

**2009**

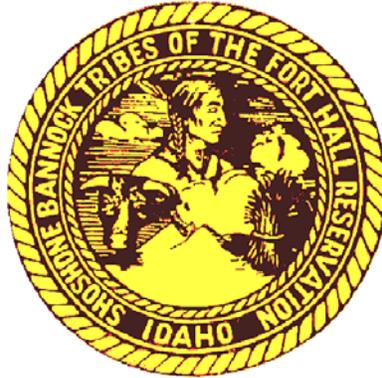
**STEELHEAD SMOLT SUPPLEMENTATION PROGRAM**



**Shoshone Bannock Tribes  
Fish and Wildlife Department**

Annual Report

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Cooperative Agreement 141109J015  
Objective 4

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## **ABSTRACT**

To maintain, rehabilitate, and enhance steelhead populations, the Tribes, under Cooperative Agreement 141109J015, initiated a steelhead supplementation program in Yankee Fork Salmon River (Yankee Fork), Valley Creek, and Slate Creek.

The main objective of the program is to release 330,000 in Yankee Fork, 50,000 in Valley Creek, and 100,000 in Slate Creek for an approximate total release of 480,000 smolts. The goal is to return > 2,000 adults; levels to help rebuild the populations, collect broodstock, and sustain harvest. In 2009, with the help of Idaho Fish and Game and US Fish and Wildlife, SBT staff released at total of 543,572 smolts (113% of overall objective) collectively in the three tributaries.

In 2011, the Tribes propose to install a small picket weir to collect broodstock to initiate a localized run, collect genetic samples from returning adults, and determine the efficacy of the steelhead smolt supplementation program.

## **ACKNOWLEDGEMENTS**

The Tribes thank Scott Marshall and staff at the LSRCP-Office for providing funding to further support this program. Special thanks to IDFG personnel including Sharon Kiefer, Pete Hassemer, Sam Sharr, Tom Rogers, and Richard Lowell as well as USFWS personnel Bryan Kenworthy and Nathan Wiese. We especially thank NOAA-Fisheries for providing technical expertise and commitment to this program.

The Tribes provided the administrative framework for this project to be successful. We would like to thank the Fish and Wildlife Department personnel Chad Colter, Claude Broncho, Tyron Broncho, Cory Bradley, and Willie Hicks for project operations and monitoring and evaluation. Thanks to Hal Hayball of the Shoshone-Bannock Tribes for furnishing maps.

## **INTRODUCTION**

The Tribes initiated a smolt supplementation program in Yankee Fork, Valley Creek, and Slate Creek to increase the viability and production of the steelhead populations, increase harvest of steelhead for members of the Tribe, and increase knowledge of fishery management techniques to accomplish the first two goals in a timely, cost-effective, and least intrusive manner.

The objectives of the steelhead smolt supplementation program, under the agreement in *U.S. v Oregon*, are to release approximately 330,000 in Yankee Fork, 50,000 in Valley Creek and 100,000 in Slate Creek for a total of 480,000 smolts with a goal of returning > 2,000 adults.

In cooperation with LSRCP, the current focus of monitor and evaluation for smolt supplementation research is structured in the Yankee Fork. This focus allows the Tribes

to evaluate the efficacy of multiple programs in one location, i.e. smolt supplementation compared to streamside incubation compared to natural production.

## STUDY AREA

### Salmon River Sub-basin

The Salmon River sub-basin is located in central Idaho. The total drainage area of the Salmon River watershed is over 14,000 square miles (36,260 square kilometers). The Salmon River flows 410 miles (650 kilometers) in a large arch from northeast to northwest to join the Snake River at River Mile 188.2. The Salmon River is the second largest sub-basin in the Columbia River drainage with the Snake River drainage being the largest (Kutchins et al. 2001). Major tributaries of the Salmon River include the Little Salmon River, South Fork Salmon River, Middle Fork Salmon River, Panther Creek, Lemhi River, Pahsimeroi River, East Fork Salmon River, Valley Creek, and Yankee Fork Salmon River (Figure 1) (Kutchins et al. 2001).

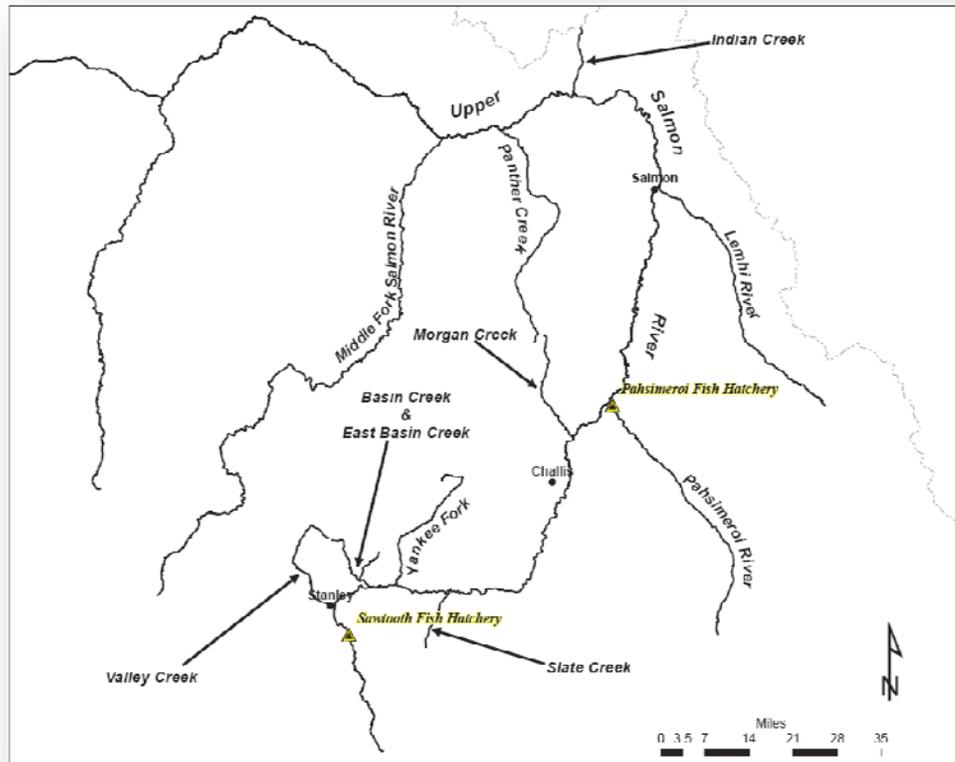


Figure 1. Upper Salmon River Basin.

## Yankee Fork Salmon River

Yankee Fork, located in the Salmon-Challis National Forest in Custer County, Idaho, is a major tributary of the upper Salmon River. The Yankee Fork flows through narrow canyons and moderately wide valleys with forest of lodgepole pine (*Pinus contorta*) (Richards and Cernera 1989). The West Fork of the Yankee Fork is the largest tributary. Other notable tributaries to the Yankee Fork include Jordan, Lightning, Greylock, Cearly, and Eightmile Creeks. Most of the system is characterized by highly erosive sandy and clay-loam soils. Yankee Fork is an important spawning and rearing stream for Chinook salmon and steelhead. Utilization by Chinook salmon and steelhead has declined since the mid-1960's. Other fish species present in the Yankee Fork system include bull trout (*Salvelinus confluentus*), cutthroat trout (*Oncorhynchus clarki*), mountain whitefish (*Prosopium williamsoni*), and short head sculpin (*Cottus confusus*).

The drainage is composed of 190 square miles of river. Elevations range from 8,204 feet at the northern boundary to 6,171 feet at the confluence with the Salmon River. Mean stream length varies annually and average precipitation is roughly 27 inches. Base flows in Yankee Fork are approximately 40 cubic feet per second and mean flows (Qa) are 247 cubic feet per second.

Historic mining activities in the Yankee Fork further aggravated the tenuous status of natural stocks, resulting in further decline. Mining activities have resulted in the complete re-channeling of lower portions of the Yankee Fork and the deposition of extensive unconsolidated dredge piles. Such activities have eliminated or degraded much of the rearing and spawning habitat in the lower Yankee Fork. As a result, the Yankee Fork drainage is grossly underutilized with respect to salmon and steelhead production (Reiser and Ramey 1987).

## **METHODS**

Steelhead for this program are collected, spawned, and sampled by SBT and IDFG staff at the Sawtooth Fish Hatchery. Smolts destined for Yankee Fork supplementation will be incubated and reared separately from all other hatchery production at the Magic Valley and Hagerman National Fish Hatcheries. Upon transport to Yankee Fork, the 330,000 smolts are planted in Pond Series 1 to maximize collection capability and program evaluations.

Upon return to Yankee Fork, adult, F1 steelhead are sampled in the SBT harvest and upon trapping starting in 2011. Tissue samples, scales, and phenotypic information are collected. In the summer, following spawning, age-0<sup>+</sup> parr are collected and sampled. DNA typing will be used to differentiate steelhead produced from the smolt supplementation program from all other steelhead produced either naturally or planted in egg incubators in the study watershed. Each steelhead (P1, parent) used in broodstock mating to produce the supplementation smolts (F1) are genotyped, allowing for all progeny to later be identifiable when captured and sampled as F1 adults or later, as F2 parr or F2 adults.

A parental exclusion, pedigree analysis (Letcher and King 2001) will be performed to determine the relative reproductive success of hatchery origin steelhead compared to natural origin steelhead in producing F2 juveniles. The number of naturally spawning steelhead in Yankee Fork will be determined by the number of unique genotypes that will be assessed in sampling of age-0<sup>+</sup> and 1<sup>+</sup> juvenile parr.

Monitor and evaluation activities focus on recording juvenile smolt out-migration and estimating adult steelhead escapement resulting from smolt releases. Staff estimates juvenile survival and timing through the hydrosystem using the SURPH model and searching for PIT tags. Implanted tags will be used in IDFG hatchery evaluations and data will be shared with staff for evaluation purposes. Information will be applied to estimate adult escapement by assuming similar survival of SFH general production steelhead.

## **RESULTS**

### **Parental Selection and Mating**

SBT staff, in coordination with Idaho Department of Fish and Game (IDFG) at the Sawtooth Fish Hatchery (SFH), randomly spawned 32 pairs, 26 pairs, 20 pairs, and 18 pairs for a total of 96 pairs on 4/17/07, 4/21/07, 4/24/2007, and 5/1/2007, respectively.

During spawning, staff collected genetic tissue samples and fork lengths from all 192 individuals. All other adults utilized for Valley Creek and Slate Creek smolt production were spawned by SFH personnel. After incubation at SFH, eggs were transferred to Magic Valley and Hagerman Hatcheries where Yankee Fork, Valley Creek, and Slate Creek fish were reared separately from general production fish.

### **Smolt Release**

Smolts were released into Pond Series 1 in Yankee Fork (Figure 2), in Valley Creek at the Stanley Lake Creek confluence (Figure 3), and into a lower site in Slate Creek (Figure 4). With the help of IDFG and USFWS, staff was present to release 387,266 smolts into Yankee Fork (117% of our objective), 93,970 smolts into Slate Creek (94% of our objective), and 62,336 smolts into Valley Creek (125% of our objective). Overall, IDFG, USFWS, and SBT staff released a total of 543,572 smolts in Yankee Fork, Valley Creek, and Slate Creek (113% of our overall objective). Locations, release numbers, collaborating hatchery, and mark values are presented below in Table 1.

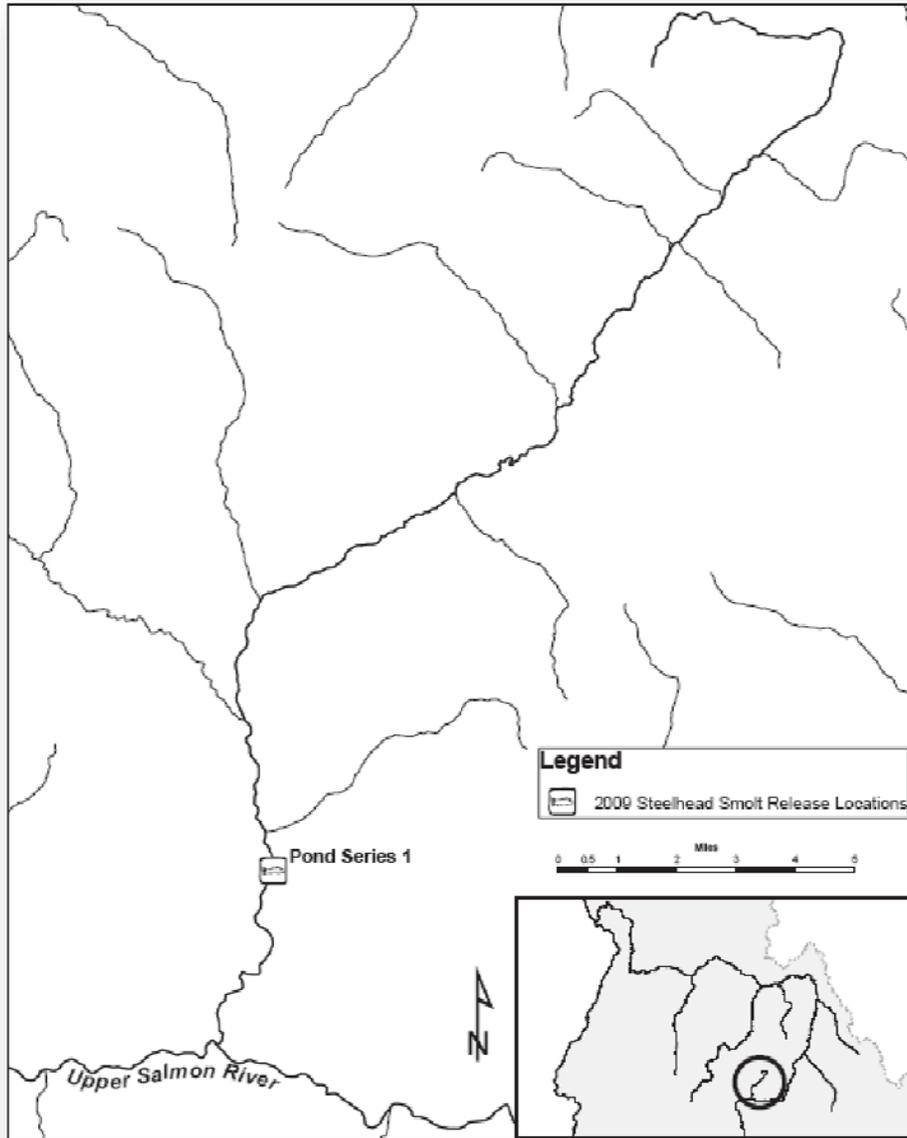


Figure 2. Yankee Fork Salmon River with smolt release locations, 2009.

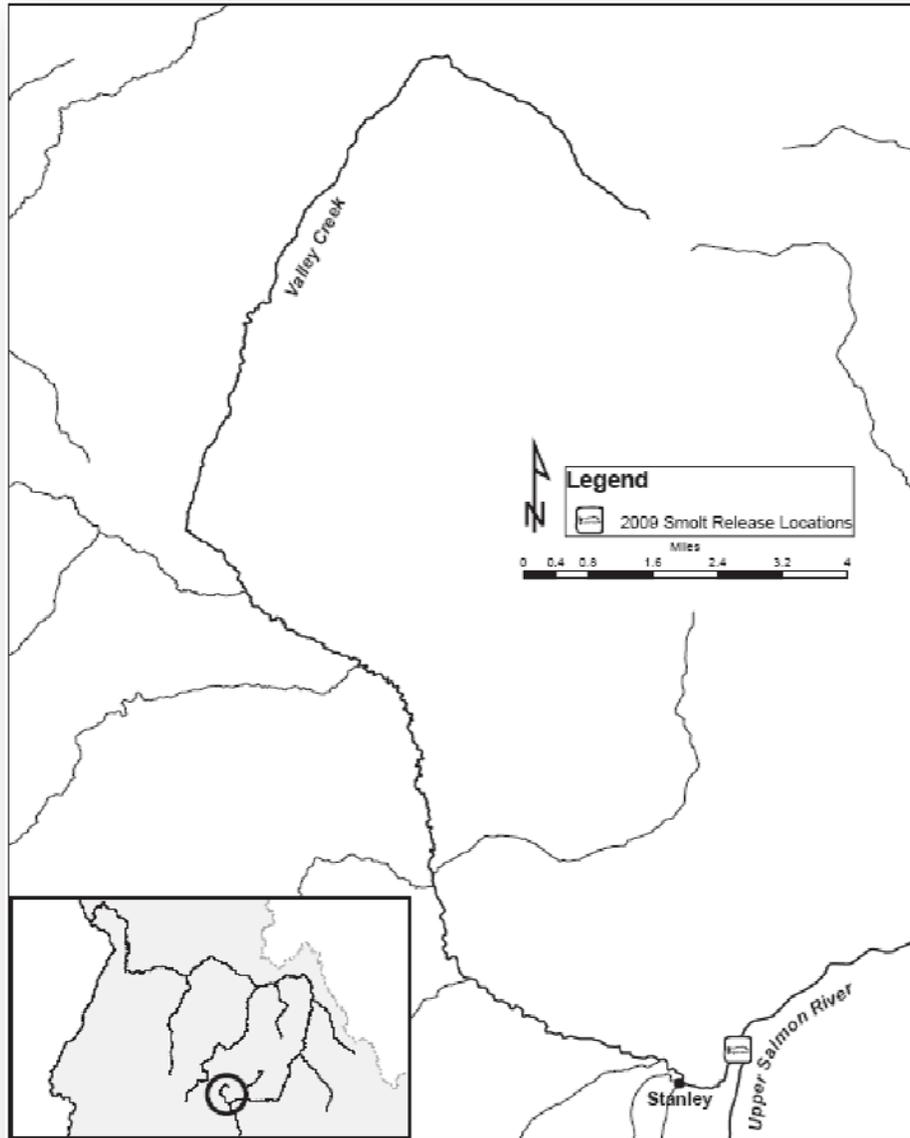


Figure 3. Valley Creek with smolt release locations, 2009.

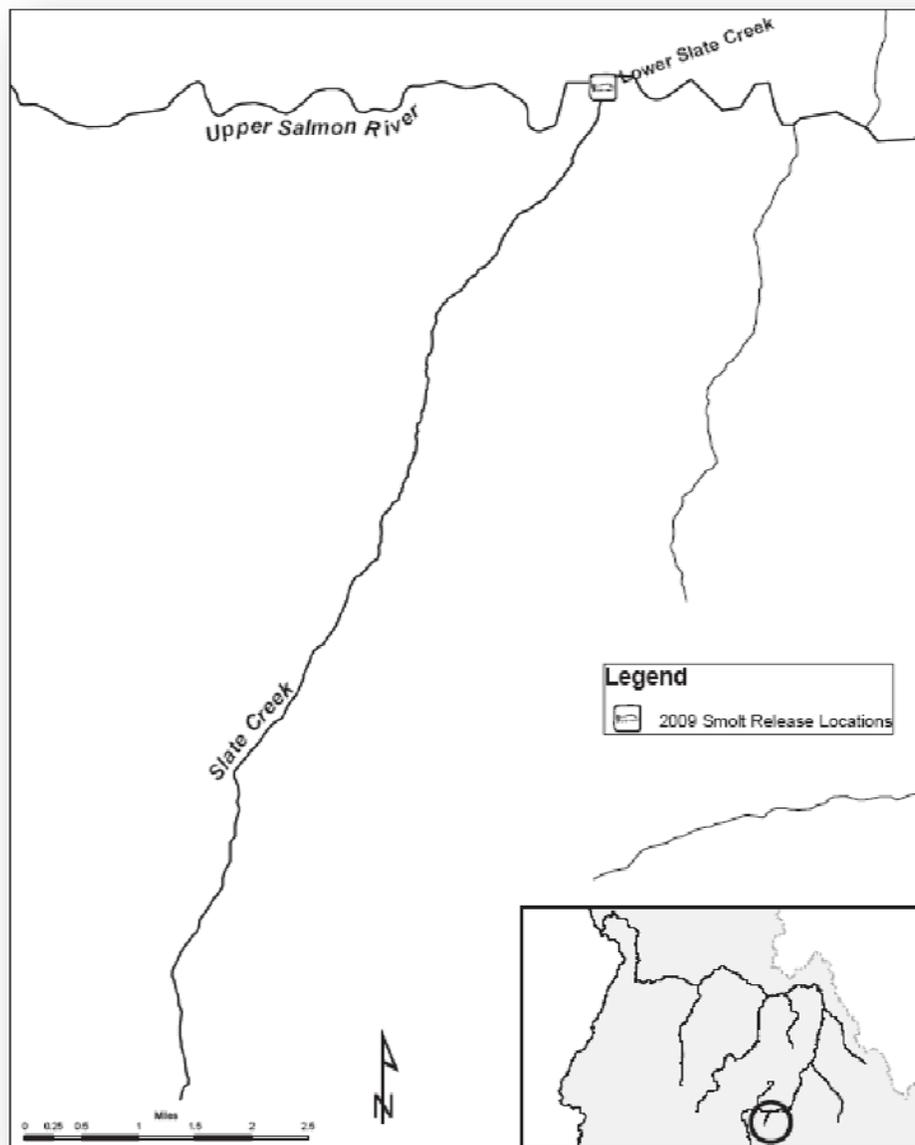


Figure 4. Slate Creek with smolt release locations, 2009.

**Table 1. 2009 steelhead smolt releases in Yankee Fork, Valley Creek, and Slate Creek.**

Location	Hatchery	Ad-clipped	Ad + CWT	Pit-Tag	No-mark	Total
Slate Creek	Magic Valley	0	31,382	1,792	62,588	93,970
Yankee Fork P1	Magic Valley	31,045	30,949	1,782	31,222	93,216
Valley Creek	Magic Valley	0	0	0	62,336	62,336
Yankee Fork P1	Hagerman	148,863	0	3038	145,187	294,050
Yankee Fork	MVH & HFH	179,908	30,949	4,820	176,409	387,266
Valley Creek	Magic Valley	0	0	0	62,336	62,336
Slate Creek	Magic Valley	0	31,382	1,792	62,588	93,970
<b>Total Release</b>		<b>179,908</b>	<b>62,331</b>	<b>6,612</b>	<b>301,333</b>	<b>543,572</b>

Of the 543,572 smolts released, 249,522 were reared at the Magic Valley Fish Hatchery (46% of total) and 294,050 were reared at the Hagerman National Fish Hatchery (54% of total). In summary, there were 179,908 ad-clipped, 62,331 ad-clipped plus coded-wire tagged, 6,612 pit-tagged, and 301,333 smolts with no marks released in Yankee Fork, Valley Creek, and Slate Creek, collectively.

Cormack/Jolly-Seber survival estimate for the 2009 hatchery steelhead smolt release in Yankee Fork equaled 0.736 (0.0168) to Lower Granite Dam. Therefore, staff estimates of the 387,266 total smolts released into Yankee Fork, 285,028 smolts survived to Lower Granite Dam.

### **Creel Information**

The 2009 steelhead harvest monitoring plan was focused on the Upper Salmon River Major Population Group (MPG); this area has most of the supplementation projects currently occurring. Since there are very few natural-origin steelhead returning to spawn in Idaho, Tribal fishermen concentrate their fishing activities on productive hatchery or supplemented areas. The 2009 fishery was monitored from March 16<sup>th</sup> until May 10<sup>th</sup>; mainly consisting of roving creel surveys conducted from Thursday to Monday. During this time frame, fishery biologists or technicians made a total of nine trips to the study area for creel surveys. In all, fishery monitors spent 137 hours and logged 3449 miles performing roving creel surveys. The Tribes Fish and Wildlife Department was very productive in creeling the majority of the fishermen in the 2009 fishery. This year's monitors recorded 171 efforts, resulting in 474.17 reported hours fished by Tribal members.

The 2009 Tribal fishery resulted in 232 steelhead harvested. Through the data collected, 83 percent of the total fish harvested during the season occurred between Thursday and Sunday. In fact, 64 percent of the total harvest was recorded on a Saturday. Monitoring crews were able to sex, length, DNA, and scale sample 137 fish. The remaining harvested fish were documented by crews in the field as already packed in ice or fisherman unwilling to allow sampling. The majority of the fish harvested were hatchery origin (218), while most of these fish were caught/speared in Yankee Fork Salmon River

Pond Series One (185). Cearly Creek, the small stream that connects the pond series is readily accessible using traditional spear methods to harvest steelhead. As spring runoff increases turbidity, other tributaries are rendered useless for this method; however the pond series see's very little run off from Cearly Creek. Tribal Fish and Game officers reported on April 11 there were 13 steelhead caught in Yankee Fork; however our monitors missed these fish in the creel survey. Consequently, there was no way of determining whether these fish were of natural or hatchery-origin.

## **DISCUSSION**

Of the major objectives and tasks under the SBT steelhead smolt supplementation program, staff completed the spawning of 192 individuals and the release of 543,572 smolts in Yankee Fork, Valley Creek, and Slate Creek, collectively.

Genetic samples taken from spawning all 192 individuals and creel samples have been archived for potential analysis by Abernathy Fish Technology Center (AFTC). With additional funding, AFTC will conduct parentage exclusion analysis to estimate adult production and smolt-to-adult survival. Under this study design, staff will be able to determine the efficacy and cost-effectiveness of the steelhead smolt program compared to natural production and/or the steelhead streamside incubation program. To increase the efficiency of monitoring and evaluation, the SBT propose to install a weir in the Yankee Fork in 2011 to trap returning adults to collect additional genetic samples beyond just creel surveys for conclusive parentage analysis studies.

In the past, steelhead smolts have been released on an irregular schedule in the Lemhi River, Yankee Fork, Valley Creek, or Slate Creek. To date, evaluation of this program has been limited to observation of adult steelhead and minimal redd counts. However, with the completion of a sound monitor and evaluation plan, the SBT can evaluate, using DNA, survival from the steelhead smolt release program in Yankee Fork. The plan is also designed to estimate capacity of the natural environment to support additional hatchery steelhead, give early warning of adverse impacts caused by the projects, and track trends in environmental quality.

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