

# APPENDIX I

Supplementation and Habitat Enhancement Programs

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# Yankee Fork Salmon River



## Shoshone Bannock Tribes

### Fish & Wildlife Department



#### Introduction

The Shoshone and Bannock people's homelands are vast and far-ranging and encompass what are now known as the states of Idaho, Oregon, Nevada, California, Utah, Wyoming, Montana and beyond. Rivers which our people used included the Snake, the Missouri and the Colorado rivers, all of which provided past and current subsistence needs. These natural resources provided food, medicine, shelter, clothing and other uses and purposes, intrinsic to traditional practices. Hunting for big game was important, along with vital native plant resources, including roots. Intrinsic to these activities is transportation.

In June 1867, an Executive Order established the Fort Hall Indian Reservation, as a collective place to consolidate the various bands of Shoshones, Bannocks and even other tribes, from their aboriginal lands, clearing the way for European-American settlements, such as ranchers and miners who desired rich resources present on aboriginal lands. The United States then signed a treaty, the Fort Bridger Treaty of 1868 with Shoshone and Bannock headmen, relinquishing any further claims to lands and title, but reserving the rights to hunt and fish on unoccupied lands in the United States, in Article 4.

Today, descendants of the Lemhi, Boise Valley, Bruneau, Weiser and other bands of Shoshoni and Bannock all reside on the Reservation. Tribal member continue to exercise off reservation treaty rights, and return to aboriginal lands to practice their unique culture and traditions. The Fort Bridger Treaty of July 3, 1868 was the only treaty ratified by Congress between the Eastern Shoshone bands and the Bannocks. In the Treaty, the Shoshone and Bannock people expressly reserved off-reservation hunting, fishing and gathering rights on the unoccupied lands of the United States. The 1868 Fort Bridger Treaty (15 Stat 73) Article IV states:

*The Indians herein named agree, when the agency-house and other buildings shall be constructed on their reservations named, they will make said reservations their permanent home, and they will make no permanent settlement elsewhere; but they shall have the right to hunt on the unoccupied land of the United States so long as game may be found thereon, and so long as peace subsists among the whites and Indians on the borders of the hunting districts.*

Article IV reserved the right for the Tribes to maintain a cultural, social and spiritual link to our ancestral homelands. Over the past 140 years the Tribes have utilized these unoccupied lands to visit significant sites, hunt, fish and wildlife for subsistence, gathered botanical species for medicine and food. In addition to the reserved Treaty rights, Tribal members also continue to exercise inherent rights including, but not limited to, visits to sacred sites or practice of traditional cultural practices. The Fort Hall Business Council is obligated to protect and preserve both Treaty rights and any inherent rights.

### **Snake River Policy**

The Tribes stress the importance of initiating efforts to restore the Snake River system and affected unoccupied lands to a natural condition. Article IV of the Fort Bridger Treaty of July 3, 2868, reserved the right to hunt on the unoccupied lands of the United States and the Tribes work diligently to ensure the protection, preservation and enhancement of those rights for future generations. The Tribes management policies generally allow for supporting federal proposals that will improve or restore resource conditions. The Shoshone-Bannock Tribes Policy for Management of the Snake River Basin Resources states:

*The Shoshone Bannock Tribes (Tribes) will pursue, promote, and where necessary, initiate efforts to restore the Snake River systems and affected unoccupied lands to a natural condition. This includes the restoration of component resources to conditions which most closely represents the ecological features associated with a natural riverine ecosystem. In addition, the Tribes will work to ensure the protection, preservation, and where appropriate-the enhancement of Rights reserved by the Tribes under the Fort Bridger Treaty of 1868 (Treaty) and any inherent aboriginal rights.*

The lands and resources within the Project area are an important part of the Tribes' history, contemporary subsistence and cultural practices. In the late 1960's, Gerald Cleo Tinno, an enrolled member of the Shoshone-Bannock Tribes and permanent resident of the Fort Hall Indian Reservation, was charged by the State of Idaho for spearing a chinook salmon on the Yankee Fork Salmon River. Both spear fishing and taking salmon at that particular time and location were violations of state fishing regulations. The State of Idaho argued that the rights reserved by Article IV of the Fort Bridger Treaty of 1868 did not extend to the Tribes' right to 'fish' for Chinook salmon. On this point the district court had the benefit of the expert testimony of Dr. Sven S. Liljeblad, a professor of anthropology and linguistics at Idaho State University, relating to the term "to hunt" as the term was generically used in the languages of the signatory Indians. The Shoshone verb was "tygi" while the corresponding Bannock term was "hoawai"; both were defined as meaning "to obtain wild food." As Dr. Liljeblad explained, the English terminology when translated to those Indian leaders at the treaty negotiations would have been understood to encompass both "fishing" and "hunting" for game.

The parties stipulated that the Yankee Fork of the Salmon River lies within the Challis National Forest and is 'unoccupied land of the United States'. At trial, Tinno answered the second element of the State's argument by showing that the Tribes made significant use of the Yankee Fork Salmon River drainage area for their subsistence needs. The record specifically shows that the early Indians took salmon by spear at the spawning beds; likewise there is evidence that after the treaty signing Fort Hall Reservation Indians customarily hunted and fished in the region encompassing the Yankee Fork locale. The Supreme Court of Idaho concluded that this area was within the meaning of the Treaty for fishing by Tribal members.

The Supreme Court of Idaho stated that "special consideration which is to be accorded the Fort Bridger Treaty fishing right must focus on the historical reason for the treaty fishing right. The gathering of food from open lands and streams constituted both the means of economic subsistence and the foundation of a native culture. Reservation of the right to gather food in this fashion protected the Indians' right to maintain essential elements of their way of life, as a complement to the life defined by the permanent homes, allotted farm lands, compulsory education, technical assistance and pecuniary rewards offered in the treaty. Settlement of the west and the rise of industrial America have significantly circumscribed the opportunities of contemporary Indians to hunt and fish for subsistence and to maintain tribal traditions. But the mere passage of time has not eroded the rights guaranteed by a solemn treaty that

both sides pledged on their honor to uphold. As part of its conservation program, the State must extend full recognition to these rights, and the purposes which underlie them.”

It is clear that anadromous fish are no longer found in abundance in some of waters where traditionally they would have been taken, of particular importance to this report is the diminished returns to the Yankee Fork Salmon River. It is essential that the Tribes continue to actively support restoration, supplementation and cooperative efforts with the State and other interested parties so that they continue to be ‘found thereon’. Under current management scenario in the Yankee Fork Salmon River, the conservation of the species is a concern for the Tribes and the State of Idaho, with both parties trying to sustain fisheries in the Upper Salmon River Basin.

The Yankee Fork Salmon River (YFSR) is located in Central Idaho in the Salmon-Challis National Forest east of Stanley, Idaho and is one of the larger watersheds (190 mi<sup>2</sup>) within the Upper Salmon River Basin. The YFSR, historically a major anadromous fish producer, contributes to anadromous and resident fish populations by providing diverse habitats, available low gradient stream channel reaches, productive aquatic habitat, and supports a remnant Chinook salmon population. Historically, the YFSR supported large spawning populations of Chinook salmon (*Onocorhynchus tshawytscha*) and steelhead trout (*Onchorhynchus myskiss*). Historic dredge mining of the lower section of the YFSR drainage has caused channel confinement, down-cutting and armoring, which has reduced critical spawning, rearing habitat and opportunity for Tribal traditional cultural practices. Regardless, the YFSR retains its Endangered Species Act critical habitat designation and is considered a high priority habitat in NOAA’s Federal Columbia River Power System 2008 Biological Opinion.

Due to dredge mining in the early 1900’s that has severely altered ten kilometers of the stream, eliminating much of the natural meander pattern, associated instream habitat, and riparian vegetation and their functions, the Tribes has put some time and effort in data collection and planning for restoration within the Yankee Fork drainage. The existing stream-floodplain complex consists of unconsolidated and unvegetated dredge tailings that offer little habitat for both terrestrial and aquatic species. The historic floodplain has been severely altered and the YFSR can no longer access the floodplain, causing an interruption of natural and nutritional fluxes. Restoring critical portions of this altered floodplain will contribute to the enhancement of the natural functions of the riverine ecosystem

and would allow the Shoshone Bannock Tribal members to continue practicing traditional hunting and fishing methods.

In addition to supporting efforts to engage in large-scale habitat restoration efforts in the YFSR, the Tribes are also contracted to perform a myriad of fisheries work ranging from research, monitoring, and evaluation to supplementation of both Snake River Chinook salmon and Snake River Steelhead. The projects, summarized in the following text, all support a YFSR program aimed at returning the habitat and fish run to its highest potential. A comprehensive blend of these programs will help answer significant questions about fish survival, the importance of habitat on critical anadromous fish life cycles, and the effects of supplementation on those fishes. This summary is intended to convey the concept that no one component of restoration can single-handedly allow fish to recover in a meaningful fashion; it will truly require a comprehensive action to bring the YFSR back into full production.

### **Overall Vision**

The Tribes past and present programs contributing to the YFSR monitoring, research, production and restoration are the Yankee Fork Restoration Project, Salmon River Habitat Enhancement Program, Steelhead streamside incubation program, Steelhead Smolt supplementation program, Yankee Fork Chinook Salmon Supplementation, Crystal Springs Fish Hatchery, and Idaho Supplementation Studies. The Salmon River Habitat Enhancement program and the Yankee Fork Restoration program are habitat programs that could enhance the floodplain, spawning, rearing and vegetation to a near natural stream. These programs have been collecting data since the early 1980's and mid 2000's, respectively. The Tribes fish supplementation programs include, Steelhead streamside incubation program (1995), Steelhead Smolt supplementation program (2006), Yankee Fork Chinook Salmon Supplementation (2008), Crystal Springs Fish hatchery is a large scale hatchery supplementation aimed at increasing abundance on the YFSR and providing a meaningful Tribal fishery in this critical watershed. The Crystal Springs Fish Hatchery program is currently undergoing the Independent Scientific Review Panel's three step process and has plans to begin production, pending approval, in late 2013. Idaho Supplementation Studies has operated a rotary screw trap on the West Fork Yankee Fork since 1992, pit tagging Chinook salmon and Steelhead, to evaluate the impacts of supplementation in the basin.

## Projects

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### Salmon River Habitat Enhancement Project

#### **Introduction**

For many years the Shoshone and Bannock Tribes (Tribes) have been working to improve anadromous fish runs back to the traditional fish areas. The historic hunting and fishing areas of the Tribes included all of central and southern Idaho. Rights to continue traditional activities were reserved by the Tribes through the Fort Bridger Treaty of 1868. The downward trends in returns of anadromous fish have been and will continue to be a concern to the Tribes. Many factors have been implicated for the decline in returning adult fish in the Salmon River basin including impaired mainstem passage, harvest, predation, impacts from hatchery programs, blocked habitat, and degraded habitat in spawning and rearing streams (NPPC 1994). However, attempting to document increases in adult returns as a result of habitat enhancement has been difficult because of out-of-basin factors.

With the Salmon River Habitat Enhancement project (established in 1984), funded by Bonneville Power Administration, the Tribes have been monitoring and evaluating various systems within the Salmon River Subbasin, of which the Tribes have sponsored habitat enhancement in three systems (Bear Valley Creek -Middle Fork Salmon River, Yankee Fork Salmon River, and East Fork Salmon River) to improve production of Chinook salmon and steelhead. Feasibility studies were conducted prior to all enhancement projects and were reviewed by interagency task force teams prior to implementation to ensure that the scientific principles were sound, and the best alternative was chosen for each system (J.M. Montgomery 1985; BNI 1987; EA 1988). Evaluation of these systems to date result in target goals established for fine sediment inputs and favorable habitat for biotic communities, spawning and rearing areas for salmonids, resident fish and wildlife species. The project also seeks to coordinate activities among involved entities and ensure Tribal participation in these tasks to avoid duplication, increase information sharing among fisheries agencies, and oversight of human activities on federal and state land on fisheries related issues.

#### **Objective/goal**

The project focuses on the recovery of Chinook salmon and steelhead in the Salmon River subbasin, primarily on habitat enhancement where anthropogenic and natural causes have hindered productivity and population. Specifically, the project monitors physical and biological characteristics and evaluates

the effectiveness of habitat actions to address limiting factors. Information gathered from the project is used to facilitate adaptive management regarding habitat actions implemented.

### **Current effort**

The project is currently focusing on other tributaries, namely in the Panther Creek Watershed, Upper Salmon Watershed and East Fork Salmon River Watershed, implementing habitat enhancement and monitoring.

### **Future effort**

The project will assist in the monitoring and evaluation upon completion of the approved restoration actions.

### **Past effort**

#### **Redd counts**

1984-2009 data is collected and reported on the WFYF

1986-2009 data collected and reported on YFSR

2001: One pass in August and two passes on WFYF in August up to Lightning Creek

2002: One pass in August from Sunbeam to Twelve Mile Creek

2003: unknown passes and location

2004: Two passes August and September.

2005: Three passes August and September from Sunbeam to Eight Mile Creek

2006: Three passes August and September from Sunbeam to Twelve Mile Creek and One pass on WFYF up to Lightning Creek.

2007: no data

2008: two passes August and September from Jordan Creek down.

2009: three passes August and September from Pole Flat Campground to Twelve Mile Creek

#### **Snorkel Surveys**

2001: Ponds, mainstem YF, WFYF, Jordan Creek, completed July

2002: Ponds, mainstem YF, WFYF, Jordan Creek, completed July

2003: no data

2004: Ponds, mainstem YF, WFYF, completed July and August

2005: Ponds, mainstem YF, WFYF, Jordan Creek, completed July  
2006: Ponds, mainstem YF, WFYF, Jordan Creek, completed July  
2007: Ponds, mainstem YF, WFYF, completed July and August  
2008: Ponds, mainstem YF, WFYF, completed July and August

**Temperature of ponds. \*additional data below Jordan Creek on the YFSR**

2002: July-October  
2003: no data  
2004: June-October  
2005: July-October  
2006: July-October\*

**Steelhead smolt releases, by IDFG**

2002  
2003

**Chinook salmon captive rearing program in WFYF**

1998-2003

**YFSR Invertebrates samples**

1991  
1992  
2004

**Measurements of Ponds, survey**

1990

**Fish Shocking**

1990

**Construction of four ponds series to aid in juvenile rearing**

The Shoshone-Bannock Tribes' Yankee Fork Habitat Enhancement project (construction phase 1987-1988) was implemented to increase off-channel rearing habitat. A series of four pond structures were interconnected to the mainstem Yankee Fork creating an additional 1.58 ha of rearing habitat (Rowe et al. 1990). The increase rearing habitat was expected to produce an additional 22,000 Chinook salmon smolts (BNI 1987). Since construction, juvenile Chinook salmon have been found to utilize this new habitat at higher densities than in the adjacent mainstem Yankee Fork (Rowe and others 1994). Use of the off-channel ponds by juvenile anadromous salmonids has been greater than the adjacent mainstem Yankee Fork.

# Yankee Fork Restoration Project

## **Background/history**

Dredge mining in the early-mid 1900s severely impacted nearly 10 kilometers of the stream, eliminating the natural meander pattern and associated in stream habitat as well as riparian vegetation and the values it provided. The existing stream-floodplain complex consists of unconsolidated and unvegetated dredge tailings that offer little habitat for aquatic and terrestrial species. The impacted floodplain has reduced natural and nutritional fluxes.

Snake River Spring Chinook salmon and summer steelhead trout have used the Yankee Fork Salmon River (YFSR) and its tributaries for spawning and rearing long before European settlement. The Shoshone and Bannock peoples resided in the Salmon River area and specifically hunted for fish, wildlife and plants for subsistence. One historical reference identified a Bannock camp at the mouth of Ramey Creek, a tributary to the YFSR. The Tribes continue to utilize the YFSR for subsistence, in accordance with Article IV of the 1868 Fort Bridger Treaty.

If portions of the YFSR are restored we can assume some level of increase in anadromous and resident fish production within the YFSR drainage. Improved YFSR habitat would provide additional rearing and spawning habitat for anadromous and resident fish, a need addressed in the 2008 FCRPS BiOp. There are many variables important to anadromous fish recovery, including: commercial fishing, dams, ocean conditions, river habitat, etc, which play a role in determining the overall health of these populations. Until these variables are adequately addressed, natural fish numbers will continue declining or remain low. All these complications are compounded by habitat degradation, introduction of exotics, and instream flow diversions throughout the basin and combined these pressures on anadromous fish populations have led to basin wide declines.

Snake River spring/summer Chinook salmon were listed under the Endangered Species Act as threatened on April 22, 1992 (57 FR 42529), and the YFSR was classified as critical habitat on 28 December 1993 (58 FR 68543). Until migration corridor problems are resolved, the resiliency and persistence of remaining anadromous fish stocks will be dependent on the diversity, quantity and quality of stream habitats. Restoration of historic habitat, like the dredged section of YFSR, is a critical component to the persistence and recovery of ESA listed fish species in the Upper Salmon River Basin.

## **Objectives/Goals**

The goals of Yankee Fork Dredge Tailings Restoration Project (YFRP) are to (1) restore the physical processes that create and maintain a self-sustaining stream ecosystem (2) restore physical processes that address biological limiting factors, including fish rearing and spawning habitat and riparian habitat/floodplain, and (3) to determine restoration success with baseline data collection and post restoration monitoring.

## **Present progress**

During 2011, the YFRP will continue collecting water quality baseline data: which includes the use of pressure transducers gathering water levels in conjunction with gathering discharge measurements; the use of SONDES, long term multi-parameters units; and collecting water temperature characteristics using thermographs. The project is contracting the USGS to install a gauging station on the YFSR. The project team will continue working with Inter-Disciplinary team on the Yankee Fork Tributary assessment to identify additional reaches, which may benefit from restorative actions.

Much of the impacted region of the YFSR is privately held by a single land-owner, J.R. Simplot Company. This land-owner has been extremely gracious to the SBT and other natural resource agencies in the region by providing access to the YFSR through private lands; this access agreement has been honored by landowner for at least two decades, but as of 2007 the access agreement has been expired. The SBT are actively engaged in conversations with private landowner regarding the proposed restoration effort and negotiations regarding conservation easements or other long-term land exchange opportunities are on-going.

## **Future plans**

The future of the YFRP is to continue working with the Yankee Fork Inter- Disciplinary team to assist in identifying restoration actions by completing a tributary and reach assessments. Also plan on completing an environmental site characterization, install piezometers, a TSS study, plant native vegetation, and continue negotiating with landowners to gain a resolution for access and easements of restoration sites. While negotiating with landowners, the team could possibly implement smaller scale restoration sites that are not on private property:

- Restoration Project one: replace a culvert with a bridge at the end of Pond Series one and lower the channels within the complex (during base flows the stream goes subsurface for several feet in length).
- Restoration Project two: reconnect Silver Creek to Pond Series One
- Restoration Project Three: reconnect Jerry's Creek to Yankee Fork main-stem
- Restoration Project Four: replace culvert with a bridge or remove entirely at Cearly Creek, Pond Series Three
- Other possible restoration projects: continue restoration on Jordan Creek above HECLA restoration site; repair low-lying road grade sections upstream of Five Mile Creek; replace or enlarge culverts/fish barriers; connect ponds to Yankee Fork main stem for year around flows.
- Other Restoration projects: will be determined by tributary and reach assessments

### **Past Data collected**

The Yankee Fork Restoration Project begun collecting water quality data in 2006; the data was collected with the use of SONDES; a Marsh-McBirney flow meter to collect in-stream discharge measurements; pressure transducers to monitor water levels; and thermographs to monitor water temperatures. All data was collected spring through the fall each year.

### **SONDES**

We used multi-parameter Sondes (YSI-Corp) to collect water quality data. The YSI 6600 Sonde is designed for in situ, long term, within water monitoring. The Sondes are equipped with individual sensors that collect temperature, pH, dissolved oxygen, turbidity and specific conductance on 15-30 minute intervals and deployed on an average of two to three week intervals throughout the field season (May-November) on the YFSR. Future of water quality data collections is dependent upon the need, do plan on collecting data throughout restoration and 2-3 years after all restoration is complete, if funding available for monitoring and evaluation.

The Sondes were placed at three different sites for the years 2006-2009 and at five sites 2010-2011. The data for 2006-2009 is sporadically collected throughout the field season, while data collected for 2010-2011 is collected continuously throughout season. Flat Rock Bridge, Bonanza Bridge and Jordan Creek Bridge locations have booms attached to the rails where the equipment is attached that provide security. The Flat Rock Bridge location is 2.4 km upstream from the mouth of the YFSR and is situated

downstream of the lower extent of the dredge tailing; the Bonanza Bridge located 12.4 km from the mouth of the YFSR is situated upstream 9.5 km from Flat Rock Bridge. Jordan Creek is a tributary to the YFSR and its location is 1.5 kilometers upstream of Bonanza Bridge. West Fork Yankee Fork Sonde is placed in PVC housing, 50 feet above the YFSR confluence, which is 9.9 km upstream from YFSR mouth. Custer Bridge is 17.7 km above YFSR mouth and is placed under the bridge housed in PVC housing.

#### 2006

|                     |                             |
|---------------------|-----------------------------|
| Jordan Creek Bridge | 5/17/2006 through 6/21/2006 |
| Bonanza Bridge      | 5/2/2006 through 11/3/2006  |
| Flat Rock Bridge    | 6/16/2006 through 11/3/2006 |

#### 2007

|                     |                              |
|---------------------|------------------------------|
| Jordan Creek Bridge | 5/24/2007 through 10/01/2006 |
| Bonanza Bridge      | 5/24/2007 through 11/8/2007  |
| Flat Rock Bridge    | 6/15/2006 through 11/8/2007  |

#### 2008

|                     |                              |
|---------------------|------------------------------|
| Jordan Creek Bridge | 7/8/2008 through 11/22/2008  |
| Bonanza Bridge      | 6/14/2008 through 11/20/2008 |
| Flat Rock Bridge    | 5/1/2008 through 9/9/2008    |

#### 2009

|                     |                              |
|---------------------|------------------------------|
| Jordan Creek Bridge | 5/12/2009 through 11/18/2009 |
| Bonanza Bridge      | 5/12/2009 through 10/29/2009 |
| Flat Rock Bridge    | 5/14/2009 through 11/18/2009 |

#### 2010

|                     |                             |
|---------------------|-----------------------------|
| Jordan Creek Bridge | 4/2/2010 through 11/9/2010  |
| Bonanza Bridge      | 4/1/2010 through 11/9/2010  |
| Flat Rock Bridge    | 4/1/2010 through 11/9/2010  |
| Custer Bridge       | 4/22/2010 through 11/9/2010 |
| Jordan Creek Bridge | 4/22/2010 through 11/9/2010 |

2011

|                     |                          |
|---------------------|--------------------------|
| Jordan Creek Bridge | 4/2/2011 through present |
| Bonanza Bridge      | 4/2/2011 through present |
| Flat Rock Bridge    | 4/2/2011 through present |
| Custer Bridge       | 4/2/2011 through present |
| Jordan Creek Bridge | 4/2/2011 through present |

### **Discharge measurements**

Discharge measurements were taken using a Marsh-McBirney Flo-Mate model 2000 portable flow-meter, Marsh-McBirney Inc., [www.marsh-mcbriney.com](http://www.marsh-mcbriney.com). The discharge measurements were randomly collected throughout the field season and at each site. Each time discharge was measured the staff gauge level was recorded if available. Some sites where discharge was measured had no corresponding staff gauge. Sites that have a staff gauge are: Yankee Fork at Flat Rock Bridge, Poleflat campground, West Fork Yankee Fork at the mouth, Bonanza Bridge, Jordan Creek, and Custer Bridge. The staff gauges on the Yankee Fork at Flat Rock Bridge and Poleflat campground were read additional times both before discharge measurements during high water, and in-between discharge measurements throughout the summer and fall. Discharges were calculated in cubic feet per second (cfs). The study area includes the YFSR: Flat Rock Bridge, Poleflat Campground, Bonanza Bridge, Custer Bridge, and Five Mile; and its tributaries: West Fork Yankee Fork (WFYF), Jordan Creek, Jerry's Creek, Silver Creek, Rankin Creek and Ramey Creek.

2006

In 2006 flow measurements were taking on the Yankee Fork at Eight Mile Creek, Poleflat Campground, Bonanza Bridge, Five Mile Creek, West Fork Yankee Fork, and Jordan Creek. The flows were taken from April 2006 through October 2006 at random dates.

In 2007 flow measurements were taking on the Yankee Fork at Poleflat Campground, Bonanza Bridge, Five Mile Creek, West Fork Yankee Fork, and Jordan Creek. The flows were taken from April 2007 through November 2007 at random dates.

In 2008 flow measurements were taking on the Yankee Fork at Poleflat Campground, Bonanza Bridge, Five Mile Creek, Flat Rock Bridge, below West Fork Yankee Fork, West Fork Yankee Fork, Jordan Creek, Silver Creek, and Jerry's Creek. The flows were taken from April 2008 through November 2008 at random dates.

In 2009 flow measurements were taking on the Yankee Fork at Poleflat Campground, Bonanza Bridge, Five Mile Creek, Flat Rock Bridge, below and above West Fork Yankee Fork, West Fork Yankee Fork, Jordan Creek, Silver Creek, and Jerry's Creek. The flows were taken from April 2009 through November 2009 at random dates.

In 2010 flow measurements were taking on the Yankee Fork at Five Mile Creek, Custer Bridge, Bonanza Bridge, Flat Rock Bridge, West Fork Yankee Fork, Jordan Creek, Silver Creek, Jerry's Creek, and Rankin Creek. The flows were taken from April 2010 through November 2010 at random dates.

### **Temperature**

Onset HOBO thermographs were deployed in the Yankee Fork Salmon River, tributaries to the Yankee Fork, and in reference streams years 2007-2011. Models of Onset HOBO data loggers used were either the U22-001 Water Temp Pro v2, U23-004 Temperature/External (for measurement of both air and water simultaneously), WTA08 StowAways or the UA-002-64 Pendant temp/light. Thermographs were anchored within the flowing portion of the channel by wiring to rebar stakes. Air temp monitors were attached to nearby trees. Temperature data loggers were deployed continuously throughout the entire season starting in as early in May as possible, to as late in November as possible. Early to late deployment was done in order to capture temperature conditions during the entire warm cycle of the season. The data from the HOBO temperature data loggers were download to either the Onset BoxCar or HOBOPRO software programs and exported as text files to Microsoft Excel.

#### 2007

|                            |   |
|----------------------------|---|
| Yankee Fork at 5-Mile      | 4/26/2007 through 11/17/2007 1 hour increments  |
| Yankee Fork above Jordan   | 6/14/2007 through 11/17/2007 30 min. increments |
| Yankee Fork at Dredge camp | 4/26/2007 through 11/17/2007 30 min. increments |
| Yankee Fork at Poleflat    | 4/26/2007 through 11/18/2007 30 min. increments |

West Fork Yankee Fork 4/26/2007 through 11/17/2007 30 min. increments

2008

Yankee Fork at Dredge camp 4/18/2008 through 11/22/2008 1 hour increment

Yankee Fork at Poleflat 4/18/2008 through 11/22/2008 1 hour increment

West Fork Yankee Fork 4/18/2008 through 11/22/2008 1 hour increment

2009

Yankee Fork at 5-Mile 6/26/2009 through 11/17/2009 1 hour increment

Yankee Fork at diffuser 5/15/2009 through 11/17/2009 1 hour increment

Yankee Fork above W Fork 7/1/2009 through 11/17/2009 1 hour increment

Yankee Fork below W Fork 7/1/2009 through 11/17/2009 1 hour increment

Yankee Fork at Dredge Camp 5/15/2009 through 11/17/2009 1 hour increment

Yankee Fork at Poleflat 5/15/2009 through 11/17/2009 1 hour increment

West Fork Yankee Fork 5/15/2009 through 11/17/2009 1 hour increment

Jerry's Creek 5/27/2009 through 11/17/2009 1 hour increment

Silver Creek 5/27/2009 through 11/17/2009 1 hour increment

2010

Yankee Fork at 9-Mile 2/28/2010 through 5/26/2010 30 minute increment

Yankee Fork at 5-Mile 4/02/2010 through 11/19/2010 30 minute increment

Yankee Fork at Custer Bridge 5/02/2010 through 11/9/2010 30 minute increment

Yankee Fork at Bonanza Bridge 5/01/2010 through 11/09/2010 30 minute increment

Yankee Fork at Dredge Camp 5/01/2010 through 11/09/2010 30 minute increment

Yankee Fork at Poleflat 3/16/2010 through 11/09/2010 30 minute increment

Yankee Fork at Flat Rock Bridge 5/02/2010 through 10/19/2010 30 minute increment

Jordan Creek 3/24/2010 through 11/19/2010 30 minute increment

West Fork Yankee Fork 3/18/2010 through 11/09/2010 30 minute increment

Rankin Creek 4/06/2010 through 11/09/2010 30 minute increment

Jerry's Creek 4/06/2010 through 11/09/2010 30 minute increment

Silver Creek no data available due to malfunction of temperature logger

## **Sub-Contractors**

### **Idaho State University**

The ISU's Stream Ecology Center was contracted in 2007 to complete a Comparison of a dredged-mined segment to reference segments manual script, also provide the Tribes with a monitoring and evaluation protocol.

In 2009, the Tribes received a manual script from Idaho State University Ecology center, Yankee Fork Dredge tailings Restoration Project 2009 report, An assessment of the potential for the Salmon and Steelhead Recovery via Floodplain restoration in the Yankee Fork Salmon River, Idaho.

### **CH2M HILL, INC.**

CH2M Hill, Inc. was contract in 2006 to assist with Independent Scientific Review Panels comments on the YFRP 2007-2009 proposal. In 2007-2008 the company was contracted to complete a conceptual design with estimated costs, Yankee Fork Floodplain Restoration Project: Alternatives Analysis and Evaluation, April 2008.

# Supplementation Monitor and Evaluation

## Summary Activities in Yankee Fork Salmon River

Kurt Tardy, 6/28/11

### **Steelhead Streamside Incubation (SSI) Program**

#### **Background**

The Yankee Fork, a major tributary of the Salmon River, is a spawning and rearing system for steelhead trout (*Onchorhynchus mykiss*) and Chinook salmon (*O. tshawytscha*). Historically, there were large spawning populations of steelhead and Chinook in Yankee Fork which are a cultural, social and subsistence based resource of historical significance for the Tribes. Factors including hydroelectric dam construction, reduced riparian habitat, irrigation, river and ocean harvest, and fish passage have caused a decline in salmon and trout populations.

Reiser and Ramey (1987) determined Yankee Fork could produce an estimated 740,064 Chinook and 295,499 steelhead smolts. Based on information from the Interior Columbia Basin Technical Recovery Team (TRT 2005) and Reiser and Ramey (1987), Yankee Fork is underutilized by anadromous fish.

The Tribes developed supplementation activities to enhance the viability of natural steelhead populations. Without changing downstream harvest and hydrosystem management, supplementation may be necessary to maintain elevated populations to support harvest and improve abundance, productivity, structure, and genetic diversity (Denny et al. 2006). Effective management of steelhead stocks can be determined by increases in abundance and distribution through a combination of field sub-sampling and DNA genotyping.

#### **Objectives and Goal**

The Tribes initiated a steelhead streamside supplementation program in 1995 to help maintain, rehabilitate, and enhance steelhead populations. The objectives of the SSI program, under the agreement in *U.S. v Oregon*, are to outplant 1.0 million eyed steelhead eggs into three Upper

Salmon River tributaries; 500,000 in Yankee Fork, 400,000 in Panther Creek, and 100,000 in Indian Creek to meet a return goal of > 2,000 adults.

### **Data Collection**

The tasks, as identified within monitor and evaluation objectives, are to: (1) collect genetic samples for parentage analysis, (2) document salmonid species, (3) estimate relative abundances for wild origin and SSI progeny, (4) determine natural production increase resulting from supplementation of steelhead in Yankee Fork and relate this information to possible limiting factors, and (5) communicate monitoring and evaluation findings to resource managers. Spawning occurs at Sawtooth Fish Hatchery (SFH), where IDFG conducts all spawning for returning pairs of steelhead adults. SFH staff collects genetic samples, gametes, and fork length for each parent fish isolated for Yankee Fork. Mating is conducted as 1:1 female to male and eggs are incubated separately from general production gametes.

Incubators are standardized with 2-inch PVC pipe with a 3-inch head pipe to collect additional flow from the stream. Each head pipe is fitted with ¼ inch mesh screen to minimize sediment and debris collection. Each incubator consists of a 50-gallon polyurethane cylinder with a sediment tray, gravel, saddles, six egg trays, and one cover tray to contain eggs until hatching occurs. Each catch tank is a 30-gallon Rubbermaid polyurethane tub with a custom fit cover. Incubators are monitored twice weekly from installation through removal. Staff records water condition, temperature, dissolved oxygen, conductivity, pH, and embryo stage as well as clean and remove debris from head pipe screens.

Upon full volitional emigration, hatch success is estimated from enumerating dead eggs in the incubator and dead fry in the catch tank. Fry seeded is estimated as the number of eggs planted minus the number of dead eggs enumerated.

Juvenile sampling was conducted on the Yankee Fork drainage. Konopacky et al. (1985, 1986) divided the drainage into seven distinct strata; generally three reaches were selected within each stratum. The sites were selected for a variety of habitats (pools, glides, riffles) and ease of

accessibility for an upper, middle, and lower location within each stratum. Sites were generally rectangular in shape, aligned with the shoreline, and divided into transects for habitat measurements.

Multiple-pass electrofishing requires closed populations to minimize emigration and immigration; hence the use of block nets. Sites were predominately 100 m in length, but did reach above 100 m due to habitat inclusion and accessibility for block net placement. Upstream and downstream ends of the sampling reach were blocked using 7-mm-mesh nets secured to the streambed with tri-pods and rebar, generally at habitat unit separations. Sites were electrofished in an upstream direction between 20 – 30 minutes with one crew member electroshocking (Smith-Root, Inc. Pulsed DC LR-24 Backpack Electrofisher) and two to three others utilizing dip nets to capture fish drifting downstream under electronarcosis. Voltage and frequency were adjusted and monitored to maximize capture, but limit fish injury (voltage: 350-450, frequency: 30-50 Hz, duty cycle: 10-12%). Fish were transferred immediately to a bucket and then to a holding tub for further analysis.

Fish were anesthetized in a 10 p.p.m. solution of clove oil. Prior to mixing solution, clove oil was first dissolved in 95% ethanol (1:10 ratio clove oil-ethanol) since clove oil is insoluble at water temperatures below 15 °C (Cho and Heath 2000). Trout and salmon were measured for fork length to the nearest 1 mm and weight to the nearest 0.01 g. Fin clips were taken from the ventral caudal lobe and scales were taken anterior of the caudal fin for parentage analysis and aging, respectively. Post-sampling, fish were transferred to a tub of fresh water to recover. A minimum of 20 minutes between passes was given to allow the return of normal fish activity and visual clarity. Fish were released after full recovery once sampling was finished.

Population estimates and probability of capture was calculated using model  $M_{(b)}$  (Zippen removal population estimator, Zippen 1956) by the program CAPTURE. CAPTURE computes estimates of capture probability and population size for all electrofishing passes based on a stationary population, equal probability of capture for each animal, and constant probability of capture.

Total reach area sampled was determined as the product of stream section length and mean width. Width: depth ratio was calculated by dividing mean width by mean depth. Catch-per-unit-effort (CPUE) for each site, strata, and Yankee Fork was calculated as fish per meter squared (fish/m<sup>2</sup>).

### **Yearly Summary**

2006 – Electrofishing: September 13-14, 19-21, and October 11-13 @ 18 sites (Figure 1)

2007 – Electrofishing: September 12-13, 18-19, and October 2-5, 10-12 @ 22 sites (Figure 2)

2008 – Electrofishing: September 16-26 @ 25 sites (Figure 3)

2009 – Rotary Screw Trap: July 2 – November 13

2010 – Rotary Screw Trap: April 27 – June 3 and August 21 – November 16

### **Future**

Install steelhead trapping weir to collect returning adults for developing a localized Yankee Fork population. Maintain program operations and continue screw trap operations and PIT tagging of migrating steelhead juveniles. Also, install PIT tag array for additional migration and survival estimates for juveniles. Continue to obtain tissue samples from migrating juveniles and conduct genetic evaluations of program contribution to steelhead production in Yankee Fork.



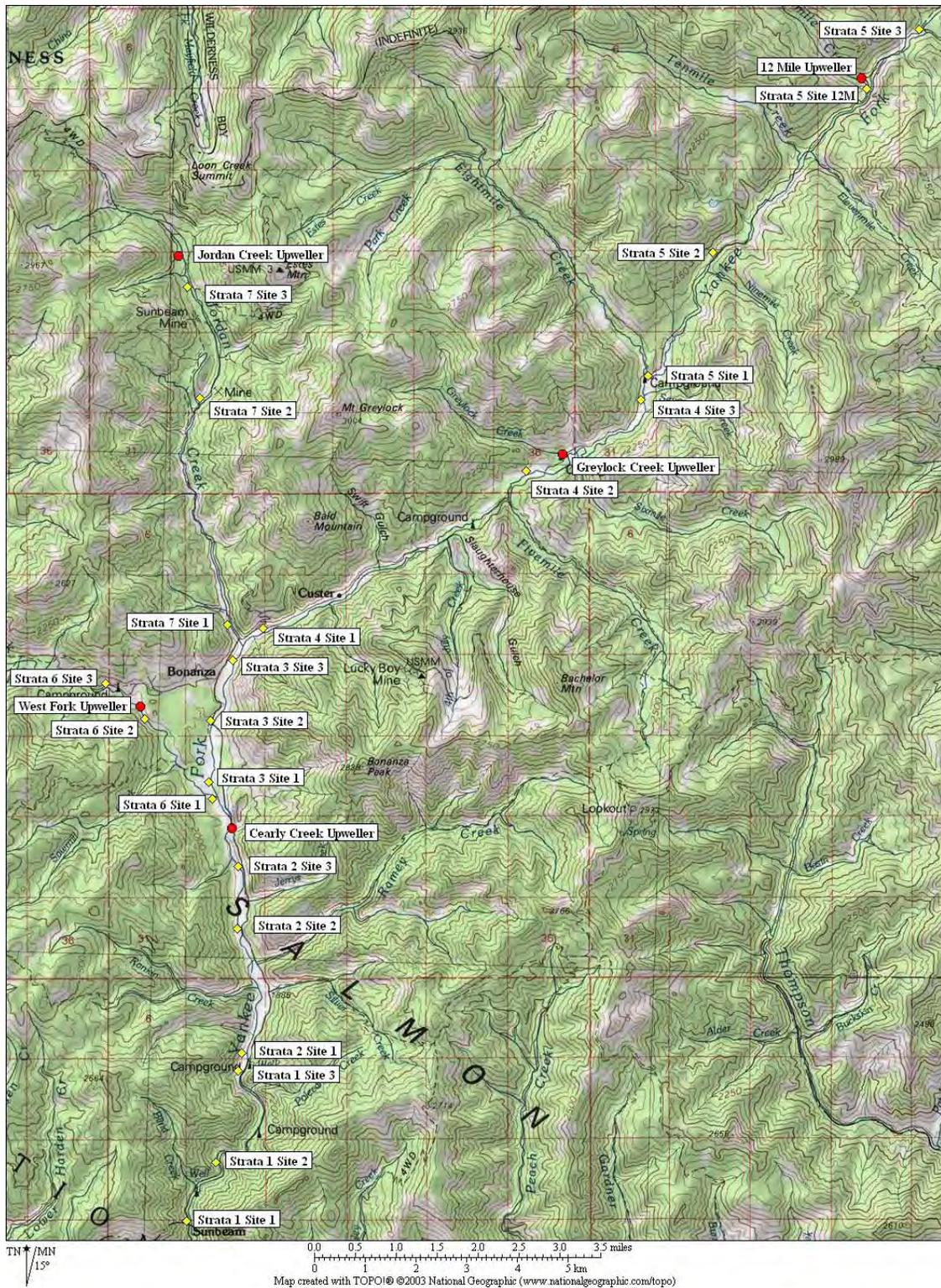


Figure 2. 2007 Electrofishing locations

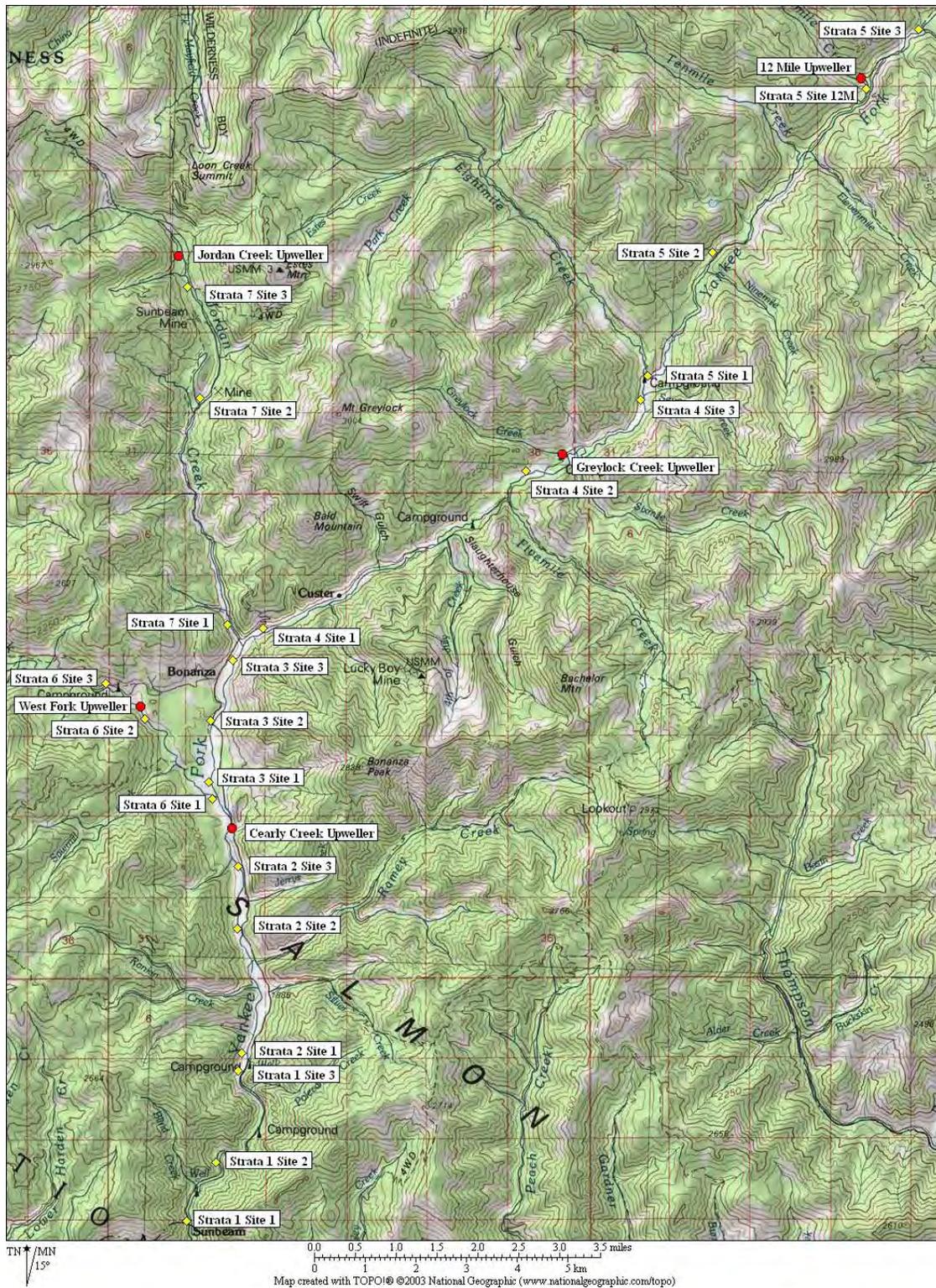


Figure 3. 2008 Electrofishing locations

## **Steelhead Smolt Supplementation (SSS) Program**

### **Background**

The Tribes initiated a smolt supplementation program in Yankee Fork to increase the viability and production of the steelhead population, 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.

In cooperation with LSRCF, 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.

### **Objectives and Goal**

The objectives of the steelhead smolt supplementation program, under the agreement in *U.S. v Oregon*, are to release approximately 440,000 smolts in Yankee Fork with a goal of returning > 2,000 adults.

### **Data Collection**

Steelhead for this program are collected, spawned, and sampled by IDFG staff at the Sawtooth Fish Hatchery. Smolts destined for Yankee Fork supplementation are incubated and reared separately from all other hatchery production at the Hagerman National Fish Hatchery. Upon transport to Yankee Fork, the 440,000 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 2012. 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.

### **Yearly Summary**

2006 – Electrofishing: September 13-14, 19-21, and October 11-13 @ 18 sites (Figure 1)

2007 – Electrofishing: September 12-13, 18-19, and October 2-5, 10-12 @ 22 sites (Figure 2)

2008 – Electrofishing: September 16-26 @ 25 sites (Figure 3)

2009 – Rotary Screw Trap: July 2 – November 13

2010 – Rotary Screw Trap: April 27 – June 3 and August 21 – November 16

### **Future**

Install steelhead trapping weir to collect returning adults for developing a localized Yankee Fork population. Maintain program operations and continue screw trap operations and PIT tagging of migrating steelhead juveniles. Also, install PIT tag array for additional migration and survival estimates for juveniles. Continue to obtain tissue samples from migrating juveniles and conduct genetic evaluations of program contribution to steelhead production in Yankee Fork.

## **Yankee Fork Chinook Salmon Supplementation (YFCSS) Program**

### **Background**

The Yankee Fork Salmon River (Yankee Fork) is a traditional Chinook salmon fishery area for Shoshone-Bannock Tribal members, reserved under the Fort Bridger Treaty of 1868. Tribal fishermen have witnessed a significant decline in the number of fish being harvested in the Yankee Fork and this decline has been closely linked to the decline in productivity. One obvious candidate to explain the decline in productivity is the number of dams that smolts (juvenile downstream migrants) and returning adults must pass to survive and complete their life cycle (Schaller et al. 1999; Deriso et al. 2001).

Yankee Fork is one of nine independent populations of Chinook salmon located within the upper Salmon River major population group (MPG) (ICTRT 2007). Yankee Fork historically supported large runs of Chinook salmon (Reiser and Ramey 1987), however in 1992, they were listed as threatened under the Endangered Species Act (ESA) (57 FR14653). In 1995, there were no redds observed during the Tribes annual spawning ground surveys.

In response to the declining Chinook salmon population in Yankee Fork, the Tribes developed the Yankee Fork Chinook Salmon Supplementation (YFCSS) Project to increase the number of Chinook salmon returning to Yankee Fork. The decision to supplement Yankee Fork Chinook salmon resulted from a number of factors including: (1) an immediate need to prevent local extirpation; (2) the importance of the area as a Tribal subsistence fishery and the need to achieve the Tribal harvest objective; (3) the importance of recovering this population and achieving the conservation objective; (4) the long history of introductions of out-of-basin stocks; (5) the proximity of a donor hatchery that could provide broodstock (i.e., Sawtooth) to support a supplementation effort; and (6) regional support for the enhancement effort.

### **Objectives and Goal**

The number of adult Chinook salmon returning to the Yankee Fork to spawn is the basis for determining whether management actions are successful. Through a combination of

management activities, including habitat restoration, harvest management, and hatchery supplementation the Tribes are working to achieve the long-term goal of returning 2,000 adult Chinook salmon to the Yankee Fork.

Until the Chinook salmon population is self-sustaining, the YFCSS Project will supplement the annual return of Chinook salmon to achieve the long-term adult abundance goal. In addition, the Tribes will continue to manage harvest according to the Tribal Resource Management Plan (Denny et al. 2008).

### **Data Collection**

The YFCSS Project was developed to assist in returning 2,000 adult Chinook salmon to Yankee Fork for Tribal conservation and harvest management objectives. The first juvenile smolt release occurred in April 2006. Juveniles were 100% adipose fin clipped and expected to return as age<sup>4</sup> adults in 2008 and age<sup>5</sup> adults in 2009.

In 2008 and 2009, natural and hatchery Chinook salmon were expected to return to Yankee Fork in sufficient numbers to initiate broodstock collection for the supplementation project. Overall, 277 Chinook salmon were trapped, of which 25.9% were natural and 74.1% were hatchery (Tardy and Denny 2010). Approximately 2,955 total hatchery adults were obtained from Sawtooth and outplanted in upper Yankee Fork for natural spawning in 2008 and 2009. Intensive spawning ground surveys were completed in both years and 1,074 total redds were observed. In summary, we estimate a total escapement of 3,575 Chinook salmon in the Yankee Fork, 1,935 in 2008 and 1,640 in 2009. We estimate 65 natural adults returned to Yankee Fork in 2010 and created a total of 27 redds.

Chinook adults for this program are currently collected, spawned, and sampled by Tribal and IDFG staff at the Sawtooth Fish Hatchery and Yankee Fork Satellite Facility. Smolts destined for the Yankee Fork program are incubated and reared separately from all other hatchery production at Sawtooth. Tribal staff is present at Sawtooth to assist set-up, crowding, loading,

transport, and clean up. Two groups, adipose clipped and adipose intact, are transported to Yankee Fork; releases occur in Pond Series One and at Jordan Creek confluence to evaluate acclimation versus direct stream release. Cormack/Jolly-Seber survival estimates are generated for hatchery Chinook salmon smolt releases in Yankee Fork to Lower Granite Dam.

The Tribes install a rotary screw trap in the Yankee Fork annually for the purposes of enumerating, tagging, and genetic tissue sampling migrating juveniles for research, monitoring, and evaluation. On a daily basis, the live box on the screw trap is emptied at approximately 11:00 hours into one large cooler; evident non-target species are enumerated, recorded, and released directly downstream of the trap. Temperature and staff gauge measurements are recorded prior to transporting fish and additional coolers to the working station. Juveniles  $\leq 69$  mm are stained using Bismark Brown (1.8 L to 18.2 L water) for a minimum of 20 minutes and maximum of 40 minutes. Juveniles  $\geq 70$  mm are injected with a Passive Integrated Transponder Tag (PIT tag) after being anesthetized in a clove oil solution. All marked fish are measured to the nearest 1 mm, weighed to the nearest 0.01 g, and tissue sampled. Stained and PIT tagged juveniles are released 1 rkm upstream of the trap at Maternity Hole for mark-recapture analysis to obtain trap efficiency. Recaptures and remaining fish by species are enumerated, recorded, and released downstream of the trap near Poleflat Creek. Mortalities are recorded as either the result of trapping or handling. If the mortality was a PIT tagged individual, the tag was recollected prior to disposing of the mortality downstream of the trap. Using the methods and data collected by the ISS, staff stratifies time periods by juvenile life stage and significant changes in the hydrograph to calculate a Gauss population estimate of the number of juvenile Chinook migrating past the trap.

On a daily basis, weirs are checked for newly trapped adult Chinook salmon and non-target species. All Chinook salmon are individually netted and transferred to a 136.4 liter modified Rubbermaid® tote holding freshwater. Fish are not anesthetized prior to handling because the Tribes are actively conducting a Chinook salmon fishery and the preferred anesthetics are not FDA approved for human consumption. Adult Chinook salmon are visually examined for fin

clips, operculum punches, external tags, and injuries as well as scanned for PIT and CWT tags. The following biological data is collected: origin, fork length (cm), and genetic sample (0.5 cm<sup>2</sup>). Chinook salmon were marked with a right operculum punch for genetic sample and mark-recapture analysis. Each fish is visually inspected for key phenotypic characteristics (i.e., kipe jaw, vent) to determine gender.

Intensive spawning ground surveys are conducted in Yankee Fork and its major tributary, West Fork Yankee Fork to determine spawn timing, redd enumeration and distribution, abundance of live fish and to collect carcasses for biological information. Yankee Fork is sub-divided into eight distinct strata (Konapacky 1986). On a weekly basis, observers walk Yankee Fork during mid-day marking Chinook salmon redds and recovering carcasses. Chinook salmon redds are identified, recorded, and marked with an iridescent ribbon directly lateral to the apex of the redd. Observers record the following information on the ribbon: date, agency, observer initials, redd number and this information is linked to the data sheets, scales envelopes, genetic vials, fin ray envelopes, and otolith envelopes. Carcasses encountered during the surveys are examined for fin clips, operculum punches, and external tags following standard trapping protocols.

### **Yearly Summary**

2006 – Smolt Release: April

Electrofishing: September 13-14, 19-21, and October 11-13 @ 18 sites (Figure 1)

2007 – Electrofishing: September 12-13, 18-19, and October 2-5, 10-12 @ 22 sites (Figure 2)

2008 – Adult Trapping: July 9 – October 10

Adult Outplanting: July 30 – September 4

Spawning Ground and Carcass Surveys: August 28 – September 19

Electrofishing: September 16-26 @ 25 sites (Figure 3)

2009 – Rotary Screw Trap: July 2 – November 13

Adult Trapping: June 30 – September 22

Adult Outplanting: July 14 – September 2

Spawning Ground and Carcass Surveys: August 18 – September 10

2010 – Smolt Release: April 20, 21, and 23

Rotary Screw Trap: April 27 – June 3 and August 21 – November 16

Adult Trapping: July 9 – September 9

Spawning Ground and Carcass Surveys: August 18 – September 1

### **Future**

Maintain all program operations. Develop Crystal Springs Fish Hatchery in conjunction with YFCSS program objectives and goals. Also, install PIT tag array for additional migration and survival estimates for juveniles. Continue to obtain tissue samples from migrating juveniles and returning adults and conduct genetic evaluations of program contribution to Chinook production in Yankee Fork.

# **SUMMARY OF THE PROPOSED CRYSTAL SPRINGS HATCHERY SNAKE RIVER CHINOOK PROGRAMS**

## **Vision for the Chinook Programs**

Historically, the Shoshone and Bannock peoples harvested salmon and trout throughout the Columbia River Basin for subsistence. Annual salmon and steelhead runs in what are now Oregon, Washington, Idaho and Nevada provided harvest opportunities throughout the year. The Shoshone- Bannock Tribes continue to harvest anadromous fish under rights reserved by the Fort Bridger Treaty of 1868. Tribal fishing methods include the culturally important technique where tribal fishers actually hunt Chinook salmon in the stream using spears. Maintaining this type of fishery is a high priority for the Tribe.

Fishing opportunities for the Tribes have been severely constrained by depressed runs of salmon caused in large part by the detrimental effects of hydroelectric development and early overfishing in the lower Columbia River. Current salmon abundance in the Upper Salmon River basin is estimated at about 0.5% of historical runs. Recent harvest opportunities for Tribal members have only provided half a pound of salmon per tribal member compared to historical use of about 700 pounds per person. The Shoshone/Bannock Tribes therefore, seek to restore fishing opportunities for their peoples through Chinook salmon management programs in the Yankee Fork Salmon River and in Panther Creek. Restoration of these ceremonial and subsistence fisheries would be accomplished in a manner compatible with recovery and long-term sustainability of Chinook salmon in the upper Salmon River basin.

The Chinook programs proposed through this Master Plan are designed to focus the Tribes' primary Chinook harvest in Yankee Fork and Panther Creek and to continue elements of the Yankee Fork Spring Chinook Supplementation Strategy (YFCSS) that was initiated in 2008. These locations and populations have been identified by the Interior Columbia Technical Review Team (ICTRT), the Hatchery Scientific Review Group (HSRG), NOAA-Fisheries and fishery co-managers as lower priority for recovery and sustainability of the Snake River Spring/Summer Chinook ESU. By focusing Shoshone - Bannock Tribes hatchery and harvest effects within these two watersheds, traditional tribal fisheries and fishing methods could be restored while at the same time, contributions could be made to recovery by establishing locally adapted hatchery and natural spawning populations of Chinook salmon in watersheds not currently priority targets for species recovery.

In developing these management programs and Master Plan, the Tribes have adopted three objectives:

- **Conservation Objective:** Contribute to recovery of Snake River Spring/Summer Chinook ESU by restoring populations of local spring/summer Chinook in Yankee Fork and Panther Creek
- **Harvest Objective:** Achieve a tribal harvest of about 1,000 spring/summer Chinook from Yankee Fork and 800 Chinook from Panther Creek
- **Cultural Objective:** Ensure that Shoshone - Bannock peoples can harvest salmon in Yankee Fork and Panther Creek by their traditional hunting methods as well as contemporary methods. The Tribes will continue working to improve habitat conditions in watersheds throughout the upper Salmon River subbasin and to advocate passage improvements at hydroelectric dams to improve productivity of Chinook populations in the headwaters. In the long term, the ongoing and proposed tribal and co-manager monitoring programs will allow the Shoshone-Bannock Tribes to adapt their management plans to provide greater conservation benefits should other populations in the MPG fail to achieve their recovery goals, and if ecosystem and biological conditions allow.

### **Yankee Fork Program Component**

Yankee Fork spring/summer Chinook are at an extremely high risk of extinction, prompting the Shoshone-Bannock Tribes to undertake a multi-phase program to support the population. The Tribes' have three primary objectives for this program described in Section 2.1. A three-phase program is proposed to meet these objectives, integral to which is construction of the Crystal Springs Hatchery to provide needed production capacity. In the first phase, colonization, surplus adults and 200,000 smolts from Sawtooth Hatchery will be released annually (this is reflected in the current YFCSS). When these Chinook return as adults, a percent will be collected as broodstock for rearing at the Crystal Springs Hatchery. Phase 2, local adaptation, will be triggered when approximately 1,000 Chinook return to the Yankee Fork, the estimated population level needed to meet broodstock and natural escapement goals. Use of Sawtooth broodstock will be eliminated in Phase 2 and all broodstock will be collected locally. Tribal harvest in the Yankee Fork will be 1 to 8 percent when runs are less than 500 adults; harvest in excess of that may occur when both broodstock and natural escapement goals are met. If natural

productivity rates reach sufficient levels, Phase 3, an integrated harvest program, may be implemented if established triggers are met. The program will be transitioned into an integrated harvest program following the guidelines of the HSRG (2004). This program is described in greater detail in Section 4.1.1.

The ICTRT (2007a) estimated the 10-year geometric mean adult abundance for Yankee Fork at 13 adults with productivity of 0.80 recruits/spawner (R/S). These abundance and productivity values are a result of degraded habitat conditions in the Yankee Fork and low juvenile and adult survival rates through the FCRPS. Improvements in both habitat condition and migration rates are expected over time; however, they may not fully be realized for many decades. Hatchery production is therefore needed to establish, develop local adaptation and conserve the genetic resources of this population while at the same time providing the fish needed to meet tribal treaty harvest rights. Unlike previous hatchery stocking efforts in the Yankee Fork, this program will provide consistent high quality smolt releases over time, is designed to achieve local adaptation, and will have sufficient monitoring in place to allow for adaptive management.

#### **DESCRIPTION OF PROPOSED PROGRAM**

In response to the declining Chinook salmon population in the Yankee Fork, the Shoshone-Bannock Tribes implemented a Chinook supplementation project in 2008 to increase the number of adults returning to the system (referred to as the Yankee Fork Chinook Supplementation Strategy, or YFCSS). This program is part of a larger project (Supplementation Project Number 2008-905-00) designed to determine the utility of supplementation as a potential recovery tool. Additional goals of this broader program are to assess the use of supplementation to augment natural populations, evaluate effects on survival and fitness, and track relative reproductive success. Plans are to compare the response of fish population over time in treatment (supplemented) vs. control (unsupplemented) streams. The Yankee Fork component is intended to restore spring Chinook to a level that ensures population persistence over time and provides harvest opportunities for tribal members.

Adult Chinook salmon trapping for the YFCSS began in the Yankee Fork in 2008. Chinook from Sawtooth Hatchery were selected for reintroduction in Yankee Fork because this is the closest remaining Chinook population to Yankee Fork, is within the MPG, and has surplus and available fish in many years. Surplus adults (~1,500) from Sawtooth Hatchery were released here in 2008 and 2009, and in addition, approximately 480,000 eyed eggs (Sawtooth stock) were planted in 2009. Juvenile fish are produced at

the Sawtooth Hatchery, transported and released to the Yankee Fork in April. In 2010, approximately 400,000 smolts (at 20 fpp) were released in the stream. Sawtooth Hatchery operations associated with the YFCSS program are described in greater detail in the Hatchery Genetics Management Plan (HGMP) presented in Appendix A of the Tribes' Master Plan. This draft HGMP includes the proposed Crystal Springs Chinook program component.

The current YFCSS depends entirely on the availability of space in the Sawtooth Hatchery. This creates conflicts with other Sawtooth Hatchery programs and results in some years when Yankee Fork production needs are not met (e.g., no surplus adults were available for stocking in 2010). This is one of the primary reasons that the Tribes are proposing to develop the Crystal Springs Hatchery, which will enable them to produce the juveniles and returning adults needed to achieve identified conservation and harvest objectives on a more consistent basis (Section 4.3). The proposed program will be operated to achieve the conservation, harvest and cultural objectives described in Section 4.3. To achieve these objectives, the Crystal Springs program will release up to 600,000 smolts yearly to the Yankee Fork.

The major facilities used to collect, hold, rear and release Yankee Fork spring Chinook are:

- Pole Flat Weir – Pole Flat weir is located adjacent to Pole Flat Campground approximately 3.2 river miles upstream from the confluence with the Salmon River. The hydrologic unit code for the weir is 17060201. This weir is used to collect adult broodstock for the YFCSS project and is proposed to be upgraded to safely handle the number of fish to be contributed by the Crystal Springs program.
- Yankee Fork Adult Holding/Juvenile Stress Relief Pond – A new adult holding facility is proposed upstream of Pole Flat in the vicinity of the confluence with Jordan Creek. It will also be used as a stress relief pond for juveniles that have been trucked from Crystal Springs. This location will be confirmed during the Stage 2 preliminary design phase of the project.
- Five Mile Weir – Five Mile weir is located above Five Mile Creek approximately 13 river miles upstream from the confluence with the Salmon River. The hydrologic unit code for the weir is 17060201. Five Mile weir is used to collect adult broodstock for the YFCSS project and as an

adult blocking weir when hatchery adults are outplanted for natural spawning. Annual installation of this weir is expected to be eliminated in the next decade.

- Sawtooth Fish Hatchery – Sawtooth Hatchery is located on the upper Salmon River approximately 5.0 miles south of Stanley, Idaho. The hydrologic unit code for the facility is 17060201. Sawtooth Hatchery provides surplus adults, egg incubation, juvenile rearing facilities, and provides some long-term adult holding for the YFCSS project.
- East Fork Salmon River Satellite Facility – The East Fork Satellite is located approximately 18 miles upstream of the confluence of the East Fork Salmon with the mainstem Salmon River. The hydrologic unit code for the facility is 17060201. The East Fork facility is used for YFCSS adult holding and spawning and may provide back-up holding capabilities for the Crystal Springs program component.
- Crystal Spring Fish Hatchery– The proposed Crystal Springs Hatchery would be constructed 2.9 miles southeast of Springfield, Idaho. Crystal Springs will be used for Yankee Fork and Panther Creek egg incubation and juvenile rearing.

The proposed programs will be implemented in two phases, with the possibility of a third phase depending on the success of habitat improvement projects in-basin and overall ESU recovery. Outlines of the actions proposed in each phase are listed below.

### **Phase 1: Colonization**

In Phase 1, the existing YFCSS will continue to operate as described below:

- Outplant up to 1,500 surplus Sawtooth Hatchery adults to achieve a spawning escapement of 1,000 Chinook in the Yankee Fork. This high level is deemed appropriate to provide the spawners needed for juvenile production, ecosystem function, and minimal fish for Shoshone - Bannock tribal ceremonial and subsistence harvest.
- Acclimate and release 200,000 smolts produced at Sawtooth Hatchery using Sawtooth returns as broodstock.

- No PNI, pNOB or pHOS objectives will be applied to this phase. The HOR stray rate goal is less than five percent to areas outside of the Yankee Fork.
- Opportunities for tribal harvest will be 1 to 8 percent when the run is less than 500 (the minimum escapement for a Basic population). The harvest rate increases when the run size exceeds 500 adults, provided hatchery broodstock and natural escapement targets are achieved.
- Escapement priorities are (1) hatchery broodstock, (2) natural escapement, and (3) tribal harvest.
- To begin the transition to local broodstock, in 2012, 120 broodstock will be collected from the Yankee Fork for the Sawtooth Hatchery juvenile program component (goal of 200,000 smolts). The adults will be held at the East Fork Salmon River facility or the Sawtooth Fish Hatchery. Broodstock will be collected at random (HORs plus NORs).

The trigger signaling the transition to Phase 2 will be the total return of 1,000 spring Chinook (HORs and NORs) to the Yankee Fork and completion of the Crystal Springs Hatchery.

### **Phase 2: Full Program Conversion to Locally Adapted Broodstock**

In Phase 2, the program will shift to the use of only locally returning adults for hatchery broodstock. The conservation objective is to achieve a Maintained population with a minimum of 500 naturally spawning adults. This population would be managed as a Stabilizing population for broodstock and the level of hatchery influence in the Yankee Fork. The harvest and cultural objective is to produce 1,000 adults (HOR and NOR) for harvest by Shoshone-Bannock tribal fishers using traditional (spears) and modern harvest techniques. An outline of Phase 2 Chinook program components is presented below:

- Establish a minimum natural escapement objective of 500 fish; however, broodstock collection will be prioritized for returning adults (HORs would be used as required to achieve a minimum natural escapement goal of 500 fish)

- Terminate the outplanting of surplus Sawtooth Hatchery adults to the Yankee Fork and terminate the use of Sawtooth broodstock for this program
- Collect all Yankee Fork broodstock at the Pole Flat weir. Collect NORs and HORs at random (358 needed) over the entire migration run. Jacks will be incorporated into the broodstock at a rate determined to be appropriate.
- Adults will be held in the proposed Yankee Fork adult holding/juvenile stress relief ponds in the vicinity of the confluence with Jordan Creek, or at the existing East Fork Salmon River facility or at Sawtooth Hatchery.
- Release up to 600,000 smolts annually into Yankee Fork. Of these, 200,000 will be reared at the Sawtooth Hatchery and 400,000 at the Crystal Springs Hatchery.
- Monitor PNI, pNOB, pHOS and natural productivity rates.
- Maintain a hatchery-origin stray rate of less than 5 percent to streams outside of the Yankee Fork.
- Opportunities for tribal harvest will be 1 – 8 percent when the run is less than 500 adults. Harvest rates will increase for run sizes greater than 500 providing natural escapement and broodstock goals are achieved.

### **Phase 3: Develop Integrated Harvest Program Consistent with HSRG Criteria for a Contributing Population**

Phase 3 is one possible long-term outcome if habitat improvements proposed in the upper Salmon River and in the FCRPS increase population productivity and abundance substantially over time. The Yankee Fork component of the Crystal Springs program will be operated as an integrated harvest program consistent with the following HSRG guidelines for a Contributing population:

- PNI > 0.5
- pHOS < 0.30
- Stray rate < 0.05 (to populations outside the Yankee Fork)
- The trigger used to determine if Phase 3 would be implemented is:
- The 5-year running average NOR escapement to the Yankee Fork exceeds 750 adults
- Once this trigger is met, the Shoshone-Bannock Tribes would consult with NOAA Fisheries to determine if managing Yankee Fork spring Chinook as a Contributing population is needed to meet recovery objectives for the Snake River Spring/Summer Chinook ESU.

- Regardless of the need to achieve ESU objectives, elimination of the hatchery program would be considered if:
- The 5-year running average NOR escapement to the Yankee Fork exceeds 2,000 adults
- With an average run-size of 2,000 NOR adults, the need for a hatchery program would be reconsidered because run-size would be sufficient to achieve all current conservation, harvest and cultural objectives. Continuation of the program might be warranted if harvest objectives are updated, particularly for tribal communal and sport harvest.

## Idaho Supplementation Studies

The Idaho Supplementation Studies (ISS) is an ongoing cooperative research program involving five agencies; Idaho Department of Fish and Game (IDFG), the Nez Perce Tribe (NPT), the Shoshone-Bannock Tribes (SBT), and the United States Fish and Wildlife Service (USFWS). The Bonneville Power Administration (BPA) provides funding for the project. Each agency is responsible for data collection on a subset of the study streams across the Clearwater River and Salmon River subbasins as developed in the original study design (Bowles and Leitzinger 1991). ISS/SBT has been responsible for data collection in the West Fork Yankee Fork stream since 1992. Data collected includes estimates of escapement for natural and supplementation origin adults, biological data from salmon carcasses, juvenile production, and juvenile passive integrated transponder (PIT) tag interrogations at detection facilities throughout the Columbia River basin.