FISHERY RESEARCH

# IDAHO ANADROMOUS PARR MONITORING

## ANNUAL PROGRESS REPORT

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# Idaho Anadromous Parr Monitoring

# 2015 Annual Report

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## ABSTRACT

Idaho Department of Fish and Game monitors density and distribution of anadromous and resident Salmonid parr with snorkel surveys. In this report, we summarize the snorkel survey methods and results for 2015. Snorkel crews from Idaho Department of Fish and Game surveyed 525 transects to describe juvenile steelhead *Oncorhynchus mykiss* and Chinook Salmon *O. tshawytscha* density, occupancy, and spatial structure. Between 2011 and 2015 in the Clearwater basin, mean steelhead trout densities ranged from 0.8 and 3.9 fish per 100m$^2$ and Chinook Salmon densities were between 2.7 and 7.2 fish per 100m$^2$. In the Salmon Basin, mean Steelhead trout densities ranged from 1.9 and 4.2 fish per 100m$^2$ and Chinook Salmon densities were between 3.6 and 8.3 fish per 100m$^2$. Between 2013 and 2015 in the Snake River Basin (Hells Canyon), mean Steelhead trout densities ranged from 17.0 and 24.8 fish per 100m$^2$. In the Clearwater basin, mean Steelhead trout densities ranged from 1.3 to 4.3 fish per 100m$^2$ and occupancies ranged from 0.6 to 0.8. In the Salmon basin, mean Steelhead trout densities in annual intensive survey panels (i.e. sites above screw traps) ranged from 0.1 to 3.7 fish per 100m$^2$ and occupancies ranged from 0.2 to 0.5. Mean Chinook Salmon densities ranged from zero to 3.9 fish per 100m$^2$ in the Clearwater basin and from 0.1 to 13.5 fish per 100m$^2$ in the Salmon basin. We surveyed four extensive panels in 2015; the Lochsa River drainage in the Clearwater basin, the Lower Salmon drainage, the South Fork Salmon River drainage, and the East Fork Salmon River drainage in the Salmon basin. Species specific occupancies in the respective extensive survey panels were 0.7, 1.0, 0.8, and 0.8 for Steelhead Trout and 0.2, 0.6, 0.3, and 0.1 for Chinook Salmon. Average detection efficiency was 41% in 2015 and was similar to the observed annual average (30%) observed since 2007.



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## INTRODUCTION

Populations of Chinook Salmon *Oncorhynchus tshawytscha* and Steelhead trout *O. mykiss* in the Snake River basin declined substantially following the construction of hydroelectric dams in the Snake and Columbia rivers. Recent observed increases in adult abundance are dominated by hatchery fish, while the returns of naturally produced Chinook Salmon and Steelhead trout remain critically low compared to historical levels. Snake River spring-summer Chinook Salmon were classified as threatened in 1992 under the Endangered Species Act (ESA). Within the Snake River spring-summer 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. However, the Dry Clearwater and the Wet Clearwater MPGs are considered to be re-established after extirpation and are not listed under the ESA. A total of 28 extant demographically independent populations have been identified. Snake River Steelhead trout were classified as threatened under the ESA in 1997 (Busby et al. 1996). Within the Snake River Steelhead trout distinct population segment (DPS), there are 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 to be extirpated (Table 1).

The Idaho Department of Fish and Game (IDFG) anadromous fish program's long-range goal, consistent with basinwide mitigation and recovery programs, is to preserve Idaho's Salmon and Steelhead trout runs and recover them to provide benefit to all users (IDFG 2013). Management to achieve these goals requires an understanding of how Salmonid populations function as well as regular status assessments (McElhany et al. 2000). However, specific data on some Snake River Steelhead trout and Chinook Salmon populations are lacking, particularly key parameters such as abundance, age composition, genetic diversity, recruits per spawner, and survival rates (ICBTRT 2003).

Snorkel surveys are widely used for monitoring fish populations because they are a versatile, cost-effective technique. Snorkel surveys are feasible 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). Because snorkel surveys are non-lethal and less intrusive than other field methods, they are an appropriate means to monitor fishes listed under the Endangered Species Act (e.g., Chinook Salmon, Steelhead trout, and Bull Trout [*Salvelinus confluentus*]). Additionally, in Idaho snorkel surveys are important to assess Steelhead trout spawning distribution because observation of spawning is difficult. Therefore, snorkel survey data describing juvenile abundance and distribution are particularly important for Steelhead trout.

The purpose of snorkel surveys in this report is to provide information relative to the status of Idaho's wild Chinook Salmon and Steelhead trout populations. Density (relative abundance) and distribution, trends of density and distribution over time, and the effectiveness of snorkel surveys as a methodology are discussed. Questions remain regarding interpretation of snorkel observations in terms of emigrant production and observation bias. To address these concerns, IDFG established annual snorkel panels above rotary screw traps in 2007 to relate emigrant production to observed fish densities, and we are currently working with the University of Idaho to determine if a relationship exists between the two metrics. To address observation bias, field crews implemented a mark-resight methodology to estimate the observation efficiency of the standing stock at the time of the survey.

Recently we have explored the use of electronic data entry in the field and report our experiences here. In 2014, the first year of electronic data collection with tablets (i.e. Apple iPad® and Panasonic Touchpad®), Fulcrum software was used as the interface for data entry in the field. Field crews reported slow entry and reliability issues, so in 2015 a snorkel application (app) was engineered by IDFG programmers to address shortcomings of previous software.

There are four specific questions that this snorkel program addresses relative to population status and the effectiveness of our monitoring techniques.

1) How is abundance of anadromous Salmonid parr changing over time?

2) How is Steelhead trout emigrant production related to parr density?

3) What is the distribution and relative abundance of Steelhead trout within the populations defined by the Interior Columbia Basin Technical Recovery Team?

4) How efficient are snorkel surveys at measuring parr density?

We report results of surveys primarily conducted in 2015 but also include data from 2014 for certain extensive panels completed over multiple years to describe distribution information in the East Fork Salmon River, the South Fork Salmon River, the lower Salmon River, and the Lochsa River.

## METHODS

Methods for conducting fish abundance surveys by snorkeling were recently detailed by Apperson et al. (2015), which include specific protocols used to evaluate anadromous parr density, and should be used as the primary methods reference for this report. We describe here the four specific types of sites surveyed by Idaho Fish and Game staff in 2015 that are used to address the research questions presented above. Exceptions or additions to protocols described in Apperson et al. (2015) are described.

Unless otherwise noted, six Salmonid species were observed within major drainages, including Steelhead trout, Chinook Salmon, Westslope Cutthroat Trout, Bull Trout, Brook Trout *Salvelinus fontinalis*, and Mountain Whitefish *Prosopium williamsoni*. Undistinguishable trout fry *Oncorhynchus* spp were also observed unless otherwise noted.

### Types of Survey Sites

#### Trend Surveys: Core, Non-core, and Resident

Core transects provide data to address the first research question. There were three types of trend transects established known as core, non-core, and resident. Subsets of long-established transects were subjectively selected because they represent suitable Chinook Salmon and Steelhead trout habitat. These transects were originally developed by the General Parr Monitoring program (GPM) which was a focused effort by IDFG to measure the juvenile response of wild/natural anadromous populations to off-site mitigation habitat actions and improvements (Scully 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, including other

transects deemed important (e.g., main stem Middle Fork Salmon River and Selway River transects). We identified 218 core trend transects (Stiefel et al. 2014). Based on logistical difficulty, core transects are surveyed annually or biannually during the months of July and August. Regular monitoring of these sites provides the "core" of Idaho's monitoring of the abundance trend of juvenile anadromous Salmonids. Non-core and resident transects are surveyed opportunistically according to IDFG regional management needs, and these are not relied on to provide statewide status and trend information.

In 2007 we began establishing sites with a probabilistic approach to obtain a spatially-balanced and representative set of sample sites, specifically employing a generalized random-tessellation stratified (GRTS) design (Stevens and Olsen 2004) to obtain estimates of Steelhead trout parr density at the population scale. Crews are provided an ordered list of sites "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). Higher priority sites must be chosen for survey or attempted to be surveyed before lower priority sites can be selected. More than the minimum required number of sites is provided in case some sites must be bypassed.

To address the second research question, panels of intensive sites were developed to evaluate the relationship between fish density from snorkel surveys and juvenile Steelhead trout emigrant abundance derived from rotary screw traps over several years. Therefore, intensive panel surveys are generally conducted annually upstream of associated screw traps (except in the Potlatch River drainage), and generally consist of at least 20 sites. In 2015, we continued monitoring the Potlatch River (lower Clearwater River Steelhead population), Rapid River (Little Salmon River steelhead population), Fish Creek (Lochsa River steelhead population), Crooked River (South Fork Clearwater River steelhead population), Marsh Creek (Upper Middle Fork Salmon River steelhead population), and South Fork Salmon River (South Fork Salmon River steelhead population). The East Fork Salmon River distribution map includes non-GRTS sites in Garden Creek surveyed by Idaho Department of Fish and Game's Screen Shop as part of annual monitoring. In 2015, the South Fork Salmon River was surveyed as both an intensive and extensive panel. The extensive panel encompassed the intensive panel extending below the screw trap and to two large tributaries (i.e. the East Fork South Fork of the Salmon River and Johnson Creek) that were outside the bounds of the intensive panel which was restricted to sites above the screw trap only. In 2015, we added 27 intensive sites in the North Fork Salmon River because a screw trap was installed and operated for the first time in this drainage. The relationship between fish density from snorkel surveys and juvenile Steelhead trout emigrant abundance derived from rotary screw traps will be examined once sufficient data are available.

To address the third research question, extensive panel drainages were established to obtain occupancy and distribution information from key Steelhead trout population and spawning aggregates as defined by the Interior Columbia Technical Recovery Team (2003, 2005) that are not surveyed annually. Extensive panel surveys in 2015 were conducted to assess Steelhead trout and Chinook Salmon parr distribution and abundance in the Lochsa River (Clearwater basin), the Lower Salmon River, the East Fork Salmon River and the South Fork Salmon River (Salmon basin). The South Fork Salmon River extensive panel included some surveys that were completed as annual intensive surveys as well. In the Lochsa River, 2014 surveys upstream of Crooked Fork Creek (previously an intensive panel) were used to complete the extensive panel. In 2015, we completed panels in the East Fork Salmon River (2 sites in 2014 and 27 sites in 2015) and the Lower Salmon River (6 sites in 2014 and 26 sites in 2015) that were started in 2014 and report results from both years. Investigators used data generated from extensive surveys to develop maps based on the Interior Columbia Technical Recovery Team's (2003, 2005) Steelhead Population delineations that display the density and

distribution of Chinook Salmon and Steelhead trout. This delineation was used for both species because original site selection using GRTS methodology was based on steelhead population boundaries. The East Fork Salmon River distribution map includes non-GRTS sites in Garden Creek surveyed by Idaho Department of Fish and Game's Screen Shop as part of annual monitoring.

To address the fourth research question, we assessed detection probability of Steelhead trout parr and Westslope Cutthroat trout in a subjectively chosen set of sites each year. A protocol modified from Thurow et al. (2006) was designed to estimate detection probability through observation of marked individuals (Apperson et al. 2015). Briefly, fish were marked (fin clip) in a target reach and then the area was surveyed beginning downstream from the target reach and finishing upstream (oversample reaches approx. 50m each). We continued to evaluate the efficiency of snorkeling for juvenile Steelhead trout and Cutthroat trout combined at a subset of transects. We attempt to conduct these mark-resight surveys in 10% of transects annually. The probability of detection was calculated for each site using the methods described in the analytical methods section below.

## Data Management

### Electronic Data Collection with Tablets

In 2015 IDFG snorkel crews continued participation in a pilot study began in 2014 to determine the feasibility of electronic data collection. Each crew was issued two ruggedized tablets: one Apple iPad 4 and one Panasonic Toughpad FZ-A1 with an application engineered specifically for collection of snorkel survey data in the field. This was the second year that electronic devices were used for recording data in the field and uploading it to the database.

Before each field season, a statewide meeting is held and developers address larger issues and train personnel on new technologies for use in the coming field season. Feedback from field crews and crew leaders is documented throughout the field season and sent to developers. Developers then incorporate changes and make real-time updates available to crews during the field season.

### Analytical Methods

Densities for all species were expressed as number of fish per 100 $m^2$ for each transect. In transects for which the entire stream width is surveyed, this is accomplished by calculating the surface area of the transect using wetted widths measured during a basic habitat survey and the total length of the transect. IDFG staff completed corridor surveys in the Middle Fork Salmon River and the Selway River. In a corridor survey, the transect is surveyed by floating from the upstream boundary to the downstream boundary. The entire stream width may or may not be surveyed. Typically, a corridor along the bank is surveyed. Transect area is based on the surface area of the corridor visible to the observer as measured before the survey (Scully et al. 1990). Five-year trend data was compiled using mean densities from core sites in the Clearwater, Salmon, and Snake River (Hells Canyon) basins.

Occupancy of Steelhead trout and Chinook Salmon was calculated for extensive and intensive probabilistic sites in the Snake and Clearwater basins. 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. For the purposes of this report, it provides a metric

that describes the amount of available habitat occupied by Steelhead trout and Chinook Salmon.

In order to visualize parr distribution and relative abundance, maps were made for all extensive panels completed in 2015. These maps will be used to describe the distribution of Steelhead trout and Chinook Salmon. In certain locations, data from non-GRTS sites were used to construct the maps. Maps were constructed using ArcMap 10.3 and they were drafted to display the distribution of Steelhead trout and Chinook Salmon across the following TRT steelhead populations: the Lochsa River, the Lower Salmon River, the South Fork Salmon River, and the East Fork Salmon River. The East Fork Salmon River boundary extends north to the mouth of the Pahsimeroi including the mainstem Salmon River and all tributaries between. Densities were classified using the Jenks' Natural Breaks Classification method which discriminates classes using low points or natural breaks in the data's frequency distribution (Jenks and Caspall 1971). Scaling of the maps was not kept consistent among populations.

The probability of detection was computed for each site where a mark-resight survey was completed. It was calculated using the number of marked fish observed in the target reach and the oversample reach divided by the total number marked. Resight efficiency estimates are not species specific and include both trout and Westslope Cutthroat trout, though no Westslope Cutthroat trout were marked during surveys in 2015 (Thurow et al. 2006).

## RESULTS

During 2015, 525 snorkel surveys were completed. Detailed results are extensive, and they are available in the appendix (Appendix B for core sites, C for intensive sites, D for extensive sites, and E for non-core trend and resident trend sites).

### Core Trend Surveys

In the Clearwater basin mean Steelhead trout densities were 0.8 fish/100m$^2$ (SD = 1.7; Figure 1) and mean Chinook Salmon densities were 7.2 fish/100m$^2$ (SD = 13.2; Figure 2). Compared to the five-year average between 2011 and 2015, mean Steelhead trout densities were low and mean Chinook Salmon densities were high. Steelhead trout and Chinook Salmon densities were intermediate in the Clearwater basin compared to the Salmon basin and Hells Canyon.

In the Salmon River basin, mean Steelhead trout densities basin were 1.9 fish/100m$^2$ (SD = 3.7; Figure 1). Mean Chinook Salmon densities were 8.2 fish/100m$^2$ (SD = 12.4; Figure 2). Compared to the 5-year average between 2011 and 2015, mean Steelhead trout densities were low and mean Chinook Salmon densities were high. Chinook Salmon densities were highest in the Salmon basin compared to the other basins surveyed each year between 2011 and 2015.

In Hells Canyon mean Steelhead trout densities were 17.1 fish/100m$^2$ (SD = 7.9; Figure 1) and mean Chinook Salmon densities were 3.7 fish/100m$^2$ (SD = 7.1; Figure 2). Mean Steelhead trout densities were the highest observed across all basins in 2015. Mean Chinook Salmon densities were the highest observed since 2013 in Hells Canyon, but they were the lowest observed among basins in 2015 (Figure 2).

## Intensive Panel Surveys

In the Potlatch River drainage, we surveyed 54 intensive panel transects. Steelhead trout had the highest mean density (2.1 fish/100m$^2$; SD = 7.3) and the highest occupancy (0.5; Figure 3; Figure 4). The Potlatch drainage was the only Clearwater drainage where Chinook Salmon were not observed.

In the Fish Creek drainage, we surveyed 21 intensive panel transects. Steelhead trout mean densities were 3.2 fish/100m$^2$ and occupancy was 0.9. Chinook Salmon density was 0.20 fish/100m$^2$ with an occupancy of 0.1. Steelhead trout densities were the highest observed in the Clearwater basin.

In the Crooked River drainage, we surveyed 25 intensive panel transects. Steelhead trout density was 0.1 fish/100m$^2$ (SD = 0.3) with an occupancy of 0.3. Chinook Salmon densities (3.9 fish/100 m$^2$) were higher than steelhead with a similar occupancy (0.3). Chinook Salmon densities were the highest observed in the Clearwater basin (Figure 3).

In the Rapid River drainage, we surveyed 20 intensive panel transects. Steelhead trout had the highest mean density (2.69 fish/100m$^2$; SD = 2.31) with an occupancy of 0.7. Chinook Salmon density was 0.13 fish/100m$^2$ (SD = 0.34) with an occupancy of 0.2. Chinook Salmon densities were the lowest observed among the drainages surveyed in the Salmon basin (Figure 5).

In the Upper South Fork Salmon River drainage, we surveyed 34 intensive panel transects. Steelhead trout had a mean density of 2.79 fish/ 100m$^2$ (SD = 0.74) and the highest occupancy (0.7). Chinook Salmon had the highest mean density (4.0 fish/100m$^2$; SD = 8.8) with an occupancy of 0.5.

In the North Fork Salmon River drainage, we surveyed 27 intensive panel sites. Steelhead trout density was 4.25 fish/100m$^2$ (SD = 3.6) with an occupancy of 0.8. Chinook Salmon density was 2.13 fish/100m$^2$ (SD = 4.6) with an occupancy of 0.3. Steelhead trout densities and occupancy were the highest observed among the drainages in the Salmon basin (Figure 5; Figure 6).

In the Marsh Creek drainage, we surveyed 26 intensive panel sites. Steelhead trout density was 1.32 fish/100m$^2$ (SD =2 .3) with an occupancy of 0.6. Mean density was greatest for Chinook Salmon (13.5 fish/100m$^2$; SD = 20.0) with an occupancy of 0.5. Marsh Creek had the highest densities and occupancy of Chinook Salmon and the lowest densities of Steelhead trout compared to the other drainages in the Salmon basin. Though Steelhead trout densities were low, occupancy was high.

## Extensive Panel Surveys

In the Lochsa drainage, distributions of Steelhead trout and Chinook Salmon were different. Steelhead trout were observed in every tributary surveyed with an occupancy of 0.7, and high densities were observed in tributaries throughout the drainage (Figure 7). Chinook Salmon occupancy was 0.2 and they were distributed in the upper reaches of the Lochsa drainage. Few or no Chinook Salmon were observed in tributaries near the mouth. Chinook Salmon densities were highest in the Crooked Fork of the Lochsa, Boulder Creek, and Twin Creeks. The highest densities were observed in transects near the confluence of Twin Creek and Boulder Creek (Figure 8).

In the Lower Salmon River, Steelhead trout were more widely distributed compared to Chinook Salmon. In many of the tributaries where Chinook Salmon densities were high, Steelhead trout were also observed. Densities were highest in Baker Gulch, Slate Creek, Eagle Creek, Boulder Creek, the Little Salmon River, and Kossler Creek. Overall Steelhead trout occupancy was 0.8 and Chinook Salmon occupancy was 0.2 in the Lower Salmon River (Figure 9). Chinook Salmon were observed in Slate Creek, Rapid River, the Little Salmon River, and Boulder Creek. Densities were highest in Rapid River and Boulder Creek. Most Chinook Salmon were observed in the more southern tributaries in the drainage, although Slate Creek is in the middle of the drainage. Chinook Salmon were also observed at two sites in tributaries near the mouth of the Salmon River (Figure 10).

In the South Fork Salmon River population, Steelhead trout were observed in more tributaries and in higher reaches than Chinook Salmon in many tributaries (Figure 11). Steelhead trout occupancy was 0.8 and 0.6 for Chinook Salmon. Three sites were visited but not surveyed because of low water or a downstream barrier was identified (Blackmare Creek, Dollar Creek, and Camp Creek). Steelhead trout were distributed throughout the South Fork Salmon River Drainage. High densities were observed in Porphyry Creek, Pony Creek, Fitsum Creek, Nick Creek, Buckhorn Creek, Camp Creek, Johnson Creek, and the East Fork South Fork Salmon River. Four sites were below the East Fork of the South Fork Salmon River (EFSFSR) and Chinook Salmon were observed at one of these sites. Above the EFSFSR, Chinook Salmon were distributed throughout the drainage. When Chinook Salmon were present in a tributary, they were typically observed near the mouth rather than in higher reaches. Densities were highest in the main stem South Fork Salmon River, Johnson Creek, and the East Fork South Fork Salmon River (Figure 12).

In the East Fork Salmon River, Steelhead trout occupancy was 0.8 and Chinook Salmon occupancy was 0.1, suggesting Steelhead trout were more widely distributed (Figure 13). Steelhead trout were observed in all streams surveyed, though not in all transects and densities were highest in Morgan Creek. Generally, Steelhead trout were observed near the mouths of tributaries and densities were low in the upper reaches of streams. Chinook Salmon were not well distributed in the survey area based on snorkeling data as they were only observed in Garden Creek and Herd Creek (three sites total; Figure 14).

### Detection Probability (Mark-Resight Surveys)

In 2015, we conducted mark-resight studies at three transects to assess detection probability for Steelhead trout in 2015. Crews marked 63 Steelhead (zero Westslope Cutthroat trout were marked) and detected 27 of them. Twenty-three were observed within the site and four were observed in the oversample reaches (two upstream and two downstream). Transect detection probabilities ranged from 14% to 67% with a mean of 41% (Table 2).

## DISCUSSION

The anadromous parr monitoring program has monitored the abundance and distribution of anadromous Salmonids since 1985. The convention over the history of anadromous parr monitoring has been to provide semiregular basinwide annual core trend results for reports (Hall-Griswold et al. 2002; Kiefer et al. 2004; Copeland et al. 2007). In 2007 Copeland et al. recommended incorporating randomized probabilistic sampling to minimize potential biases associated with traditional core trend surveys that were originally established within suitable

Steelhead trout and Chinook Salmon habitat. The results of this recommendation are the intensive and extensive panels reported here. In future reports, adding annual trend data to these reports for intensive panels would be useful. Currently these data in combination with core trend surveys represent the best description of juvenile Salmonid abundance and occurrence in Idaho (Copeland and Meyer 2011).

Mean densities of Steelhead trout and Chinook Salmon in core trend transects have fluctuated over the last five years (Figures 1 and 2). Steelhead trout densities in the Clearwater basin increased to a high in 2013 and have decreased since to a five-year low in 2015. Steelhead trout densities in the Salmon basin have declined from a previous period of stable densities. In Hells Canyon, trend data is not available from 2011 and 2012 because surveys were not completed in those years. Steelhead trout densities in Hells Canyon in 2015 were similar to those observed in 2014, but were lower than those observed in 2013. In each of the three years we report here, Steelhead trout densities were higher in Hells Canyon compared to the Salmon and Clearwater basins. Densities of Chinook Salmon in the Clearwater River basin have increased since 2011 but were much more erratic in the Salmon River basin varying each year between moderate and high densities. Observed Chinook Salmon densities were higher in 2015 compared to previous years. In 2015 in Hells Canyon, Chinook Salmon densities were higher than the previous three years though densities were generally lower than those observed in the Salmon and Clearwater basins.

The major metric for evaluation of spatial structure is occupancy rate in terms of arrangement and continuity of distribution and the variety of habitats occupied. In previous reports and discussions, occupancy was the only metric used to summarize the spatial distribution of Salmonids observed during snorkel surveys. Though useful, occupancy could be considered a coarse metric that depicts large areas distilled to a single proportion. The distribution maps presented in this report offer an improved landscape level depiction of the areas inhabited by Steelhead trout and Chinook Salmon in Idaho as well as the relative densities of these species. In the future, including more of these maps with additional species and other types of surveys (i.e. intensive and core) would benefit stakeholders, managers, and investigators.

We established intensive panels to determine if a relationship exists between juvenile observations during snorkeling and emigration past rotary screw traps. Intensive panels were first established in Marsh Creek, Fish Creek, and Rapid River in 2007 while Crooked Fork and the Potlatch River were added in 2008. The Crooked Fork trap was pulled in 2014, so intensive surveys were also stopped in that year though the data from 2014 was used to complete the Lochsa extensive panel. In 2016, the North Fork Salmon River trap was installed and operated for the first full year to obtain additional coverage in the Salmon basin. In 2015, core trend results mirrored intensive panel results. Results from both panels suggest that Steelhead trout and Chinook Salmon densities were higher in the Salmon basin than the Clearwater basin. As these datasets grow, they may also be used to evaluate juvenile anadromous trends in relative abundance alongside core trend surveys.

Extensive surveys are used to ascertain fish distribution and relative abundance at a larger spatial scale than can be surveyed annually. They are generally sampled for a single year (or possibly up to three if all sites could not be surveyed in a single year) and each site is surveyed once while core sites or intensive sites are surveyed either annually or biannually. These data generally represent the most complete fish assemblage and distribution information for many of these areas as they are sometimes difficult to access. In 2015, we completed the remaining extensive panels that were originally planned, meaning we have successfully visited

and surveyed much of the available Steelhead trout and Chinook Salmon habitat in Idaho filling in a large data gap for these species and other Salmonids. In future years, IDFG will determine the need to revisit panels on a rotational basis to focus effort in other warranted areas. These data have already been used to prioritize areas of the Lochsa drainage for habitat restoration work.

Detection probability was computed as the number of marked fish seen in the target and oversample reaches divided by number marked. We included all marked fish observed in the oversample reaches because movement of marked fish from the target reach biased the estimate downwards. Keeping marked fish from the overreaches in the calculation increases precision because each marked fish is treated as an independent trial: seen or not seen. Annual resight efficiencies have varied between 21% and 48% since 2007.

## Electronic Data Collection

Based on 2015 sampling and field crew feedback, data collection with tablets has greatly improved although some issues still remain. The most significant improvement was the increased speed of data entry accomplished by using grids on the device that mimicked traditional paper data sheets used by IDFG crews. Additionally, because survey sites were preloaded to tablets from the database where data are stored, transcription errors (e.g., misnamed survey transects) were greatly reduced.

Shortcomings of the tablets were also documented by field crews. Crews used paper data sheets as the primary entry method during a survey, and then entered the data into the tablet at the end of a survey as a backup procedure. Field crews expressed concern over lack of a data backup mechanism in case of tablet failure. One crew lost data when a tablet was crushed between a snorkeler and a rock in the stream. In the future, an option for data backup is necessary when crews are using tablets as the primary data entry method. Additionally, tablets did not minimize QA/QC time. The new software was concurrently tested and updated throughout the field season which created numerous data errors after uploads. At the end of the season, crew leaders expended additional time and effort ensuring data were accurate from tablet uploaded surveys.

Certain aspects of electronic data collection demonstrated the utility of this technology. Specifically, each tablet was equipped with a GPS to log the waypoint of each survey. The iPad's Bad Elf GPS was an external device that linked wirelessly via Bluetooth to the iPad. Crews found this combination superior to the Panasonic's built-in GPS system in both accuracy and ease of operation. Each tablet was equipped with internal cameras which could eliminate the need to carry an additional camera in the future. Crews preferred the higher image resolution and faster response of the iPad when taking site photos and entering data compared to the Panasonic tablet. When fish densities are low, and survey logistics allow for an assigned data manager, tablet use was warranted. Surveys with high fish densities or surveys that required the entire crew to snorkel were conducive to paper data entry rather than tablet use.

# RECOMMENDATIONS

1. Maintain and update GPM trend series by surveying all 218 core trend transects on a two-year rotating panel. Maintain analytical consistency with methods from Copeland et al. (2007).

2. Calibrate parr densities with production of juvenile emigrants estimated from screw traps in target drainages using intensive survey results.

3. Build distribution maps for extensive panels completed in previous years and possibly adopt them for other types (i.e. intensive and core) of surveys to describe the spatial structure of Steelhead trout, Chinook Salmon, and other Salmonids in Idaho.

4. Continue evaluating and refining electronic data entry and uploading methodology through field testing and collaboration with application designers.

## ACKNOWLEDGEMENTS

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**TABLES**

Table 1. Major population groups and independent populations within the Snake River Steelhead distinct population segment (DPS) and spring-summer Chinook Salmon evolutionary significant unit (ESU; ICBTRT 2003, 2005; Ford et al. 2010; NMFS 2011).

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

Table 1. Continued.

| Snake River spring-summer Chinook Salmon ESU | |
|---|---|
| Major population group | Population name |
| Lower Snake River | 1. Tucannon River |
| | 2. Asotin Creek (extirpated) [a] |
| 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) [a] |
| | 10. Lookingglass Creek (extirpated) [a] |
| 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) [a] |
| | 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) [a] | 33. Potlatch River (extirpated) [a] |
| | 34. Lapwai Creek (extirpated) [a] |
| | 35. Lawyer Creek (extirpated) [a] |
| | 36. Upper South Fork Clearwater River (extirpated) [a] |
| Wet Clearwater River (extirpated) [a] | 37. Lower North Fork Clearwater River (extirpated) |
| | 38. Upper North Fork Clearwater River (extirpated) |
| | 39. Lolo Creek (extirpated) [a] |
| | 40. Lochsa River (extirpated) [a] |
| | 41. Meadow Creek (extirpated) [a] |
| | 42. Moose Creek (extirpated) [a] |
| | 43. Upper Selway River (extirpated) [a] |

[a] Reintroduced fish exist in extirpated areas except the North Fork Clearwater River.

Table 2. Mean annual detection probabilities for juvenile Steelhead trout and Westslope Cutthroat trout, from mark-resight snorkel surveys between 2007 and 2015. Asterisks indicate that juvenile Westslope Cutthroat trout were included in the estimate.

| **Probabilities of observing marked Steelhead and Cutthroat trout** | | |
|---|---|---|
| **Year** | **# of Sites** | **Resight Efficiency** |
| 2007 | 4 | 0.21* |
| 2008 | 29 | 0.07* |
| 2009 | 15 | 0.41* |
| 2010 | 17 | 0.48* |
| 2011 | 14 | 0.09 |
| 2012 | 29 | 0.43* |
| 2013 | 26 | 0.29* |
| 2014 | 7 | 0.33 |
| 2015 | 3 | 0.41 |

**FIGURES**

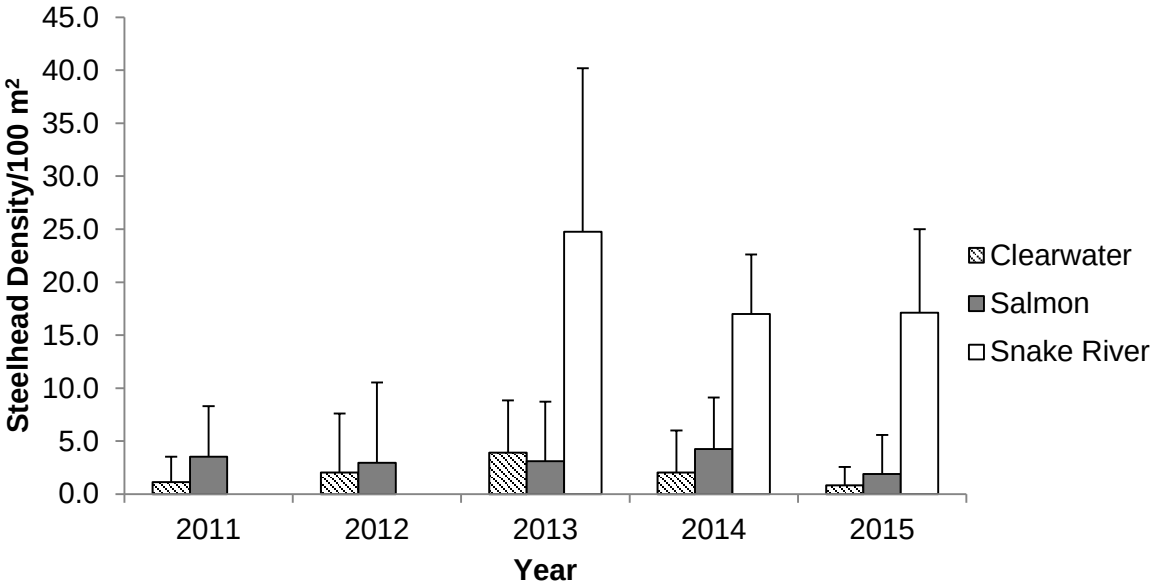


Figure 1. Mean densities of Steelhead trout (number per 100m$^2$) observed during snorkel surveys in core sites in the Clearwater, Salmon, and Snake River basins between 2011 and 2015. In 2011 and 2012, core snorkel surveys were not completed in the Snake River basin. Error bars represent one standard deviation.

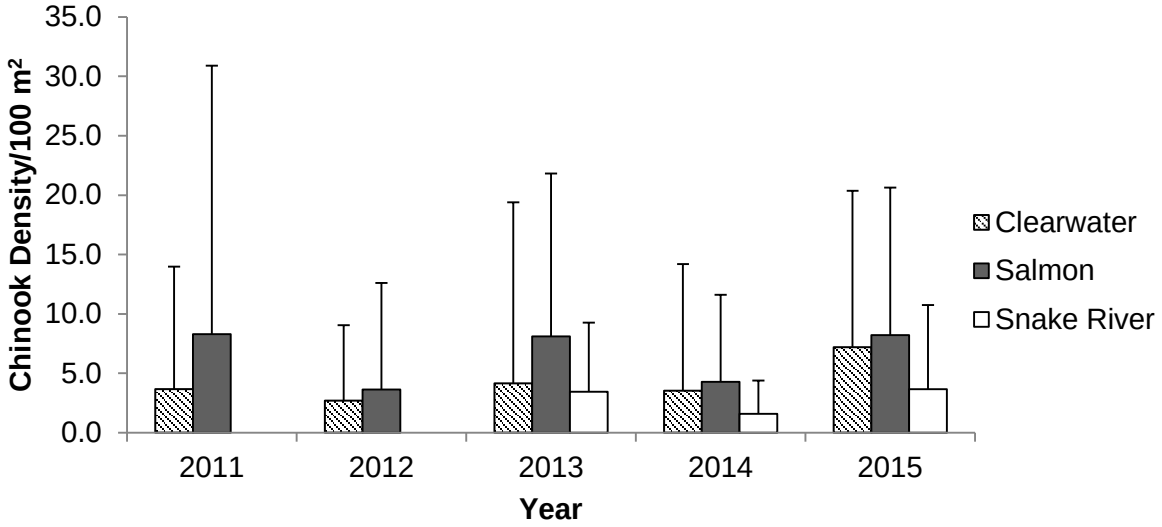


Figure 2. Mean densities of Chinook Salmon (number per 100m$^2$) observed during snorkel surveys in core sites in the Clearwater, Salmon, and Snake River basins between 2011 and 2015. In 2011 and 2012, core snorkel surveys were not completed in the Snake River basin. Error bars represent one standard deviation.

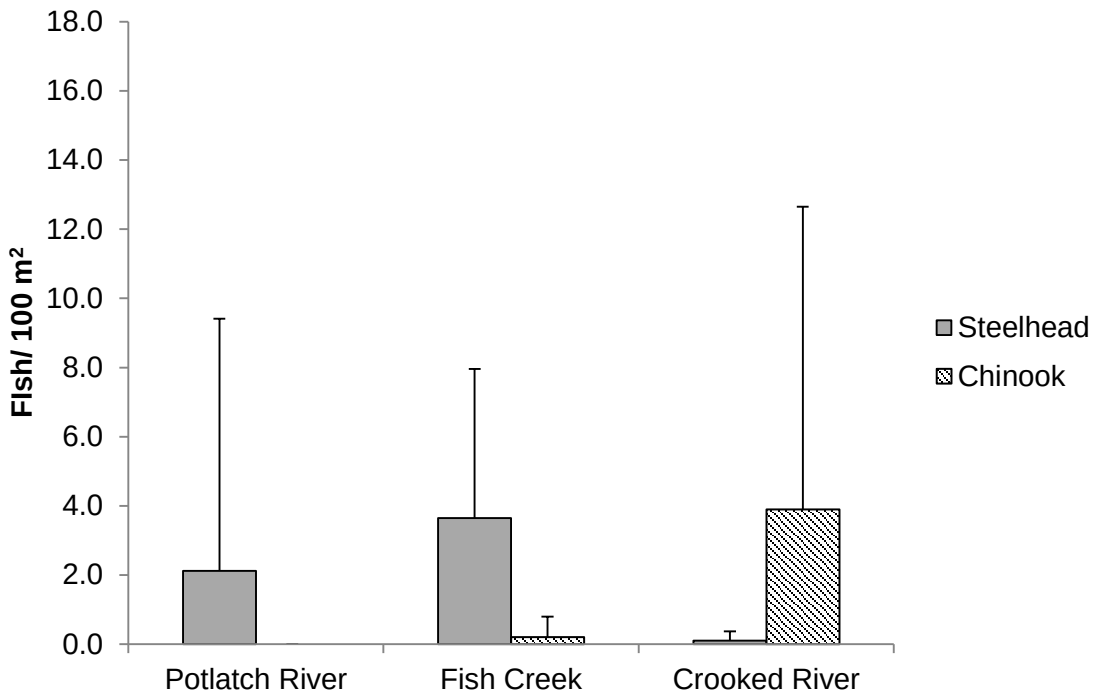


Figure 3. Mean densities of Steelhead trout and Chinook Salmon per 100m$^2$ observed during snorkel surveys at intensive sites in the Clearwater basin in 2015. Error bars represent one standard deviation.

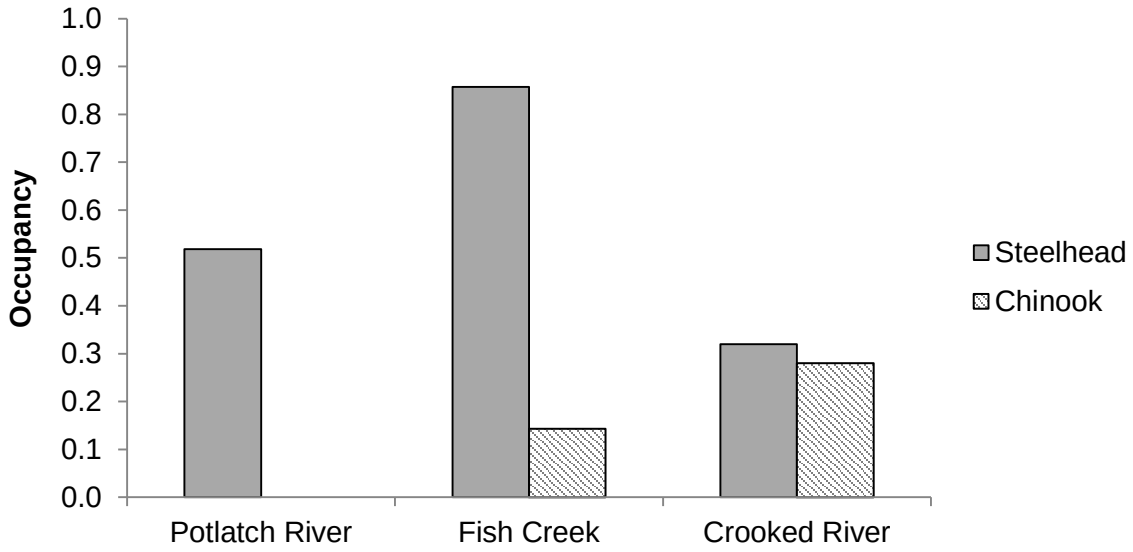


Figure 4. Occupancy of Steelhead trout and Chinook Salmon observed during snorkel surveys at intensive sites in the Clearwater basin in 2015.

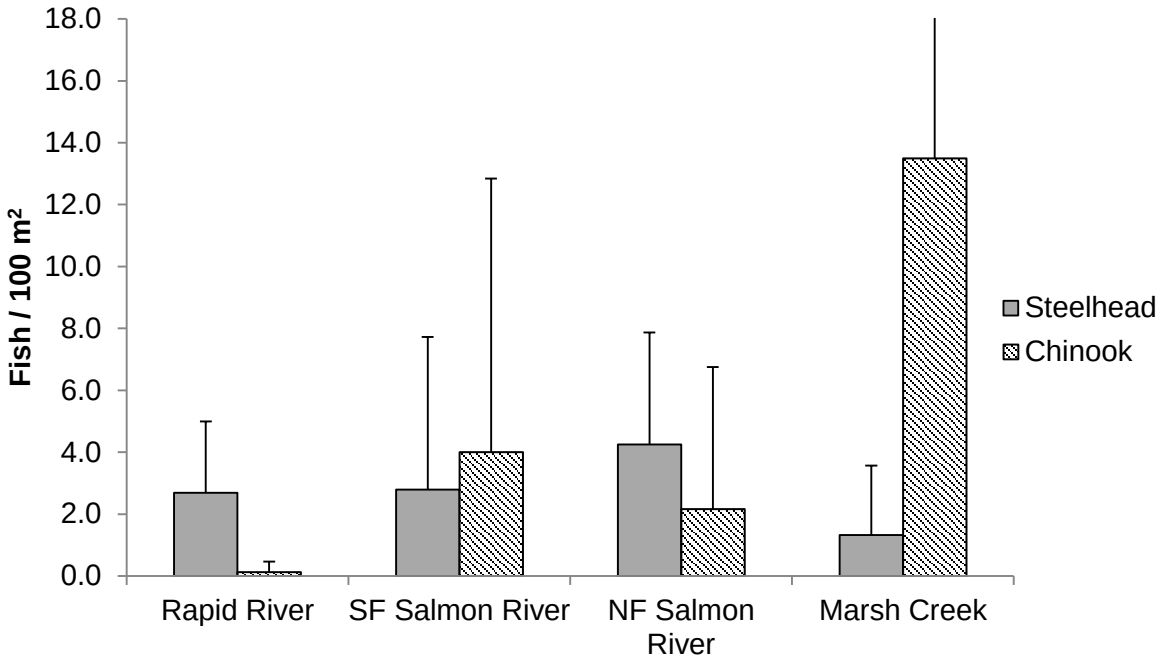


Figure 5. Mean densities of Steelhead trout and Chinook Salmon per 100m$^2$ observed during snorkel surveys at intensive sites in the Salmon basin in 2015. Error bars represent one standard deviation.

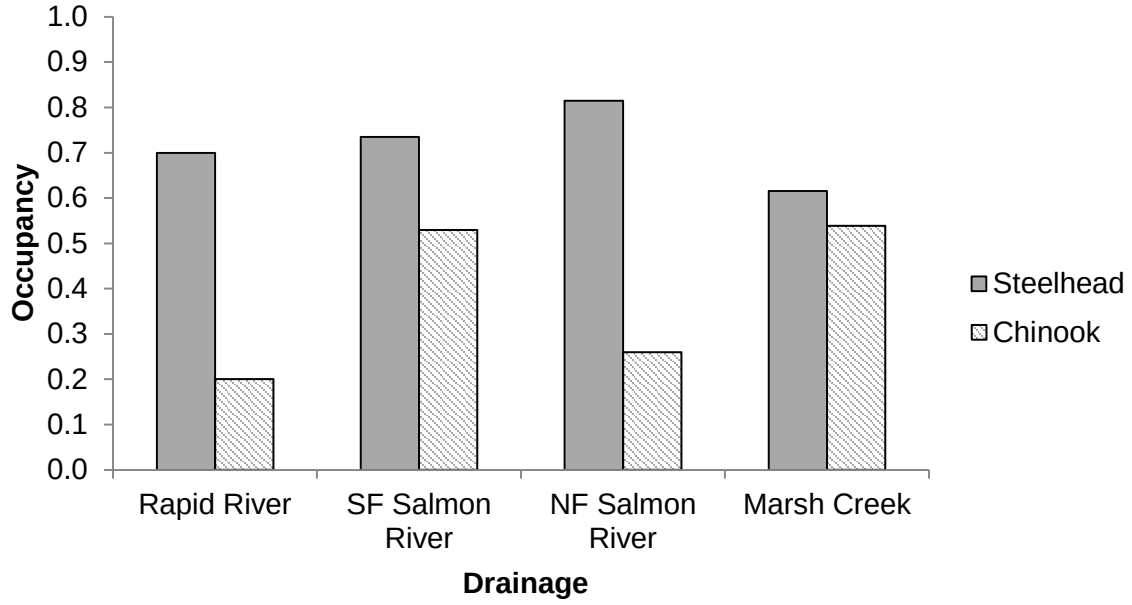


Figure 6. Occupancy of Steelhead trout and Chinook Salmon observed during snorkel surveys at intensive sites in the Salmon basin in 2015.

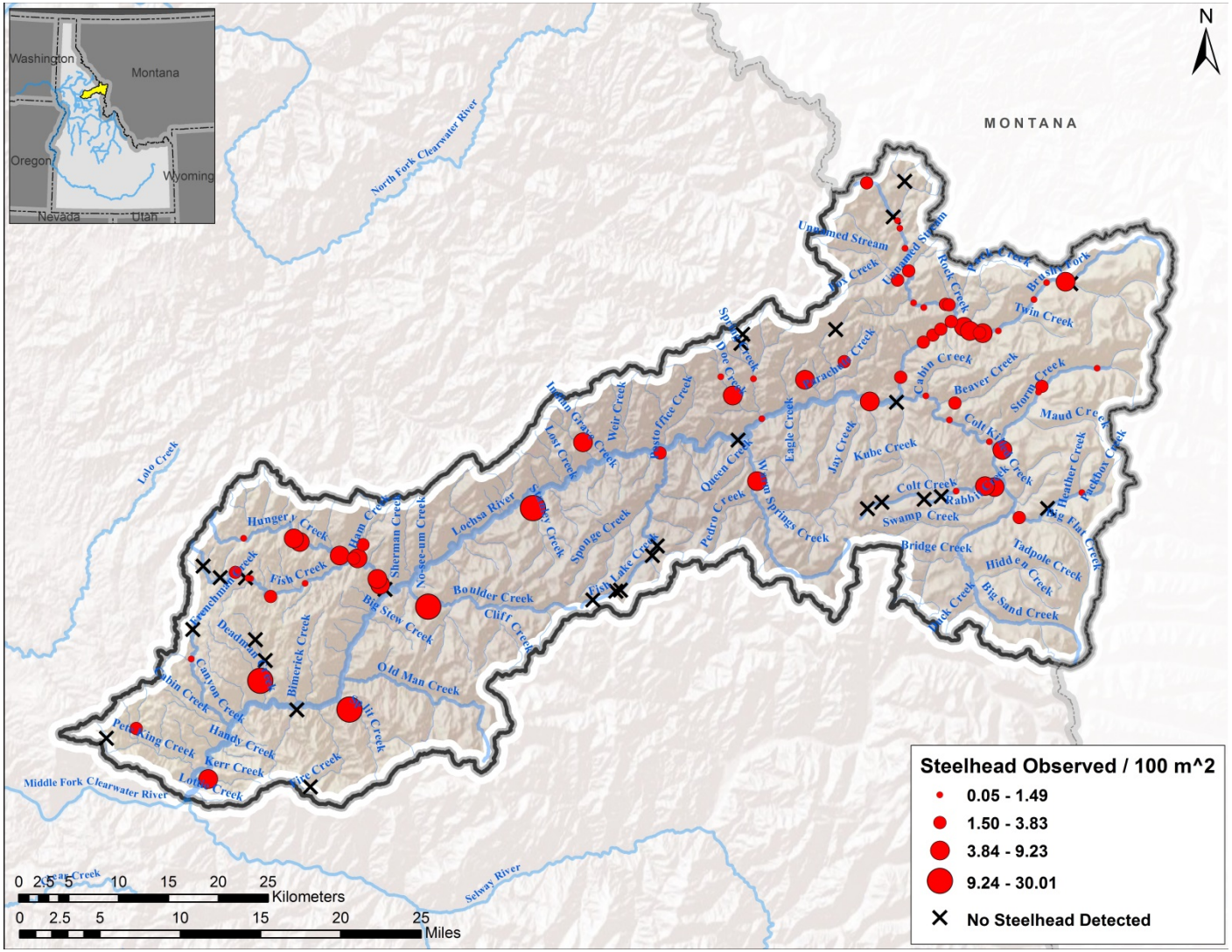


Figure 7. Density and distribution of Steelhead trout in the Lochsa River population observed during surveys completed in 2014 and 2015.

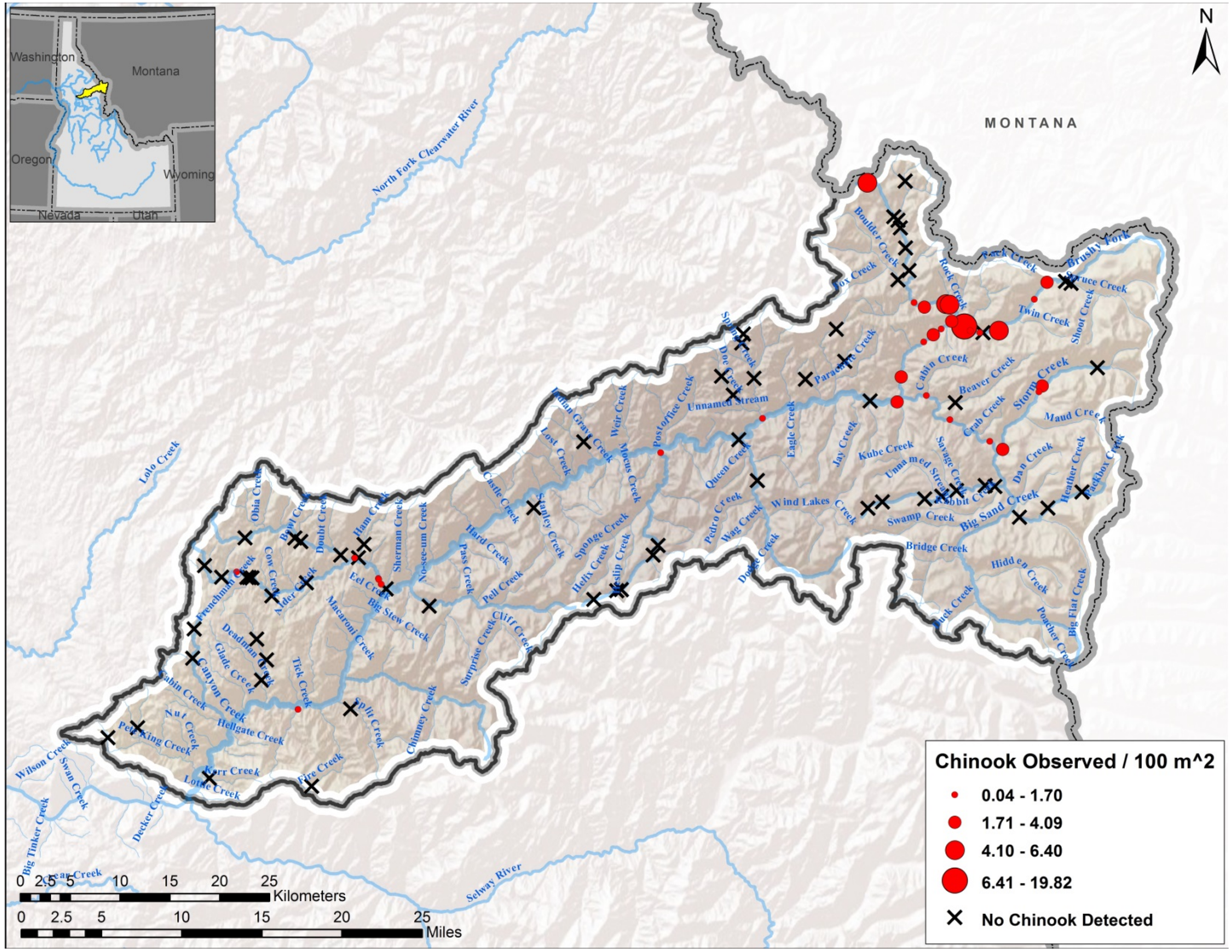


Figure 8. Map displaying the density and distribution of Chinook Salmon in the Lochsa River Steelhead trout population observed during surveys completed in 2014 and 2015.

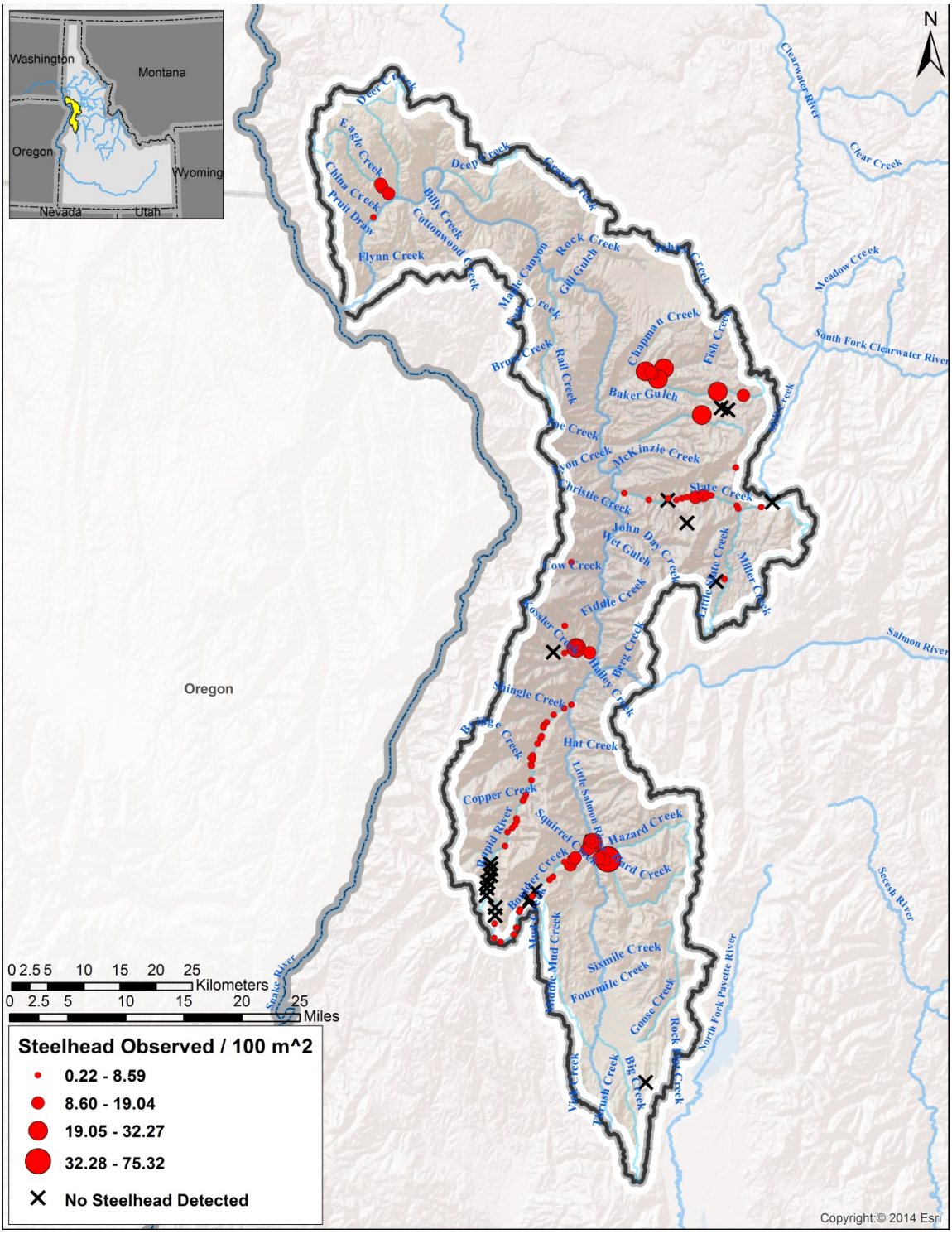


Figure 9. Map displaying the density and distribution of Steelhead trout in the Lower Salmon River population observed during snorkel surveys completed in 2014 and 2015.

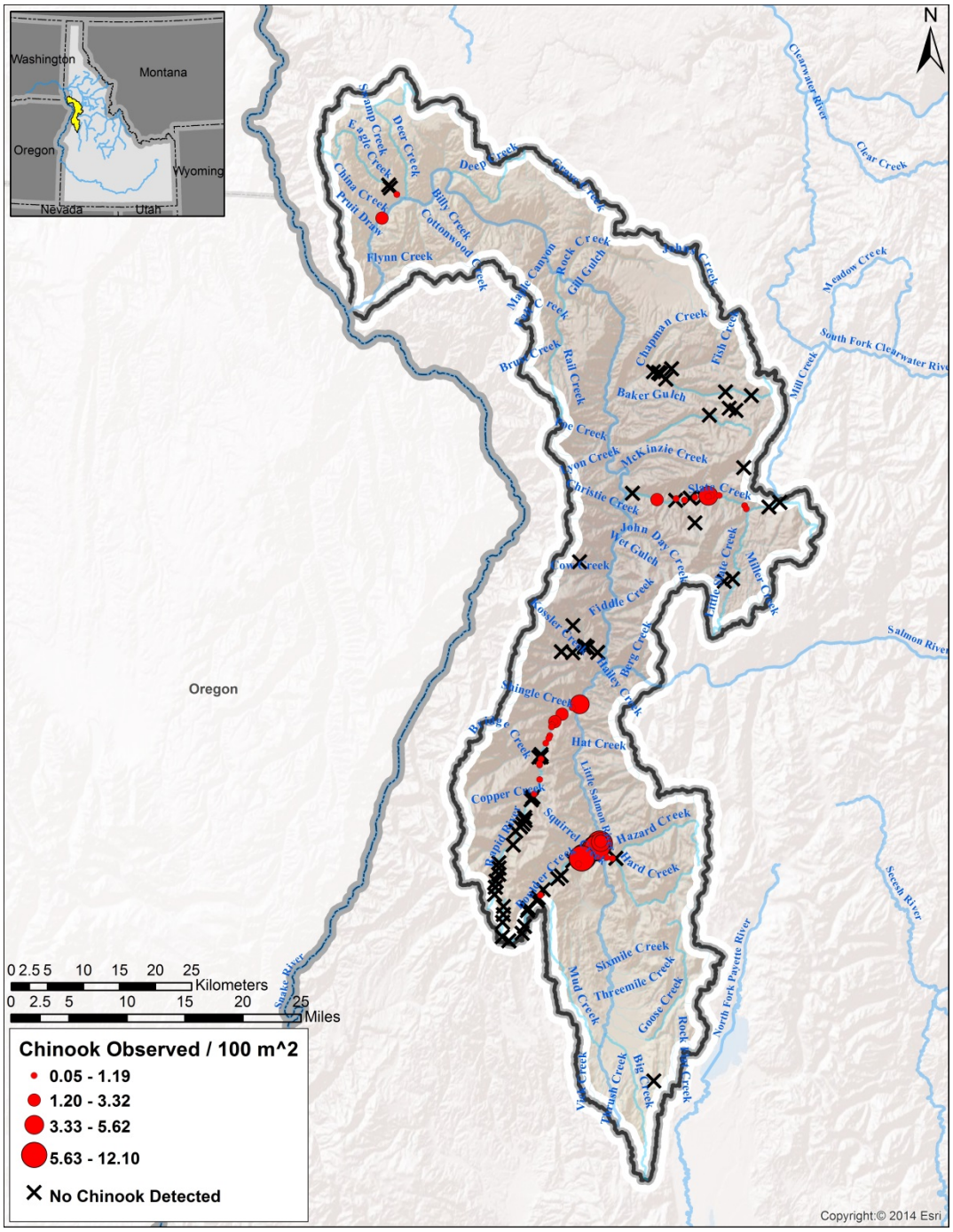


Figure 10. Map displaying the density and distribution of Chinook Salmon in the Lower Salmon River Steelhead trout population observed during snorkel surveys completed in 2014 and 2015.

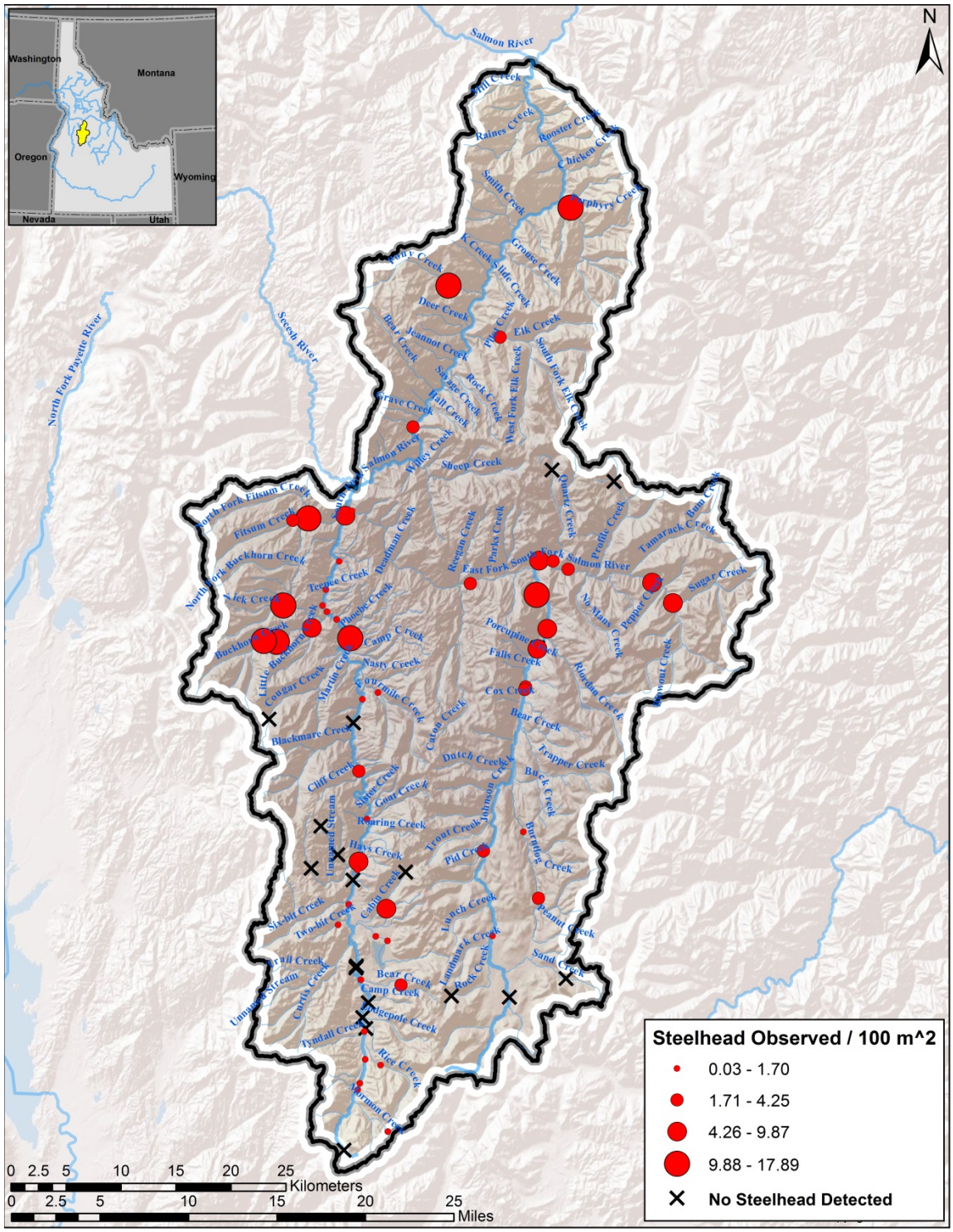


Figure 11. Map displaying the density and distribution of Steelhead trout in the South Fork Salmon River population observed during snorkel surveys.

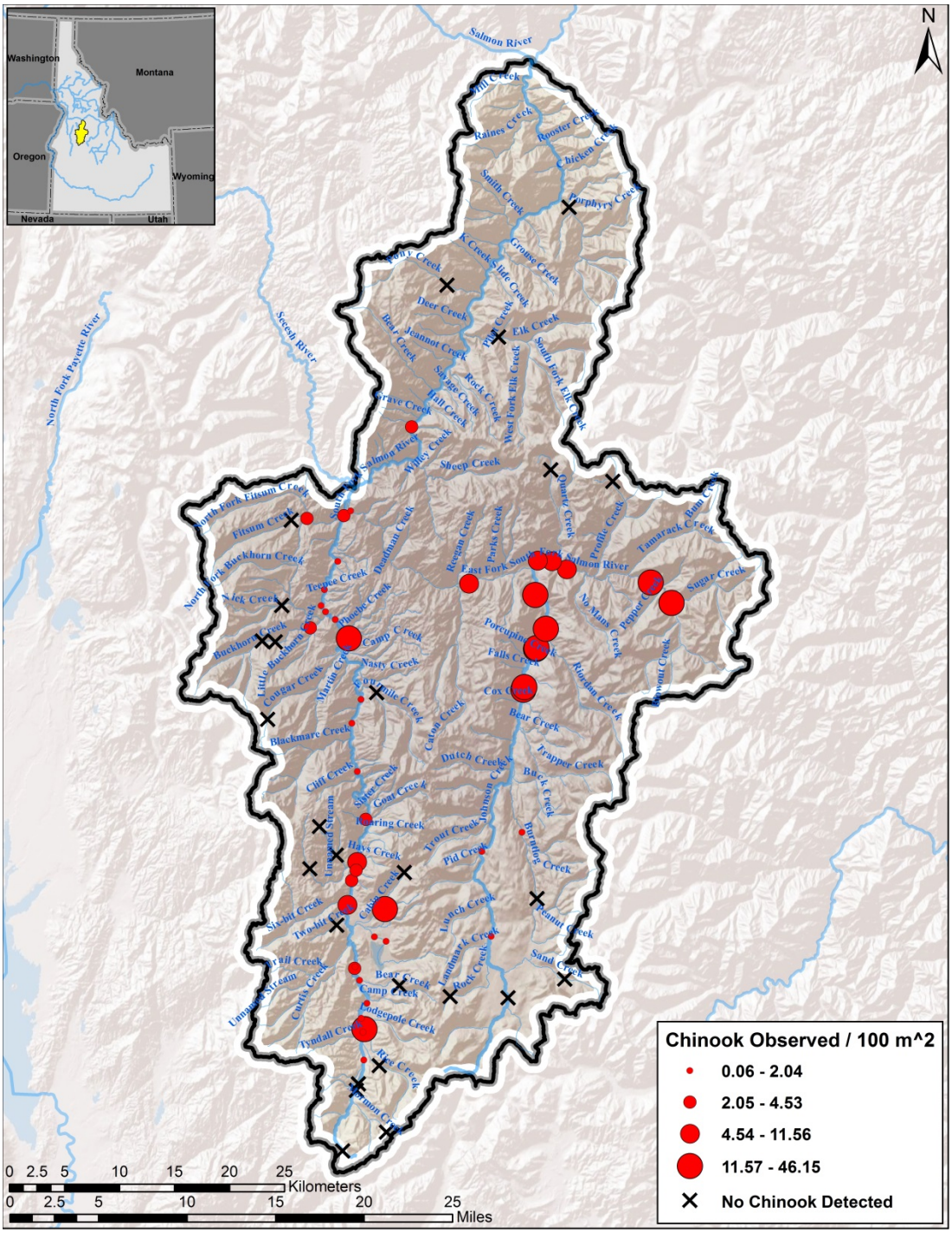


Figure 12. Map displaying the density and distribution of Chinook Salmon in the South Fork Salmon River Steelhead trout population observed during snorkel surveys completed in 2014 and 2015.

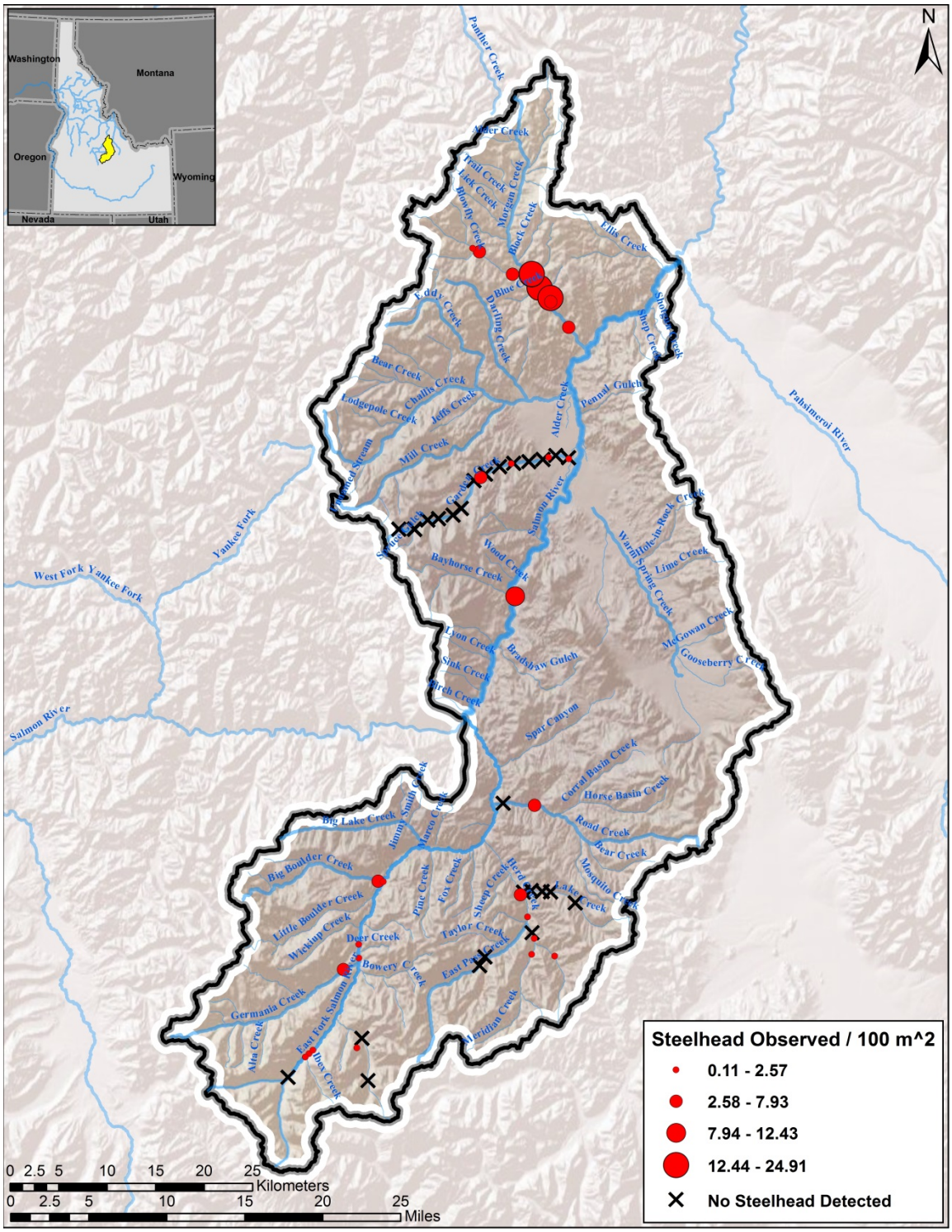


Figure 13. Map displaying the density and distribution of Steelhead trout in the East Fork Salmon River population observed during snorkel surveys completed in 2014 and 2015.

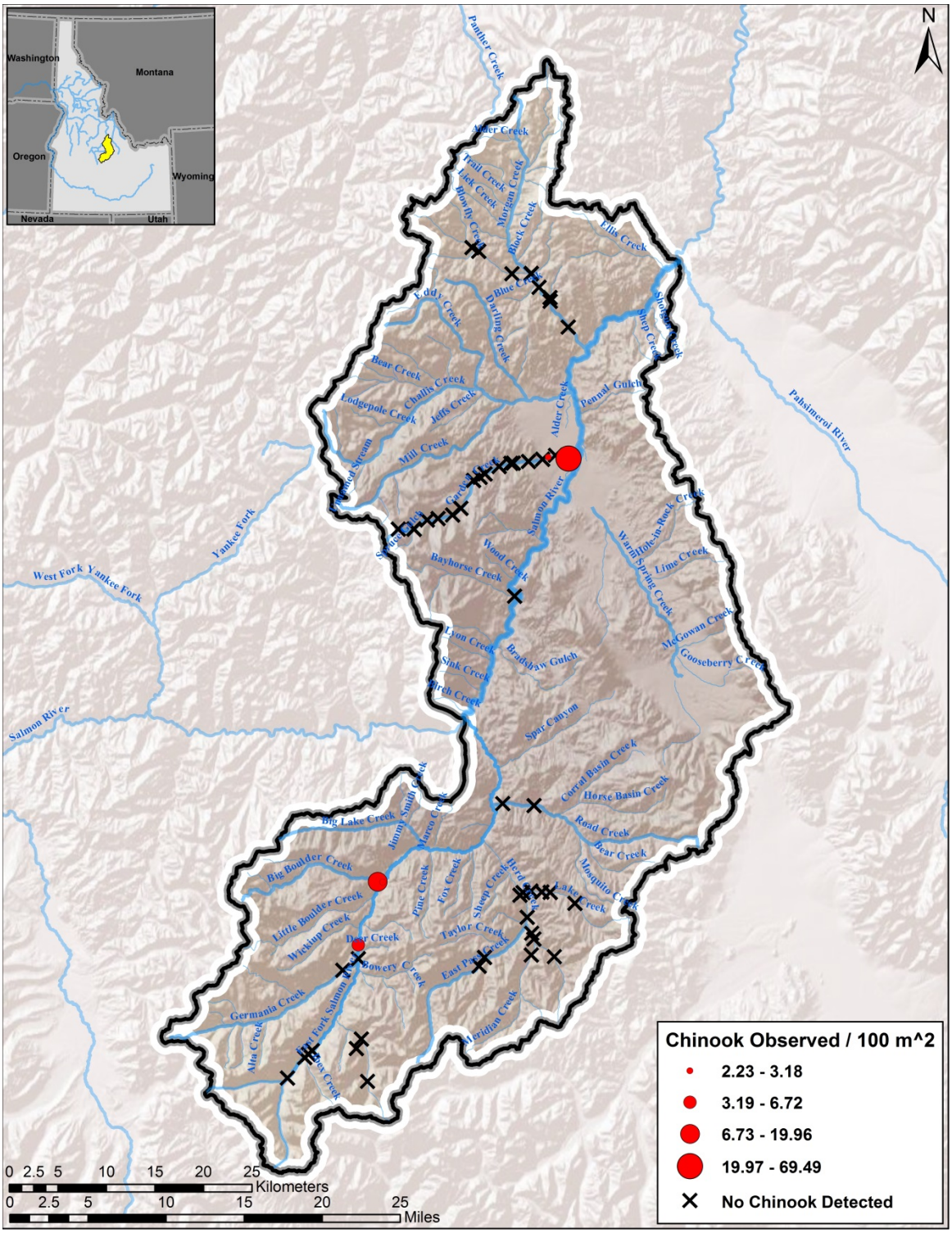


Figure 14. Map displaying the density and distribution of Chinook Salmon in the East Fork Salmon River Steelhead trout population observed during snorkel surveys completed in 2014 and 2015.

# APPENDICES

Appendix A1. IDFG core trend snorkel survey transects n = 218 by Snake River Steelhead major and independent population. Middle Fork Salmon River and its tributaries were surveyed by regional management crews funded by the Dingell-Johnson Act and License funds.

| Steelhead Major and Independent Population | Stream Name | Stratum | Transect Name | Survey Frequency | Last Surveyed | Next Scheduled Survey |
|---|---|---|---|---|---|---|
| **Hells Canyon Tributaries** | | | | | | |
| Hells Canyon (SNHCT-s) | Granite Creek | --- | 1 | Annual | 2015 | 2016 |
| | Granite Creek | --- | 3 | Annual | 2015 | 2016 |
| | Sheep Creek | --- | 1 | Annual | 2015 | 2016 |
| | Sheep Creek | --- | 2 | Annual | 2015 | 2016 |
| Independent Population Total: | | | 4 | | | |
| MPG Total: | | | 4 | | | |
| **Clearwater River** | | | | | | |
| Lower Clearwater River (CRLMA-s) | Big Canyon Creek | --- | 1 | Annual | | |
| Independent Population Total: | | | 1 | | | |
| South Fork Clearwater River (CRSFC-s) | American River | 2 | 1 | Annual | 2015 | 2016 |
| | American River | 3 | 2 | Triannual | 2015 | |
| | Crooked River | 1 | BOULDER-A | Annual | 2015 | 2016 |
| | Crooked River | 1 | BOULDER-B | Triannual | 2015 | |
| | Crooked River | 1 | SILL-LOG-B | Triannual | 2014 | |
| | Crooked River | 2 | CONTROL1 | Triannual | 2015 | |
| | Crooked River | 2 | CONTROL2 | Triannual | 2014 | |
| | Crooked River | 2 | TREAT2 | Annual | 2015 | 2016 |
| | Crooked River | 3 | NATURAL1 | Annual | 2015 | 2016 |
| | Crooked River | 4 | MEANDER1 | Annual | 2015 | 2016 |
| | Crooked River | C | CAN2 | Triannual | 2014 | |
| | Crooked River | C | CAN3 | Annual | 2015 | 2016 |
| | East Fork Crooked River | H | EF1 | Annual | 2015 | 2016 |
| | East Fork Crooked River | H | EF2 | Triannual | 2012 | 2016 |
| | Johns Creek | 1 | 1 | Triannual | 2013 | 2016 |
| | Johns Creek | 1 | 2 | Triannual | 2013 | 2016 |
| | Johns Creek | 2 | 3 | Triannual | 2013 | 2016 |
| | Red River | 1 | CNTL 1 | Annual | 2015 | 2016 |
| | Red River | 1 | CNTL 2 | Annual | 2015 | 2016 |
| | Red River | 2 | CNTL 2 | Annual | 2015 | 2016 |
| | Red River | 2 | TREAT 2 | Annual | 2015 | 2016 |
| | Red River | 4 | CNTL 2 | Annual | 2015 | 2016 |
| | Red River | 4 | TREAT 2 | Annual | 2015 | 2016 |
| | Red River | 5 | CNTL 2 | Annual | 2015 | 2016 |
| | Red River | 5 | TREAT 2 | Annual | 2015 | 2016 |
| | Relief Creek | 1 | 1A | Triannual | 2015 | |
| | Relief Creek | 1 | 1B | Triannual | 2015 | |
| | Tenmile Creek | --- | 1 | Triannual | 2013 | 2016 |

Appendix A1. Continued

| Steelhead Major and Independent Population | Stream Name | Stratum | Transect Name | Survey Frequency | Last Surveyed | Next Scheduled Survey |
|---|---|---|---|---|---|---|
| | West Fork Crooked River | H | WF1 | Annual | 2014 | |
| | West Fork Crooked River | H | WF2 | Triannual | 2015 | |
| Independent Population Total: | | | 30 | | | |
| Lochsa River (CRLOC-s) | Brushy Fork | 3 | 1 | Biannual | 2015 | |
| | Brushy Fork | 3 | 2 | Annual | 2015 | |
| | Colt Creek | | BRIDGE | Biannual | 2015 | |
| | Crooked Fork Creek | 1 | 2A | Biannual | 2015 | |
| | Crooked Fork Creek | 2 | 3A | Biannual | 2015 | |
| | Crooked Fork Creek | 2 | 4A | Biannual | 2015 | |
| | Crooked Fork Creek | 3 | 1 | Biannual | 2015 | |
| | Crooked Fork Creek | 3 | 2 | Biannual | 2015 | |
| | Crooked Fork Creek | 3 | 2B | Annual | 2015 | |
| | Crooked Fork Creek | 4 | 1B | Annual | 2014 | 2016 |
| | Fish Creek | --- | 1 | Annual | 2015 | |
| | Fish Creek | --- | 2 | Annual | 2015 | |
| | Lochsa River | --- | L1 | Annual | 2014 | 2016 |
| | Lochsa River | --- | L2 | Biannual | 2014 | 2016 |
| | Lochsa River | --- | L3 | Biannual | 2014 | 2016 |
| | Lochsa River | --- | L4 | Annual | 2014 | 2016 |
| | Old Man Creek | --- | 1 | Triannual | 2013 | 2016 |
| | Postoffice Creek | --- | 1 | Triannual | 2013 | 2016 |
| | Postoffice Creek | --- | 2 | Triannual | 2014 | 2016 |
| | Warm Springs Creek | --- | 1 | Biannual | 2015 | |
| | White Sands Creek | --- | LWRMONITOR | Biannual | 2014 | 2016 |
| Independent Population Total: | | | 21 | | | |
| Selway River (CRSEL-s) | Bear Creek | --- | 1 | Annual | 2015 | |
| | Bear Creek | --- | 2 | Annual | 2015 | |
| | Deep Creek | --- | CACTUS | Annual | 2015 | |
| | Deep Creek | --- | SCIMITAR | Annual | 2015 | |
| | East Fork Moose Creek | --- | 3 | Annual | 2015 | |
| | Meadow Creek | --- | 1 | Annual | 2015 | |
| | Moose Creek | --- | 1 | Annual | 2015 | |
| | Moose Creek | --- | 2 | Annual | 2010 | |
| | Running Creek | --- | 1 | Annual | 2015 | |
| | Running Creek | --- | 2 | Annual | 2015 | |
| | Selway River | --- | HELLSHALF | Annual | 2015 | |
| | Selway River | --- | LITTLE-CW | Annual | 2015 | |
| | Selway River | --- | MAG-XING | Annual | 2015 | |
| | Selway River | --- | RUNNING CR | Annual | 2015 | |
| | Three Links Creek | --- | 1 | Annual | 2015 | |
| | White Cap Creek | 3 | 1 | Annual | 2015 | |

Appendix A1. Continued

| Steelhead Major and Independent Population | Stream Name | Stratum | Transect Name | Survey Frequency | Last Surveyed | Next Scheduled Survey |
|---|---|---|---|---|---|---|
| | White Cap Creek | 3 | 2 | Annual | 2015 | |
| | White Cap Creek | 3 | 3 | Annual | 2015 | |
| Independent Population Total: | | | 18 | | | |
| MPG Total: | | | 70 | | | |
| **Salmon River** | | | | | | |
| Little Salmon River (SRLSR-s) | Boulder Creek | ABOVE | 1 | Annual | 2015 | 2016 |
| | Boulder Creek | ABOVE | 2 | Annual | 2015 | 2016 |
| | Boulder Creek | BELOW | 3 | Annual | 2015 | 2016 |
| | Boulder Creek | BELOW | 5 | Annual | 2015 | 2016 |
| | Hazard Creek | --- | HAZ1 | Annual | 2015 | 2016 |
| | Little Salmon River | --- | 1 | Annual | 2015 | 2016 |
| | Little Salmon River | --- | 2 | Annual | 2015 | 2016 |
| | Rapid River | BLW W FK | RAP2 | Annual | | |
| | Slate Creek | --- | 1 | Triannual | 2014 | 2017 |
| | Slate Creek | --- | 2 | Triannual | 2014 | 2017 |
| | Slate Creek | --- | 3 | Triannual | 2014 | 2017 |
| | Slate Creek | --- | 4 | Triannual | 2014 | 2017 |
| | Slate Creek | --- | 6 | Triannual | 2014 | 2017 |
| | South Fork White Bird Creek | --- | SF-#2 | Triannual | 2014 | 2017 |
| | South Fork White Bird Creek | --- | SF-#3 | Triannual | 2014 | 2017 |
| | West Fork Rapid River | BLW FALLS | RAP1 | Annual | | |
| | White Bird Creek | --- | 1 | Triannual | 2014 | 2017 |
| Independent Population Total: | | | 17 | | | |
| South Fork Salmon River (SFMAI-s) | East Fork South Fork Salmon | ABV JHNSN | 3 | Biannual | 2014 | 2016 |
| | East Fork South Fork Salmon | BLW JHNSN | 6 | Biannual | 2014 | 2016 |
| | East Fork South Fork Salmon | BLW JHNSN | 7 | Biannual | 2014 | 2016 |
| | Johnson Creek | LOWER IV | L2 | Triannual | 2013 | 2016 |
| | Johnson Creek | LOWER IV | L3 | Triannual | 2013 | 2016 |
| | Johnson Creek | MID LOWIII | PW3B | Triannual | 2013 | 2016 |
| | Johnson Creek | MID UPR II | PW3A | Triannual | 2013 | 2016 |
| | Johnson Creek | UPPER I | M1 | Triannual | 2013 | 2016 |
| | Johnson Creek | UPPER I | M2 | Triannual | 2013 | 2016 |
| | Johnson Creek | UPPER I | M3 | Triannual | 2013 | 2016 |
| | Johnson Creek | UPPER I | PW1A | Triannual | 2013 | 2016 |
| | Rock Creek | UPPER I | M1 | Triannual | 2013 | 2016 |
| | Sand Creek | UPPER I | M2 | Triannual | 2013 | 2016 |
| | South Fork Salmon River | --- | 11 | Annual | 2015 | 2016 |
| | South Fork Salmon River | --- | 14 | Annual | 2015 | 2016 |
| | South Fork Salmon River | --- | 16 | Annual | 2015 | 2016 |
| | South Fork Salmon River | --- | 5 | Annual | 2015 | 2016 |
| | South Fork Salmon River | --- | 7 | Annual | 2015 | 2016 |
| | South Fork Salmon River | --- | POVERTY | Annual | 2015 | 2016 |

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 | 2015 | 2016 |
| | South Fork Salmon River | --- | STOLLE2 | Annual | 2015 | 2016 |
| Independent Population Total: | | | 21 | | | |
| Secesh River (SFSEC-s) | Lake Creek | --- | BURGDORF | Annual | 2015 | 2016 |
| | Lake Creek | --- | WILLOW CR | Annual | 2015 | 2016 |
| | Lick Creek | --- | L3 | Annual | 2015 | 2016 |
| | Secesh River | --- | GROUSE | Annual | 2015 | 2016 |
| | Secesh River | --- | LONG-GULCH | Annual | 2015 | 2016 |
| Independent Population Total: | | | 5 | | | |
| Chamberlain Creek (SRCHA-s) | Bargamin Creek | --- | 1 | Biannual | 2014 | 2016 |
| | Bargamin Creek | --- | 2 | Biannual | 2014 | 2016 |
| | Chamberlain Creek | --- | CHA1 | Biannual | 2014 | 2016 |
| | Chamberlain Creek | --- | CHA4 | Biannual | 2014 | 2016 |
| | Sheep Creek | --- | L1 | Biannual | 2014 | 2016 |
| | Sheep Creek | --- | L2 | Biannual | 2014 | 2016 |
| | West Fork Chamberlain Cr. | --- | CHA2 | Biannual | 2014 | 2016 |
| | West Fork Chamberlain Cr. | --- | CHA3 | Biannual | 2014 | 2016 |
| Independent Population Total: | | | 8 | | | |
| Lower Middle Fork Salmon River | Big Creek | LOWER | L1 | Annual | | |
| (Loon Creek and below; MFBIG-s) | Big Creek | MIDDLE | Cabin Cr | Biannual | 2015 | 2017 |
| | Big Creek | MIDDLE | TAYLOR 1 | Biannual | 2015 | 2017 |
| | Big Creek | UPPER | LOGAN CR | Biannual | 2014 | 2016 |
| | Camas Creek | --- | 2 | Biannual | 2015 | 2017 |
| | Camas Creek | --- | CAM1 | Biannual | 2015 | 2017 |
| | Loon Creek | C CHANNEL | 2 | Biannual | 2013 | 2016 |
| | Loon Creek | LNM1 | 3 | Biannual | 2013 | 2016 |
| | Loon Creek | PACK BR | 1 | Biannual | 2013 | 2016 |
| | Middle Fork Salmon River | 2 | HOSPPL | Annual | 2015 | 2016 |
| | Middle Fork Salmon River | 2 | HOSPRUN | Annual | 2015 | 2016 |
| | Middle Fork Salmon River | 2 | TAPPANPOOL | Annual | 2015 | 2016 |
| | Middle Fork Salmon River | 2 | TAPPANRUN | Annual | 2000 | NA |
| | Middle Fork Salmon River | 3 | AIRSTRIP | Annual | 2015 | 2016 |
| | Middle Fork Salmon River | 3 | FLYING-B | Annual | 2015 | 2016 |
| | Middle Fork Salmon River | 3 | SURVEY | Annual | 2015 | 2016 |
| | Middle Fork Salmon River | 4 | BIG-CR-BR | Annual | 2015 | 2016 |
| | Middle Fork Salmon River | 4 | GOATPOOL | Annual | 2015 | 2016 |
| | Middle Fork Salmon River | 4 | GOATRUN | Annual | 2015 | 2016 |
| | Middle Fork Salmon River | 4 | LITOUZEL | Annual | 2015 | 2016 |
| | Middle Fork Salmon River | 4 | LOVEBAR | Annual | 2015 | 2016 |
| | Middle Fork Salmon River | 4 | OTTERBAR | Annual | 2015 | 2016 |
| | Middle Fork Salmon River | 4 | SHIPISLAND | Annual | 2015 | 2016 |

Appendix A1. Continued

| Steelhead Major and Independent Population | Stream Name | Stratum | Transect Name | Survey Frequency | Last Surveyed | Next Scheduled Survey |
|---|---|---|---|---|---|---|
| | Monumental Creek | --- | MON1 | Triannual | 2013 | 2016 |
| | Monumental Creek | --- | MON2 | Triannual | 2013 | 2016 |
| | Monumental Creek | --- | MON3 | Triannual | 2013 | 2016 |
| | Monumental Creek | --- | MON5 | Triannual | 2013 | 2016 |
| | West Fork Monumental Creek | --- | MON4 | Triannual | 2013 | 2016 |
| Independent Population Total: | | | 28 | | | |
| Upper Middle Fork Salmon River (above Loon Creek; MFUMA-s) | Beaver Creek | --- | A | Annual | 2015 | 2016 |
| | Beaver Creek | --- | B | Annual | 2015 | 2016 |
| | Cape Horn Creek | 1 | A | Annual | 2015 | 2016 |
| | Cape Horn Creek | 2 | B | Annual | 2015 | 2016 |
| | Elk Creek | --- | 1A | Annual | 2015 | 2016 |
| | Elk Creek | --- | 1B | Annual | 2015 | 2016 |
| | Elk Creek | --- | 2A | Annual | 2015 | 2016 |
| | Elk Creek | --- | 2B | Annual | 2015 | 2016 |
| | Knapp Creek | 1 | A | Annual | 2015 | 2016 |
| | Knapp Creek | 1 | B | Annual | 2015 | 2016 |
| | Knapp Creek | 1 | LCKD FENCE | Annual | 2015 | 2016 |
| | Marble Creek | UPPER | MAR1 | Biannual | 2014 | 2016 |
| | Marble Creek | UPPER | MAR1B | Biannual | 2014 | 2016 |
| | Marble Creek | UPPER | MAR2 | Biannual | 2014 | 2016 |
| | Marsh Creek | 1 | A | Annual | 2015 | 2016 |
| | Marsh Creek | 1 | B | Annual | 2015 | 2016 |
| | Marsh Creek | 3 | A | Annual | 2015 | 2016 |
| | Marsh Creek | 4 | B | Annual | 2009 | 2016 |
| | Marsh Creek | 5 | A | Annual | 2009 | 2016 |
| | Middle Fork Salmon River | 1 | BOUNDARY | Annual | 2015 | 2016 |
| | Middle Fork Salmon River | 1 | ELKHORN | Annual | 2015 | 2016 |
| | Middle Fork Salmon River | 1 | GRDLHOLE | Annual | 2015 | 2016 |
| | Middle Fork Salmon River | 1 | GREYHOUND | Annual | 2014 | 2016 |
| | Middle Fork Salmon River | 1 | INDIAN | Annual | 2015 | 2016 |
| | Middle Fork Salmon River | 1 | RAPID-R | Annual | 2015 | 2016 |
| | Middle Fork Salmon River | 1 | SHEEPEATER | Annual | 2015 | 2016 |
| | Middle Fork Salmon River | 1 | VELVET | Annual | 2015 | 2016 |
| | Middle Fork Salmon River | 2 | COUGAR | Annual | 2015 | 2016 |
| | Middle Fork Salmon River | 2 | LJACKASS | Annual | 2015 | 2016 |
| | Middle Fork Salmon River | 2 | MARBLPL | Annual | 2015 | 2016 |
| | Middle Fork Salmon River | 2 | PUNGO | Annual | 2015 | 2016 |
| | Middle Fork Salmon River | 2 | ROCK IS | Annual | 2015 | 2016 |
| | Middle Fork Salmon River | 2 | SKIJUMP | Annual | 2015 | 2016 |
| | Middle Fork Salmon River | 2 | WHITEYCX | Annual | 2015 | 2016 |
| Independent Population Total: | | | 34 | | | |
| Panther Creek (SRPAN-s) | Horse Creek | --- | L1 | Triannual | 2014 | 2017 |

Appendix A1. Continued

| Steelhead Major and Independent Population | Stream Name | Stratum | Transect Name | Survey Frequency | Last Surveyed | Next Scheduled Survey |
|---|---|---|---|---|---|---|
| | Horse Creek | --- | L2 | Triannual | 2014 | 2017 |
| | Panther Creek | ABOVE | PC9 | Annual | 2015 | 2016 |
| | Panther Creek | DS-BIGD | PC4 | Annual | 2015 | 2016 |
| | Panther Creek | DS-BLACKB | PC6 | Annual | 2009 | NA |
| | Panther Creek | DS-CLEAR | PC1 | Annual | 2015 | 2016 |
| Independent Population Total: | | | 6 | | | |
| North Fork Salmon River (SRNFS-s) | North Fork Salmon River | 2 | DAHLONEGA | Annual | 2015 | 2016 |
| | Pine Creek | --- | BRIDGE | Annual | 2014 | 2016 |
| | Pine Creek | --- | SAWMILL CR | Triannual | 2014 | 2017 |
| | North Fork Salmon River | 2 | HUGHES | Triannual | 2014 | 2018 |
| Independent Population Total: | | | 4 | | | |
| Lemhi River (SRLEM-s) | Big Springs Creek | LEM1 | A | Biannual | 2015 | 2017 |
| | Hayden Creek | HC2 | B | Biannual | 2014 | 2016 |
| | Hayden Creek | HC3 | B | Biannual | 2014 | 2016 |
| | Lemhi | 1 | LEM3A | Biannual | 2011 | 2016 |
| Independent Population Total: | | | 4 | | | |
| Pahsimeroi River (SRPAH-s) | Pahsimeroi River | LOWER | DWTNLANE | Biannual | 2015 | 2017 |
| Independent Population Total: | | | 1 | | | |
| East Fork Salmon River (SREFS-s) | East Fork Salmon River | ABOVE-WEIR | 2 | Biannual | 2014 | 2016 |
| | East Fork Salmon River | ABOVE-WEIR | 3 | Biannual | 2014 | 2016 |
| | Morgan Creek | UPPER | BLM CAMP | Triannual | 2014 | 2017 |
| Independent Population Total: | | | 3 | | | |
| Upper Salmon River (SRUMA-s) | Alturas Lake Creek | 2 | 2B | Annual | 2015 | 2016 |
| | Redfish Lake Creek | --- | LOWER | Annual | 2006 | NA |
| | Redfish Lake Creek | --- | WEIR DS | Annual | 2015 | 2016 |
| | Salmon River | 1 | RBNSN-BAR | Annual | 2015 | 2016 |
| | Salmon River | 2 | 2B | Annual | 2015 | 2016 |
| | Salmon River | 3 | 3B | Annual | 2015 | 2016 |
| | Salmon River | 3 | 3BRA | Annual | 2015 | 2016 |
| | Salmon River | 4 | 4B | Annual | 2015 | 2016 |
| | Salmon River | 7 | 7A | Annual | 2015 | 2016 |
| | Valley Creek | 1 | B | Annual | 2015 | 2016 |
| | Valley Creek | 3 | A | Annual | 2015 | 2016 |
| | Valley Creek | 3 | B | Annual | 2015 | 2016 |
| | Valley Creek | 6 | B | Annual | 2015 | 2016 |
| Independent Population Total: | | | 13 | | | |
| MPG Total: | | | 144 | | | |
| Snake River DPS Total: | | | 218 | | | |

Appendix A2. IDFG non-core trend snorkel survey transects n = 104 by Snake River Steelhead major and independent population. Middle Fork Salmon River and its tributaries were surveyed by regional management crews funded by the Dingell-Johnson Act and License funds.

| Steelhead Major and Independent Population | Stream Name | Stratum | Transect Name | Survey Frequency | Last Surveyed | Next Scheduled Survey |
|---|---|---|---|---|---|---|
| **Hells Canyon Tributaries** | | | | | | |
| Hells Canyon (SNHCT-s) | Granite Creek | --- | 2 | Opportunistic | 2013 | |
| Independent Population Total: | | | 1 | | | |
| MPG Total: | | | 1 | | | |
| **Clearwater River** | | | | | | |
| Lower Clearwater River (CRLMA-s) | East Fork Potlatch River | --- | PFI4 | Opportunistic | 2010 | |
| | East Fork Potlatch River | --- | PFI5 | Opportunistic | 2010 | |
| | East Fork Potlatch River | --- | PFI6 | Opportunistic | 2010 | |
| | East Fork Potlatch River | --- | PFI7 | Opportunistic | 2010 | |
| | East Fork Potlatch River | --- | PFI8 | Opportunistic | 2010 | |
| | East Fork Potlatch River | --- | PFI9 | Opportunistic | 2010 | |
| | East Fork Potlatch River | --- | 1 | Opportunistic | 2009 | |
| | East Fork Potlatch River | --- | 2 | Opportunistic | 2008 | |
| | East Fork Potlatch River | --- | 3 | Opportunistic | 2008 | |
| Independent Population Total: | | | 9 | | | |
| South Fork Clearwater River (CRSFC-s) | American River | 2 | 1/8MABVEFK | Opportunistic | 2011 | |
| | | | ABV CATTLE | | 2009 | |
| | American River | 2 | GRD | Variable | | |
| | | | FLAT IRON | | 2011 | |
| | American River | 2 | RIDGE | Variable | | |
| | American River | 2 | GUNTLEYS | Variable | 2011 | |
| | American River | 3 | STOCK SIGN | Variable | 2009 | |
| | American River | 1 | 2.25U | Variable | 2011 | |
| | American River | 1 | 2.65U | Variable | 2011 | |
| | American River | 1 | GRAVEL PIT | Variable | 2011 | |
| | | | .5MI BELOW | | 2011 | |
| | American River | 3 | BOXSING | Variable | | |
| | American River | 3 | BUFFALO PIT | Variable | 2011 | |
| | Crooked River | 2 | TREAT3 | Variable | 2009 | |
| | Crooked River | 3 | NATURAL3 | Variable | 2012 | |
| | Crooked River | 4 | MEANDER2 | Variable | 2011 | |
| | Crooked River | 1 | Control 2 | Variable | 2009 | |
| | Johns Creek | 2 | 4 | Variable | 2013 | |
| | Red River | 1 | SHISSLER CR | Variable | 2011 | |
| | | | UPPER | | 2011 | |
| | Red River | 1 | SHISSLER | Variable | | |
| | Red River | 3 | BELOW WEIR | Variable | 2011 | |
| | Red River | 3 | OLD BRIDGE | Variable | 2011 | |
| | Red River | 4 | BOULDER POOL | Variable | 2011 | |
| | 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 | 2010 | |
| | Fire Creek | --- | 1 | Opportunistic | 2011 | |
| | Fire Creek | --- | 2 | Opportunistic | 2011 | |
| | Hopeful Creek | 1 | 1-BOOGIEDN | Opportunistic | 2011 | |
| | Split Creek | --- | 1 | Opportunistic | 2011 | |
| | Split Creek | --- | 2 | Opportunistic | 2011 | |
| Independent Population Total: | | | 6 | | | |
| Selway River (CRSEL-s) | East Fork Moose Creek | --- | 2 | Opportunistic | 2015 | |
| | Gedney Creek | --- | 2 | Opportunistic | 2011 | |
| | Marten Creek | --- | 1 | Opportunistic | 2015 | |
| | Meadow Creek | --- | 2 | Opportunistic | 2011 | |
| | OHara Creek | --- | 1 | Opportunistic | 2011 | |
| | OHara Creek | --- | 2 | Opportunistic | 2011 | |
| | Selway River | --- | abv rodeo rapid | Opportunistic | 2015 | |
| | | | above wolf cr. | | 2011 | |
| | Selway River | --- | Rpd | Opportunistic | | |
| | Selway River | --- | blw Rodeo rapid | Opportunistic | 2015 | |
| | Selway River | --- | blw 3 links rpd | Opportunistic | 2015 | |
| | | | Moose creek | | 2015 | |
| | Selway River | --- | confluence | Opportunistic | | |
| | Selway River | --- | Selway lodge | Opportunistic | 2015 | |
| | Selway River | --- | 1 mi. blw wt cap | Opportunistic | 2015 | |
| | | | ½ mile below | | 2015 | |
| | Selway River | --- | Running | Opportunistic | | |
| | Selway River | --- | ½ mi. blw wt cap | Opportunistic | 2015 | |
| | Selway River | --- | Abv goat cr | Opportunistic | 2015 | |
| | Selway River | --- | Archer | Opportunistic | 2015 | |
| | Selway River | --- | below ham rapid | Opportunistic | 2015 | |
| | Selway River | --- | Blw pettibone cr | Opportunistic | 2015 | |
| | Selway River | --- | cougar bluff | Opportunistic | 2015 | |

Appendix A2. Continued

| Steelhead Major and Independent Population | Stream Name | Stratum | Transect Name | Survey Frequency | Last Surveyed | Next Scheduled Survey |
|---|---|---|---|---|---|---|
| | Selway River | --- | DIVIDE | Opportunistic | 2011 | |
| | Selway River | --- | dry bar | Opportunistic | 2011 | |
| | Selway River | --- | rattlesnake | Opportunistic | 2015 | |
| | Selway River | --- | BadLuck CR | Annual | 2015 | |
| | Selway River | --- | @ Lower Tango | Annual | 2015 | |
| | Selway River | --- | Big bend | Annual | 2015 | |
| | Selway River | --- | Osprey Is | Opportunistic | 2015 | |
| Independent Population Total: | | | 28 | | | |
| MPG Total: | | | 73 | | | |
| **Salmon River** | | | | | | |
| Little Salmon River (SRLSR-s) | Hazard Creek | --- | HAZ2 | Opportunistic | 2011 | -- |
| | Rapid River | ABV W FK | 4 | Annual | 2013 | |
| | Rapid River | ABV W FK | CASTLE CR | Annual | 2014 | |
| | Rapid River | ABV W FK | COPPER CR | Void | 2013 | |
| | Rapid River | ABV W FK | CORA CLIFF | Annual | 2014 | |
| | Rapid River | ABV W FK | PARADISE | Annual | 2014 | |
| | Rapid River | BLW W FK | CLIFF HANG | Annual | 2013 | |
| Independent Population Total: | | | 7 | | | |
| South Fork Salmon River (SFMAI-s) | South Fork Salmon River | --- | 5 | Opportunistic | 2015 | -- |
| | South Fork Salmon River | --- | BLW HAMILTON | Opportunistic | 2009 | -- |
| Independent Population Total: | | | 2 | | | |
| Secesh River (SFSEC-s) | Lick Creek | --- | L1 | Opportunistic | 2010 | -- |
| Independent Population Total: | | | 1 | | | |
| Lower Middle Fork Salmon River | Camas Creek | --- | Upper | Annual | 2015 | 2016 |
| (Loon Creek and below; MFBIG-s) | Middle Fork Salmon River | Lower | CLIFPL | Annual | 2014 | 2016 |
| | Middle Fork Salmon River | Lower | HANPOL | Annual | 2015 | 2016 |
| | Middle Fork Salmon River | Middle | AIRSTP | Biannual | 2015 | 2016 |
| Independent Population Total: | | | 4 | | | |
| Upper Middle Fork Salmon River | Indian Creek | --- | Lower | Annual | 2014 | 2016 |
| (above Loon Creek; MFUMA-s) | Indian Creek | --- | Upper | Annual | 2014 | 2016 |
| | Middle Fork Salmon River | Upper | Mahoney Camp | Annual | 2015 | 2016 |
| | Middle Fork Salmon River | Middle | WCPB | Annual | 2015 | 2016 |
| | Middle Fork Salmon River | Upper | LICRGS | Annual | 2015 | 2016 |
| Independent Population Total: | | | 5 | | | |
| Panther Creek (SRPAN-s) | Panther Creek | DS Clear | PC-2 | Opportunistic | 2012 | NA |

Appendix A2. Continued.

| Steelhead Major and Independent Population | Stream Name | Stratum | Transect Name | Survey Frequency | Last Surveyed | Next Scheduled Survey |
|---|---|---|---|---|---|---|
| | Panther Creek | Above | US Cabin Cr | Opportunistic | 2009 | 2016 |
| Independent Population Total: | | | 2 | | | |
| Lemhi River (SRLEM-s) | Big Springs Creek | --- | BSC BRIDGE | Annual | 2015 | 2016 |
| | Lemhi River | LEM2 | B | Biannual | 2015 | 2016 |
| Independent Population Total: | | | 2 | | | |
| Pahsimeroi River (SRPAH-s) | Pahsimeroi River | 1 | Ponds | Annual | 2015 | 2016 |
| | Pahsimeroi River | Weir | Weir | Annual | 2015 | 2016 |
| Independent Population Total | | | 2 | | | |
| Upper Salmon River (SRUMA-s) | Hannah Slough | --- | UPS Garden Cr | Annual | 2015 | 2016 |
| | Thompson Creek | Below | 1 | Opportunistic | 2014 | 2016 |
| Independent Population Total: | | | 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 were surveyed by regional management crews funded by the Dingell-Johnson Act and License funds.

| Steelhead Major and Independent Population | Stream Name | Stratum | Transect Name | Survey Frequency | Last Surveyed | Next Scheduled Survey |
|---|---|---|---|---|---|---|
| **Clearwater River** | | | | | | |
| South Fork Clearwater River (CRSFC-s) | Crooked River | 1 | SILL-LOG-A | Triannual | 2014 | |
| | Moores Creek | --- | 2 | Triannual | 2015 | |
| Independent Population Total: | | | 2 | | | |
| Lochsa River (CRLOC-s) | Squaw Creek | --- | 7 | Annual | 2015 | |
| Independent Population Total: | | | 1 | | | |
| Selway River (CRSEL-s) | Little Clearwater River | --- | 1 | Annual | 2015 | |
| | Little Clearwater River | --- | 2 | Annual | 2015 | |
| | North Fork Moose Creek | --- | 4 | Annual | 2015 | |
| | Selway River | --- | BEAVERPT | Annual | 2015 | |
| Independent Population Total: | | | 4 | | | |
| MPG Total: | | | 7 | | | |
| **Salmon River** | | | | | | |
| South Fork Salmon River (SFMAI-s) | East Fork South Fork Salmon | ABV JHNSN | SUGAR CR | Biannual | 2015 | 2017 |
| | East Fork South Fork Salmon | BLW JHNSN | MP 35.8 | Biannual | 2015 | 2017 |
| Independent Population Total: | | | 2 | | | |
| Secesh River (SFSEC-s) | Secesh River | --- | U-SCSH-MDW | Annual | 2015 | 2016 |
| Independent Population Total: | | | 1 | | | |
| Lower Middle Fork Salmon River | Big Creek | UPPER | NEAR FORD | Biannual | 2014 | 2016 |
| (Loon Creek and below; MFBIG-s) | Camas Creek | --- | 1 | Triannual | 2015 | 2018 |
| | Camas Creek | --- | L1-MOUTH | Annual | 2015 | 2016 |
| | Loon Creek | --- | L1-BRIDGE | Annual | 2015 | 2016 |
| | Loon Creek | --- | L2-RUN | Annual | 2015 | 2016 |
| Independent Population Total: | | | 5 | | | |
| Upper Middle Fork Salmon River | Bear Valley Creek | 1 | A | Triannual | 2015 | 2018 |
| (above Loon Creek; MFUMA-s) | Bear Valley Creek | 2 | B | Triannual | 2015 | 2018 |
| | Bear Valley Creek | 3 | A | Triannual | 2015 | 2018 |
| | Bear Valley Creek | 9 | B | Triannual | 2015 | 2018 |
| | Marble Creek | Lower | L1 | Annual | 2015 | 2016 |
| | Pistol Creek | --- | L1/Lower | Annual | 2015 | 2016 |
| | Pistol Creek | --- | L2/Upper | Annual | 2015 | 2016 |
| Independent Population Total: | | | 7 | | | |
| Panther Creek (SRPAN-s) | Panther Creek | Above | PC10 | Annual | 2015 | 2016 |

Appendix A3. Continued

| Steelhead Major and Independent Population | Stream Name | Stratum | Transect Name | Survey Frequency | Last Surveyed | Next Scheduled Survey |
|---|---|---|---|---|---|---|
| Independent Population Total: | | | 1 | | | |
| Lemhi River (SRLEM-s) | Bear Valley Creek | HC1 | B-LOWER | Triannual | 2014 | 2017 |
| | Bear Valley Creek | HC1 | CAMP | Triannual | 2014 | 2017 |
| Independent Population Total: | | | 2 | | | |
| Upper Salmon River (SRUMA-s) | Thompson Creek | ABOVE | TWO-POLE | Biannual | 2014 | 2016 |
| Independent Population Total: | | | 1 | | | |
| MPG Total: | | | 19 | | | |
| Snake River DPS Total: | | | 26 | | | |

Appendix B1. Densities (fish/100m$^2$) of Salmonids observed at 47 core trend transects snorkeled in the Clearwater River basin during 2015. Trout fry = all trout <50mm that could not be distinguished between Steelhead trout and Westslope Cutthroat Trout.

| | | Density (Fish/100 m$^2$) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Stream** | **Transect** | **Trout Fry** | **Steelhead** | **Chinook Salmon** | **WS Cutthroat Trout** | **Bull Trout** | **Brook Trout** | **Whitefish** | **Visibility (m)** | **Temp (°C)** |
| American River | 2/1 | 0.2 | - | 41.0 | 0.8 | - | 0.6 | 0.2 | 2.9 | 15.0 |
| American River | 3/2 | - | - | 20.4 | - | - | - | - | 1.4 | 14.0 |
| Bear Creek | 1 | 1.8 | - | 1.5 | 0.4 | - | - | - | 5.8 | 16.0 |
| Bear Creek | 2 | 3.4 | 1.8 | 0.7 | 0.6 | - | - | 0.4 | 5.8 | 16.0 |
| Colt Creek | BRIDGE | - | - | - | 2.0 | - | - | - | 3.1 | 11.0 |
| Crooked Fork Lochsa River | 1/2A | 0.7 | - | - | - | - | - | - | 3.5 | 12.0 |
| Crooked Fork Lochsa River | 2/3A | 1.2 | 0.6 | - | 6.2 | - | - | - | 5.6 | 13.0 |
| Crooked Fork Lochsa River | 2/4A | 1.1 | - | - | 3.8 | - | - | - | 3.8 | 17.0 |
| Crooked Fork Lochsa River | 3/1 | 3.4 | 3.0 | 19.8 | 1.1 | - | - | - | 5.0 | 16.0 |
| Crooked Fork Lochsa River | 3/2 | 4.1 | 0.3 | 8.2 | 0.3 | - | - | - | 5.0 | 15.0 |
| Crooked Fork Lochsa River | 3/2B | 4.6 | 2.4 | 46.7 | 2.8 | - | - | 2.6 | 4.4 | 21.0 |
| Crooked River | 1/BOULDER-A | 1.8 | 0.2 | 2.0 | 1.7 | - | 0.1 | - | 2.3 | 13.0 |
| Crooked River | 1/BOULDER-B | 1.9 | 0.2 | 13.5 | 2.3 | <0.1 | - | 0.3 | 2.2 | 1.7 |
| Crooked River | 2/CONTROL1 | - | - | 2.2 | 2.0 | - | - | - | 1.2 | 11.0 |
| Crooked River | 2/TREAT2 | - | - | 7.1 | 0.5 | - | - | - | 1.8 | 13.0 |
| Crooked River | 3/NATURAL1 | 0.8 | <0.1 | 28.6 | 0.5 | - | 0.2 | <0.1 | 1.4 | 15.0 |
| Crooked River | 4/MEANDER1 | <0.1 | - | 9.3 | 0.2 | - | <0.1 | <0.1 | 1.4 | 11.0 |
| Crooked River | C/CAN3 | - | 0.1 | 6.3 | 0.2 | 0.2 | 0.2 | 0.6 | 1.3 | 15.0 |
| Deep Creek | CACTUS | 0.9 | 1.9 | 3.5 | 0.7 | - | - | - | 1.9 | 15.0 |
| Deep Creek | SCIMITAR | - | 0.6 | 6.6 | 1.0 | - | - | - | 2.0 | 13.0 |
| EF Crooked River | H/EF1 | 0.2 | - | 0.3 | 3.1 | - | - | - | 2.4 | 9.0 |
| EF Moose Creek | 3 | 1.5 | 2.4 | 2.8 | 0.4 | - | - | - | 8.0 | 15.0 |
| Fish Creek | 1 | 11.0 | 4.7 | 0.5 | 0.3 | - | - | - | 3.1 | 15.5 |
| Fish Creek | 2 | 36.9 | 6.6 | 1.5 | 1.1 | - | - | 0.6 | 2.9 | 20.0 |
| Johns Creek | 2/3 | 0.1 | 2.7 | 0.2 | 1.9 | - | - | - | 4.6 | 9.0 |
| Meadow Creek | 1 | - | 0.7 | 0.5 | - | <0.1 | - | - | 2.2 | 15.0 |
| Moose Creek | 1 | - | 1.7 | - | - | - | - | 2.4 | 2.2 | 15.0 |
| Red River | 1/CNTL 1 | 9.2 | 0.3 | - | - | - | 1.5 | 0.6 | 4.3 | 15.0 |
| Red River | 1/CNTL 2 | 3.4 | - | 0.2 | - | 0.3 | 0.2 | - | 3.6 | 16.0 |
| Red River | 2/CNTL 2 | 0.2 | - | 1.8 | 0.8 | - | 1.8 | 0.1 | 2.6 | 15.0 |
| Red River | 2/TREAT 2 | 0.1 | - | - | 0.3 | - | 0.4 | - | 2.3 | 16.9 |
| Red River | 4/CNTL 2 | - | - | 16.7 | - | - | 0.2 | - | 1.6 | 15.7 |
| Red River | 4/TREAT 2 | 1.1 | 1.2 | 13.3 | 0.5 | - | <0.1 | 0.4 | 1.9 | 14.8 |
| Red River | 5/CNTL 2 | 3.7 | - | 23.6 | 0.6 | - | - | 0.2 | 1.8 | 14.1 |
| Red River | 5/TREAT 2 | 0.4 | - | 45.8 | <0.1 | - | <0.1 | 0.1 | 2.2 | 14.4 |
| Relief Creek | 1/1A | 0.7 | - | - | 3.9 | - | - | - | 1.8 | 10.5 |
| Relief Creek | 1/1B | - | 0.6 | - | 3.7 | - | - | - | 1.3 | 10.0 |
| Running Creek | 1 | - | 0.4 | 0.3 | - | - | - | - | 4.2 | 15.0 |
| Running Creek | 2 | 13.2 | - | 5.2 | 1.8 | - | - | - | 4.4 | 21.0 |
| Selway River | HELLSHALF | - | 0.1 | - | 0.3 | - | - | 1.1 | 1.5 | 11.0 |
| Selway River | LITTLE-CW | - | 1.2 | 1.4 | <0.1 | - | - | 2.3 | 2.6 | 16.0 |

Appendix B1. Continued.

| | | Density (Fish/100 $m^2$) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Stream** | **Transect** | **Trout Fry** | **Steelhead** | **Chinook Salmon** | **WS Cutthroat Trout** | **Bull Trout** | **Brook Trout** | **Whitefish** | **Visibility (m)** | **Temp (°C)** |
| Selway River | MAG-XING | <0.1 | <0.1 | 0.7 | 0.4 | - | - | 0.3 | 2.5 | 19.0 |
| Three Links Creek | 1 | - | 5.1 | - | - | - | - | - | 6.7 | 17.0 |
| WF Crooked River | H/WF1 | 2.2 | - | - | 9.0 | - | - | - | 2.3 | 10.0 |
| White Cap Creek | 3/1 | <0.1 | 0.4 | 1.1 | 0.7 | - | - | 0.3 | 3.4 | 18.0 |
| White Cap Creek | 3/2 | 0.4 | <0.1 | 0.6 | 0.3 | - | - | - | 5.1 | 17.0 |
| White Cap Creek | 3/3 | 0.6 | 0.4 | 3.8 | 0.2 | - | - | - | 3.0 | 15.0 |
| | | | | | | | | | | |
| Mean | | 2.4 | 0.8 | 7.2 | 1.2 | <0.1 | 0.1 | 0.3 | | |
| SD | | 5.9 | 1.5 | 12.1 | 1.8 | <0.1 | 0.3 | 0.6 | | |
| Occupancy | | 0.7 | 0.6 | 0.7 | 0.8 | <0.1 | 0.3 | 0.4 | | |

Appendix B2. Densities (fish/100m$^2$) of Salmonids observed at 86 core transects snorkeled in the Salmon River basin during 2015. Trout fry = all trout <50mm that could not be distinguished between Steelhead trout and Westslope Cutthroat trout.

| | | Density (Fish/100 m$^2$) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Stream** | **Transect** | **Trout Fry** | **Steelhead** | **Chinook Salmon** | **WS Cutthroat Trout** | **Bull Trout** | **Brook Trout** | **Whitefish** | **Visibility (m)** | **Temp (°C)** |
| Alturas Lake Creek | 2/2B | - | - | 0.4 | - | - | - | 0.8 | 2.0 | 23.0 |
| Beaver Creek | 1/A | <0.1 | - | 1.5 | - | - | - | - | 1.4 | 9.5 |
| Beaver Creek | 3/B | 0.3 | 0.5 | 8.1 | - | 0.2 | 1.6 | 0.3 | 1.4 | 15.5 |
| Big Creek | Cabin Cr | <0.1 | 2.1 | 0.8 | 0.7 | - | - | 3.9 | 2.0 | 11.0 |
| Big Creek | TAYLOR 1 | 0.8 | <0.1 | 0.8 | 0.9 | <0.1 | - | 0.5 | 1.0 | 15.0 |
| Big Springs Creek | LEM1/A | 31.3 | 2.6 | 2.4 | - | - | 9.8 | - | 1.3 | 15.5 |
| Boulder Creek | ABOVE/1 | - | 2.5 | - | - | - | 8.0 | - | 1.6 | 10.0 |
| Boulder Creek | ABOVE/2 | - | 9.5 | - | - | 0.1 | - | - | 1.3 | 14.0 |
| Boulder Creek | BELOW/3 | - | 20.6 | 44.5 | - | - | 1.6 | 0.3 | 1.4 | 16.0 |
| Boulder Creek | BELOW/5 | - | 13.6 | 4.6 | 0.2 | - | - | - | 1.1 | 14.0 |
| Camas Creek | 2 | 0.5 | - | 0.1 | 1.0 | - | - | 3.4 | 1.5 | 13.0 |
| Camas Creek | CAM1 | 0.3 | 7.1 | - | 2.9 | - | - | 5.2 | 1.5 | 12.0 |
| Cape Horn Creek | 1/A | - | 0.2 | 58.9 | - | - | - | - | 3.0 | 9.5 |
| Cape Horn Creek | 2/B | 0.2 | 0.2 | 75.5 | - | - | 0.5 | - | 2.7 | 10.5 |
| Elk Creek | 1A | 5.7 | - | 1.6 | - | - | - | 13.5 | 1.3 | 12.0 |
| Elk Creek | 1B | - | - | 1.1 | - | - | - | 11.1 | 2.0 | 11.0 |
| Elk Creek | 2A | 0.1 | - | 11.0 | - | - | <0.1 | 14.0 | 1.4 | 15.0 |
| Elk Creek | 2B | 1.0 | - | 0.4 | - | - | - | 20.3 | 2.0 | 12.0 |
| Hazard Creek | HAZ1[a] | 5.7 | 7.8 | <0.1 | - | - | - | - | 1.8 | 16.0 |
| Knapp Creek | 1/A | 5.6 | 1.1 | 57.7 | - | 0.9 | 19.9 | - | 1.9 | 12.5 |
| Knapp Creek | 1/B | 0.5 | 0.5 | 6.3 | - | - | 6.2 | - | 1.8 | 10.0 |
| Knapp Creek | 1/LCKD FENCE | 17.0 | 1.2 | 32.0 | - | - | 38.3 | - | 1.6 | 13.5 |
| Lake Creek | BURGDORF | - | - | 2.1 | - | - | - | - | 1.8 | 11.5 |
| Lake Creek | WILLOW CR | - | - | 8.9 | - | - | 0.6 | - | 1.6 | 11.0 |
| Lick Creek | L3 | 14.9 | 8.2 | 6.7 | 0.1 | - | - | - | 1.6 | 21.0 |
| Little Salmon River | 1[b] | 0.2 | 6.0 | 1.0 | - | - | - | - | 1.2 | 18.0 |
| Little Salmon River | 2 | - | 3.8 | 5.9 | - | <0.1 | - | 0.3 | 1.0 | 17.0 |
| Marsh Creek | 1/A | - | - | 0.1 | 0.1 | - | - | 9.5 | 1.6 | 9.0 |
| Marsh Creek | 1/B[c] | - | 0.1 | <0.1 | 0.1 | - | <0.1 | 8.0 | 1.8 | 10.0 |
| Marsh Creek | 3/A | 7.7 | - | 115.9 | - | - | 22.5 | - | 1.8 | 13.0 |
| MF Salmon River | 1/BOUNDARY | - | 0.7 | - | 0.2 | - | - | 1.7 | 1.5 | 14.5 |
| MF Salmon River | 1/ELKHORN | - | - | 0.4 | 1.8 | - | - | 2.9 | 1.0 | 16.0 |
| MF Salmon River | 1/GRDLHOLE | - | 0.4 | - | 0.7 | - | - | 1.7 | 1.4 | 16.0 |
| MF Salmon River | 1/INDIAN | - | - | - | - | - | - | - | 1.2 | 14.0 |
| MF Salmon River | 1/RAPID-R | - | 0.3 | - | 1.4 | - | - | - | 1.2 | 13.0 |
| MF Salmon River | 1/SHEEPEATER | 0.4 | 1.5 | 1.7 | 0.6 | - | - | 0.6 | 1.3 | 18.0 |
| MF Salmon River | 1/VELVET | - | - | 13.5 | 1.0 | - | - | - | 1.4 | 14.0 |
| MF Salmon River | 2/COUGAR | - | - | 1.0 | - | - | - | 0.3 | 1.5 | 17.0 |
| MF Salmon River | 2/HOSPPL | - | - | - | 0.4 | - | - | - | 1.4 | 15.0 |
| MF Salmon River | 2/HOSPRUN | - | - | - | 0.5 | - | - | 0.3 | 1.4 | 15.0 |
| MF Salmon River | 2/LJACKASS | - | - | - | 0.5 | - | - | - | 1.7 | 16.0 |
| MF Salmon River | 2/MARBLPL | - | - | - | - | - | - | - | 2.0 | 15.0 |

Appendix B2. Continued.

| | | Density (Fish/100 m$^2$) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Stream** | **Transect** | **Trout Fry** | **Steelhead** | **Chinook Salmon** | **WS Cutthroat Trout** | **Bull Trout** | **Brook Trout** | **Whitefish** | **Visibility (m)** | **Temp (°C)** |
| MF Salmon River | 2/PUNGO | - | - | - | - | - | - | 0.5 | 1.3 | 13.0 |
| MF Salmon River | 2/ROCK IS | - | - | - | - | - | - | 0.1 | 1.4 | 15.0 |
| MF Salmon River | 2/SKIJUMP | 0.4 | - | 0.1 | - | - | - | 0.2 | 1.3 | 15.0 |
| MF Salmon River | 2/TAPPANPOOL | - | - | - | 0.5 | - | - | 0.2 | 1.1 | 18.0 |
| MF Salmon River | 2/WHITEYCX | - | - | - | 0.2 | - | - | - | 1.4 | 15.0 |
| MF Salmon River | 3/AIRSTRIP | - | - | - | 0.2 | - | - | - | 2.2 | 18.0 |
| MF Salmon River | 3/FLYING-B | - | - | - | 2.1 | - | - | - | 1.1 | 17.0 |
| MF Salmon River | 3/SURVEY | - | - | - | - | - | - | 0.2 | 1.4 | 18.0 |
| MF Salmon River | 4/BIG-CR-BR | - | - | - | <0.1 | - | - | <0.1 | 1.5 | 14.5 |
| MF Salmon River | 4/GOATPOOL | - | - | - | - | - | - | - | 1.8 | 13.0 |
| MF Salmon River | 4/GOATRUN | - | - | - | - | - | - | - | 1.8 | 13.0 |
| MF Salmon River | 4/LITOUZEL | - | - | - | 0.2 | - | - | - | 1.8 | 15.0 |
| MF Salmon River | 4/LOVEBAR | - | - | - | 0.2 | - | - | 0.2 | 1.5 | 14.0 |
| MF Salmon River | 4/OTTERBAR | - | - | - | 0.3 | - | - | - | 1.8 | 15.0 |
| MF Salmon River | 4/SHIPISLAND | - | 0.1 | 0.1 | 0.4 | - | - | 0.1 | 1.8 | 15.0 |
| NF Salmon River | 2/Dahlonega | 6.2 | 6.8 | 25.6 | <0.1 | - | - | 0.3 | 1.8 | 11.0 |
| NF Salmon River | 2/Hughes | 8.5 | 3.4 | 4.2 | 0.2 | - | - | 6.2 | 2.0 | 13.0 |
| Pahsimeroir River | LOWER/DWTNLANE | 5.8 | 15.1 | 22.2 | - | - | 0.7 | 13.7 | 1.6 | 14.5 |
| Panther Creek | Above/PC9 | 7.7 | 13.6 | 29.3 | 0.5 | - | - | 5.6 | 1.2 | 19.0 |
| Panther Creek | DS-BIGD/PC4 | 1.2 | 2.9 | 4.4 | <0.1 | - | - | 2.8 | 1.8 | 18.5 |
| Panther Creek | DS-CLEAR/PC1 | 1.2 | 4.6 | 1.0 | 0.3 | - | - | 9.4 | 1.8 | 19.0 |
| Rapid River | Rap2 | 0.7 | 0.3 | 0.6 | - | - | - | - | 3.1 | 11.5 |
| Redfish Lake Creek | WEIR DS | <0.1 | 0.1 | 1.6 | - | <0.1 | - | 0.2 | 2.8 | 21.0 |
| Salmon River | 1/RBNSN-BAR | - | - | - | - | - | - | 0.6 | 1.8 | 13.0 |
| Salmon River | 2/2B[d] | - | 0.7 | 0.6 | - | - | - | 1.3 | 2.4 | 19.0 |
| Salmon River | 3/3B | 0.2 | - | - | - | - | - | - | 2.4 | 19.0 |
| Salmon River | 3/3BRA[e] | <0.1 | 1.5 | 2.5 | - | - | - | 2.2 | 2.4 | 17.0 |
| Salmon River | 4/4B | - | - | <0.1 | - | 0.2 | - | 1.4 | 2.0 | 14.0 |
| Salmon River | 7/7A | 0.1 | - | 0.6 | - | - | - | 0.6 | 1.8 | 11.5 |
| Secesh River | GROUSE | - | 0.1 | 0.1 | - | - | - | - | 2.3 | 11.0 |
| Secesh River | LONG-GULCH | - | - | 2.6 | - | - | - | 0.2 | 1.3 | 12.0 |
| SF Salmon River | 5 | - | - | 4.5 | - | - | - | - | 1.3 | 14.0 |
| SF Salmon River | 7 | 0.7 | - | 3.8 | - | - | - | 2.8 | 1.3 | 14.0 |
| SF Salmon River | 11 | - | 0.3 | 0.1 | - | - | - | 1.0 | 1.4 | 16.0 |
| SF Salmon River | 14 | 0.4 | <0.1 | 2.0 | - | - | - | 2.3 | 1.5 | 15.0 |
| SF Salmon River | 16 | 2.0 | 6.6 | 3.5 | - | - | - | 3.0 | 1.8 | 20.0 |
| SF Salmon River | POVERTY | 4.9 | - | 0.2 | - | - | - | 1.1 | 1.4 | 15.0 |
| SF Salmon River | STOLLE1 | 1.1 | 0.5 | 1.2 | - | - | - | 2.7 | 1.3 | 10.0 |
| SF Salmon River | STOLLE2 | 4.4 | - | 0.8 | - | - | - | 1.3 | 1.3 | 11.0 |
| Valley Creek | 1/B | 2.1 | 2.2 | 17.7 | <0.1 | - | - | 22.1 | 1.7 | 20.0 |
| Valley Creek | 3/A | 0.9 | 5.3 | 24.8 | <0.1 | - | <0.1 | 2.8 | 1.5 | 10.0 |
| Valley Creek | 3/B | 0.9 | 2.1 | 61.1 | - | - | 2.6 | 4.0 | 1.7 | 8.5 |
| Valley Creek | 6/B | 0.5 | 0.3 | 25.1 | - | 0.3 | 1.2 | - | 1.8 | 12.0 |
| WF Rapid River | Rap1 | 3.7 | 6.2 | - | 0.4 | 0.4 | - | - | 1.9 | 12.0 |

Appendix B2. Continued.

| | | Density (Fish/100 $m^2$) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Stream** | **Transect** | **Trout Fry** | **Steelhead** | **Chinook Salmon** | **WS Cutthroat Trout** | **Bull Trout** | **Brook Trout** | **Whitefish** | **Visibility (m)** | **Temp (°C)** |
| Mean | | 1.7 | 1.9 | 8.2 | 0.2 | <0.1 | 1.3 | 2.2 | | |
| SD | | 4.4 | 3.9 | 19.1 | 0.5 | 0.1 | 5.3 | 4.4 | | |
| Occupancy | | 0.5 | 0.5 | 0.7 | 0.4 | 0.1 | 0.2 | 0.6 | | |

[a] 0.1 hatchery *O. Mykiss* included in steelhead density.
[b] 0.3 hatchery *O. Mykiss* included in steelhead density.
[c] <0.1 brook x bull trout hybrid included in brook trout density.
[d] <0.1 hatchery *O. Mykiss* included in steelhead density.
[e] 0.1 hatchery *O. Mykiss* included in steelhead density.

Appendix B3. Densities (fish/100m$^2$) of Salmonids observed at four core trend transects snorkeled in the Hells Canyon reach of the Snake River basin during 2015. Trout fry = all trout <50mm that could not be distinguished between Steelhead trout and Westslope Cutthroat trout.

| | | Density (Fish/100 m$^2$) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Stream** | **Transect** | **Trout Fry** | **Steelhead** | **Chinook Salmon** | **WS Cutthroat Trout** | **Bull Trout** | **Brook Trout** | **Whitefish** | **Visibility (m)** | **Temp (°C)** |
| Granite Creek | 1 | 7.7 | 21.7 | 0.3 | - | - | - | - | 2.0 | 18.0 |
| Granite Creek | 3 | 20.5 | 14.6 | 14.3 | - | - | - | - | 3.4 | 15.0 |
| Sheep Creek | 1 | 0.7 | 25.0 | - | - | - | - | - | 1.6 | 15.6 |
| Sheep Creek | 2 | 1.5 | 7.2 | - | - | - | - | - | 4.5 | 14.7 |
| | | | | | | | | | | |
| Mean | | 7.6 | 17.1 | 3.7 | - | - | - | - | | |
| SD | | 9.2 | 7.9 | 7.1 | - | - | - | - | | |
| Occupancy | | 1.0 | 1.0 | 0.5 | - | - | - | - | | |

Appendix C1. Densities (fish/100m$^2$) of Salmonids observed at 54 intensive panel transects snorkeled in the Potlatch River drainage during 2015. Trout fry = all trout <50mm that could not be distinguished between Steelhead trout and Westslope Cutthroat trout.

| | | Density (Fish/100 m$^2$) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Stream** | **Transect** | **Trout Fry** | **Steelhead** | **Chinook Salmon** | **WS Cutthroat Trout** | **Bull Trout** | **Brook Trout** | **Whitefish** | **Visibility (m)** | **Temp (°C)** |
| Big Bear Creek | 30690 | - | - | - | - | - | - | - | 0.6 | 24.0 |
| Big Bear Creek | 106514 | - | - | - | - | - | - | - | 1.7 | 27.0 |
| Big Bear Creek | 169954 | - | - | - | - | - | - | - | 0.7 | 21.0 |
| Big Meadow Creek | 12818 | - | - | - | - | - | - | - | 0.9 | 15.5 |
| Bloom Creek | 78705 | 13.7 | - | - | - | - | 13.7 | - | 2.0 | 13.0 |
| EF Big Bear Creek | 126946 | 3.1 | 8.5 | - | - | - | - | - | 1.1 | 15.0 |
| EF Potlatch River | 2929 | 0.9 | - | - | - | - | - | - | 1.3 | 20.0 |
| EF Potlatch River | 34786 | 0.5 | 0.1 | - | - | - | - | - | 1.3 | 22.0 |
| EF Potlatch River | 45937 | 10.8 | 2.4 | - | - | - | 2.4 | - | 1.3 | 20.0 |
| EF Potlatch River | 130018 | 0.5 | 0.3 | - | - | - | - | - | 1.2 | 23.0 |
| EF Potlatch River | 134001 | 2.5 | 4.1 | - | - | - | 0.5 | - | 1.5 | 14.0 |
| EF Potlatch River | 136049 | 0.2 | 1.1 | - | - | - | 0.2 | - | 1.4 | 21.0 |
| EF Potlatch River | 144241 | 2.2 | 4.2 | - | - | - | 2.0 | - | 1.3 | 20.0 |
| EF Potlatch River | 168817 | 1.5 | 1.2 | - | - | - | 0.3 | - | 1.8 | 20.0 |
| EF Potlatch River | 457698 | 1.2 | 0.1 | - | - | - | 0.4 | - | 1.1 | 22.0 |
| EF Potlatch River | Trout Fry Meadows 1 | 1.1 | 0.7 | - | - | - | 0.4 | - | 1.3 | 17.5 |
| EF Potlatch River | Trout Fry Meadows 2 | 1.1 | - | - | - | - | - | - | 1.3 | 18.0 |
| EF Potlatch River | Trout Fry Meadows 4 | 0.6 | - | - | - | - | - | - | 1.3 | 19.0 |
| Little Bear Creek | 158226 | 4.0 | 41.2 | - | - | - | - | - | 1.1 | 16.5 |
| Little Bear Creek | 177170 | 14.4 | 0.3 | - | - | - | - | - | 1.0 | 16.0 |
| Little Boulder Creek | Little Boulder Creek 1 | 7.4 | - | - | - | - | - | - | 0.6 | 20.0 |
| Little Boulder Creek | Little Boulder Creek 2 | - | 0.9 | - | - | - | - | - | 1.0 | 15.0 |
| Little Boulder Creek | Little Boulder Creek 3 | 7.4 | - | - | - | - | - | - | 1.0 | 20.0 |
| Little Boulder Creek | Little Boulder Creek 4 | - | - | - | - | - | - | - | 1.0 | 18.0 |
| Pine Creek | 98018 | - | 0.7 | - | - | - | - | - | 1.5 | 15.0 |
| Pine Creek | 130786 | 0.5 | - | - | - | - | - | - | 1.1 | 14.5 |
| Pine Creek | 153570 | 14.0 | - | - | - | - | - | - | 0.9 | 13.0 |
| Pine Creek | 181266 | 12.9 | 0.6 | - | - | - | - | - | 1.2 | 14.5 |
| Pine Creek | 229090 | - | - | - | - | - | - | - | 1.5 | 13.0 |
| Pine Creek | 364258 | 16.9 | 0.4 | - | - | - | - | - | 0.9 | 22.0 |
| Pine Creek | 393698 | 10.9 | 0.5 | - | - | - | - | - | 0.9 | 17.0 |
| Pine Creek | 413410 | 10.0 | 1.0 | - | - | - | - | - | 1.0 | 22.0 |
| Ruby Creek | 2018 | - | - | - | - | - | 0.3 | - | 1.1 | 16.0 |
| Ruby Creek | 31714 | 1.4 | - | - | - | - | 5.6 | - | 0.7 | 17.0 |
| Ruby Creek | 67554 | 0.3 | - | - | - | - | 1.6 | - | 1.2 | 18.0 |
| Ruby Creek | 113634 | 1.4 | - | - | - | - | 2.1 | - | 1.0 | 15.0 |
| Shwartz Creek | 24594 | - | 3.3 | - | - | - | - | - | 0.6 | 11.5 |
| Shwartz Creek | 57362 | - | 3.1 | - | - | - | - | - | 1.0 | 11.0 |
| Spring Valley Cr | 111122 | - | - | - | - | - | - | - | 1.1 | 25.5 |
| WF Little Bear Creek | 60434 | 17.2 | 0.2 | - | - | - | - | - | 1.0 | 19.9 |
| WF Little Bear Creek | 78354 | 1.0 | 0.5 | - | - | - | - | - | 0.9 | 15.9 |

Appendix C1. Continued.

| | | | Density (Fish/100 m$^2$) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Stream** | **Transect** | | **Trout Fry** | **Steelhead** | **Chinook Salmon** | **WS Cutthroat Trout** | **Bull Trout** | **Brook Trout** | **Whitefish** | **Visibility (m)** | **Temp (°C)** |
| WF Little Bear Creek | 100882 | | 0.5 | 35.0 | - | - | - | - | - | 0.9 | 19.6 |
| WF Little Bear Creek | 136210 | | 13.9 | 0.8 | - | - | - | 0.4 | - | 1.2 | 18.5 |
| WF Little Bear Creek | 150034 | | 9.0 | 0.6 | - | - | - | - | - | 1.0 | 16.5 |
| WF Little Bear Creek | 224274 | | 8.3 | 1.3 | - | - | - | - | - | 1.2 | 21.1 |
| WF Little Bear Creek | 363026 | | 6.8 | 1.0 | - | - | - | - | - | 0.7 | 18.0 |
| WF Little Bear Creek | Dutchman Restoration | Flat | 15.9 | 0.3 | - | - | - | - | - | 1.8 | 14.6 |
| WF Potlatch River | 16354 | | - | - | - | - | - | 0.4 | - | 0.8 | 17.0 |
| WF Potlatch River | 237538 | | 2.6 | - | - | - | - | 0.7 | - | 1.1 | 20.0 |
| WF Potlatch River | 393186 | | - | - | - | - | - | - | - | 0.7 | 19.0 |
| WF Potlatch River | 416901 | | - | - | - | - | - | - | - | 0.9 | 21.0 |
| WF Potlatch River | 417762 | | 3.7 | - | - | - | - | 0.9 | - | 0.9 | 18.0 |
| WF Potlatch River | 458722 | | - | - | - | - | - | - | - | 0.8 | 20.0 |
| WF Potlatch River | 499682 | | 0.3 | - | - | - | - | 0.7 | - | 0.8 | 21.0 |
| Mean | | | 4.1 | 2.1 | - | - | - | 0.6 | - | | |
| SD | | | 5.5 | 7.3 | - | - | - | 2.0 | - | | |
| Occupancy | | | 0.7 | 0.5 | - | - | - | 0.3 | - | | |

Appendix C2. Densities (fish/100m$^2$) of Salmonids observed at 21 intensive panel transects snorkeled in the Fish Creek drainage during 2015. Trout fry = all trout <50mm that could not be distinguished between Steelhead trout and Westslope Cutthroat trout.

| | | Density (Fish/100 m$^2$) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Stream** | **Transect** | **Trout Fry** | **Steelhead** | **Chinook Salmon** | **WS Cutthroat Trout** | **Bull Trout** | **Brook Trout** | **Whitefish** | **Visibility (m)** | **Temp (°C)** |
| Fish Creek | 12994 | 1.4 | 1.7 | 0.3 | 0.6 | - | - | 0.1 | 2.4 | 18.0 |
| Fish Creek | 20418 | 24.7 | 2.3 | - | 2.3 | - | - | - | 2.3 | 16.0 |
| Fish Creek | 41666 | 30.8 | 4.5 | 1.7 | 1.5 | - | - | <0.1 | 2.3 | 21.0 |
| Fish Creek | 57378 | - | - | - | 20.5 | - | - | - | 1.7 | 14.0 |
| Fish Creek | 69666 | 10.3 | - | - | 1.7 | - | - | - | 3.6 | 14.5 |
| Fish Creek | 74434 | 13.4 | 7.1 | - | 1.6 | - | - | - | 2.1 | 13.5 |
| Fish Creek | 96194 | 44.8 | 1.2 | - | 0.6 | - | - | - | 4.2 | 15.9 |
| Fish Creek | 102338 | 24.9 | 0.6 | - | 0.2 | - | - | - | 3.1 | 13.5 |
| Fish Creek | 151490 | 27.8 | 0.8 | - | 0.3 | - | - | - | 2.2 | 19.5 |
| Fish Creek | 167874 | 43.1 | 0.6 | - | 0.3 | - | - | - | 3.9 | 16.0 |
| Fish Creek | 172738 | 14.3 | 16.0 | 2.2 | 2.8 | - | - | - | 3.2 | 14.0 |
| Fish Creek | 194498 | 23.3 | 2.0 | - | 1.8 | - | - | - | 2.3 | 15.0 |
| Hungery Creek | 17314 | 27.8 | 11.8 | - | 2.6 | - | - | - | 2.3 | 13.0 |
| Hungery Creek | 24610 | 0.4 | - | - | 6.3 | - | - | - | 3.2 | 16.0 |
| Hungery Creek | 33698 | - | 0.3 | - | 13.1 | - | - | - | 2.9 | 14.0 |
| Hungery Creek | 58050 | 30.5 | 4.7 | - | 0.4 | - | - | - | 2.3 | 17.0 |
| Hungery Creek | 97698 | 29.7 | 6.8 | - | 0.7 | - | - | - | 3.7 | 12.5 |
| Hungery Creek | 164770 | 10.9 | 0.2 | - | 2.1 | - | - | - | 2.6 | 17.5 |
| Hungery Creek | 213922 | 22.3 | 5.8 | - | 2.5 | - | - | - | 3.8 | 17.0 |
| Willow Creek | 156354 | 17.2 | 8.0 | - | 0.2 | - | - | - | 4.1 | 14.5 |
| Willow Creek | 221890 | 24.2 | 2.4 | - | 4.7 | - | - | - | 3.8 | 14.0 |
| Mean | | 20.1 | 3.6 | 0.2 | 3.2 | - | - | <0.1 | | |
| SD | | 13.2 | 4.3 | 0.6 | 4.9 | - | - | <0.1 | | |
| Occupancy | | 0.9 | 0.9 | 0.1 | 1.0 | - | - | <0.1 | | |

Appendix C3. Densities (fish/100m$^2$) of Salmonids observed at 25 intensive panel transects snorkeled in the Crooked River drainage during 2015. Trout fry = all trout <50mm that could not be distinguished between Steelhead trout and Westslope Cutthroat trout.

| | | Density (Fish/100 m$^2$) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Stream** | **Transect** | **Trout Fry** | **Steelhead** | **Chinook Salmon** | **WS Cutthroat Trout** | **Bull Trout** | **Brook Trout** | **Whitefish** | **Visibility (m)** | **Temp (°C)** |
| Crooked River | 5698 | 0.2 | 0.1 | 34.2 | 0.7 | - | - | 0.3 | 2.2 | 11.0 |
| Crooked River | 50754 | - | 0.1 | 2.6 | 1.8 | - | - | 0.2 | 1.2 | 11.0 |
| Crooked River | 72258 | - | - | - | 1.8 | 0.1 | - | 0.1 | 1.8 | 9.0 |
| Crooked River | 73282 | - | - | 1.8 | - | - | - | 0.3 | 1.7 | 15.0 |
| Crooked River | 161346 | - | - | 11.0 | 0.2 | - | - | 1.3 | 1.6 | 13.0 |
| Crooked River | 202306 | - | 0.2 | 11.0 | 1.3 | - | - | 0.2 | 3.2 | 13.0 |
| Crooked River | 214594 | 1.1 | 0.2 | 26.1 | 2.5 | - | - | - | 1.9 | 12.4 |
| Crooked River | 243266 | - | - | 10.7 | 0.2 | - | 0.2 | 0.2 | 1.6 | 12.0 |
| EF Crooked River | 55874 | - | - | - | 3.5 | 0.4 | - | - | 1.4 | 10.0 |
| EF Crooked River | 219714 | - | - | - | 1.1 | 0.1 | - | - | 2.5 | 10.0 |
| EF Relief Creek | 58946 | 1.6 | - | - | 9.5 | - | - | - | 1.4 | 11.0 |
| EF Relief Creek | 157250 | 3.8 | - | - | 8.7 | - | - | - | 1.4 | 11.0 |
| EF Relief Creek | 247362 | 6.2 | - | - | 6.2 | - | - | - | 0.9 | 10.0 |
| Fivemile Creek | 14914 | - | - | - | 7.3 | - | - | - | 1.7 | 10.0 |
| Fivemile Creek | 186946 | - | - | - | 2.7 | - | - | - | 1.7 | 9.5 |
| Relief Creek | 124482 | 0.8 | - | - | 13.6 | 0.5 | - | - | 1.8 | 10.5 |
| Relief Creek | 181826 | 1.0 | 1.3 | - | 3.5 | - | - | - | 1.9 | 11.5 |
| Relief Creek | 235074 | - | - | - | 9.1 | - | - | - | 2.3 | 10.1 |
| WF Crooked River | 105026 | 0.2 | - | - | 1.6 | 0.8 | - | - | 1.6 | 7.0 |
| WF Crooked River | 170562 | 0.5 | - | - | 1.6 | - | - | - | 2.1 | 7.5 |
| WF Crooked River | 178754 | 0.2 | 0.2 | - | 2.0 | 0.7 | 0.4 | 0.2 | 2.9 | 8.0 |
| WF Crooked River | 211522 | - | - | - | 11.9 | 0.2 | - | - | 2.3 | 10.1 |
| WF Crooked River | 236098 | - | 0.1 | - | 0.7 | 0.9 | - | - | 2.8 | 7.0 |
| WF Crooked River | 244290 | - | 0.4 | - | 2.2 | 1.8 | 0.6 | - | 2.7 | 9.5 |
| WF Crooked River | 256578 | 0.2 | - | - | 2.2 | - | - | - | 1.7 | 9.9 |
| Mean | | 0.6 | 0.1 | 3.9 | 3.8 | 0.2 | <0.1 | 0.1 | | |
| SD | | 1.4 | 0.3 | 8.8 | 3.9 | 0.4 | 0.1 | 0.3 | | |
| Occupancy | | 0.4 | 0.3 | 0.3 | 1.0 | 0.4 | 0.1 | 0.3 | | |

Appendix C4. Densities (fish/100m$^2$) of Salmonids observed at 20 intensive panel transects snorkeled in the Rapid River drainage during 2015. Trout fry = all trout <50mm that could not be distinguished between Steelhead trout and Westslope Cutthroat trout.

| | | Density (Fish/100 m$^2$) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Stream** | **Transect** | **Trout Fry** | **Steelhead** | **Chinook Salmon** | **WS Cutthroat Trout** | **Bull Trout** | **Brook Trout** | **Whitefish** | **Visibility (m)** | **Temp (°C)** |
| Rapid River | 15762 | 2.6 | 6.2 | - | - | <0.1 | - | - | 2.1 | 10.5 |
| Rapid River | 17298 | 0.2 | 5.9 | - | - | 0.6 | - | - | 1.8 | 11.5 |
| Rapid River | 19346 | 4.0 | 2.9 | - | - | 0.2 | - | - | 3.1 | 11.5 |
| Rapid River | 24658 | - | - | - | - | 2.0 | - | - | 3.3 | 7.0 |
| Rapid River | 62354 | 6.4 | 3.7 | - | - | <0.1 | - | - | 2.7 | 12.0 |
| Rapid River | 90194 | - | - | - | - | 4.7 | - | - | 3.5 | 10.0 |
| Rapid River | 126866 | - | 3.7 | - | 0.1 | 2.2 | - | - | 2.9 | 14.0 |
| Rapid River | 135250 | - | - | - | - | 3.7 | - | - | 3.0 | 11.0 |
| Rapid River | 155730 | - | - | - | - | 2.8 | - | - | 2.0 | 14.0 |
| Rapid River | 192402 | - | 4.7 | - | - | 1.0 | - | - | 2.9 | 12.0 |
| Rapid River | 193426 | 3.3 | 4.1 | 0.4 | - | - | - | - | 2.0 | 12.0 |
| Rapid River | 196690 | - | 0.2 | - | - | 0.8 | - | - | 2.8 | 10.0 |
| Rapid River | 200786 | - | - | - | - | 6.3 | - | - | 3.2 | 14.0 |
| Rapid River | 215954 | 9.4 | 1.6 | 1.3 | - | - | - | - | 2.0 | 16.0 |
| Rapid River | 237650 | - | - | - | - | 4.5 | - | - | 3.9 | 8.0 |
| Rapid River | 294290 | 6.2 | 6.2 | - | 0.1 | 0.4 | - | - | 2.2 | 10.0 |
| Rapid River | 323474 | - | 3.3 | - | - | 1.8 | - | - | 2.6 | 11.0 |
| Rapid River | 324498 | 6.5 | 3.9 | <0.1 | <0.1 | 0.2 | - | - | 3.1 | 11.0 |
| Rapid River | 390034 | 11.0 | 5.0 | 0.8 | <0.1 | <0.1 | - | - | 1.7 | 14.0 |
| WF Rapid River | 163218 | 3.1 | 2.2 | - | - | - | - | - | 2.4 | 11.0 |
| Mean | | 2.6 | 2.7 | 0.1 | <0.1 | 1.6 | - | - | | |
| SD | | 3.5 | 2.3 | 0.3 | <0.1 | 1.9 | - | - | | |
| Occupancy | | 0.5 | 0.7 | 0.2 | 0.2 | 0.9 | - | - | | |

Appendix C5. Densities (fish/100m2) of Salmonids observed at 34 intensive panel transects snorkeled in the South Fork Salmon River drainage above Krassel Gauge during 2015. Trout fry = all trout <50mm that could not be distinguished between Steelhead trout and Westslope Cutthroat trout.

| | | Density (Fish/100m$^2$) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Stream** | **Transect** | **Trout Fry** | **Steelhead** | **Chinook Salmon** | **WS Cutthroat Trout** | **Bull Trout** | **Brook Trout** | **Whitefish** | **Visibility (m)** | **Temp (°C)** |
| Bear Creek | 40439 | - | 0.9 | 2.0 | - | - | - | - | 1.4 | 15.0 |
| Bear Creek | 41975 | 4.8 | 3.8 | - | 1.0 | - | 5.3 | - | 1.5 | 13.0 |
| Buckhorn Creek | 26655 | - | 11.6 | - | - | - | - | - | 5.0 | 12.5 |
| Buckhorn Creek | 39967 | - | 17.9 | - | 0.4 | - | - | - | 5.0 | 15.0 |
| Buckhorn Creek | 72735 | - | 8.4 | 3.7 | 0.2 | - | - | - | 2.6 | 18.0 |
| Cabin Creek | 43511 | - | - | - | - | 1.7 | - | - | 2.0 | 10.0 |
| Cabin Creek | 59895 | - | 6.5 | 34.0 | - | - | 1.3 | - | 2.0 | 18.0 |
| Cougar Creek | 54303 | - | - | - | - | - | - | - | 2.0 | 9.0 |
| Dollar Creek | 72183 | 2.9 | 6.1 | 11.6 | - | - | - | 0.6 | 1.3 | 16.0 |
| Fourmile Creek | 18975 | - | 0.1 | - | 0.4 | - | - | - | 1.4 | 12.0 |
| Mormon Creek | 62479 | - | 0.2 | - | - | 0.7 | - | - | 1.5 | 10.0 |
| NF Dollar Creek | 22007 | - | - | - | - | - | - | - | 0.9 | 12.0 |
| NF Dollar Creek | 75255 | - | - | - | - | - | - | - | 1.0 | 14.0 |
| Phoebe Creek | 29727 | 3.5 | 11.8 | 31.6 | - | - | - | - | 1.0 | 15.0 |
| Rice Creek | 31223 | - | 1.7 | - | - | - | - | - | 1.7 | 14.0 |
| SF Salmon River | 543 | - | 0.6 | 0.6 | - | - | - | 2.4 | 1.5 | 15.0 |
| SF Salmon River | 6159 | 5.3 | - | - | - | 3.2 | - | - | 2.0 | 9.5 |
| SF Salmon River | 10743 | 1.0 | <0.10 | 2.9 | - | - | - | 2.5 | 1.5 | 15.0 |
| SF Salmon River | 12831 | 0.6 | 0.4 | 4.0 | - | - | - | 1.7 | 1.5 | 17.0 |
| SF Salmon River | 14839 | 3.2 | - | 24.6 | - | - | - | 0.2 | 1.6 | 12.5 |
| SF Salmon River | 23031 | - | 0.2 | - | - | - | - | - | 1.6 | 9.0 |
| SF Salmon River | 29215 | 0.3 | 2.7 | 1.6 | - | - | - | 1.5 | 1.3 | 18.0 |
| SF Salmon River | 33311 | 0.1 | 0.8 | 1.1 | - | - | - | 2.2 | 1.5 | 16.0 |
| SF Salmon River | 44535 | 0.6 | 0.7 | 13.3 | - | <0.10 | - | 2.4 | 1.4 | 15.0 |
| SF Salmon River | 47607 | - | - | 1.6 | - | - | - | 0.4 | 1.0 | 13.0 |
| SF Salmon River | 60447 | 0.3 | 0.2 | 0.9 | - | - | - | 7.7 | 1.5 | 15.0 |
| SF Salmon River | 63991 | - | <0.10 | 0.7 | - | - | - | - | 1.6 | 9.0 |
| SF Salmon River | 73207 | - | - | <0.10 | - | - | - | 0.1 | 1.2 | 15.0 |
| SF Salmon River | 88567 | - | 0.8 | - | - | 0.1 | 0.1 | - | 1.6 | 13.0 |
| Two-bit Creek | 77303 | - | 1.0 | - | - | - | - | - | 1.5 | 11.0 |
| Unnamed Tributary to Dollar Creek | 9719 | - | - | - | - | - | - | - | 2.7 | 9.5 |
| Warm Lake Creek | 28151 | - | 0.8 | 1.4 | - | - | 9.3 | - | 1.5 | 25.0 |
| Warm Lake Creek | 50167 | - | 0.3 | 0.5 | - | - | 4.6 | - | 1.2 | 23.0 |
| WF Buckhorn Creek | 56351 | - | 17.2 | - | 1.1 | - | - | - | 2.5 | 16.0 |
| | | | | | | | | | | |
| Mean | | 0.7 | 2.8 | 4.0 | 0.1 | 0.2 | 0.6 | 0.6 | | |
| SD | | 1.4 | 4.9 | 8.8 | 0.3 | 0.6 | 1.9 | 1.5 | | |
| Occupancy | | 0.3 | 0.7 | 0.5 | 0.1 | 0.1 | 0.1 | 0.3 | | |

Appendix C6. Densities (fish/100m$^2$) of Salmonids observed at 27 intensive panel transects snorkeled in the North Fork Salmon River drainage during 2015. Trout fry = all trout <50mm that could not be distinguished between Steelhead trout and Westslope Cutthroat trout.

| | | Density (number/100m$^2$) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Stream** | **Transect** | **Trout Fry** | **Steelhead** | **Chinook Salmon** | **WS Cutthroat Trout** | **Bull Trout** | **Brook Trout** | **Whitefish** | **Visibility (m)** | **Temp (°C)** |
| Dahlonega Creek | 3039 | - | 6.4 | - | - | - | 1.1 | - | 1.3 | 12.0 |
| Dahlonega Creek | 29663 | 0.3 | 7.7 | - | 0.3 | - | - | - | 1.5 | 11.0 |
| Dahlonega Creek | 46047 | 1.0 | 6.2 | - | - | - | - | - | 2.1 | 9.5 |
| Dahlonega Creek | 68575 | - | 1.5 | - | - | - | - | - | 1.7 | 12.0 |
| Hughes Creek | 77631 | - | 5.0 | - | 0.5 | 0.5 | - | - | 2.0 | 13.0 |
| Hughes Creek | 98015 | - | 6.2 | - | 0.2 | 0.4 | - | - | 2.0 | 13.5 |
| Hughes Creek | 110303 | 20.6 | 12.5 | 8.3 | 0.3 | 0.2 | - | - | 1.7 | 12.0 |
| Hull Creek | 81631 | 1.5 | 12.4 | - | 5.1 | - | - | - | 1.5 | 11.5 |
| Hull Creek | 216895 | - | 2.6 | - | - | - | - | - | 1.5 | 9.0 |
| Hull Creek | 245471 | 211.7 | 6.4 | - | - | - | 11.4 | - | 1.5 | 11.5 |
| Moose Creek | 11743 | - | 2.6 | - | 1.1 | 2.9 | - | - | 1.7 | 9.0 |
| NF Salmon River | 20959 | 7.8 | 7.1 | 10.8 | 1.1 | 0.3 | - | 22.0 | 1.2 | 16.0 |
| NF Salmon River | 21471 | 1.4 | 7.1 | 0.9 | 0.2 | 0.1 | - | 0.1 | 2.1 | 12.0 |
| NF Salmon River | 24287 | 23.5 | 3.8 | 18.6 | - | 0.4 | - | 0.6 | 1.7 | 11.5 |
| NF Salmon River | 61151 | 1.4 | 4.4 | 4.2 | 0.4 | - | - | 1.2 | 2.2 | 14.0 |
| NF Salmon River | 93919[a] | 3.7 | 2.0 | 6.8 | <0.1 | - | - | 0.9 | 2.3 | 14.0 |
| NF Salmon River | 106207 | 14.3 | 7.1 | 8.9 | 0.2 | - | - | 0.2 | 1.5 | 15.5 |
| NF Salmon River | 118239 | - | 2.7 | - | 1.5 | 0.3 | - | - | 2.2 | 8.5 |
| NF Sheep Creek | 44767 | - | - | - | - | 1.7 | - | - | 1.8 | 6.5 |
| Pierce Creek | 44511 | - | 7.6 | - | - | - | - | - | 1.2 | 9.5 |
| Pierce Creek | 110047 | - | 2.2 | - | - | - | - | - | 1.2 | 11.0 |
| Sheep Creek | 20191 | - | 0.8 | - | 0.7 | 0.7 | - | - | 2.3 | 7.0 |
| Sheep Creek | 77535 | - | - | - | - | 4.8 | - | - | 2.5 | 9.0 |
| Twin Creek | 15839 | - | - | - | - | 3.9 | - | - | 2.1 | 8.0 |
| Twin Creek | 32223 | - | - | - | - | 4.1 | - | - | 2.0 | 9.0 |
| Twin Creek | 56799 | - | 0.6 | - | - | 6.1 | - | - | 2.1 | 9.5 |
| Twin Creek | 97759 | - | - | - | - | 2.8 | - | - | 2.3 | 8.0 |
| Mean | | 10.6 | 4.2 | 2.2 | 0.4 | 1.1 | 0.5 | 0.9 | | |
| SD | | 40.7 | 3.6 | 4.6 | 1.0 | 1.8 | 2.2 | 4.2 | | |
| Occupancy | | 0.4 | 0.8 | 0.3 | 0.5 | 0.6 | <0.1 | 0.2 | | |

[a] <0.1 cutthroat x rainbow trout hybrid included in steelhead density.

Appendix C7. Densities (fish/100m$^2$) of Salmonids observed at 26 intensive panel transects snorkeled in the Marsh Creek drainage during 2015. Trout fry = all trout <50mm that could not be distinguished between Steelhead trout and Westslope Cutthroat trout.

| | | Density (Fish/100m$^2$) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Stream** | **Transect** | **Trout Fry** | **Steelhead** | **Chinook Salmon** | **WS Cutthroat Trout** | **Bull Trout** | **Brook Trout** | **Whitefish** | **Visibility (m)** | **Temp (°C)** |
| Bear Creek | 109911 | - | - | - | - | - | - | - | 2.1 | 8.0 |
| Beaver Creek | 11607 | 6.3 | 0.2 | 14.2 | - | - | - | 2.2 | 1.9 | 14.5 |
| Beaver Creek | 15703 | - | 0.4 | 28.4 | - | - | 1.8 | - | 1.3 | 10.0 |
| Beaver Creek | 27991 | <0.1 | <0.1 | 5.8 | - | - | - | 0.6 | 2.0 | 13.0 |
| Beaver Creek | 32111 | - | - | - | - | 0.7 | - | - | 1.9 | 10.0 |
| Beaver Creek | 51031[a] | - | 0.9 | 28.0 | - | 0.2 | 1.5 | - | 1.2 | 12.5 |
| Beaver Creek | 83799[b] | - | - | - | - | 0.4 | 1.1 | - | 1.6 | 13.0 |
| Beaver Creek | 97111 | - | - | - | - | - | - | - | 1.9 | 10.0 |
| Bench Creek | 101719 | - | - | - | - | 1.9 | - | - | 1.3 | 7.0 |
| Cape Horn Creek | 150871 | - | 2.3 | 74.4 | - | 0.3 | 0.3 | 0.9 | 1.9 | 13.5 |
| Knapp Creek | 40279 | - | 1.7 | 8.4 | - | - | 14.5 | - | 2.0 | 13.5 |
| Knapp Creek | 60759 | 17.9 | 6.0 | 31.1 | - | - | 30.4 | - | 1.9 | 16.0 |
| Knapp Creek | 73047 | 0.9 | 1.7 | 2.0 | - | - | 5.8 | - | 1.8 | 12.5 |
| Knapp Creek | 126295 | 5.8 | 8.6 | 9.1 | - | - | 11.0 | - | 1.9 | 16.0 |
| Knapp Creek | 130391 | 1.4 | 0.5 | - | - | - | 1.8 | - | 1.8 | 12.0 |
| Knapp Creek | 164695 | - | - | - | - | - | 3.8 | - | 1.8 | 10.0 |
| Lola Creek | 60274 | - | 1.9 | 3.8 | - | 0.3 | 1.0 | - | 2.3 | 9.5 |
| Marsh Creek | 56663 | 15.8 | 0.9 | 55.8 | - | - | 3.9 | 5.6 | 1.9 | 16.0 |
| Marsh Creek | 89431[c] | 4.9 | 1.5 | 43.3 | - | - | 0.1 | 0.8 | 1.9 | 17.5 |
| Marsh Creek | 105815[d] | 12.6 | 6.6 | 32.4 | - | 0.1 | 0.2 | 1.2 | 1.8 | 14.5 |
| Marsh Creek | 125783 | 0.2 | 0.4 | - | - | - | - | 2.4 | 1.8 | 12.0 |
| Swamp Creek | 21847[e] | 2.1 | - | 14.1 | - | 0.8 | 1.2 | - | 2.2 | 14.0 |
| Swamp Creek | 120151 | - | - | - | - | - | 6.3 | - | 2.8 | 12.0 |
| Winnemucca Creek | 18263 | 4.5 | 0.9 | - | - | - | 5.4 | - | 1.4 | 12.5 |
| Winnemucca Creek | 123735 | 1.5 | - | - | - | - | 0.3 | - | 1.5 | 7.0 |
| Winnemucca Creek | 141143 | - | - | - | - | - | - | - | 1.8 | 7.0 |
| Mean | | 2.8 | 1.3 | 13.5 | - | 0.2 | 3.5 | 0.5 | | |
| SD | | 5.1 | 2.3 | 20.0 | - | 0.4 | 6.6 | 1.2 | | |
| Occupancy | | 0.5 | 0.6 | 0.5 | - | 0.3 | 0.7 | 0.3 | | |

[a] 0.3 brook x bull trout hybrid included in brook trout density.
[b] 0.7 brook x bull trout hybrid included in brook trout density.
[c] 0.1 brook x bull trout hybrid included in brook trout density.
[d] 0.1 cutthroat x rainbow trout hybrid included in steelhead density.
[e] 0.4 brook x bull trout hybrid included in brook trout density.

Appendix D1. Densities (fish/100m$^2$) of Salmonids observed at 45 extensive transects snorkeled in the Lochsa River basin during 2015. Trout fry = all trout <50mm that could not be distinguished between Steelhead trout and Westslope Cutthroat trout.

| | | Density (Fish/100 m$^2$) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Stream** | **Transect** | **Trout Fry** | **Steelhead** | **Chinook Salmon** | **WS Cutthroat Trout** | **Bull Trout** | **Brook Trout** | **Whitefish** | **Visibility (m)** | **Temp (°C)** |
| Beaver Creek | 5697 | <0.1 | 3.0 | - | 2.8 | 2.5 | - | - | 2.5 | 10.0 |
| Boulder Creek | 19138 | <0.1 | 10.1 | - | - | - | <0.1 | - | 3.3 | 17.0 |
| Canyon Creek | 49186 | 3.6 | - | - | 7.2 | - | - | - | 1.9 | 10.0 |
| Canyon Creek | 61474 | 3.8 | 0.6 | - | 9.6 | - | - | - | 3.1 | 13.0 |
| Cliff Creek | 33601 | 3.3 | 4.4 | - | 1.0 | - | - | - | 1.3 | 10.0 |
| Colt Creek | 3649 | 4.4 | 6.5 | - | 1.6 | 0.4 | - | - | 3.7 | 12.5 |
| Colt Creek | 20801 | 0.4 | 1.0 | - | 0.5 | - | 0.2 | - | 3.4 | 10.5 |
| Colt Creek | 40513 | 0.2 | - | - | 7.7 | - | - | - | 3.5 | 12.0 |
| Colt Creek | 69185 | 0.7 | 4.4 | - | 3.0 | 0.5 | - | - | 3.2 | 12.0 |
| Colt Creek | 75329 | 0.3 | - | - | 4.4 | - | - | - | 2.3 | 13.0 |
| Colt Killed Creek | 9793 | 2.2 | 0.2 | 1.2 | 0.3 | - | - | <0.1 | 2.1 | 13.5 |
| Colt Killed Creek | 11841 | 2.0 | - | 0.2 | 1.0 | - | - | 1.0 | 2.8 | 14.0 |
| Colt Killed Creek | 13377 | 0.3 | 1.5 | - | 5.1 | - | - | - | 2.6 | 13.0 |
| Colt Killed Creek | 46657 | 0.5 | - | - | <0.1 | - | - | - | 2.3 | 13.5 |
| Colt Killed Creek | 54849 | 1.6 | 3.8 | - | 0.6 | - | - | - | 2.1 | 10.5 |
| Colt Killed Creek | 71233 | 2.2 | 0.5 | 0.8 | 0.6 | - | - | 0.3 | 3.2 | 16.0 |
| Coolwater Creek | 38946 | 6.0 | 0.4 | - | 0.4 | - | - | - | 1.4 | 11.0 |
| Deadman Creek | 30754 | 30.5 | 15.0 | - | 1.5 | - | - | - | 2.6 | 15.0 |
| EF Deadman Creek | 55330 | - | - | - | - | - | - | - | 0.9 | 16.0 |
| EF Deadman Creek | 63522 | 4.3 | - | - | 9.0 | - | - | - | 2.4 | 14.5 |
| EF Papoose Creek | 44865 | 1.1 | 2.7 | - | 20.2 | - | - | - | 2.9 | 10.5 |
| Doe Creek | 40257 | 2.0 | 0.3 | - | 28.0 | - | - | - | 2.0 | 15.0 |
| Doe Creek | 48449 | 10.8 | 2.9 | - | 9.9 | - | - | - | 2.2 | 15.5 |
| Fire Creek | 1986 | - | - | - | - | - | - | - | 1.4 | 12.5 |
| Fish Lake Creek | 25794 | 0.6 | 1.4 | - | 5.8 | - | - | - | 2.4 | 11.1 |
| Fish Lake Creek | 41410 | - | 0.4 | - | 4.2 | 0.4 | - | - | 4.0 | 14.9 |
| Fish Lake Creek | 46274 | - | - | - | - | - | - | - | 2.4 | 19.0 |
| Fish Lake Creek | 58689 | 13.6 | 1.8 | 0.8 | 0.2 | - | - | - | 3.0 | 19.0 |
| Fish Lake Creek | Gypsy Creek Mouth | 0.6 | 1.4 | - | 5.8 | - | - | - | 2.6 | 15.0 |
| Fish Lake Creek trib | 13506 | - | 0.4 | - | 7.1 | - | - | - | 2.4 | 16.7 |
| Indian Grave Creek | 60610 | - | 3.8 | - | 14.2 | - | - | - | 3.5 | 13.5 |
| Kerr Creek | 75714 | 2.3 | 4.2 | - | 1.7 | - | - | - | 0.8 | 15.0 |
| Pete King Creek | 29218 | 3.7 | - | - | 5.5 | - | - | - | 1.5 | 11.0 |
| Split Creek | 65474 | 8.0 | 8.8 | - | - | - | - | - | 2.7 | 15.0 |
| Stanley Creek | 36034 | - | 9.9 | - | 1.3 | - | - | - | 1.7 | 15.0 |
| Storm Creek | 2881 | 5.8 | 1.8 | 4.1 | 2.3 | - | - | - | 3.0 | 14.0 |
| Storm Creek | 16961 | 7.2 | 0.7 | - | 2.6 | 0.1 | - | - | 3.2 | 14.5 |
| Storm Creek | 52801 | 4.3 | 5.1 | 2.9 | 2.0 | 0.6 | - | - | 3.2 | 16.5 |
| Storm Creek | 64577 | 8.3 | 0.2 | 0.5 | 0.3 | - | - | - | 3.0 | 12.0 |
| Walde Creek | 61986 | - | 1.9 | - | 14.1 | - | - | - | 1.5 | 13.0 |

Appendix D1. Continued.

| | | Density (Fish/100m$^2$) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Stream** | **Transect** | **Trout Fry** | **Steelhead** | **Chinook Salmon** | **WS Cutthroat Trout** | **Bull Trout** | **Brook Trout** | **Whitefish** | **Visibility (m)** | **Temp (°C)** |
| Warm Springs Creek | 54593 | 0.3 | 2.9 | - | 0.3 | <0.1 | - | - | 1.7 | 13.5 |
| Waw'aalamnime Creek (Squaw Cr) | 23873 | 0.4 | 0.4 | - | 5.4 | 1.6 | - | - | 2.4 | 12.5 |
| WF Squaw Creek | 10561 | 3.5 | - | - | 8.0 | 0.9 | - | - | 1.9 | 10.0 |
| WF Squaw Creek | 43329 | - | - | - | - | - | - | - | 2.0 | 7.0 |
| WF Wendover Creek | 25409 | 2.2 | 4.9 | - | 4.4 | - | - | - | 1.6 | 12.0 |
| Mean | | 3.1 | 2.4 | 0.2 | 4.4 | 0.2 | <0.1 | <0.1 | | |
| SD | | 5.2 | 3.3 | 0.8 | 5.8 | 0.5 | <0.1 | 0.1 | | |
| Occupancy | | 0.8 | 0.7 | 0.2 | 0.9 | 0.2 | <0.1 | <0.1 | | |

Appendix D2. Densities (fish/100m$^2$) of Salmonids observed at 26 extensive panel transects snorkeled in the Lower Salmon River drainage during 2014 and 2015. Trout fry = all trout <50mm that could not be distinguished between Steelhead trout and Westslope Cutthroat trout.

| | | Density (Fish/100m$^2$) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Stream** | **Transect** | **Trout Fry** | **Steelhead** | **Chinook Salmon** | **WS Cutthroat Trout** | **Bull Trout** | **Brook Trout** | **Whitefish** | **Visibility (m)** | **Temp (°C)** |
| China Creek | 22274* | 5.7 | 5.7 | 3.3 | 1.9 | - | - | - | 1.0 | 15.0 |
| China Creek | 61234* | - | 0.7 | - | - | - | - | - | 1.0 | 13.0 |
| Eagle Creek | 130* | 3.4 | 16.5 | - | - | - | - | - | 1.0 | 18.0 |
| Eagle Creek | 50946* | 3.6 | 15.9 | - | - | - | - | - | 1.0 | 17.0 |
| Eagle Creek | 65666* | 5.5 | 14.8 | 0.3 | - | - | - | - | 1.5 | 16.0 |
| Little Van Buren Creek | 13106 | - | - | - | - | - | - | - | 2.0 | 10.0 |
| Little White Bird Creek | 15666 | 2.7 | - | - | - | - | - | - | 1.5 | 14.0 |
| Little White Bird Creek | 56626 | 0.8 | - | - | - | - | - | - | 1.6 | 12.0 |
| NF Skookumchuck Creek | 48434 | - | 24.9 | - | - | - | - | - | 2.0 | 15.0 |
| NF Whitebird Creek | 39703 | 6.3 | 32.3 | - | - | - | - | - | 1.3 | 21.0 |
| Peter Ready Creek | 22322 | 1.2 | 0.6 | - | 6.9 | - | 2.9 | - | 2.0 | 12.0 |
| Rock Creek | 74290* | - | 0.2 | - | - | - | - | - | 0.9 | 25.0 |
| Slate Creek | 9010 | 0.6 | 6.1 | 0.4 | - | - | - | - | 1.9 | 16.0 |
| Slate Creek | 14130 | - | 5.3 | - | - | - | 1.3 | - | 1.6 | 12.0 |
| Slate Creek | 46898 | - | - | - | - | - | 6.3 | - | 2.0 | 11.0 |
| Slate Creek | 54066 | 6.3 | 8.6 | <0.1 | <0.1 | <0.1 | - | 0.4 | 1.9 | 19.0 |
| Slate Creek | 63282 | 1.0 | 5.5 | 0.7 | <0.1 | 0.2 | - | 0.2 | 1.9 | 12.0 |
| Slate Creek | 71858 | 1.0 | 2.0 | - | - | - | - | 0.2 | 1.8 | 15.0 |
| Slate Creek | 78642 | 9.7 | 6.9 | - | - | - | - | <0.1 | 1.9 | 19.0 |
| Slide Creek | 49970 | 26.8 | 11.5 | - | - | - | 4.6 | - | 2.0 | 18.0 |
| SF Race Creek | 21906 | 10.3 | 4.6 | - | - | - | - | - | 1.6 | 12.0 |
| SF Whitebird Creek | 33586 | 2.3 | 25.9 | - | - | - | - | - | 2.4 | 14.0 |
| Turnbull Creek | 44498 | - | - | - | - | - | - | - | 1.5 | 11.0 |
| Van Buren Creek | 28114 | - | 3.5 | - | - | 4.3 | - | - | 1.9 | 13.0 |
| WF Race Creek | 19858 | - | 1.0 | - | - | - | - | - | 2.0 | 10.0 |
| White Bird Creek | 11570 | 16.7 | 25.2 | - | - | - | - | - | 1.6 | 19.0 |
| Mean | | 4.0 | 8.4 | 0.2 | 0.3 | 0.2 | 0.6 | - | | |
| SD | | 6.2 | 9.6 | 0.7 | 1.4 | 0.8 | 1.6 | <0.1 | | |
| Occupancy | | 0.7 | 0.8 | 0.2 | 0.2 | 0.1 | 0.2 | 0.2 | | |

*Transect surveyed in 2015.

Appendix D3. Densities (fish/100m$^2$) of Salmonids observed at 37 extensive panel transects snorkeled in the South Fork Salmon River drainage during 2015. Trout fry = all trout <50mm that could not be distinguished between Steelhead trout and Westslope Cutthroat trout.

| | | Density (Fish/100m$^2$) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Stream** | **Transect** | **Trout Fry** | **Steelhead** | **Chinook Salmon** | **WS Cutthroat Trout** | **Bull Trout** | **Brook Trout** | **Whitefish** | **Temp (°C)** | **Visibility (m)** |
| Buckhorn Creek | 26655 | - | 11.6 | - | - | - | - | - | 5.0 | 12.5 |
| Buckhorn Creek | 39967 | - | 17.9 | - | 0.4 | - | - | - | 5.0 | 15.0 |
| Burntlog Creek | 6127 | 2.5 | 2.7 | - | 6.6 | - | - | - | 2.0 | 10.0 |
| Burntlog Creek | 47087 | 0.5 | 0.1 | 0.2 | - | - | - | - | 2.0 | 9.5 |
| Cabin Creek | 43511 | - | - | - | - | 1.7 | - | - | 2.0 | 10.0 |
| EF SF Salmon River | 287 | 0.9 | 3.3 | 9.5 | - | 0.1 | - | 2.5 | 1.8 | 12.0 |
| EF SF Salmon River | 32287 | 2.5 | 2.4 | 10.7 | 0.2 | <0.1 | - | 1.7 | 1.7 | 10.0 |
| EF SF Salmon River | 33055 | 1.8 | 7.8 | 6.5 | 0.9 | 0.2 | - | 2.1 | 2.1 | 10.0 |
| EF SF Salmon River | 36383 | 7.2 | 9.9 | 21.8 | 0.6 | 1.1 | - | 2.6 | 2.6 | 13.0 |
| Elk Creek | 863 | 0.3 | 3.4 | - | 12.9 | - | - | - | 1.7 | 17.0 |
| Fitsum Creek | 48159 | 5.3 | 4.2 | - | - | - | - | - | 2.5 | 10.0 |
| Fitsum Creek | 49695 | 0.4 | 13.8 | 4.4 | 0.4 | - | - | - | 2.0 | 11.0 |
| Fourmile Creek | 18975 | - | 0.1 | - | 0.4 | - | - | - | 1.4 | 12.0 |
| Johnson Creek | 24559 | 3.2 | 2.9 | 41.8 | <0.1 | - | - | 2.2 | 2.0 | 16.0 |
| Johnson Creek | 25591 | <0.1 | 0.2 | 0.6 | <0.1 | <0.1 | 2.3 | - | 1.5 | 17.0 |
| Johnson Creek | 40943 | 9.5 | 2.3 | 46.2 | <0.1 | - | <0.1 | 0.5 | 2.0 | 15.0 |
| Johnson Creek | 42991 | - | 4.1 | 0.5 | <0.1 | <0.1 | 0.2 | - | 1.5 | 17.0 |
| Johnson Creek | 49135 | 3.6 | 5.9 | 37.7 | 0.3 | <0.1 | 0.1 | 0.4 | 2.0 | 17.0 |
| Johnson Creek | 49167 | - | - | - | - | - | 22.3 | - | 1.5 | 13.0 |
| NF Dollar Creek | 22007 | - | - | - | - | - | - | - | 0.9 | 12.0 |
| Phoebe Creek | 29727 | 3.5 | 11.8 | 31.6 | - | - | - | - | 1.0 | 15.0 |
| Pidgeon Creek | 799 | - | 2.7 | 2.7 | - | - | - | - | 2.0 | 12.0 |
| Pony Creek | 3359 | 0.8 | 12.4 | - | - | - | - | - | 2.4 | 10.0 |
| Porphyry Creek | 18783 | 3.5 | 12.1 | - | - | - | - | - | 2.5 | 12.0 |
| Profile Creek | 37151 | - | - | - | 2.2 | 1.3 | - | - | 2.5 | 9.5 |
| Quartz Creek | 20767 | - | - | - | 4.1 | 4.7 | - | - | 2.0 | 11.5 |
| Rock Creek | 17399 | 12.4 | - | - | - | - | 0.5 | - | 1.0 | 10.0 |
| Sand Creek | 16375 | - | - | - | - | - | 5.4 | - | 1.0 | 12.0 |
| SF Salmon River | 543 | - | 0.6 | 0.6 | - | - | - | 2.4 | 1.5 | 15.0 |
| SF Salmon River | 7199 | - | 0.3 | 0.7 | <0.1 | - | - | 2.0 | 1.9 | 21.0 |
| SF Salmon River | 10743 | 1.0 | <0.1 | 2.9 | - | - | - | 2.5 | 1.5 | 15.0 |
| SF Salmon River | 12831 | 0.6 | 0.4 | 4.0 | - | - | - | 1.7 | 1.5 | 17.0 |
| SF Salmon River | 29215 | 0.3 | 2.7 | 1.6 | - | - | - | 1.5 | 1.3 | 18.0 |
| SF Salmon River | 33311 | 0.1 | 0.8 | 1.1 | - | - | - | 2.2 | 1.5 | 16.0 |
| SF Salmon River | 44535 | 0.6 | 0.7 | 13.3 | - | <0.1 | - | 2.4 | 1.4 | 15.0 |
| Warm Lake Creek | 28151 | - | 0.8 | 1.4 | - | - | 9.3 | - | 1.5 | 25.0 |
| Warm Lake Creek | 50167 | - | 0.3 | 0.5 | - | - | 4.6 | - | 1.2 | 23.0 |
| Mean | | 1.6 | 3.7 | 6.5 | 0.8 | 0.3 | 1.2 | 0.7 | | |
| SD | | 2.8 | 4.9 | 12.6 | 2.4 | 0.8 | 4.0 | 1.0 | | |
| Occupancy | | 0.6 | 0.8 | 0.6 | 0.4 | 0.3 | 0.2 | 0.4 | | |

Appendix D4. Densities (fish/100m$^2$) of Salmonids observed at 29 extensive panel transects snorkeled in the East Fork Salmon River drainage during 2014 and 2015. Trout fry = all trout <50mm that could not be distinguished between Steelhead trout and Westslope Cutthroat trout.

| | | Density (Fish/100m$^2$) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Stream** | **Transect** | **Trout Fry** | **Steelhead** | **Chinook Salmon** | **WS Cutthroat Trout** | **Bull Trout** | **Brook Trout** | **Whitefish** | **Visibility (m)** | **Temp (°C)** |
| Bayhorse Creek | 16687 | 35.17 | 12.43 | - | - | - | - | - | 1.6 | 14.0 |
| Big Boulder Creek | 113815* | 3.63 | 5.45 | 7.26 | - | 0.30 | - | - | 1.6 | 11.0 |
| Garden Creek | 40559* | - | 2.33 | 2.91 | - | - | - | - | 1.6 | 16.0 |
| Garden Creek | 102767 | 1.75 | 1.46 | - | 0.29 | - | - | - | 1.2 | NA |
| Garden Creek | 123247 | - | 4.00 | - | 0.80 | - | 0.26 | - | 1.6 | NA |
| Germania Creek | 147095 | - | 3.69 | - | 0.47 | 0.11 | - | 1.31 | 1.3 | 7.5 |
| East Fork Herd Creek | 919 | - | 0.58 | - | - | - | - | - | 1.4 | 6.0 |
| East Fork Salmon River | 57751 | - | - | - | - | 1.08 | - | - | 2.3 | 9.0 |
| East Fork Salmon River | 70039 | - | 1.66 | - | - | 0.55 | - | 0.46 | 2.2 | 12.0 |
| East Fork Salmon River | 102807 | - | 1.10 | - | - | 0.73 | - | 0.73 | 2.2 | 10.0 |
| East Fork Salmon River | 135575 | - | 2.57 | - | - | 1.28 | - | 0.80 | 2.2 | 11.0 |
| East Pass Creek | 5015 | - | - | - | - | 3.39 | - | - | 1.1 | NA |
| East Pass Creek | 123799 | - | - | - | - | 2.71 | - | - | 1.4 | NA |
| Herd Creek | 56727 | - | - | - | - | - | - | - | 1.3 | 6.5 |
| Herd Creek | 97687 | - | 2.55 | - | - | - | - | - | 1.0 | 10.0 |
| Herd Creek | 122263 | - | 0.92 | - | - | - | - | 0.76 | 1.0 | 10.0 |
| Herd Creek | 128407 | - | 2.49 | 2.23 | - | - | - | 1.05 | 1.3 | 15.0 |
| Herd Creek | 146839 | 1.03 | 5.00 | - | - | 0.29 | - | 0.58 | 1.4 | 13.0 |
| Morgan Creek | 38511 | 1.10 | 7.93 | - | - | - | - | - | 1.0 | 16.0 |
| Morgan Creek | 83567 | - | 21.98 | - | - | - | - | 3.53 | 1.1 | 17.0 |
| Morgan Creek | 118383 | 6.66 | 5.58 | - | - | - | - | 0.54 | 0.9 | 17.0 |
| Road Creek | 13719 | - | 3.90 | - | - | - | - | - | 0.6 | 16.0 |
| West Fork Herd Creek | 32151 | - | 1.55 | - | - | - | - | - | 1.6 | 6.0 |
| West Fork Morgan Creek | 50799 | 0.27 | 11.06 | - | - | - | - | - | 1.3 | 11.0 |
| West Fork Morgan Creek | 70063 | 0.27 | 3.59 | - | 0.55 | 0.83 | 0.27 | - | 2.1 | 7.0 |
| West Fork Morgan Creek | 135599 | - | 6.95 | - | - | - | - | - | 1.7 | 9.0 |
| West Pass Creek | 24983 | - | - | - | - | - | - | - | 1.9 | 5.0 |
| West Pass Creek | 41367 | - | - | - | - | 2.40 | - | - | 4.0 | 9.0 |
| West Pass Creek | 139671 | - | 0.11 | - | 0.11 | 1.22 | - | - | 4.0 | 9.0 |
| Mean | | 1.72 | 3.75 | 0.43 | <0.1 | 0.51 | <0.1 | 0.34 | | |
| SD | | 6.59 | 4.78 | 1.47 | 0.20 | 0.91 | <0.1 | 0.72 | | |
| Occupancy | | 0.28 | 0.79 | 0.10 | 0.17 | 0.41 | <0.1 | 0.31 | | |

*Transect surveyed in 2015.

Appendix E1. Densities (fish/100m$^2$) of Salmonids observed at seven resident trend transects snorkeled in the Clearwater River basin during 2015. Trout fry = all trout <50mm that could not be distinguished between Steelhead trout and Westslope Cutthroat trout.

| | | Density (Fish/100m$^2$) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Stream** | **Transect** | **Trout Fry** | **Steelhead** | **Chinook Salmon** | **WS Cutthroat Trout** | **Bull Trout** | **Brook Trout** | **Whitefish** | **Visibility (m)** | **Temp (°C)** |
| Little Clearwater River | 1 | 3.9 | 1.5 | 0.2 | - | - | - | 0.7 | 1.8 | 16.0 |
| Little Clearwater River | 2 | 0.2 | 1.0 | 0.3 | - | - | - | - | 2.0 | 15.0 |
| Moores Creek | 2 | - | 1.2 | - | 2.3 | - | - | - | 2.7 | 7.5 |
| NF Moose Creek | 4 | <0.1 | - | - | <0.1 | - | - | - | 4.7 | 20.0 |
| Selway River | BEAVERPT | - | <0.1 | 1.9 | 0.3 | - | - | 0.5 | 3.0 | 18.0 |
| Selway River | @NORTHSTAR | - | - | - | 0.6 | - | - | 2.0 | 2.8 | 21.0 |
| Waw'aalamnime Creek | 7 | 4.5 | 0.4 | 1.2 | - | - | - | - | 3.9 | 14.0 |
| | | | | | | | | | | |
| Mean | | 1.2 | 0.6 | 0.5 | 0.5 | - | - | 0.5 | | |
| SD | | 2.0 | 0.6 | 0.8 | 0.9 | - | - | 0.7 | | |
| Occupancy | | 0.6 | 0.7 | 0.6 | 0.6 | - | - | 0.4 | | |

Appendix E2. Densities (fish/100m$^2$) of Salmonids observed at 15 resident transects snorkeled in the Salmon River basin during 2015. Trout fry = all trout <50mm that could not be distinguished between Steelhead trout and Westslope Cutthroat trout.

| | | Density (Fish/100m$^2$) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Stream** | **Transect** | **Trout Fry** | **Steelhead** | **Chinook Salmon** | **WS Cutthroat Trout** | **Bull Trout** | **Brook Trout** | **Whitefish** | **Visibility (m)** | **Temp (°C)** |
| Bear Valley Creek | 1A | 0.3 | - | 1.7 | - | - | - | 4.8 | 1.5 | 13.0 |
| Bear Valley Creek | 2B | 0.8 | - | 4.4 | - | - | - | 2.5 | 1.5 | 16.0 |
| Bear Valley Creek | 3A | - | - | 22.3 | - | - | 0.1 | 8.9 | 1.3 | 14.0 |
| Bear Valley Creek | 9B | - | - | - | - | 0.1 | 0.3 | - | 2.0 | 14.0 |
| Camas Creek | 1 | 7.1 | 2.5 | 1.4 | 0.8 | 0.4 | - | 3.1 | 1.3 | 14.5 |
| Camas Creek | L1-Mouth | - | 0.5 | 2.6 | 3.1 | - | - | 8.3 | 1.4 | 17.0 |
| EF SF Salmon River | MP 35.8 | 0.5 | 1.3 | 1.8 | 0.5 | - | - | 7.0 | 2.0 | 17.0 |
| EF SF Salmon River | SUGAR CR | 5.0 | 7.4 | 25.4 | 0.2 | 1.2 | - | 0.2 | 2.1 | 12.0 |
| Loon Creek | L1-Bridge | - | - | 2.4 | 8.9 | - | - | 3.1 | 1.4 | 14.0 |
| Loon Creek | L2-Run | - | 0.5 | 5.5 | 3.0 | - | - | 0.5 | 1.4 | 14.0 |
| Marble Creek | LOWER/L1 | - | - | - | - | - | - | - | 1.3 | 16.5 |
| Panther Creek | Above/PC10 | - | 4.8 | 1.3 | - | - | 3.5 | - | 1.0 | 18.5 |
| Pistol Creek | L1 | - | 2.2 | 5.2 | 2.2 | - | - | 3.7 | 1.2 | 18.0 |
| Pistol Creek | L2 | - | 3.1 | 4.2 | 2.1 | - | - | 0.5 | 1.2 | 18.0 |
| Secesh River | U-SCSH-MDW | 0.2 | - | 6.1 | - | - | - | <0.1 | 2.2 | 12.0 |
| Mean | | 0.9 | 1.5 | 5.6 | 1.4 | 0.1 | 0.3 | 2.9 | | |
| SD | | 2.1 | 2.2 | 7.7 | 2.4 | 0.3 | 0.9 | 3.2 | | |
| Occupancy | | 0.4 | 0.5 | 0.9 | 0.5 | 0.2 | 0.2 | 0.8 | | |

Appendix E3. Densities (fish/100m$^2$) of Salmonids observed at six non-core transects snorkeled in the Clearwater River basin during 2015. Trout fry = all trout <50mm that could not be distinguished between Steelhead trout and Westslope Cutthroat trout.

| | | Density (Fish/100m$^2$) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Stream** | **Transect** | **Trout Fry** | **Steelhead** | **Chinook Salmon** | **WS Cutthroat Trout** | **Bull Trout** | **Brook Trout** | **Whitefish** | **Visibility (m)** | **Temp (°C)** |
| EF Moose Creek | 2 | - | <0.1 | 0.4 | - | - | - | - | 8.4 | 22.0 |
| Marten Creek | 1 | - | 7.4 | 6.1 | 4.7 | - | - | - | 5.3 | 14.0 |
| Selway River | @LOWER TANGO | - | - | - | 0.2 | - | - | <0.1 | 4.0 | 20.0 |
| Selway River | BADLUCK CR | - | - | - | 0.2 | - | - | <0.1 | 2.2 | 21.0 |
| Selway River | bigbend | - | - | - | 0.3 | - | - | 0.4 | 3.4 | 18.0 |
| Selway River | Osprey Is | - | <0.1 | - | 0.6 | - | - | 0.6 | 6.8 | 20.5 |
| Mean | | - | 1.3 | 1.1 | 1.0 | - | - | 0.2 | | |
| SD | | - | 3.0 | 2.5 | 1.8 | - | - | 0.3 | | |
| Occupancy | | - | 0.5 | 0.3 | 0.8 | - | - | 0.7 | | |

Appendix E4. Densities (fish/100m$^2$) of Salmonids observed at 13 non-core transects snorkeled in the Salmon River basin during 2015. Trout fry = all trout <50mm that could not be distinguished between Steelhead trout and Westslope Cutthroat trout.

| | | Density (Fish/100m$^2$) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Stream** | **Transect** | **Trout Fry** | **Steelhead** | **Chinook Salmon** | **WS Cutthroat Trout** | **Bull Trout** | **Brook Trout** | **Whitefish** | **Visibility (m)** | **Temp (°C)** |
| Big Springs Creek | 1/BSC BRIDGE | 5.2 | 0.2 | 4.2 | - | - | 0.2 | - | 1.3 | 14.0 |
| Camas Creek | UPPER | - | 5.8 | 12.5 | 4.3 | 0.5 | - | 6.8 | 1.4 | 17.0 |
| Hannah Slough | UPS Garden Cr | 0.1 | 0.6 | 113.7 | - | - | - | - | 1.9 | 16.5 |
| Indian Creek | LOWER | - | - | - | - | - | - | - | 0.6 | 19.0 |
| Indian Creek | UPPER | - | - | - | - | - | - | - | 0.6 | 19.0 |
| Lemhi River | LEM2/B | - | 1.6 | 0.2 | - | - | - | 14.7 | 1.6 | 9.0 |
| MF Salmon River | Lower/HANPOL | - | - | - | 0.2 | - | - | 0.1 | 1.8 | 12.0 |
| MF Salmon River | Middle/AIRSTP | - | 0.2 | - | 0.4 | - | - | - | 1.4 | 18.0 |
| MF Salmon River | Middle/WCPB | - | - | - | <0.1 | - | - | - | 1.4 | 15.0 |
| MF Salmon River | UPPER/LICRGS | - | - | - | 0.4 | - | - | 0.2 | 1.4 | 16.0 |
| MF Salmon River | UPPER/MAHONEY CAMP | - | - | - | 1.3 | - | - | - | 1.5 | 17.0 |
| Pahsimeroi River | 1/PONDS | 1.1 | 27.9 | 24.6 | - | - | 0.5 | 25.8 | 1.6 | 14.0 |
| Pahsimeroi River | WEIR/WEIR | 0.3 | 15.8 | 13.7 | 0.2 | - | - | 53.8 | 1.6 | 14.5 |
| Mean | | 0.5 | 4.0 | 13.0 | 0.5 | <0.1 | <0.1 | 7.8 | | |
| SD | | 1.4 | 8.4 | 31.2 | 1.2 | 0.1 | 0.2 | 15.9 | | |
| Occupancy | | 0.3 | 0.5 | 0.5 | 0.5 | <0.1 | 0.2 | 0.5 | | |

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