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Habitat Restoration/Enhancement Fort Hall Reservation 2008 Annual Report

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Abstract

Habitat enhancement, protection and monitoring were the focus of the Resident Fisheries Program during 2008. Enhancement and protection included sloping, fencing and planting wetlands plugs at sites on Spring Creek (Head-waters). Many previously constructed instream structures (rock barbs and wing dams) were repaired throughout the Fort Hall Indian Reservation (Reservation). Physical sampling during 2008 included sediment and depth measurements (SADMS) in Spring Creek at the Car Removal site. SADMS, used to track changes in channel morphology and specifically track movements of silt through Bottoms stream systems were completed for 5 strata on Spring Creek. Water temperature and chemistry were monitored monthly on Spring Creek, Clear Creek, Diggie Creek, and Portneuf (Jimmy Drinks) and Blackfoot rivers. Fish population densities and biomass were sampled in five reservation streams which included nine sites. Sampling protocols were identical to methods used in past years. Numbers of fish in Spring Creek series remained relatively low, however, there was an increase of biomass overall since 1993. Salmonid fry densities were monitored near Broncho Bridge and were similar to 2006, and 2007, however, as in years past, high densities of macrophytes make it very difficult to see fry in addition to lack of field technicians. Mean catch rate by anglers on Bottoms streams stayed the same as 2007 at 1.5/hr. Numbers of fish larger than 18" caught by anglers increased from 2007 at .20 to .26/hr.

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INTRODUCTION

The primary goal of the Resident Fisheries Program (RFP) is to restore, enhance, and protect Fort Hall Indian Reservation (Reservation) streams so they can support native fish populations at historic levels. Streams on the Reservation have been negatively affected (i.e. loss of riparian vegetation, downcutting, and lateral scouring of streambanks) by a variety of sources, including, livestock grazing; American Falls Reservoir construction and operations; and the 1976 Teton Dam collapse. Cattle, bison, and horses have been present on the Reservation since the early 1800's. Damage to streambanks from years of unrestricted grazing continues to be a problem on Reservation streams. Rapid flooding and drafting of American Falls Reservoir in conjunction with seasonal freeze-thaw cycles is a cause of streambank failures on lowland Reservation streams. Negative impacts from streambank failures include, but are not limited to: widened channels; a reduction in riparian vegetation and instream cover; increased summer water temperatures; and deposition of fines on critical spawning and rearing substrates.

In 1992, the RFP, by combining Bonneville Power Administration (BPA) and Bureau of Indian Affairs (BIA) projects, began large-scale, low-tech, habitat restoration projects on the Reservation. Restoration was directed at stabilizing eroding banks, deepening and narrowing stream channels, and restoring diversity to the spring-stream biota with instream structures. Restoration efforts were originally focused on Clear Creek, a heavily impacted Reservation stream. The RFP directed efforts toward other Reservation streams, including, Spring; Diggie and Big Jimmy creeks. The primary focus of restoration has changed over the course of the project. Less reliance on in-stream structures and more reliance on enclosure fencing, bank sloping and revegetation and natural healing processes. Work performed in 2008 involved physical and biotic assessments at project locations; development and implementation of fencing projects; repair of streambanks through sloping, wetlands plugs, and enclosure fencing. The assessment of past habitat restoration efforts is imperative to the efficacy of any habitat improvement project. Changes in project focus are the result of information collected on changes in stream channel morphology and trends in fish population densities at restoration sites. Silt And Depth Measurement (SADM) surveys, developed by the RFP for low-gradient spring creeks, continue to be used to assess changes in channel characteristics in treatment and control areas of streams on the Reservation. Other restoration efforts in 2008 included acquiring Tribal cattle

allotments solely for the benefit of fish and wildlife resources and making recommendations on management of range units and stream corridors.

DESCRIPTION OF RESERVATION

The Fort Hall Indian Reservation located in southeastern Idaho, is drained by more than twenty streams (Figure 1). Many small streams drain montane areas of the Reservation and feed into the Blackfoot and Portneuf Rivers. Strongholds of pure Yellowstone cutthroat trout reside in several of these mountain streams. Of particular importance are streams in the Fort Hall Bottoms, a large wetland adjacent to the Snake River near its entrance into American Falls Reservoir. These streams are all spring fed, low gradient, and relatively short in length. Of the four primary Bottoms streams, Spring Creek is the largest ($12.75 \text{ m}^3/\text{s}$ and approximately 15 km in length) (Figure 2) and Clear Creek is the second largest ($4.5 \text{ m}^3/\text{s}$ and approximately 11 km in length) (Figure 3). Bottoms streams provide critical wintering, spawning, and nursery habitats for adfluvial and resident salmonids (Taki and Arthaud 1993). Wintering and nesting waterfowl, shorebirds, and raptors also heavily use the streams, lateral springs and surrounding marshlands. Endangered bald eagles and trumpeter swans winter, nest and fish on the Bottoms.



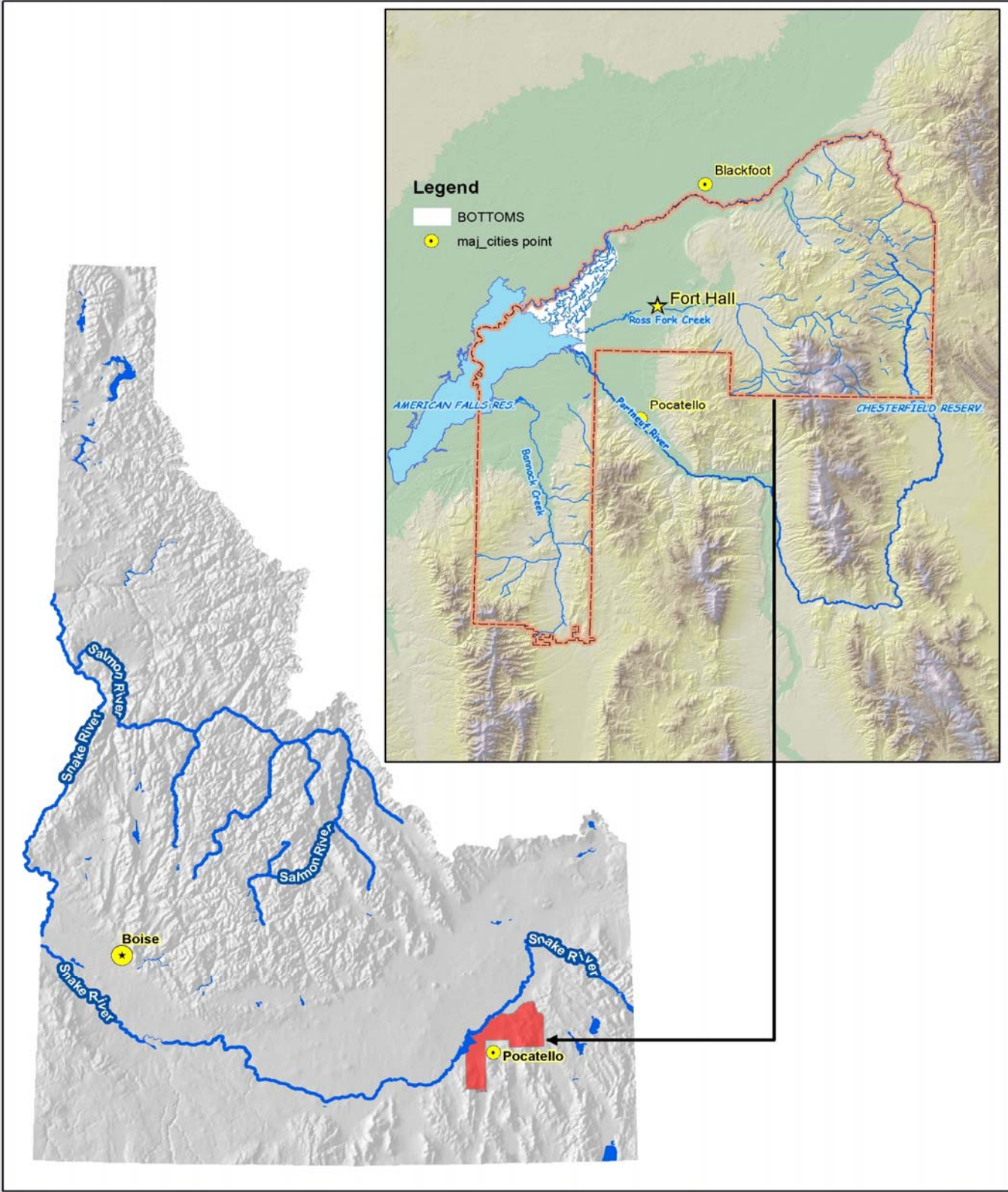


Figure 1. - Location of Fort Hall Indian Reservation.

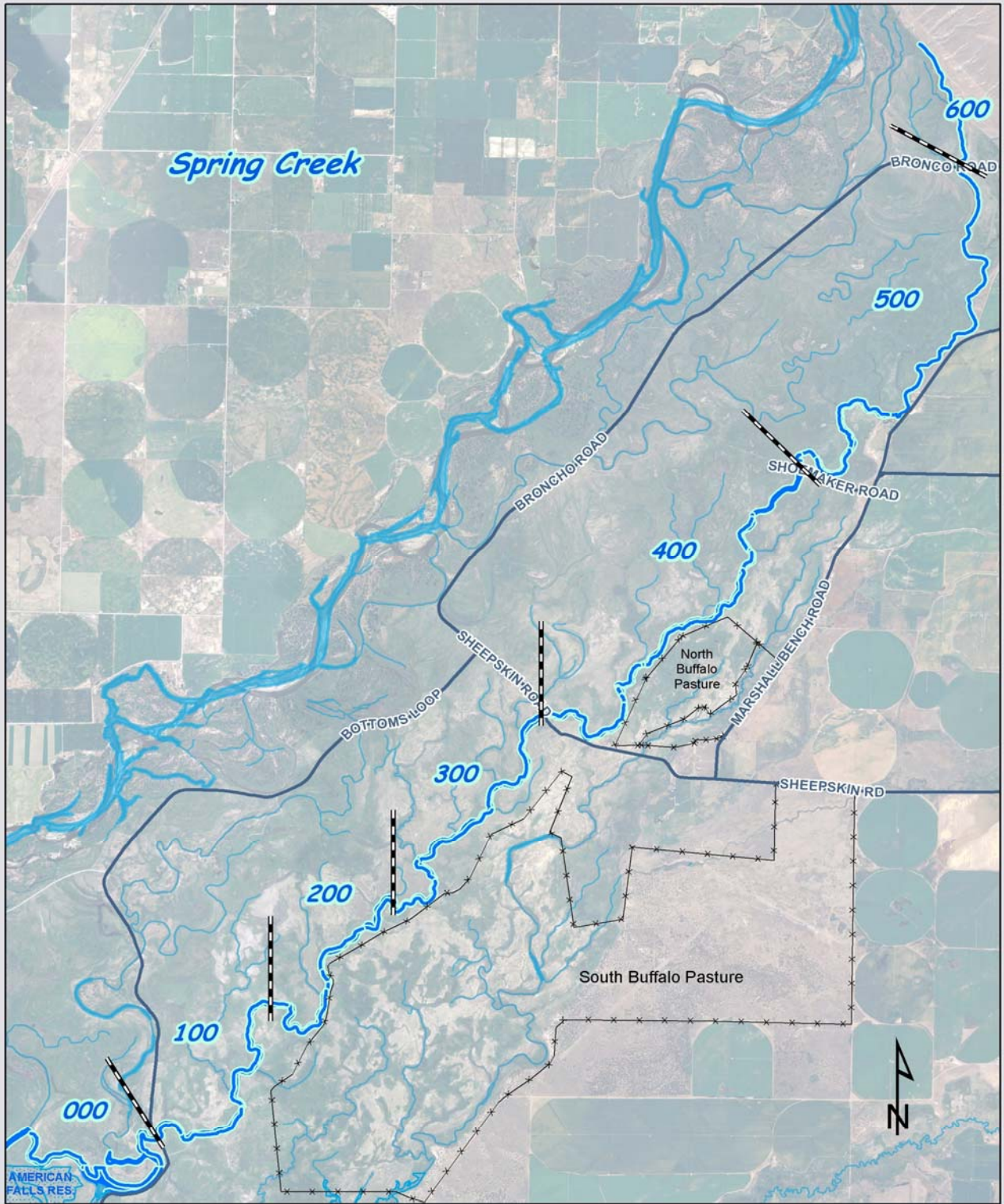


Figure 2. - Map of Spring Creek showing project locations.

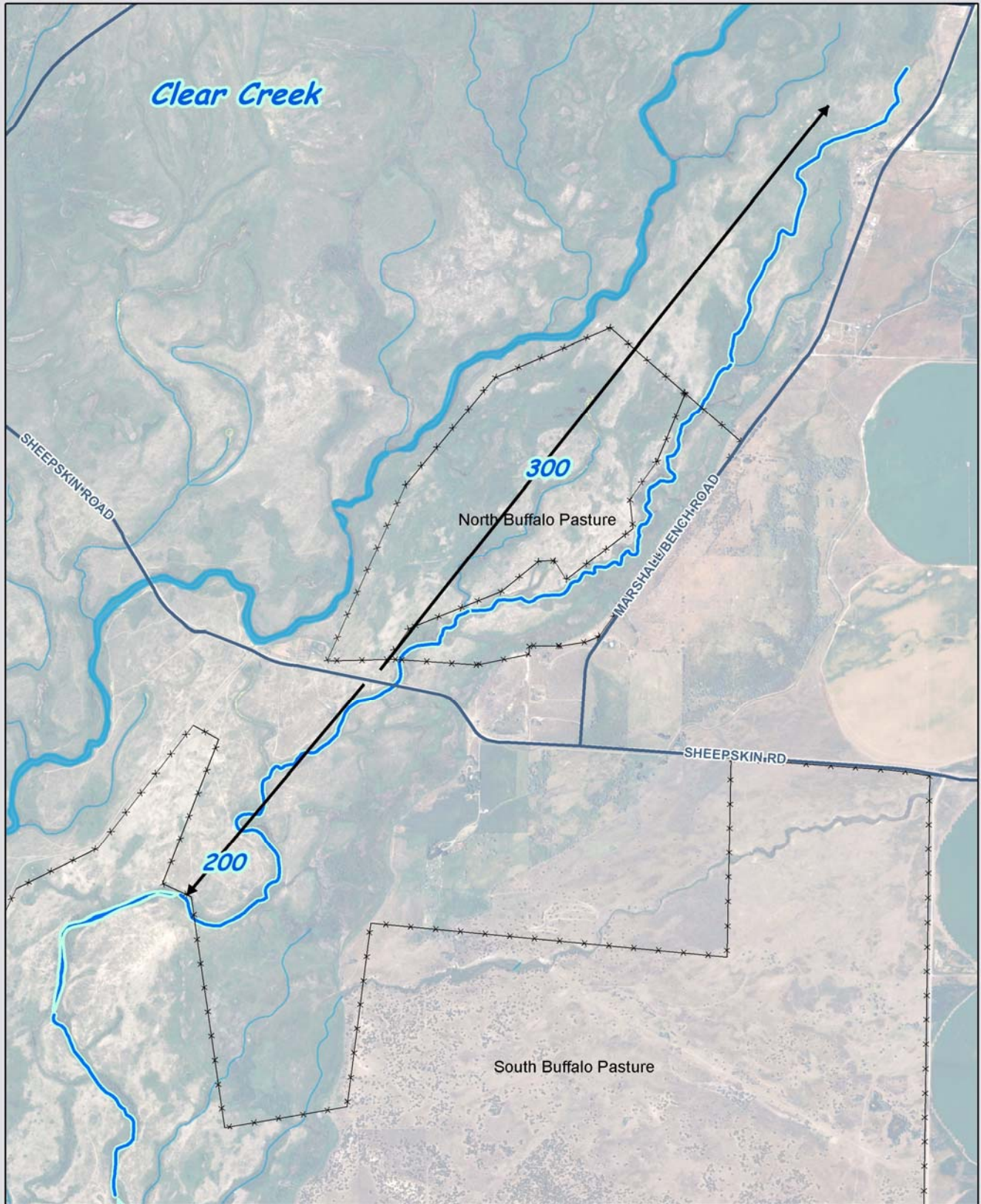


Figure 3. - Map of Clear Creek showing 200 and 300 series.

METHODS AND MATERIALS - RESTORATION WORK

Habitat Enhancement/Protection

Sloping and Revegetation

In 2008, RFP sloped small portions of stream bank at Head-end Spring Creek. Salmonid and interdependent species habitats were directly enhanced using a suite of streambank restoration techniques. As in 2007, willows were not propagated and out-planted this year for the Bottoms. Sloping projects occurred on the Head-end Spring Creek in which 70m of stream bank were treated. Monitoring of the site will continue in 2008. All plugs excluding willows were also planted on Head-end Spring Creek. 500 willows will be planted at this site during 2009.

Figure 4. Sedge and bulrush planted on sloping at Head-end Spring Creek.



Location	3-square bulrush	Creeping spike rush	Nebraska sedge	Willows
Head-end	205	105	No germination	200

Table 1. Location and number of plugs planted during 2009.

Fencing

In 2008, RFP did not purchase lodge pole pine fencing material as in previous years. A new option for jack and rail was preferred in which steel was to be the principal material. This option of fence has been found to have advantages over wood jack and rail. Steel jack fence made by Liberty and Rocky Mountain Pipe is moveable because the design allows the fence to assembled and disassembled which would ultimately save the program money in the future. Maintenance was done as needed for the Bottoms and existing mountain fenced areas. Fencing was purchased in 2006 from Liberty and occurred on Fort Hall Bottoms along Head-end Spring Creek (aprox.300m).



Figure 5. Steel jack and rail and access point at Head-end Spring Creek 2009.

Physical Sampling

SADM surveys

Levels of silt, water depth and stream width (SADMS) were measured in Car Removal project area on Spring Creek. Ten equidistant transects (ten individual measurements of each transect) were measured along each strata(100m lengths). Each individual measurement included a water depth and silt depth in meters and rate of flow in ft/s with Marsh McBurney Flomate. SADM data were collected from 4 strata. SADM data collected were analyzed using repeated measures ANOVA, means were discriminated using Scheffe's post hoc test.

Chemical Measurements

Since 1995 five water quality parameters have been monitored (dissolved oxygen, conductivity, total dissolved solids, pH, and temperature) on the Reservation (Moser, 2001). In 2008 monitoring occurred once per month from January to December. Trend data from 1997-2008 were analyzed to elucidate changes in water quality for the five constituents at all Reservation sites.

Substrate Sampling

Core samples were collected at four sites on the Spring Creek Car Removal site. Collection was done with a McNeil Core Sampler at areas that appeared to have the cleanest gravels (no coverage of silt). Gravels and some cobble were placed into a series of sieves and volume measured and recorded to establish percent fine sediments and spawning substrate.

Biotic Sampling

Fish Populations – Bottoms and Mountain streams

Fish populations were monitored in Spring Creek, and sites on three mountain streams, Ross Fork, Mill Creek, and Bannock Creek. Sampling on the Bottoms was done with a Clackacraft low profile drift boat modified for electrofishing. A two pass estimator of population size was used to save time, money, and reduce stress to fish (Arthaud and Taki 1994) as in previous years.

Data collected was analyzed in terms of length frequency for 3 sites on Spring Creek and seven sites on mountain streams (combined). Because of problems with out-board motor were experienced, only two sites were sampled on Spring Creek. Lower Portneuf on the Fort Hall Bottoms was also sampled in 2007. Sampling took place during the month of October and

November 2008. Large carp were not captured during sampling although were observed while electrofishing Spring Creek on section 000 (figure 3) but could not be captured.



Figure 6. Cutthroat on Lower Ross Fork (Fort Hall Bottoms) 2001.

Electrofishing on mountain streams was done with a new Smith-Root battery powered backpack unit purchase with BPA \$ in August of 2004. Total length and weight were collected for each fish. Densities and biomass will be presented as number of fish per 100m length of stream.

Fry Counts

Snorkeling was conducted during the spring and summer months of 2008. Winter snorkeling was done in February and March 2009. On two occasions fry were observed during the months of June and July 2009, snorkeling was conducted to count numbers of young-of-the-year (fry) fish along the edges of four hundred and sixty meters of streambank at Head End Spring Creek and at the Car Removal site. Over the past twelve years juvenile rearing habitat has been enhanced in this area using evergreen tree revetments and willow wattle placement along stream bank. Fry counts provide a simple method of estimating the effectiveness of revetments and trends in fry abundance through time. No evergreen tree revetments were placed in 2008.

Figure 7. Trout fry along stream bank in Spring Creek 2003.



Telemetry Study

No fish were tagged in 2008, problems with the receiver were identified and repaired from manufacturer. Tagging may resume in fall 2009.

Invertebrates

Invertebrate samples collected in 2008. Collection of samples was obtained in strata at the Car Removal Sites for with a Hess sampler and substrate disturbed to 8-10 inches in depth. Samples were sub-sampled in a 500 ct. Taxon will be reported in 2009.

RESULTS AND DISCUSSION - RESTORATION WORK

Habitat Enhancement/Protection

Sloping and Revegetation

In 2008, no willows were planted in the nursery. 4,150 wetlands plugs were planted on sloped banks and mostly on riparian burned areas on Ross Fork Creek in the Twitchell Meadows area. Post monitoring reports survival > 50% for plugs planted. Sloping and revegetation was

successful at the Head-end during 2008 (fig.). Sloping and protection of banks using fencing appears to be effective in decreasing down cutting, erosion and deposition of additional fines in spawning gravels.



Figure 8. Head-end sloping pre-treatment 2008.



Figure 9. Beginning Phase of stabilization process at Head-end.

Logs were collected from the Mt. Putnam area on the Reservation. This portion of the Head-end Spring Creek is increasing in channel width approximately 1m / yr. Protecting and stabilizing bank will enhance this area on Spring Creek which is critical spawning habitat for trout, and is frequently used by Tribal members. The following figures show the sloping process at the Head-end site. Staff consisted of Fish and Wildlife Technicians and Summer Youth Employment workers, all Tribal members. Monitoring will continue in 2009 which will include silt and depth measurements and flow rates.



Figure 10. Progression of the process at same site.



Figure 11. Sloped and planted streambank at Head-end site 2009.

In addition to sloping and revegetation, rocks were also utilized to create deflectors (fig.) instream to redirect flow away from streambank. We have found that decreased velocities downstream of structures along streamside provide additional space for rearing trout. Drawbacks to instream habitat work we have found, is that routine maintenance must be done. Annual seems to be the norm for maintenance and repair schedule for rock structures.



Figure 12. Rock deflector immediately below sloping sites.

Fencing

Analysis of past data collected from exclosure projects shows the ability of stream ecosystems to heal naturally given time and removal of causative agents (e.g. grazing and reservoir influences) (Moser 1998). Fencing delivered in 2008 and utilized on new restoration sites on the Bottoms and also to replace old jack and rail at the Head-end site (fig.). Approximately 300m was put up on the bottoms in 2008. Fencing will continue throughout 2008-09 on new projects on Spring Creek and Big Jimmy Creek.



Figure 13. Jack and Rail at the Head-end Spring Creek March 2009.

Physical Sampling

SADM surveys

SADM data was collected at the Car Removal site on Spring Creek as part of preliminary assessment of the project area. Figure shows means of water depth and average silt depth for each stratum for 2008. A repeated measure ANOVA was used to compare overall gains and losses of sediment in the reach between years, this will be applicable after a few years. Average silt depth is highest in the most downstream strata (SC-1), which is expected as this is the deepest strata in which most of the sediment would deposit from the strata with most erosion and bank sloughing (SC-2 and 3). SC-2 and 3 have the widest channel and least depth out of the strata.

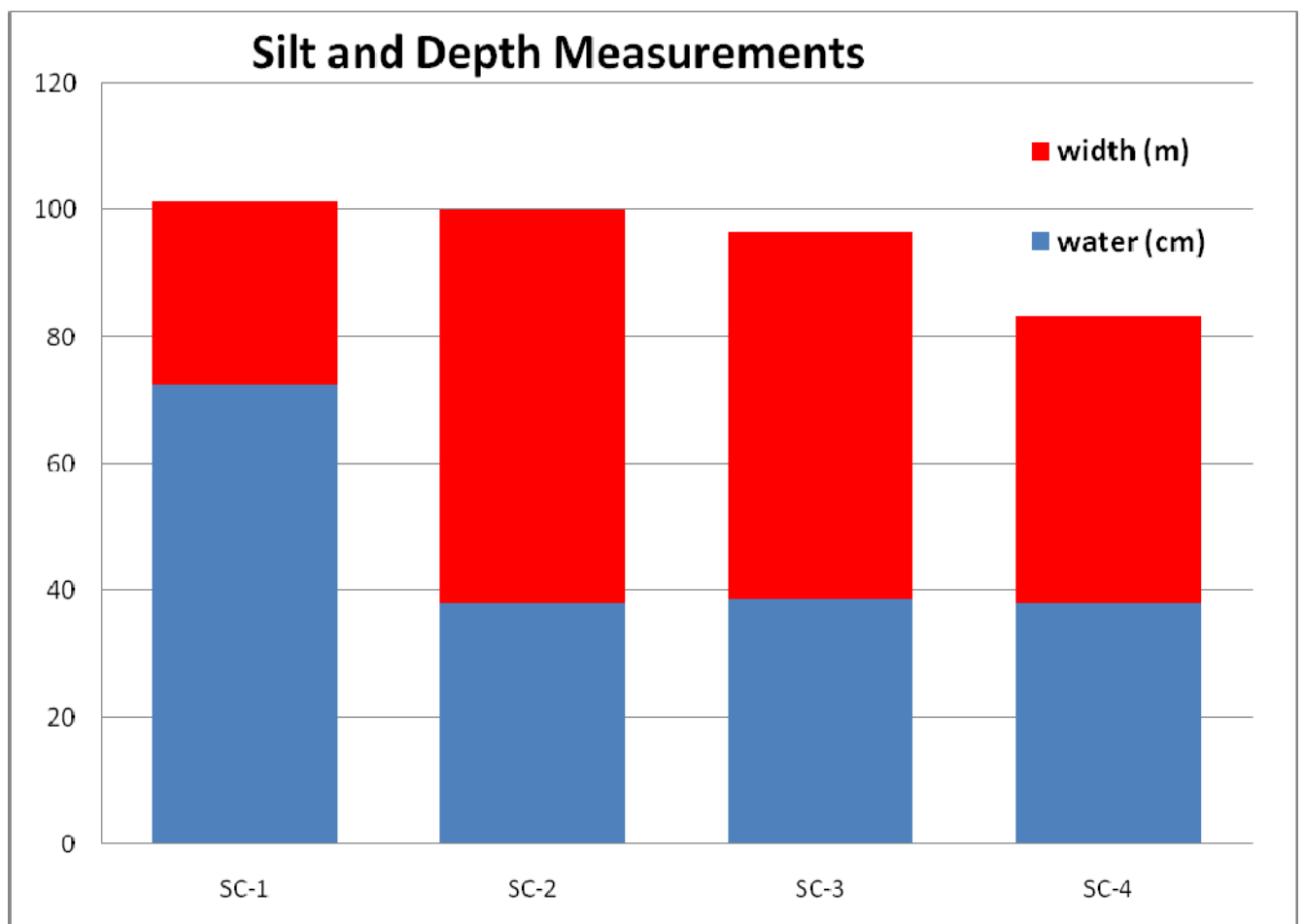


Figure 14. Average water depth and stream width for Spring Creek Car Removal site 2008/09.

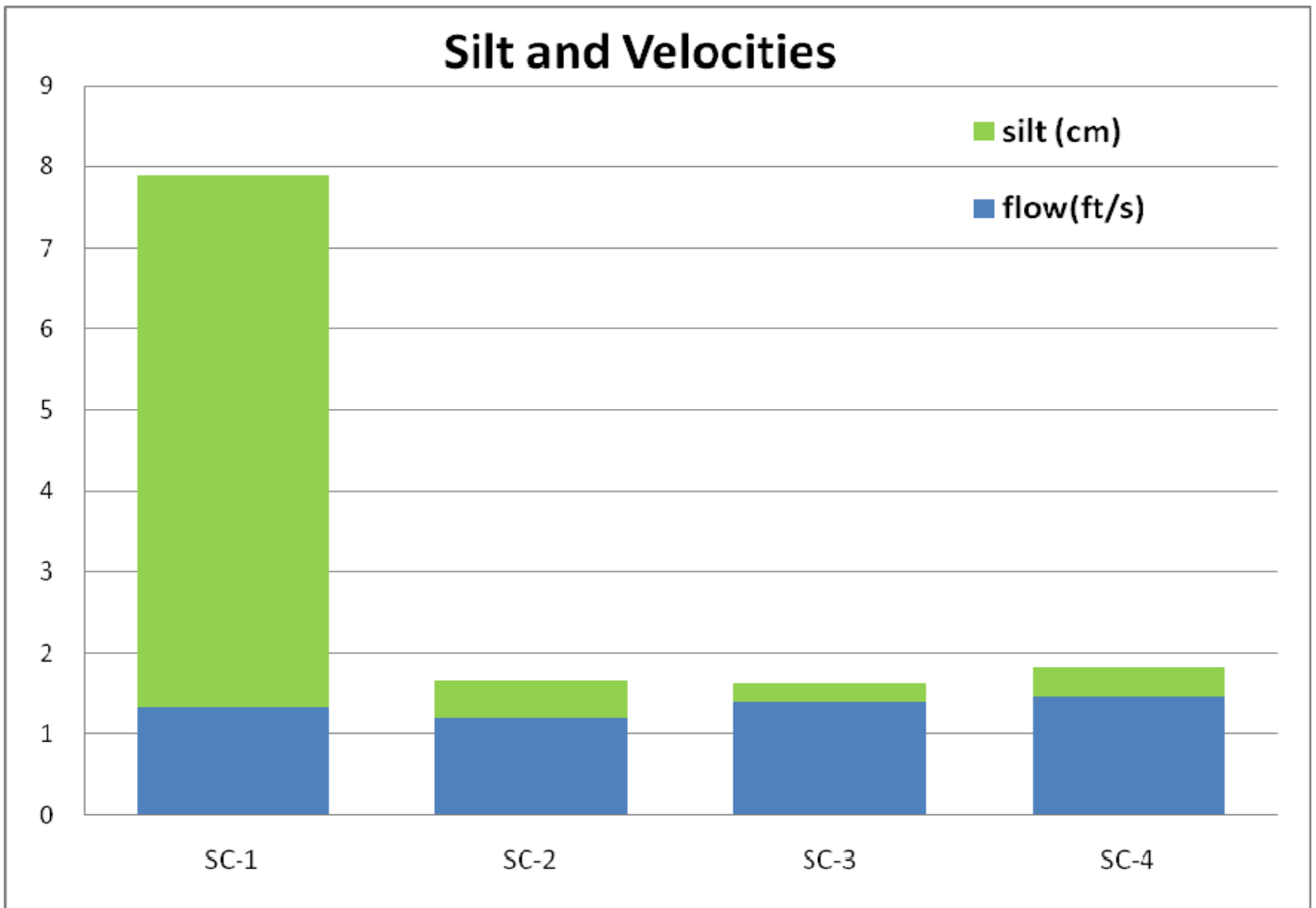


Figure 15. Average silt depth and flow measurements at Car Removal site.

Substrate Sampling

Core samples collected show average fines at 23% out of the 4 strata on the Removal site on Spring Creek. This percentage is somewhat high relative to range for Spring Creek. Past percentages for Spring Creek range from 10% to 34% for sample sites with best available gravels for spawning. Post project percentages will

Fish Populations - Bottoms

Densities and biomass were obtained for Spring Creek during 2008 . In 2006, a new anode was purchased from Smith-Root and seems to work fine (no trout were observed escaping past the field surrounding boat). However, not carp were captured in 2008, carp were observed frequently but could not be netted. Densities for Spring Creek (fig.) have decreased overall, from 1993 to 2008 densities for trout have dropped from 1.5 to .38 trout / 100m² . Major decline in densities occurred from 1993 to 1998, these could be the result of no stocking of hatchery catchables. Resident Fisheries has not stocked catchables since 1994. Densities from 1999 to 2008 have had little fluctuation (fig.). Trout biomass (gm/100m²) has increased overall since 1993 (fig.). Increases from 10 to 19gm/100m² from years 1993 to 2008 respectively (fig.). Length frequency was not a good indicator of overall size of trout captured as it appears less larger trout were sampled compared to previous years, but when averaged, larger size classes were the majority in 2008 (fig.). Trout composition in 2008 showed an increase in cutthroat trout and hybrids (cutt x rainbow), and finespot or Snake River cutthroat trout. Rainbow trout were lower than previous years.

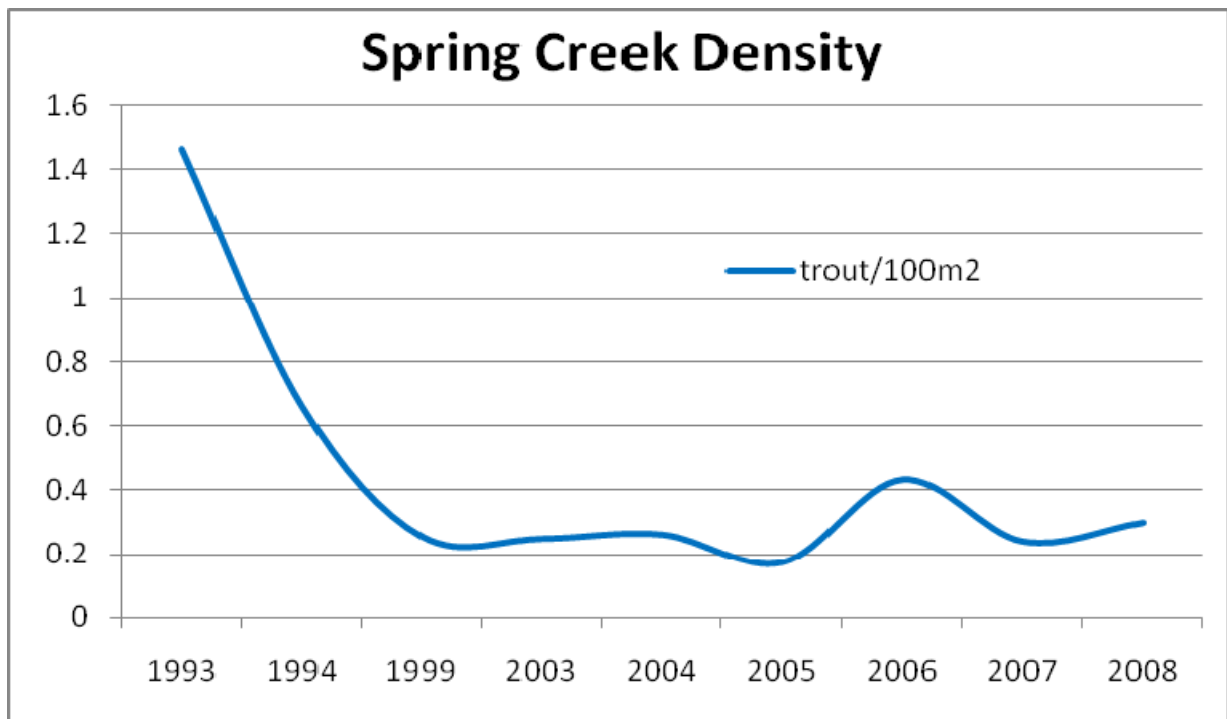


Figure 16. Densities for Spring Creek from 1993 to 2008.

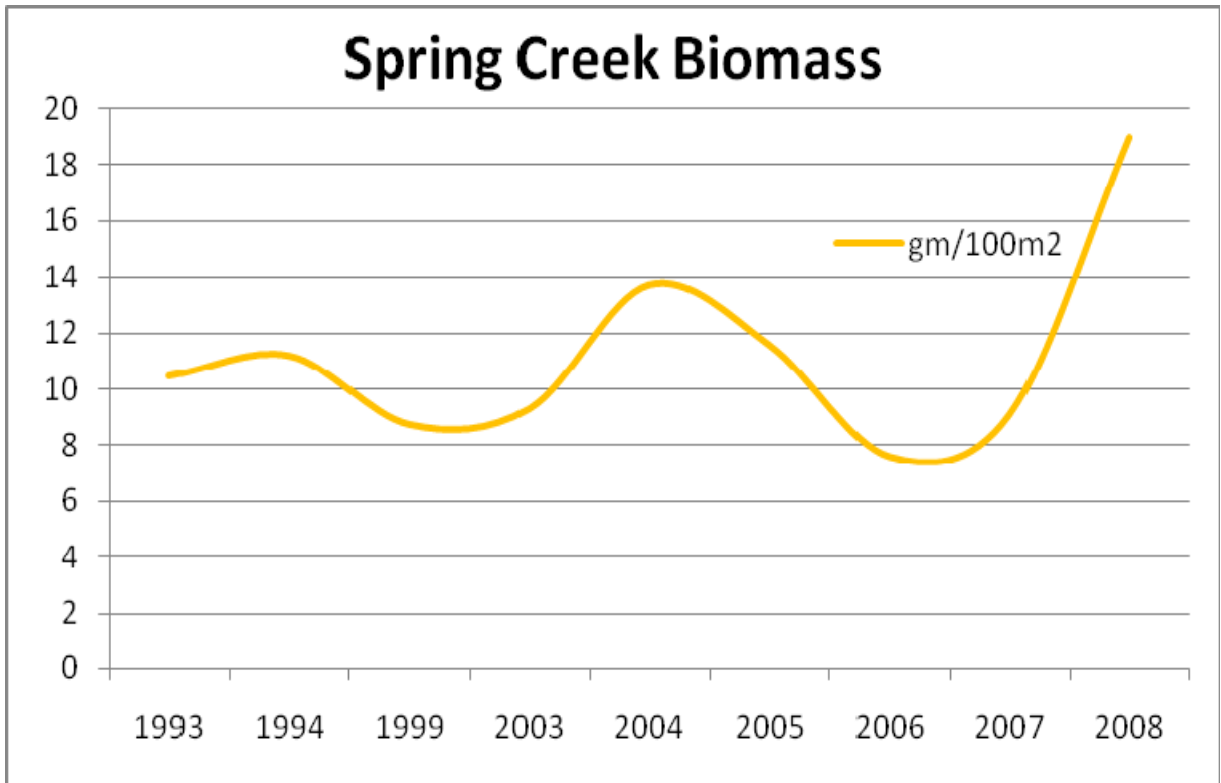
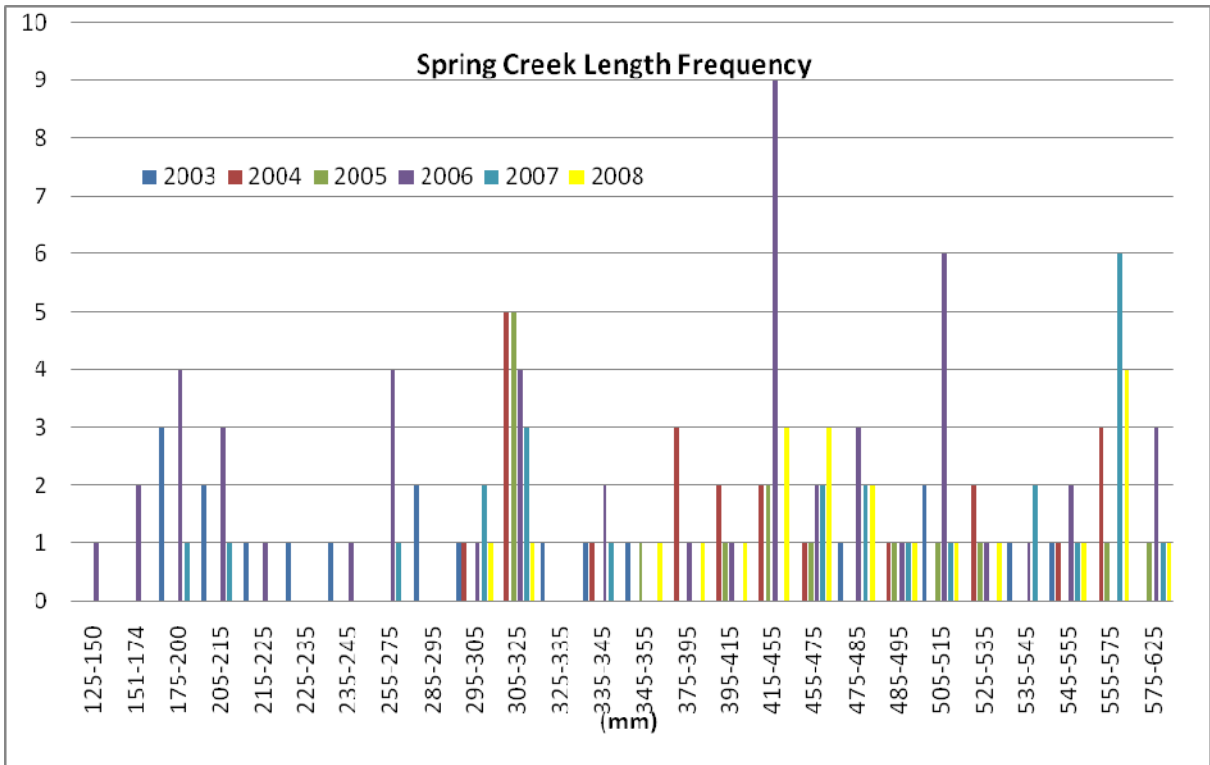


Figure 17. Biomass and Length Histogram for Spring Creek.



Fish Populations - Mountain Stream

Sampling occurred on three reservation streams in the Mt. Putnam and Bannock Creek areas. Four sections of Ross Fork Creek, two sections on Mill creek, and one section Bannock Creek. Ross Fork densities overall remain high (fig.) especially in sections where brook and cutthroat can both be found (fig.). Densities for Brook trout have increased slightly, though remain lower than cutthroat. Cutthroat remained higher than brook trout in all sections of Ross Fork. No brook trout were caught in sections 1 – 3 on Ross Fork in 2008.

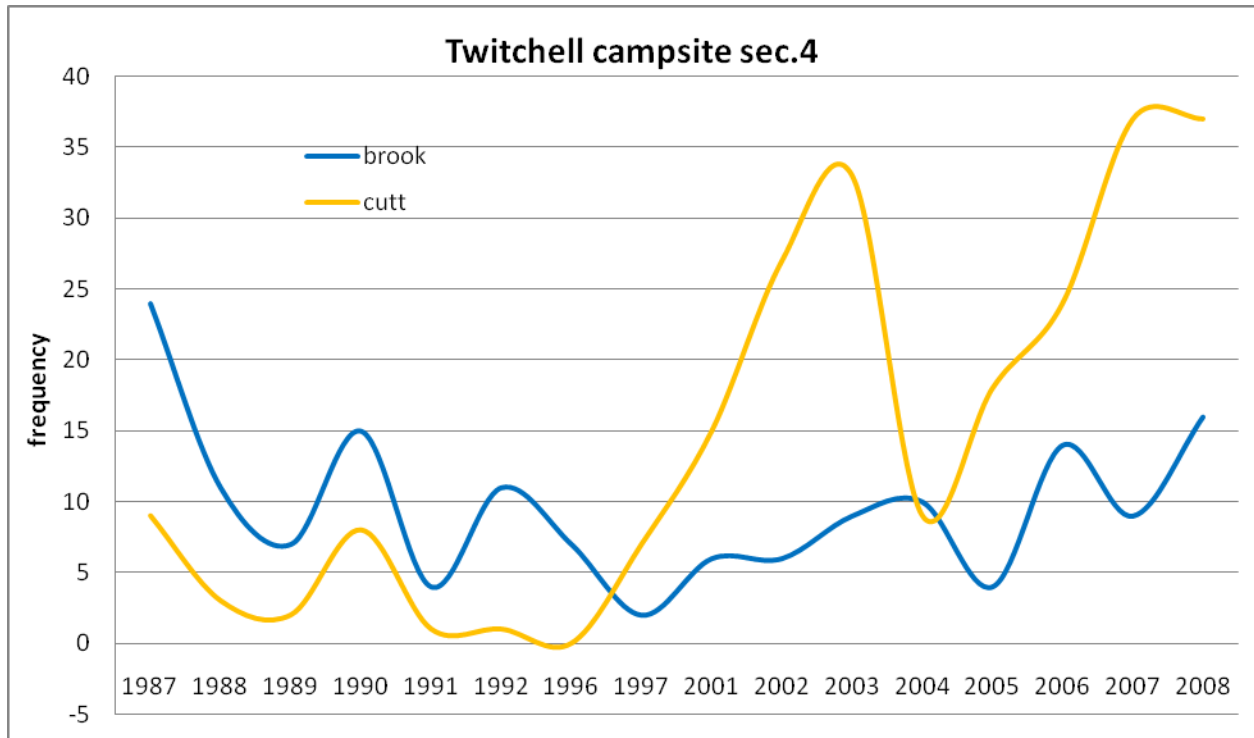


Figure 18. Densities (per 100m) of cutthroat vs. brook on Ross Fork, years 1987-2008.

Biomass and densities were slightly lower in the Narrows section 2 of Ross Fork compared to previous years. This could be attributed to the high density of willows and birch covering the stream which make it very difficult to see and net trout. No brook trout were observed in this section. Harvesting by Tribal members could also explain the lower numbers as access is not an issue at this portion of Ross Fork.

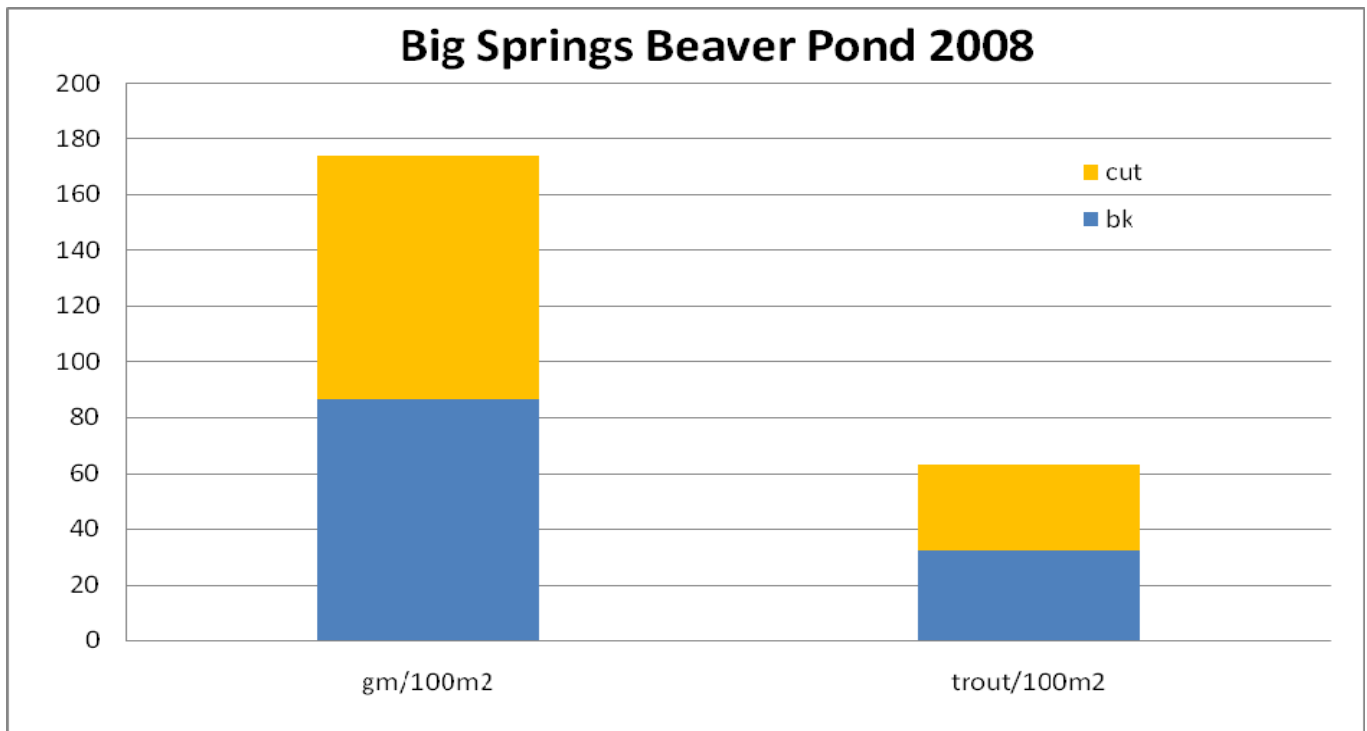


Figure 19 . Ross Fork section below Big Springs, start of Ross Fork creek.

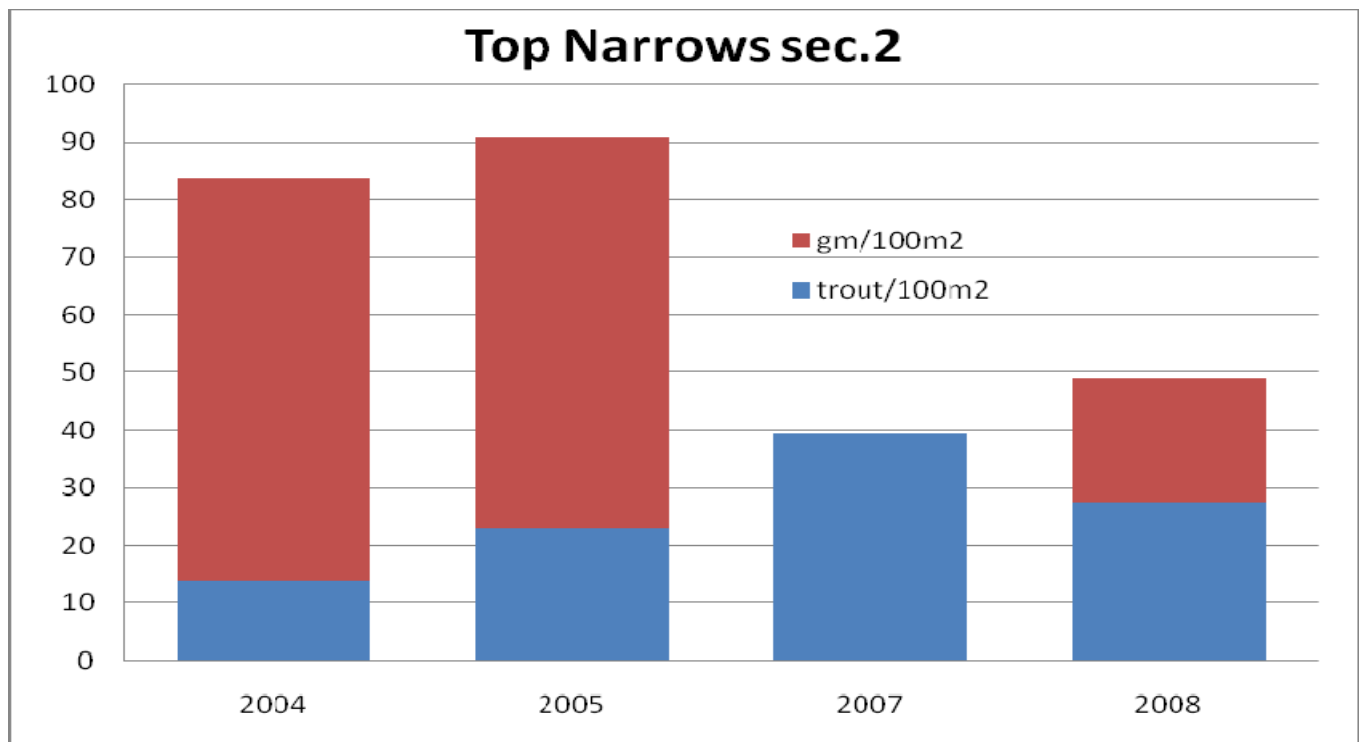


Figure 20. Ross Fork section 2, densities and biomass of pure Yellowstone cutthroat.

Mill Creek

Mill Creek is located on the south west side of Mt. Putnam and is primarily dominated by brook trout. Genetic inventories in 1999 have shown the upper reach of Mill creek support populations of Yellowstone cutthroat, this has not been reevaluated. Brook trout appear to the lowest since 2004, however cutthroat numbers have remained relatively the same (fig.).

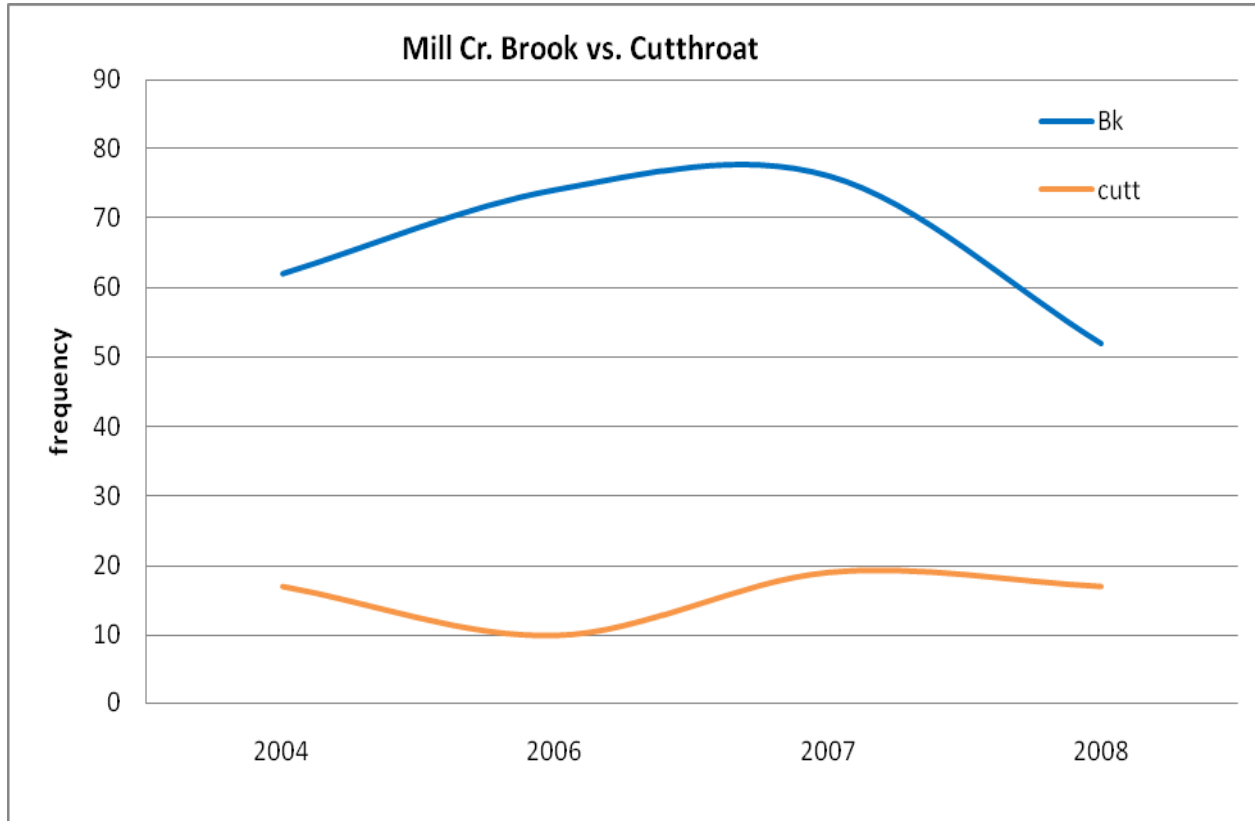


Figure 21. Mill creek sections continue to have high brook trout numbers in 2008.

Bannock Creek

In 2008 mainstem Bannock Creek was sampled near the confluence of Rattlesnake creek. Densities are extremely low relative to trout streams on the Reservation. Bannock creek has severe water quality issues and meets requirements for 303d listing. (fig.)

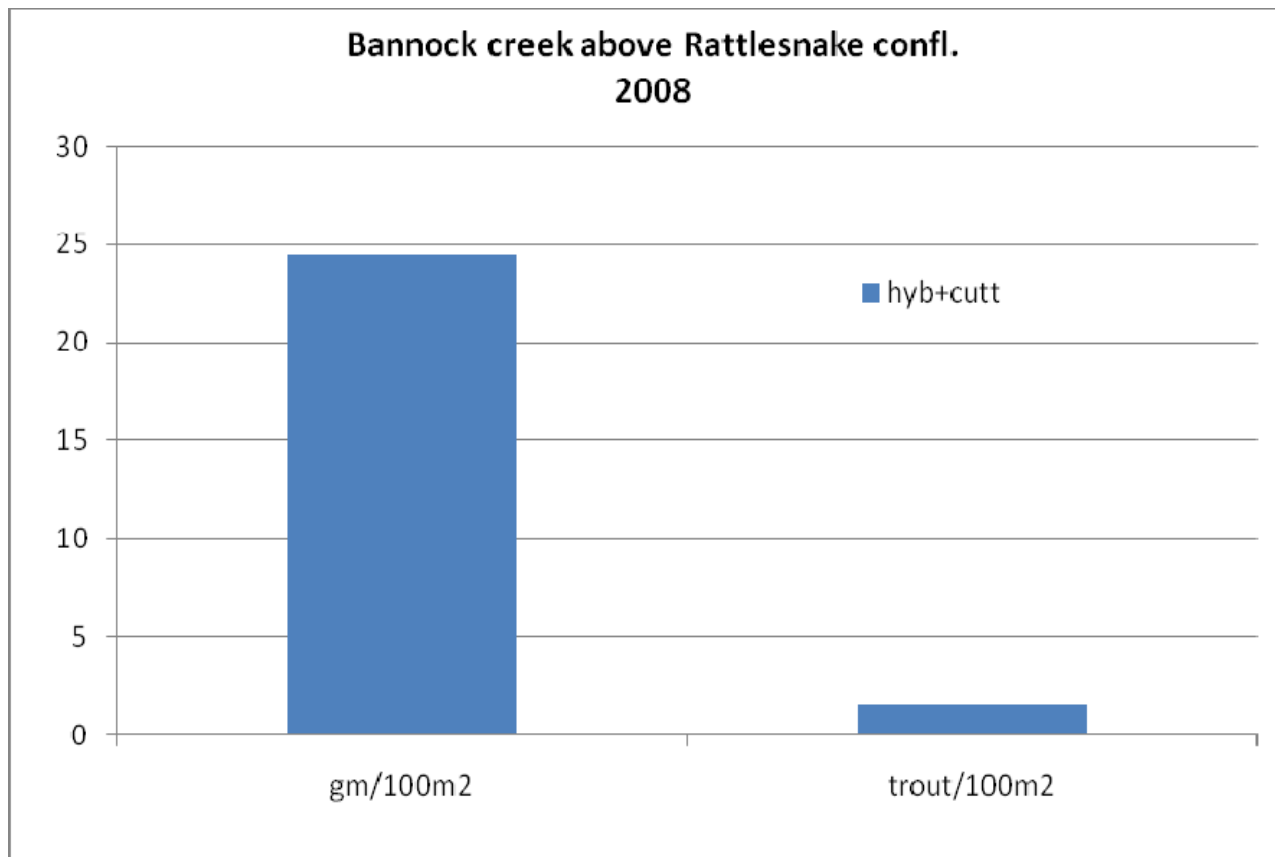


Figure 23. Mainstem Bannock Creek densities and biomass 2008.

Fry Counts

Tree revetments in Spring Creek near Broncho Bridge were snorkeled on two occasions in 2008. Fry counts were not as high in previous years (fig.). Snorkeling was again difficult due to the high macrophyte density in Spring Creek. This was not an effective method for collecting fry densities in 2003-2005 but higher visibility was experienced in 2007 and 2008. Fry counts were also done on Car Removal site. Average density (fry/100m) are lower than 2006 and relatively the same as 2007. No revetments were placed at the Car Removal site. Monitoring of fry will continue in newly placed structures at the Head-end.

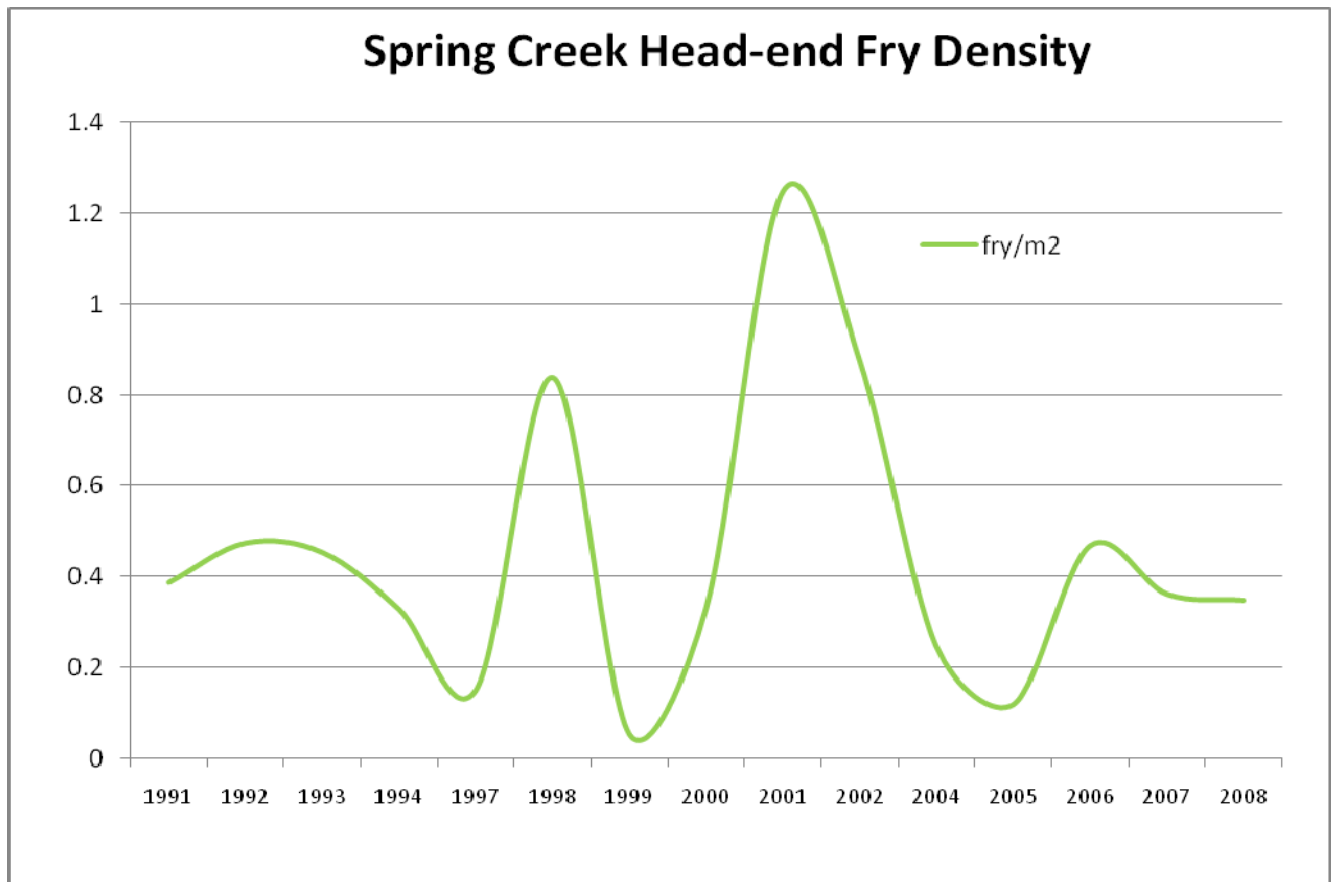


Figure 24 . Average fry densities at Head –end Spring Creek.

Creel Survey

Permit and Tribal Member anglers on Spring Creek were surveyed at random times throughout the summer. Figure shows catch per hour data from 1996 to 2008. Season catch rates were higher than in 2007. Catch rate for trout > 18” caught were the highest since 2000. Although large trout catch rate among anglers appears to be decreasing in 2007 many fisherman have reported to staff that during the 2008 season trout approaching 30 inches were caught more often than in previous years to 2004.

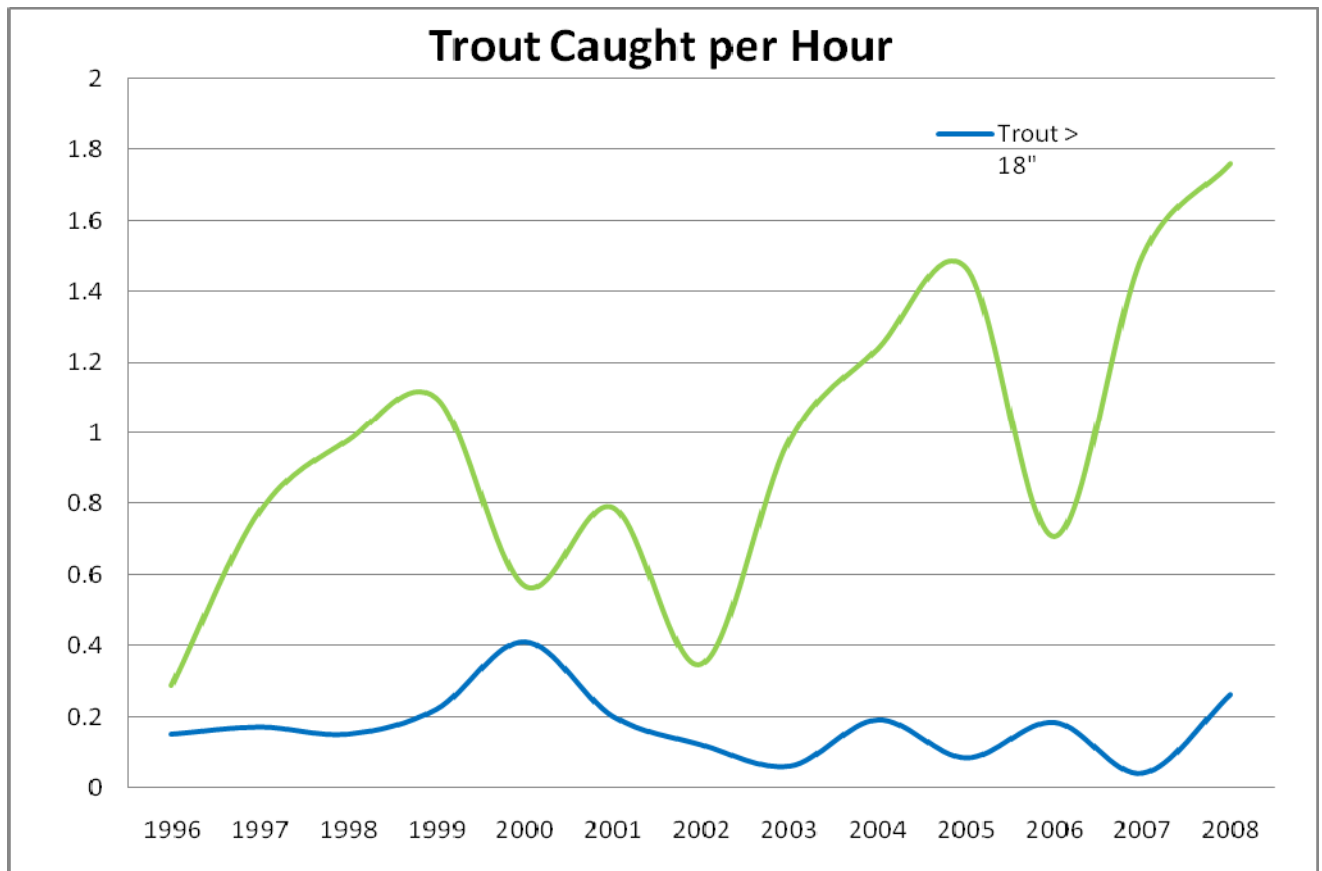


Figure 24 Trout caught per hour during the 2008 Non-Member fishing season.

Invertebrate Collection

Invertebrates are currently be identified. Invertebrate collection will begin in August 2008 on proposed sites on Big Jimmy Creek. Taxon for both Spring Creek and Big Jimmy will be evaluated and reported in 2009. Visually, the dominant orders for Spring Creek is Ephemeroptera, Trichoptera, and Diptera. Quantification will be done in 2009.

Wetland Project/ BLM Assistance Agreement

Coordination and guidance from the BLM is on-going and will continue as assistance is being provided through 2008 in which the Tribes received an additional 50k from the BLM for growing costs for Wyoming sagebrush. As in 2007, approximately 32,000 seedlings were

propagated in Tribal Nursery and outplanted with BLM and Tribal Fish and Wildlife staff on BLM lands burned in 20006. Educational components such as involvement of the Shoshone-Bannock Junior and Senior High students is taking place in the older 30' x 70' nursery and will expand to include the newly constructed nursery beginning 2008 (students were not involved in 2006). Sho-Ban High focused on their own projects in the greenhouse nurseries in Spring 2009.

Tribal member employment and training, and contract growing are expected to take place in summer 2009 as was the case in 2008. The Tribes will grow another 50k Wyoming sage seedlings for the BLM and did complete the construction of another 30'x60' nursery with assistance from the BLM. The 5000 native riparian plants for outplanting on sloping projects under BPA funded projects on the Bottoms in 2008, has had propagation difficulties in that germination was not occurring in 90% of the seeds planted. Replanting has occurred with some success, outplanting will occur throughout 2009 and 2010 on all BPA Projects on the Bottoms.



Figure 26. Completed, newly assembled 30' x 60' nursery (right) and existing 30' x 70' (left), 2006, and 30'x60' (left) 1999.

Meetings - Symposia

Monthly meetings consisted of supervisors meeting with executive director, and internal meeting many regarding planning and development of BPA Accord Projects and comments on Tribal documents (IRMP). Meetings with Fort Hall Business Council for resolution approval for general contractor agreement for nursery, 2009 Non-Member Fishing Season, BLM Assistance Agreement and approval for FY09 BPA and BIA 638 budgets. Resident Fish Committee meetings attended regarding fish loss assessments. A large amount of time was incurred during the winter and spring months of 2009 developing criteria for Umbrella Planning and Pisces training for the Accord Projects. Tribal Fish and Wildlife staff spent a lot of time developing projects that would benefit the Tribes to be funded as terms of an Memorandum of Agreement for Tribes in support of the BiOP.

Educational Assistance

Tribal member and full-time technician Preston Buckskin is currently attending Idaho State University. He is at sophomore nearing Junior status and is majoring Biology and carries 12 credit hours (full-time). Preston has also successfully completed the 6 week aquaculture course funded by BPA in 2004 at Jerome, Idaho. Preston will attend ISU in Fall Semester 2009. Natural Resource scholarships are funded by the Permit Fishing Permit Program, a tribal revenue program.

Educational Employment Training

EET allows Tribal youth ages 14-18 yrs. to work with Tribal departments in the summer. In 2008 as in previous years, tribal fisheries took on youth to assist with habitat work on the bottoms. They assisted in field work during the month of July. Tribal Fisheries took on 2 EET workers in the month of June 2009.

Future Work

The RFP (Resident Fisheries Program) will continue to protect sensitive riparian areas of the Reservation through fencing, instream work, revegetation, and modification of grazing practices. The RFP will continue to restore and enhance fish habitat through representation at

local, state, and federal forums. RFP, in cooperation with the Tribal Fish and Wildlife Department, will move toward use of the NEPA process and develop GIS overlays of critical fish and wildlife habitats (continuing into 2008). In addition, the RFP will continue a telemetry study on the Fort Hall Bottoms in 2009. The project will provide information on movement of adfluvial and fluvial salmonids through spring creeks, American Falls Reservoir, and the Snake River (Moser, 2001). Information will be used to manage fish populations for the benefit of the Shoshone-Bannock Tribes. Genetic analysis of rainbow cutthroat hybrids on the reservation will begin in fall 2008 pending budgetary amounts in BIA 638 contract for Resident Fisheries. RFP will continue to develop the greenhouse nursery program and provide plants to burn areas of the reservation consisting of upland and riparian vegetation including BPA funded projects on the Fort Hall Bottoms. The Fish and Wildlife Program will deliver and plant approximately 35,000 sagebrush plugs for fire rehab for the BLM and 5,000 native riparian plants in 2008. Baseline collection will be complete for the project areas on the Car Removal site and Big Jimmy sites. On the ground implementation will begin in fall of 2009. Monitoring of Reservation sites will continue as in previous years. First Draft of the Tribal Fish Management Plan for the Reservation will be completed by September 2009.

Acknowledgements

Technicians Preston Buckskin, Doug Hevewah, Wayne Crue, Cameron Farmer and summer youth workers were a great help with projects during the field season. Fish and Wildlife staff Virgilena LeClaire, Relda Edmo, and Jacee Furniss and Chantel Lopez for their assistance during the 2008/09 Permit Fishing season. Cheryle Zwang and Jason Wright of the BLM for their guidance and interests in developing the tribal nursery program, and Roy Beatty and Joe DeHerrera, COTR Bonneville Power Administration.

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