-	-	<b>0.92</b>	-	-	<b>1.3</b>	<b>15.2</b>
	<b>Standard Deviation</b>	<b>1.30</b>	<b>6.07</b>	-	-	-	<b>2.63</b>	-	-	<b>0.6</b>	3.0
	<b>Proportion Occupied</b>	<b>0.08</b>	<b>0.42</b>	-	-	-	<b>0.25</b>	-	-		

Appendix E2. Densities (fish/100 m<sup>2</sup>) of salmonids observed in 2023 at 23 extensive panel transects snorkeled throughout the Canyon Creek basin, Idaho. Trout fry = all trout <50 mm that could not be distinguished between steelhead and Westslope Cutthroat Trout. Dashes represent transects in which no fish of a given type were observed.

		Density (Fish/100m <sup>2</sup> )											
Stream	Transect	Trout fry	Steelhead	Chinook Salmon	WS Cutthroat Trout	Bull Trout	Brook Trout	Coho	Whitefish	Visibility (m)	Temp (C)		
Canyon Creek	157730	0.28	4.50	-	1.13	-	-	-	-	1.4	11.0		
Canyon Creek	197666	0.19	0.77	-	2.59	-	-	-	-	1.8	12.0		
Canyon Creek	485410	-	3.60	-	-	-	-	-	-	0.9	12.0		
Canyon Creek	526370	1.13	0.42	-	2.69	-	-	-	-	1.9	14.0		
Canyon Creek	92194	-	4.04	1.35	-	-	-	-	-	1.6	13.0		
Canyon Creek	132130	-	-	-	3.00	-	-	-	-	2.2	13.0		
Canyon Creek	192546	-	-	-	2.65	-	-	-	-	2.2	10.5		
Canyon Creek	323618	0.22	0.43	-	1.08	-	-	-	-	3.6	9.0		
Canyon Creek	395298	-	-	-	3.85	-	-	-	-	2.0	11.0		
Canyon Creek	49186	-	-	-	5.05	-	-	-	-	2.0	11.0		
Canyon Creek	94242	1.11	0.44	-	10.44	-	-	-	-	1.6	9.0		
Mystery Creek	127010	-	-	-	3.27	-	-	-	-	1.3	12.0		
Mystery Creek	165922	-	-	-	3.31	-	-	-	-	1.6	12.0		
Mystery Creek	225314	0.73	-	-	5.10	-	-	-	-	1.7	13.0		
Mystery Creek	28706	-	-	-	3.20	-	-	-	-	1.6	12.0		
Mystery Creek	290850	0.36	-	-	6.75	-	-	-	-	1.2	12.0		
Mystery Creek	296994	-	-	-	1.53	-	-	-	-	1.1	12.0		
South Fork Canyon Creek	288802	-	1.37	-	0.34	-	-	-	-	1.5	12.0		
South Fork Canyon Creek	59426	-	2.52	-	0.36	-	-	-	-	0.8	12.0		
South Fork Canyon Creek	116674	0.63	-	-	3.16	-	-	-	-	2.0	11.0		
South Fork Canyon Creek	258082	0.81	-	-	-	-	-	-	-	1.3	10.5		
South Fork Canyon Creek	26658	0.47	-	-	1.17	-	-	-	-	1.5	10.0		
South Fork Canyon Creek	329762	3.49	-	-	6.40	-	-	-	-	1.9	10.0		
	<b>Mean</b>	<b>0.41</b>	<b>0.79</b>	<b>0.06</b>	<b>2.92</b>	-	-	-	-	<b>1.7</b>	<b>11.5</b>		
	<b>Standard Deviation</b>	<b>0.77</b>	<b>1.43</b>	<b>0.28</b>	<b>2.56</b>	-	-	-	-	<b>0.6</b>	<b>1.3</b>		
	<b>Proportion Occupied</b>	<b>0.48</b>	<b>0.39</b>	-	<b>0.87</b>	-	-	-	-	-	-		

Appendix E3. Densities (fish/100 m<sup>2</sup>) of salmonids observed in 2023 at 29 extensive panel transects snorkeled throughout the Yankee Fork Salmon River basin, Idaho. Trout fry = all trout <50 mm that could not be distinguished between steelhead and Westslope Cutthroat Trout. Dashes represent transects in which no fish of a given type were observed.

		Density (Fish/100m <sup>2</sup> )								Visibility	Temp
Stream	Transect	Trout fry	Steelhead	Chinook Salmon	WS Cutthroat Trout	Bull Trout	Brook Trout	Whitefish	(m)	(C)	
Cabin Creek	97879	0.26	1.30	-	-	0.26	-	-	3.2	12.4	
Deadwood Creek	89687	-	-	-	-	-	-	-	2.7	10.3	
Fivemile Creek	69487	-	-	-	-	-	-	-	2.1	7.0	
Jordan Creek	112983	0.19	4.90	-	2.45	-	-	-	3.0	15.6	
Jordan Creek	31063	-	2.46	-	2.87	0.61	-	-	3.0	14.6	
Jordan Creek	58223	0.28	1.42	-	4.53	-	-	-	3.0	8.2	
Lightning Creek	114263	1.19	1.49	-	1.79	-	-	-	4.1	10.1	
Lightning Creek	37743	0.18	1.48	-	3.88	0.55	-	-	3.8	14.5	
Ninemile Creek	57199	-	-	-	1.58	-	-	-	1.7	10.7	
Ramey Creek	112495	-	-	-	-	-	-	-	1.7	9.0	
Ramey Creek	139607	0.41	-	-	6.12	-	-	-	0.7	14.1	
Ramey Creek	26967	1.48	1.48	-	9.23	-	-	-	0.9	11.1	
Sawmill Creek	121175	-	2.34	-	0.67	0.33	-	-	2.5	12.2	
Sixmile Creek	49391	-	0.34	-	-	0.69	-	-	2.2	9.0	
West Fork Yankee Fork	125271	-	-	-	-	-	-	0.08	4.4	11.0	
West Fork Yankee Fork	145751	0.12	-	-	0.23	0.12	-	1.73	2.8	15.0	
West Fork Yankee Fork	32343	3.04	0.58	-	5.64	0.29	-	-	2.0	15.8	
West Fork Yankee Fork	43351	0.29	-	0.96	-	-	-	0.77	4.5	13.5	
West Fork Yankee Fork	73303	-	1.70	-	13.57	1.45	-	-	3.3	10.5	
West Fork Yankee Fork	7767	0.20	1.01	-	4.03	-	-	-	2.8	15.3	
Yankee Fork	114927	-	1.13	-	-	-	-	-	2.2	10.4	
Yankee Fork	137559	0.07	0.07	-	0.07	-	-	1.88	2.6	9.0	
Yankee Fork	147799	-	2.69	0.13	1.02	0.06	-	1.66	2.4	12.6	
Yankee Fork	15215	-	-	-	-	4.66	-	-	2.3	7.6	
Yankee Fork	153943	-	-	-	-	-	-	0.16	2.8	8.6	
Yankee Fork	22871	-	0.40	-	0.10	0.10	-	0.30	2.8	8.8	
Yankee Fork	56175	-	-	-	-	0.75	-	-	2.3	11.0	
Yankee Fork	72023	-	-	-	-	-	-	0.18	0.8	8.0	
Yankee Fork	89967	-	-	1.33	-	-	-	0.18	1.9	11.0	
	<b>Mean</b>	<b>0.27</b>	<b>0.85</b>	<b>0.08</b>	<b>1.99</b>	<b>0.34</b>	<b>-</b>	<b>0.24</b>	<b>2.6</b>	<b>11.3</b>	
	<b>Standard Deviation</b>	<b>0.64</b>	<b>1.16</b>	<b>0.30</b>	<b>3.26</b>	<b>0.90</b>	<b>-</b>	<b>0.55</b>	<b>0.9</b>	<b>2.6</b>	
	<b>Proportion Occupied</b>	<b>0.41</b>	<b>0.55</b>	<b>0.10</b>	<b>0.55</b>	<b>0.41</b>	<b>-</b>	<b>0.31</b>			

Appendix E4. Densities (fish/100 m<sup>2</sup>) of salmonids observed in 2023 at 18 extensive panel transects snorkeled throughout Slate Creek basin, Idaho. Trout fry = all trout <50 mm that could not be distinguished between steelhead and Westslope Cutthroat Trout. Dashes represent transects in which no fish of a given type were observed.

		Density (Fish/100m <sup>2</sup> )							Visibility	Temp
Stream	Transect	Trout fry	Steelhead	Chinook Salmon	WS Cutthroat Trout	Bull Trout	Brook Trout	Whitefish	(m)	(C)
Slate Creek	10903	-	0.22	-	-	-	-	-	2.2	11.5
Slate Creek	94871	-	-	-	-	-	-	-	1.7	6.8
Slate Creek	101015	-	0.24	-	-	-	-	-	2.3	10.0
Slate Creek	117399	-	-	-	-	-	-	-	2.3	8.0
Slate Creek	137879	-	-	-	-	-	-	-	3.7	4.0
Slate Creek	160407	-	-	-	-	-	-	-	1.1	8.8
Slate Creek	266903	-	0.83	-	-	-	-	-	2.0	10.0
Slate Creek	268951	-	-	-	-	-	-	-	3.5	6.0
Slate Creek	314007	-	0.30	-	-	-	-	-	1.9	11.0
Slate Creek	379543	-	0.28	-	-	-	-	-	2.6	13.5
Slate Creek	404119	-	0.19	-	-	-	-	-	2.2	13.7
Slate Creek	422511	-	-	-	-	-	-	-	1.5	8.4
Slate Creek	428695	-	-	-	-	0.31	-	-	2.3	10.0
Slate Creek	445079	-	-	-	-	-	-	-	2.0	9.0
Slate Creek	455319	-	-	-	-	-	-	-	2.0	7.3
Slate Creek	461463	-	-	-	-	-	-	-	2.6	11.0
Slate Creek	508567	-	1.23	-	0.18	-	-	-	3.0	8.0
Slate Creek	518870	-	-	-	0.97	-	-	-	3.2	16.0
	<b>Mean</b>	-	<b>0.18</b>	-	<b>0.06</b>	<b>0.02</b>	-	-	<b>2.3</b>	<b>9.6</b>
	<b>Standard Deviation</b>	-	<b>0.34</b>	-	<b>0.23</b>	<b>0.07</b>	-	-	<b>0.7</b>	<b>2.9</b>
	<b>Proportion Occupied</b>	-	<b>0.39</b>	-	<b>0.11</b>	<b>0.06</b>	-	-		

Appendix E5. Densities (fish/100 m<sup>2</sup>) of salmonids observed in 2023 at 21 extensive panel transects snorkeled throughout the Tenmile Creek basin, Idaho. Trout fry = all trout <50 mm that could not be distinguished between steelhead and Westslope Cutthroat Trout. Dashes represent transects in which no fish of a given type were observed.

		Density (Fish/100m <sup>2</sup> )							Visibility	Temp
Stream	Transect	Trout fry	Steelhead	Chinook Salmon	WS Cutthroat Trout	Bull Trout	Brook Trout	Whitefish	(m)	(C)
Fourmile Creek	60449	-	-	-	9.44	-	-	-	1.3	12.2
Sixmile Creek	122434	0.32	-	-	6.73	-	-	-	1.8	11.4
Sixmile Creek	192066	1.20	-	-	11.18	-	-	-	1.6	14.2
Sixmile Creek	355906	-	-	-	6.90	-	-	-	1.9	14.2
Tenmile Creek	18130	-	0.16	-	3.95	0.47	-	-	1.9	11.0
Tenmile Creek	50898	0.18	-	-	3.17	0.35	-	-	3.4	10.0
Tenmile Creek	89666	0.11	3.36	-	2.13	-	-	-	2.5	13.9
Tenmile Creek	165586	-	-	-	2.68	-	-	-	3.9	9.0
Tenmile Creek	175682	2.73	6.11	2.73	2.82	0.28	-	-	1.9	17.5
Tenmile Creek	187970	-	4.00	1.18	3.11	0.15	-	-	2.1	11.7
Tenmile Creek	253506	0.25	4.55	0.51	1.77	-	-	-	3.3	12.4
Tenmile Creek	260818	-	1.13	-	4.93	-	-	-	1.9	13.0
Tenmile Creek	263890	0.36	2.55	-	6.19	-	-	-	2.4	10.0
Tenmile Creek	280274	-	0.55	-	6.63	0.55	-	-	2.4	12.0
Tenmile Creek	290370	0.32	8.37	0.54	2.90	0.11	-	1.07	1.8	12.5
Tenmile Creek	306754	1.48	2.46	0.21	2.46	0.07	-	0.14	2.5	15.0
Tenmile Creek	313042	-	-	-	1.41	-	-	-	3.9	11.0
Tenmile Creek	345810	3.51	-	-	6.67	0.12	-	-	3.9	11.0
Tenmile Creek	384578	0.30	4.13	-	2.32	0.10	-	-	3.4	13.6
Williams Creek	129746	0.21	-	-	8.33	-	-	-	1.8	15.0
Williams Creek	457426	0.62	-	-	6.41	0.21	-	-	2.1	12.0
	<b>Mean</b>	<b>0.55</b>	<b>1.78</b>	<b>0.25</b>	<b>4.86</b>	<b>0.11</b>	-	<b>0.06</b>	<b>2.5</b>	<b>12.5</b>
	<b>Standard Deviation</b>	<b>0.95</b>	<b>2.45</b>	<b>0.64</b>	<b>2.76</b>	<b>0.17</b>	-	<b>0.23</b>	<b>0.8</b>	<b>2.0</b>
	<b>Proportion Occupied</b>	<b>0.62</b>	<b>0.52</b>	<b>0.24</b>	<b>1.00</b>	<b>0.48</b>	-	<b>0.10</b>		

Appendix E6. Densities (fish/100 m<sup>2</sup>) of salmonids observed in 2023 at 21 extensive panel transects snorkeled throughout the South Fork Salmon River basindownstream of the East Fork South Fork confluence, Idaho. Trout fry = all trout <50 mm that could not be distinguished between steelhead and Westslope Cutthroat Trout. Dashes represent transects in which no fish of a given type were observed.

		Density (Fish/100m <sup>2</sup> )							Visibility	Temp
Stream	Transect	Trout fry	Steelhead	Chinook Salmon	WS Cutthroat Trout	Bull Trout	Brook Trout	Whitefish	(m)	(C)
Elk Creek	863	0.58	1.73	-	9.62	-	-	-	2.5	15.2
Elk Creek	10527	-	0.65	-	3.46	-	-	-	3.8	11.4
West Fork Elk Creek	2335	-	0.42	-	-	6.57	-	-	2.8	7.9
Pony Creek	3359	1.06	2.54	-	0.42	-	-	-	2.3	10.5
N/A (Pony Creek Trib)	29983	-	-	-	-	-	-	-	1.4	21.3
Circle End Creek	5407	-	-	-	-	-	-	-	0.2	15.5
Tailholt Creek	21791	-	-	-	-	-	-	-	0.5	11.5
China Creek	32095	-	-	-	-	-	-	-	1.5	12.0
Elk Creek	19807	-	-	-	-	-	-	-	2.7	9.2
Rock Creek	48415	-	-	-	-	-	-	-	2.3	10.3
SFK Salmon River	17183	-	-	-	-	-	-	0.18	1.7	19.0
SFK Salmon River	56671	-	0.15	1.06	0.30	-	-	-	1.8	16.0
SFK Salmon River	15711	-	0.75	0.30	1.20	-	-	-	1.7	17.0
SFK Salmon River	48479	-	-	0.30	-	-	-	-	1.7	17.0
SFK Salmon River	51551	-	-	-	0.66	-	-	0.16	1.5	17.0
Porphry Creek	18783	0.18	-	-	5.72	-	-	-	1.5	13.0
SFK Salmon River	45407	-	0.14	-	0.55	-	-	0.82	1.8	14.0
SFK Salmon River	17759	-	-	-	-	-	-	0.14	1.8	17.0
SFK Salmon River	34143	-	-	0.14	-	-	-	-	1.8	18.0
SFK Salmon River	33567	-	0.11	5.48	0.33	-	-	0.44	2.3	16.0
SFK Salmon River	49951	-	-	0.33	0.16	-	-	0.82	1.5	18.0
	<b>Mean</b>	<b>0.09</b>	<b>0.31</b>	<b>0.36</b>	<b>1.07</b>	<b>0.31</b>	-	<b>0.12</b>	<b>1.9</b>	<b>14.6</b>
	<b>Standard Deviation</b>	<b>0.06</b>	<b>0.14</b>	<b>0.26</b>	<b>0.53</b>	<b>0.31</b>	-	<b>0.06</b>	<b>0.2</b>	<b>0.8</b>
	<b>Proportion Occupied</b>	<b>0.14</b>	<b>0.38</b>	<b>0.29</b>	<b>0.48</b>	<b>0.05</b>	-	<b>0.29</b>		

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