BONNEVILLE POWER ADMINISTRATION

Lake Roosevelt Rainbow Trout Habitat/Passage Improvement Project

Annual Report 2002 - 2003 January 2004 DOE/BP-00004413-5

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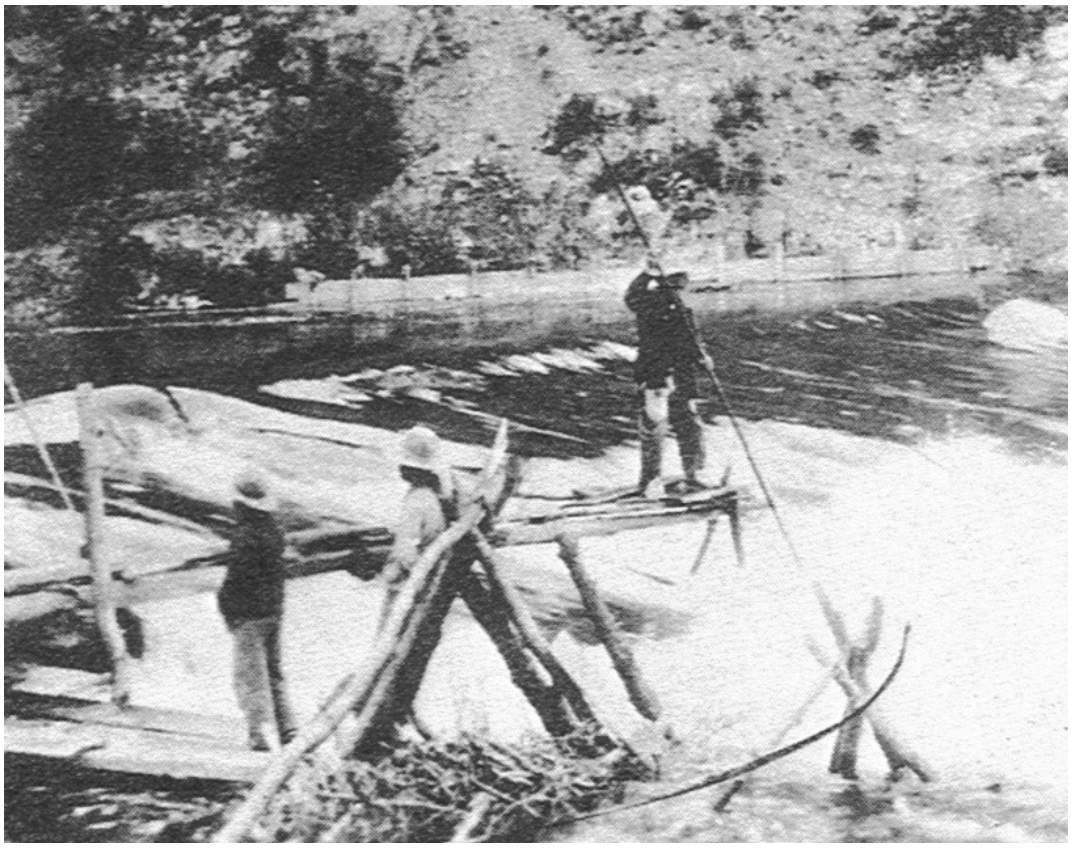
Colville Confederated Tribes
Lake Roosevelt Rainbow Trout
Habitat/Passage Improvement Project

2003 Annual Report



Traditional Fishing on the San Poil River

Lake Roosevelt Rainbow Trout

Habitat/Passage Improvement Project

Annual Report

October 1, 2002 – September 30, 2003

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Project Information:

Lake Roosevelt Rainbow Trout Habitat/Passage Improvement Project

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2003 Annual Report
January 2004

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ABSTRACT

Lake Roosevelt Rainbow Trout Habitat/Passage Improvement Project

The construction of Chief Joseph and Grand Coulee Dams completely and irrevocably blocked anadromous fish migrations to the Upper Columbia River. Historically this area hosted vast numbers of salmon returning to their natal waters to reproduce and die. For the native peoples of the region, salmon and steelhead were a principle food source, providing physical nourishment and spiritual sustenance, and contributing to the religious practices and the cultural basis of tribal communities. The decaying remains of spawned-out salmon carcasses contributed untold amounts of nutrients into the aquatic, aerial, and terrestrial ecosystems of tributary habitats in the upper basin.

Near the present site of Kettle Falls, Washington, the second largest Indian fishery in the state existed for thousands of years. Returning salmon were caught in nets and baskets or speared on their migration to the headwater of the Columbia River in British Columbia. Catch estimates at Kettle Falls range from 600,000 in 1940 to two (2) million around the turn of the century (UCUT, Report #2).

The loss of anadromous fish limited the opportunities for fisheries management and enhancement exclusively to those actions addressed to resident fish. The Lake Roosevelt Rainbow Trout Habitat/Passage Improvement Project is a mitigation project intended to enhance resident fish populations and to partially mitigate for anadromous fish losses caused by hydropower system impacts. This substitution of resident fish for anadromous fish losses is considered in-place and out-of-kind mitigation.

Upstream migration and passage barriers limit the amount of spawning and rearing habitat that might otherwise be utilized by rainbow trout. The results of even limited stream surveys and habitat inventories indicated that a potential for increased natural production exists. However, the lack of any comprehensive enhancement measures prompted the Upper Columbia United Tribes Fisheries Center (UCUT), Colville Confederated Tribes (CCT), Spokane Tribe of Indians (STI) and Washington Department of Fish and Wildlife (WDFW) to develop and propose a comprehensive fishery management plan for Lake Roosevelt. The Rainbow Trout Habitat/Passage Improvement Project (LRHIP) was designed with goals directed towards increasing natural production while maintaining genetic integrity among current tributary stocks.

The initial phase of the Lake Roosevelt Habitat Improvement Project (Phase I, baseline data collection: 1990-91) was focused on the assessment of limiting factors, including the quality and quantity of available spawning gravel, identification of passage barriers, and assessment of other constraints. After the initial assessment of stream parameters, five streams meeting specific criteria were selected for habitat/passage improvement projects (Phase II, implementation -1992-1995). Four of these projects were on the Colville Indian Reservation South Nanamkin, North Nanamkin, Louie and Iron Creeks and one Blue Creek was on the Spokane Indian Reservation. At the completion of project habitat improvements, the final phase (Phase III, monitoring-1996-2000) began. This phase assessed the changes and determined the success achieved through the improvements.

Data analysis showed that passage improvements are successful for increasing habitat availability and use. The results of in-stream habitat improvements were inconclusive. Project streams, to the last monitoring date, have shown increases in fish density following implementation of the improvements.

In 2000 Bridge Creek, on the Colville Reservation was selected for the next phase of improvements. Data collection, including baseline stream survey and population data collection, was carried out during 2001 in preparation for the design and implementation of stream habitat/passage improvements. Agencies cooperating on the project include the Colville Confederated Tribes (CCT), Natural Resource Conservation Service (NRCS, Ferry County District), Ferry County Conservation District, and Ferry County. The Bonneville Power Administration (BPA) provided project funding support and program integration assistance.

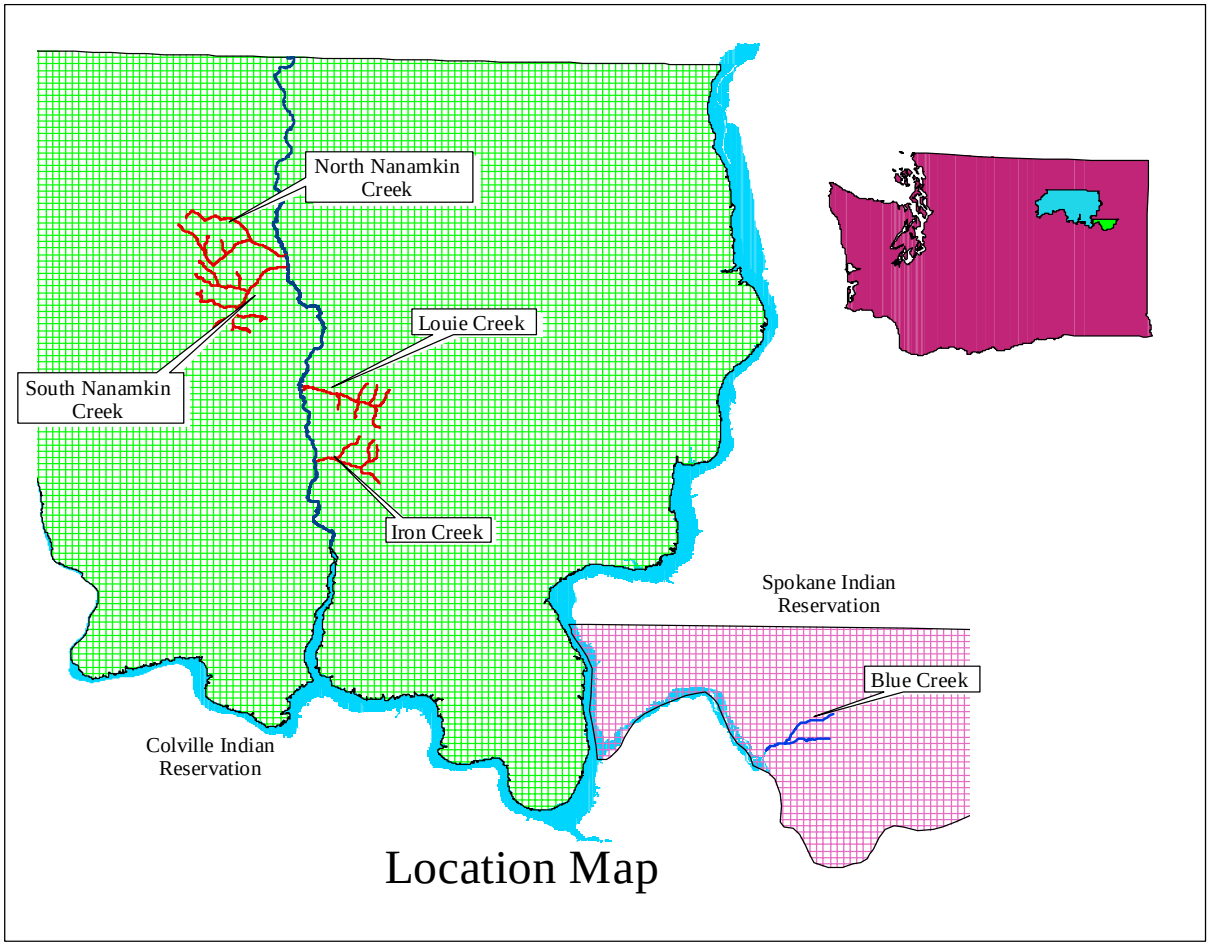
A stock of redband rainbow trout, were discovered in 2001 in an isolated section of Bridge Creek above a set of waterfalls. DNA microsatellite analysis was conducted at the University of Idaho and indicated that very little if any hybridization. The targeted species in the genetic analysis was red band/rainbow trout (*Oncorhynchus mykiss spp.*). The sub-contract is with Madison Powell and Joyce Faler at the Center for Salmonid and Freshwater Species at Risk at the University of Idaho/HFCES. DNA analysis used mitochondrial and nuclear RFLP markers along with two microsatellite loci. Sample populations were screened for detectable levels of introgressive hybridization arising from possible admixtures of hatchery coastal rainbow trout with native red band trout. Both nuclear and mitochondrial RFLPs have been used successfully to assess genetic diversity and hybridization among and between *O. mykiss* subspecies and between *O. clarki* (Wishard et al. 1984; Wilson Thomas and Bechenback 1985; Williams and Jaworski 1995, Williams, et al. 1996; Williams, Leay and Currens 1997; Powell and Faler 1999; McCusker, Parkinson, and Taylor 2000; Campbell, Dillon, and Powell 2002). Additional potential redband populations were identified in 2003 and DNA samples were collected from Brush, Jack, and Thirty Mile Creeks.

Fish trapping and electro-shock population studies are continuing on several San Poil River tributaries. A baseline horizontal habitat survey was completed on Thirty-Mile Creek in October of 2002 and planned for October of 2003 for Twenty-Three Mile Creek. A survey is planned for a new stream each year. BPA funding problems postponed the implementation of the geo-hydrologically engineered stabilization and passage improvements on Bridge Creek in 2002. Implementation of the improvements was scheduled for the late summer of 2003. However, BPA failed to contract the archaeological survey agreed on as part of the THPO consultation for compliance with Historic Preservation Act. The work was rescheduled for 2004 FY and the archaeological survey was begun on September 28, 2003.

During 2002 the lower and middle sections of the San Poil Sub-basin were used to test the Ecosystem Diagnosis and Treatment (EDT) model. An extensive survey of all culverts and man-made and natural barriers was completed as part of the data input into the model. EMAP was incorporated into a strategy of long term monitoring and evaluation. The intention is to use it as a tool for assessing status and trends in landscape processes that form and sustain habitats over space and time, and as an aid in the identification of land use practices causing habitat degradation. In 2003 it was

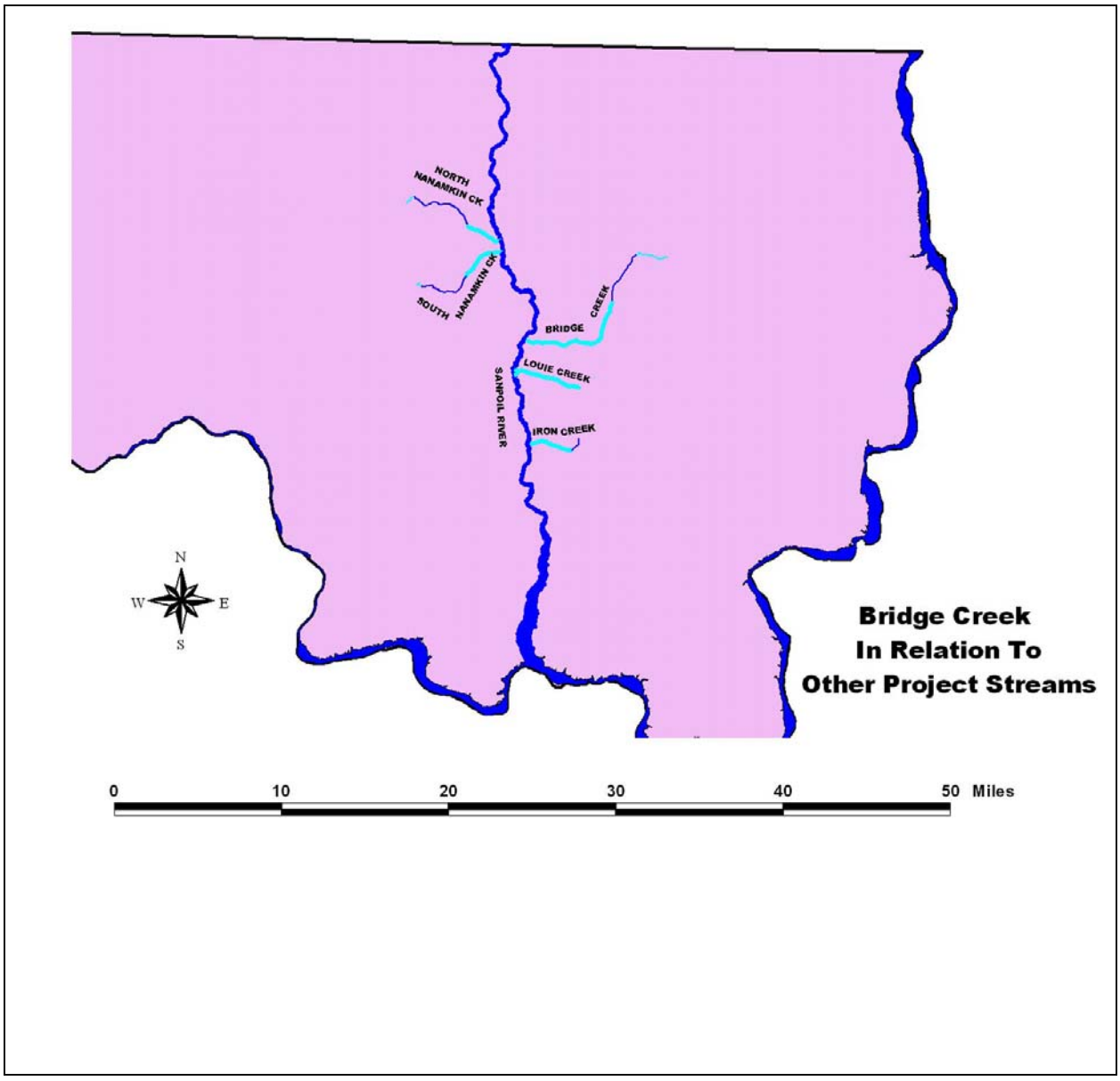
determined that the EDT Model was not appropriate for use with resident fisheries. It will be used in evaluation of anadromous fisheries. Sub-basin planning began and a second model QHA was selected for use in the blocked areas.

Map 1

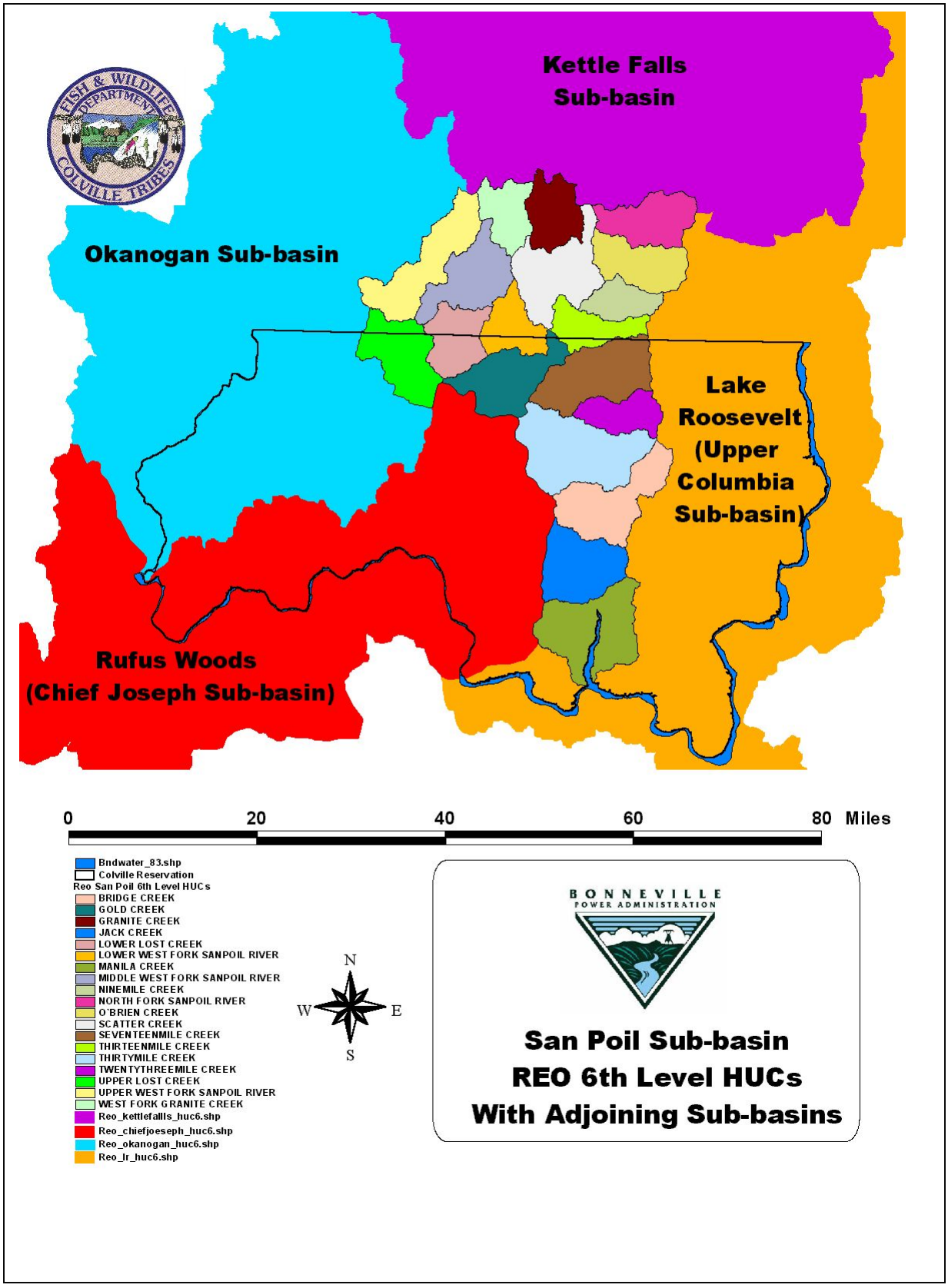


Locations of original stream rehabilitation and enhancement projects completed 1993-1995.

Map 2


NORTH NANAMKIN CK
SOUTH NANAMKIN CK
BRIDGE CREEK
LOUIE CREEK
SANPOIL RIVER
IRON CREEK
N
W
E
S
Bridge Creek
In Relation To
Other Project Streams
0
10
20
30
40
50 Miles

Map 3


Kettle Falls
Sub-basin
Okanogan Sub-basin
Lake
Roosevelt
(Upper
Columbia
Sub-basin)
Rufus Woods
(Chief Joseph Sub-basin)
0
20
40
60
80 Miles
Bndwater_83.shp
Colville Reservation
Reo San Poil 6th Level HUCs
BRIDGE CREEK
GOLD CREEK
GRANITE CREEK
JACK CREEK
LOWER LOST CREEK
LOWER WEST FORK SANPOIL RIVER
MANILA CREEK
MIDDLE WEST FORK SANPOIL RIVER
NINEMILE CREEK
NORTH FORK SANPOIL RIVER
O'BRIEN CREEK
SCATTER CREEK
SEVENTEENMILE CREEK
THIRTEENMILE CREEK
THIRTYMILE CREEK
TWENTYTHREEMILE CREEK
UPPER LOST CREEK
UPPER WEST FORK SANPOIL RIVER
WEST FORK GRANITE CREEK
Reo_kettlefalls_huc6.shp
Reo_chiefjoeseph_huc6.shp
Reo_okanogan_huc6.shp
Reo_lr_huc6.shp
N
W
E
S
BONNEVILLE
POWER ADMINISTRATION
San Poil Sub-basin
REO 6th Level HUCs
With Adjoining Sub-basins

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INTRODUCTION

HISTORICAL BACKGROUND

Since the loss of anadromous salmonids above Grand Coulee Dam, fishery enhancement measures have been limited on the reservoir and surrounding area. A few short-term fisheries surveys were conducted on the reservoir associated with the introduction of fish species by the Washington Department of Fish and Wildlife (WDFW), Spokane Tribe of Indians (STI), and the Confederated Tribes of the Colville Reservation (CCT). Studies have shown that existing spawning habitat in Lake Roosevelt tributary streams may be inadequate to sustain a rainbow trout *(Oncorhynchus mykiss*) fishery in Lake Roosevelt (Scholz et. al., 1988).

Upstream migration passage barriers limit the amount of spawning and rearing habitat that might otherwise be utilized by rainbow trout. Limited stream surveys and habitat inventories indicate that a potential for increased natural production exists. The lack of any comprehensive enhancement measures prompted the Upper Columbia United Tribes Fisheries Center (UCUT), Colville Confederated Tribes (CCT), Spokane Tribe of Indians (STI) and Washington Department of Fish and Wildlife (WDFW) to develop a comprehensive fishery management plan for Lake Roosevelt (Scholz et. al., 1988). The Rainbow Trout Habitat/Passage Improvement Project (LRHIP) was designed with goals directed towards increasing natural production while maintaining genetic integrity among current tributary stocks.

The plan was amended, to the Columbia River Basin Fish and Wildlife Program by the Northwest Power Planning Council (NPPC) in 1987 (NPPC, 1987). Program Measures 903 (g) (1)(c)(d)(e) directed Bonneville Power Administration (BPA) to fund "improvement of spawning and rearing habitat in order to facilitate passage to spawning tributaries to increase natural production of rainbow trout" and "evaluate the effectiveness of the above measures by conducting a monitoring program".

The interagency team of the Colville Confederated Tribes (CCT), Spokane Tribe of Indians (STI), Washington Department of Wildlife (WDW), and the Upper Columbia United Tribes (UCUT) selected the streams for habitat evaluation and improvements.

DESCRIPTION OF STUDY AREA

Lake Franklin D. Roosevelt reaches upstream from the Grand Coulee Dam, 151 miles to the Canadian border. Approximately 494 miles of shoreline exist where sixty-five (65) tributary streams contribute their flow and biomass to the fishery in the lake. Ferry, Stevens, Spokane, Lincoln, Grant and Okanogan Counties border the shoreline and study areas. The area

lies within the Okanogan Highland geological district. The land habitat surrounding this lake is diverse, habitats range from coniferous forest, lush lowlands to semi-arid shrub steppe. The areas climate is greatly affected by the annual rainfall regimes (10 inches/year at low elevations to 35 at the highest elevations) as well as the warming micro-climatic effects of Lake Roosevelt. Annual temperatures range from winter lows of -40 degrees F. to summer highs of 100 + degrees F.

Historically this area hosted vast numbers of salmon returning to their natal waters to reproduce and die. For the native peoples of the region, salmon and steelhead were a principle food source, providing physical nourishment and spiritual sustenance, and contributing to the religious practices and the cultural basis of tribal communities. The decaying remains of spawned-out salmon carcasses contributed untold amounts of nutrients into the aquatic, aerial, and terrestrial ecosystems of tributary habitats in the upper basin.

Near the present site of Kettle Falls, Washington, the second largest Indian fishery in the state existed for thousands of years. Returning salmon were caught in nets, baskets or speared on their migration to the headwater of the Columbia River in British Columbia. Other smaller, but important, fishery sites existed south of Kettle Falls at Rickey Rapids and at the Little Spokane Falls. Catch estimates at Kettle Falls range from 600,000 in 1940 to two (2) million around the turn of the century (UCUT, Report #2).

Annual gatherings at the various fishing sites brought together many bands of native people for fishing, socializing and religious activities. The rumble of the great Kettle Falls could be heard from as far away as 10 miles (UCUT, Rep #2). The roar of the falls was silenced forever in 1943 when the backwaters of Grand Coulee Dam inundated the falls. Lost forever to the native people of the area and all other region residents were: 1.) Diverse salmon runs, 2.) Basis of the local economy, 3.) Nutrient contribution to the upper Columbia basin, 4.) Icon for important religious ceremonies, and 5.) Cultural identity linked to the vast salmon runs.

SCOPE OF PROJECT

GOAL

Increase the quality and quantity of spawning and rearing habitat available to adfluvial rainbow trout in selected streams that drain into Lake Roosevelt by eliminating migration barriers, improving riparian conditions, and improving instream habitat. Projects that will remove passage barriers, reduce sediment loading, improve or protect existing riparian vegetation, provide habitat diversity

and protect the genetic integrity of rainbow trout within the system will be prioritized for implementation. Protecting and improving the habitat of the stocks indigenous to Lake Roosevelt will achieve this goal. Ultimately, this will increase the contribution of adfluvial rainbow trout to Lake Roosevelt's fishery.

OBJECTIVES

1. Improve/create passage for rainbow trout in Bridge Creek.
2. Create passage where manmade barriers now exist in the Lake Roosevelt Watershed.
3. Monitor and evaluate habitat/passage improvements
4. Identify future habitat/passage improvement opportunities in the "blocked areas" above Chief Joseph and Grand Coulee Dams

The Lake Roosevelt Rainbow Trout Habitat/Passage Improvement Project is a resident fish substitution project to mitigate for anadromous fish losses above Chief Joseph and Grand Coulee Dams. Specific over-all program objectives include: Increase habitat availability to optimize parr production consistent with achieving harvestable levels of adfluvial rainbow trout; Manage adfluvial rainbow trout populations as self-sustaining populations; Identify future habitat/passage improvement opportunities in the "blocked areas" above Chief Joseph and Grand Coulee Dams; Monitor and evaluate habitat/passage improvements.

As in the past the current Project includes three phases: Phase I- Develop base-line information of existing conditions and strategies/opportunities for enhancement; Phase II- Implementation of selected actions/strategies described in Phase I; and Phase III- Monitor and evaluate the impacts of implementation actions.

MONITORING METHODOLOGY

Juvenile Population Estimates

Juvenile population enumeration began in September and continued through October on Twenty Three Mile Creek for population estimates. Juvenile rainbow trout populations are estimated in the stream by conducting electro-shocking surveys in randomly selected sections consisting of 10% of each habitat type found in a given valley segment. Population estimates utilize the two (2)-pass methodology of Saber-LeCren (Everhart 1975). A Smith-Root model B backpack elector-fisher was used to capture fish. A minimum of two (2) electro-fishing passes will be made for each section. Block-nets will be placed at the upstream and downstream boundaries to prevent immigration and emigration. Fish captured in the first pass are held in buckets until after the second pass is completed then the fish are enumerated, measured to the nearest millimeter and weighed to the nearest gram. Once fully recovered they are returned to the stream.

Adult Adfluvial Rainbow Trout Enumeration

Adult adfluvial rainbow trout enumeration was conducted for the second year prior to the implementation phase. During 2003 adult adfluvial rainbow trout enumeration in San Poil Tributaries began the first week of March and continued through the end of May. In 2003 upstream migratory traps were placed in five (6) streams at pre-selected sites. Trapping was conducted on Bridge Creek, Twenty Five Mile Creek, Thirty Mile Creek, Bear Creek, Twenty Three Mile, and Seventeen Mile when creel studies indicated that adult migration had begun in the San Poil River. A screw trap was also placed near the mouth of the West Fork of the San Poil River. High flows required that the traps be removed from the streams for about a week in mid-March. There was most likely high migration during this period that we were unable to record.

The trap design consists of 1-inch round aluminum tubing resembling a picket fence. The panels are placed across the stream at an angle. The angle of the panels, lead the fish to a holding structure located in an upstream pool. Panels are placed on the upstream end of riffle areas at a point where the stream constricts to minimize the number of panels required.

Fish captured are anesthetized before handling to reduce stress and injury to the fish as data is collected. Gaseous CO_2 from a compressed gas cylinder is lightly bubbled through the holding tank through a diffusion stone to anesthetize the captured fish (Nielson and Johnson, 1983). Traps are checked twice daily during the spawning periods. Once the fish have been captured, they were placed in a plastic container and CO_2 gas passed through the water for a few moments until fish had calmed, then they were weighed to the nearest gram, condition noted, sex determined, and lengths measured to the nearest millimeter. Data was recorded and scales samples taken to assess the age for growth analysis. DNA samples were collected on selected fish. A small fin clip was placed in a 99% ethanol solution for preservation and selected samples are sent to the University of Idaho for DNA analysis. The fish were then placed in another plastic container containing fresh water until they recover from the CO_2, then released unharmed upstream of the trap site where they could continue their migration to spawn. The trapping continued on all selected streams on a daily basis until the run ceased and traps were removed at the end of May.

Juvenile Adfluvial Rainbow Trout Out-migration Enumeration

Out-migrant traps were constructed in January of 1996. The trap design consists of a fyke type net that tapers to a cod end which leads to a live-box. The fyke net was placed perpendicular to the stream. The angle of the net, leads the fish toward the cod end into the livewell. The fyke net was placed at the lower end of a riffle next to a pool where the livewell was anchored down with re-bar. The traps were placed at pre-selected sites in the same streams that adult enumeration was conducted

Trapping juvenile rainbow trout in the six streams that had migratory begin late-April and continued through the end of June. The trap was checked daily during the monitoring period. Fish captured were anesthetized before handling to reduce stress and injury to the fish as data was collected. Gaseous CO_2 from a compressed gas cylinder is lightly bubbled through a diffusion stone in the holding tank to anesthetize the captured fish (Nielson and Johnson, 1983). CO_2 gas is passed through the water for few moments until the fish have calmed, then they are counted, weighed to the nearest gram, and measured to the nearest millimeter The fish were then be put into another plastic container containing fresh water until they had recovered before being returned to the stream.

Screw Trap Enumeration of Rainbow Trout Juvenile Fish

Migration and enumeration of rainbow trout juveniles in the San Poil River has in the past been monitored using a floating screw type trap near the mouth of the San Poil River. Richard LeCaire's Lake Roosevelt Kokanee Project #199501100 previously conducted the trapping of juvenile rainbow trout in the San Poil River. However, it has not occurred during the past few years due to changes in the project priorities. The screw trap was used in 2003 at the mouth of the West Fork of the San Poil River, by this project as an indicator of adfluvial rainbow trout use of the upper and West Fork of the San Poil River and its' contribution to Lake Roosevelt's fishery with excellent results.

Spawning Surveys

Spawning ground surveys were conducted from Mid-May through June 2003 to assess rainbow trout spawning activity. Project personnel conducted foot surveys from the mouth of the streams to the upper limit of fish habitat sporadically throughout the spring spawning period (April - June). Redds were counted, marked and precise GPS locations recorded. Redds were marked with a 5/8 inch re-barr hammered into the ground on the bank near each redd. A

description of site, date and number was recorded on a tag, which was attached to the re-barr. Spawning ground surveys were planned to be utilized to develop fish to redd ratios, identify spawning habitat and during Phase III Monitoring to assess the effectiveness of passage improvements and instream habitat utilization by adult adfluvial rainbow trout.

A habitat survey was to be conducted at each located redd. Data collection included substrate classification, available instream cover, stream width and depth, location of redd in relation to riffle and pool structure, temperature, cobble embeddedness, riparian zone vegetation type and quantity, and canopy cover. Data on possible predation aquatic, aerial, and terrestrial was to be collected as well as the location of each located redd in relation to the stream habitat types. A few located redds were selected for redd caps to enumerate emerging fry for production estimates. The design on the redd caps again gave us problems with fish escaping under the trap. The data collected was invalid due to an unknown number of fish escaping. All redd and redd cap sites were marked and located with a Garmin 12X GPS (Global Positioning System).

Fish passage structures

Visual observations of the condition of the various passage improvement structures were recorded throughout the monitoring period. Project sites were visited during periods of peak spawning migration to observe functional status, passage conditions, and the attempts of adult fish to negotiate the modified barriers. Redd counts methodology discussed in objective I will be utilized to identify spawning activity in previously inaccessible areas. A model 2000 Flo-mate flow meter will be used to measure the velocity flow at the discharge end of culverts to determine potential migration barriers.

In-stream structural enhancements are monitored and evaluated throughout the post-monitoring phase for purposes of documenting functional status, maintenance, and replacement needs.

Some Iron Creek log structures washed out during high water event of 1996-97 causing bank to undercut. Will continue to monitor may need to be repaired.

Gates on South Nanamkin Creek collected debris and altered channel during high water event of 1996-97. Gates removed will not be used again.

Horizontal Stream Survey Channel Morphology Surveys (Horizontal Control Survey)

Transacts were set up every 100 meters. Bankfull width and depth were measured at each transect. Bankfull height is determined and depths from bankfull to streambed are measured every 1/10 of a meter across each transect. The method used comes out of the Timber, Fish and Wildlife (TFW) Monitoring Procedure (Schuett-Hames et. al.1994).

Stream flow discharge and temperature will be measured monthly beginning March through November. A Flomate 2000 flow meter with a top setting wading rod will be used at each site. Stream widths will be measured and divided into at least 10 to 20 equal cells depending on the width of the stream. Velocities will then be measured at each cell at two (2) thirds of the depth, then discharge can be calculated. The methodology for taking stream flow and temperatures is consistent with the Timber, Fish and Wildlife (TFW) Monitoring Program (Dave Schuett-Hames et al. 1994).

Habitat Stream Survey was begun during late summer August 28th through October 10th. Stream channel surveys

were conducted using Timber, Fish and Wildlife (TFW) Monitoring Program Methodology (Schuett-Hames et al. 1994). A field crew of two (2) or three (3) people systematically surveyed the habitat of valley segments delineated in the horizontal survey. Each habitat unit was measured for length and width. Mean depth of riffle units and a minimum and maximum depth for pool units and tail-out depth, substrate diversity, cobble embeddedness and channel gradient were measured. Woody debris were counted and categorized as logs or root wads at each recorded habitat unit. Function of the debris was assessed as well as a determination of an adequate or inadequate amount of debris present. The riparian condition was estimated by determining the canopy closure every 300 meters within the habitat units.

Canopy closure measurements were taken with a densiometer from the center of the stream looking up stream, down stream, left bank and right bank. This measurement provides an indirect measure of shading the stream receives by adjacent riparian vegetation. The vegetation along the stream bank was categorized by visual estimates of the serial or successional stage of the plant communities at each recorded habitat unit. Type of dominant vegetation whether deciduous, coniferous or mixed, and land use, was documented. Data was recorded on standardized Timber, Fish and Wildlife (TFW) forms and entered into Excel for computerized database storage. Habitat surveys are used to assess habitat conditions and define impacts in stream reaches due to land use practices.

RESULTS

Objectives:

1.) Improve/create passage for rainbow trout in Bridge Creek.

Tasks:

A. Design/engineer new channel and stabalization of lateral cutting.
    1. Developed decision matrix and selected Entrix as design firm for design of Bridge Creek improvements.
    2. Received 100 % design plan and reviewed with land owner Jennot, Batrice Beckwith (NRCS), and Lloyd O'Dell (Ferry County Conservtion District).

B. Re-create original stream channel and floodplain and connection to wetland and the San Poil River.
    1. Wrote RFP for Bridge Creek Implementation and distributed to contractors.
    2. Completed bid packages and distributed to responding contractors.
    3. Reviewed bids and selected contractor and processed contract.
    4. Processed contract and ready to begin work at uppermost segment "M".

C. NEPA compliance.
    1. Worked with Shannon on NEPA compliance. Formal letter requesting106 historic consultation with THPO sent by BPA. Due to high number of wildland fires this year archeologist is unable to complete survey of site. Steve Tromely archeologist with BPA also unable to accomplish work. Contacted BPA Archeological Dept. Yvonne Bess contracted firm out of Colville to do survey that has worked with Tribes previously.
    2. Wrote article on Bridge Creek project for public information and published in Tribal Resource Newsletter mailed to Colville Tribal Membership.
    3. Checked during 1st week of September for archaeological report. Survey had not been ordered. Shannon Stewart ordered survey and it was begun on Sept. 29th. Was not able to begin implementation without report, rescheduled implementation.

D. Baseline adult fish trapping in spring before implementation.
    1. Repaired traps during first quarter in preparation of upcoming trapping season.
    2. Adult and juvenile traps place in streams on March. Fluctuating water levels from heavy spring rains blew out traps at end of March. Out for about a week, then trapping continued. Traps in Bridge Creek, 30-Mile Creek, Bear Creek. April 7th 23-Mile and 17-Mile traps placed back in stream.
    3. Continued trapping on Bridge Creek pre-implementation and Thirty Mile Creek prior to passage improvements.
    4. Trapping completed and traps pulled in mid-May.

Table 1 Adult Adfluvial Rainbow Trout Male and Female Average Lengths & Weights

Average Length	# Males	Average Length	Average Weight		# Females	Average Length	Average Weight
Bridge Creek	14	469.6	1101.6		8	502.4	1172.0
Bear Creek	5	451.2	1014.8		7	487.3	1457.9
30-Mile Creek	7	475.1	1192.0		10	492.3	1420.6
23-Mile Creek	11	457	1172.4		12	487.5	1679.3
17-Mile Creek	5	457	1101.6		2	487.5	1172.0
Total	42				39		
Average All Streams		462	1116.5			487.5	1380.4

Table 2 Adult Adfluvial Rainbow Trout Minimum and Maximum Lengths and Weights

Stream	Max Weight	Min Weight	Max Length	Min Length
Bridge Creek	1689	546	575	365
Bear Creek	1901	582	536	381
30-Mile Creek	1775	481	524	345
23-Mile Creek	1896	814	531	409
17-Mile Creek	1373	846	503	410
Average All Streams	1726.8	653.8	533.8	382

Table 3 Juvenile Out-Migrants

Stream	Number of Fish	Max Weight	Min Weight	Max Length	Min Length	Average Weight	Average Length
25-Mile Creek	21	18	5	115	75	98	10.5
West Fork SPR	369	98	1.3	229	8.5	12	97

Table 4 Juvenile Out-Migrant Species

Species	Number of Fish
Rainbow Trout	341
Sucker	8
Redside Shiner	3
Northern Pike Minnow	3
Total	355

E. Electroshock/population estimates in area to be affected.
    1. Electro-shocking conducted on lower 30-Mile Creek. Collected data on length, gender, species, and scales taken then samples for the DNA analysis collected.

F. Spawning (Redd) survey.
    1. Redd surveys on Bridge Creek, Thirty Mile, North and South Nanamkin, Bear, Anderson, Seventeen Mile, Twenty-Three Mile, and Gold Creeks.

2. Redd locations mapped with GIS files created from GPS data.

G. Redd habitat assessment.

1. Observed and recorded physical habitat parameters at each located redd site. Average stream width was 2.8 to 3.2 meters with a sand/gravel substrate at the tailout of a pool at .29 meters depth. Average canopy closure was 94.5%. Deciduous trees of alder and cottonwood were the dominant vegetation with stream temperatures at 13°C. The average size of the redds were 0.93 meters long and 0.85 meters wide.

H. Redd production, emerging fry enumeration (redd cap).

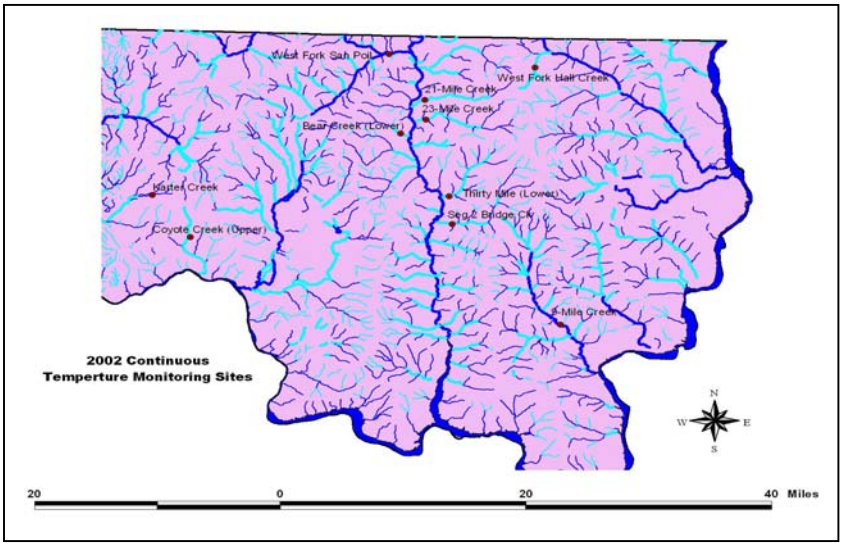
1. Unable to conduct redd cap fry enumeration in 2002 field season, netting has taken too long to receive order.
2. Ordered all remaining parts for redd caps and began construction during mid-winter.
3. Four redd caps constructed and placed in Bridge, Thirty Mile Creeks. Fry escaping under edge of base and stream substrate unable to get accurate counts. Will attempt to modify construction

I. Continuous temperature monitoring

1. Launched temperature data monitors in May 2002. Retrieved temperature data monitors November 2003.
2. Downloaded and reviewed temperature data during first quarter.
3. Temperature monitors launched in 11 streams (Bear, Bridge, Coyote, Kartar, Nine Mile, Thirty Mile, Twenty One Mile, Twenty Three Mile, West Fork Hall, and West Fork San Poil Creeks.)
4. Monitors re-launched in May of 2003.
5. Sites located with GPS converted to ArcView shapefiles and mapped.
6. All temperature data collected in Celsius.

Temperatures demonstrate a diurnal variance of 4-5° C in most streams. Some streams with lower flows diurnal variance was10° C to as high as 18°C. Indicating ambient air conditions have considerable influence over stream temperatures and that canopy cover could have significant effects on lowering stream temperatures.

Map 4



Bear Creek Temperatures 2002-2003

Graph 1

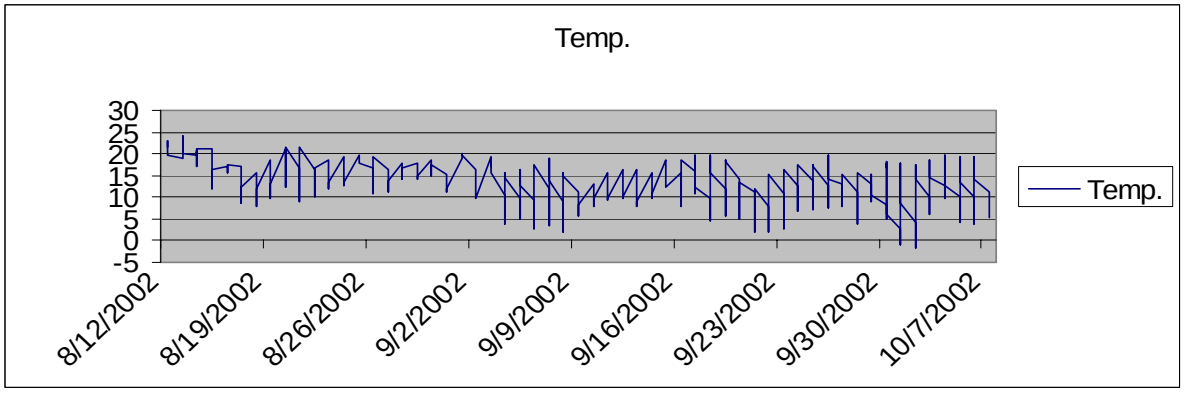


Table 5

Average	Maximum Temp	Minimum Temp	Average High Temp
12.57	24.01	-1.51	16

Bridge Creek Temperatures 2002-2003

Graph 2

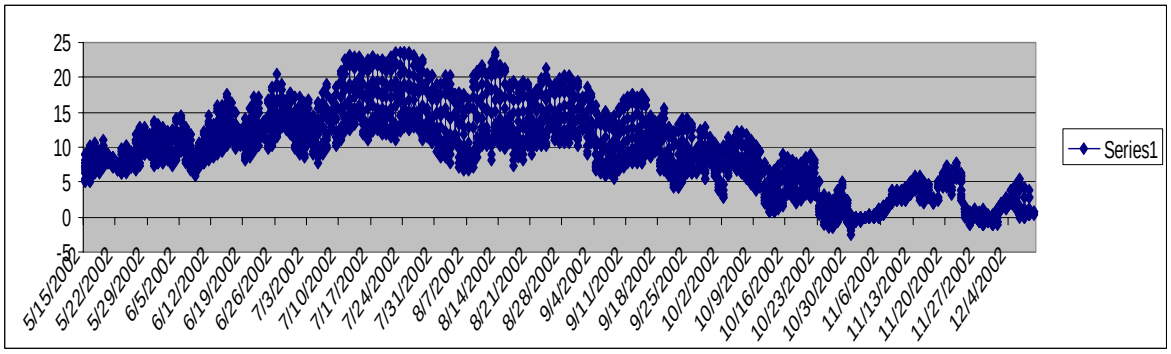


Table 6

Average	Maximum Temp	Minimum Temp	Average High Temp
9.63	23.63	-2.44	18

Coyote Creek Temperatures 2002-2003

Graph 3

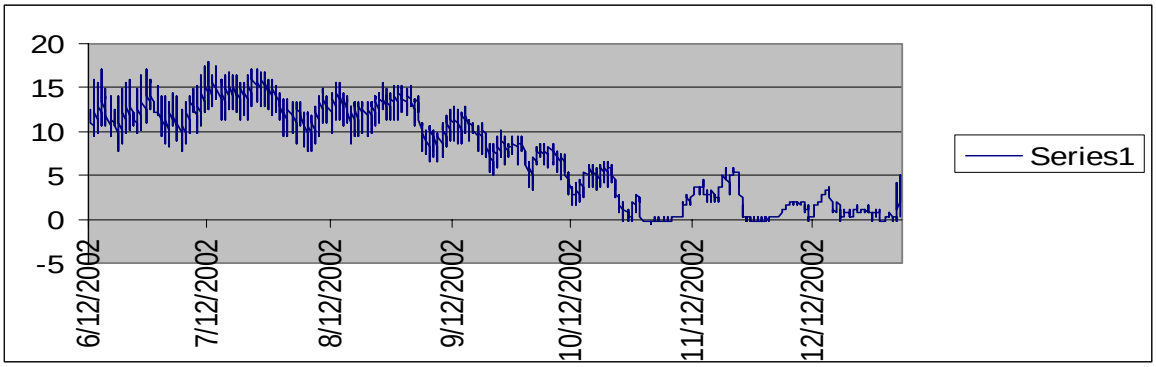


Table 7

Average	Maximum Temp	Minimum Temp	Average High Temp
7.49	17.9	-0.61	14

Kartar Creek Temperatures 2002-2003

The temperature monitor malfunctioned, no data available.

Nine Mile Creek Temperatures 2002-2003

Graph 4

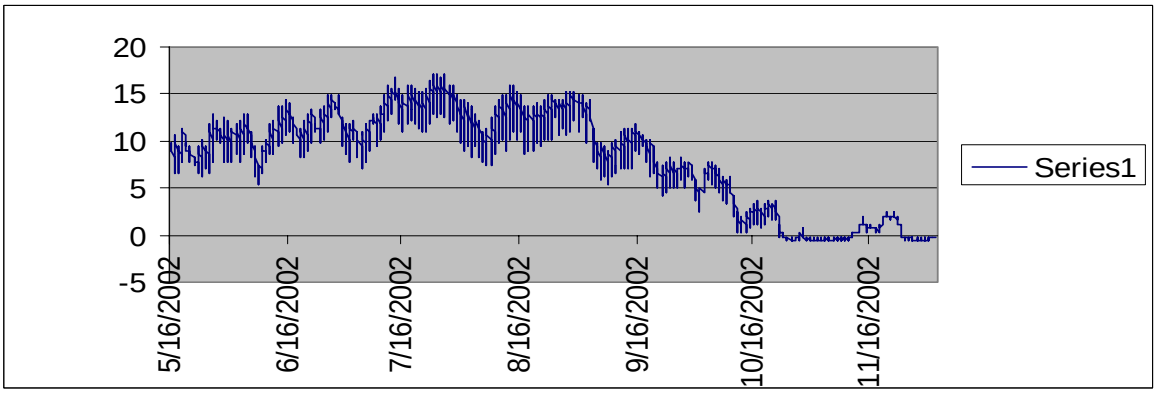


Table 8

Average	Maximum Temp	Minimum Temp	Average High Temp
7.93	17.14	-0.61	15

Twenty One Mile Creek Temperatures 2002-2003

Graph 5

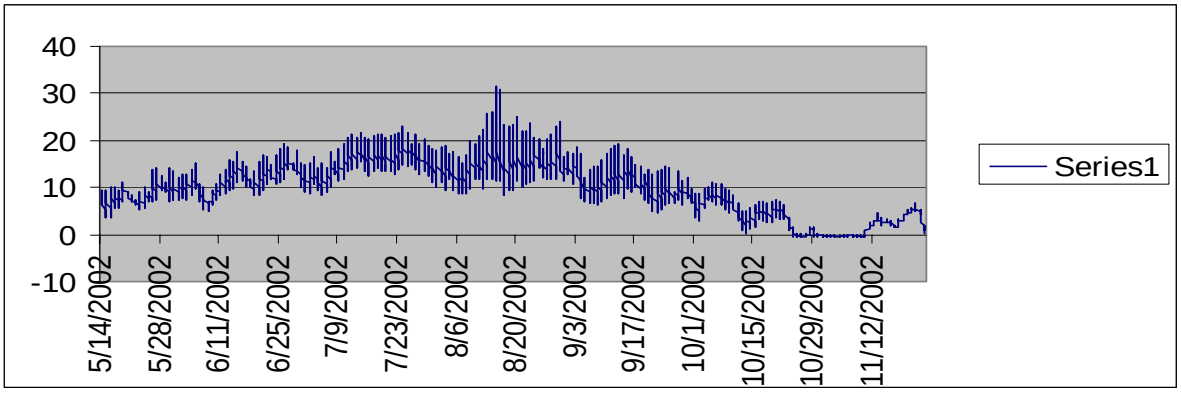


Table 9

Average	Maximum Temp	Minimum Temp	Average High Temp
9.87	31.52	-0.61	16

Twenty Three Mile Creek Temperatures 2002-2003

Graph 6

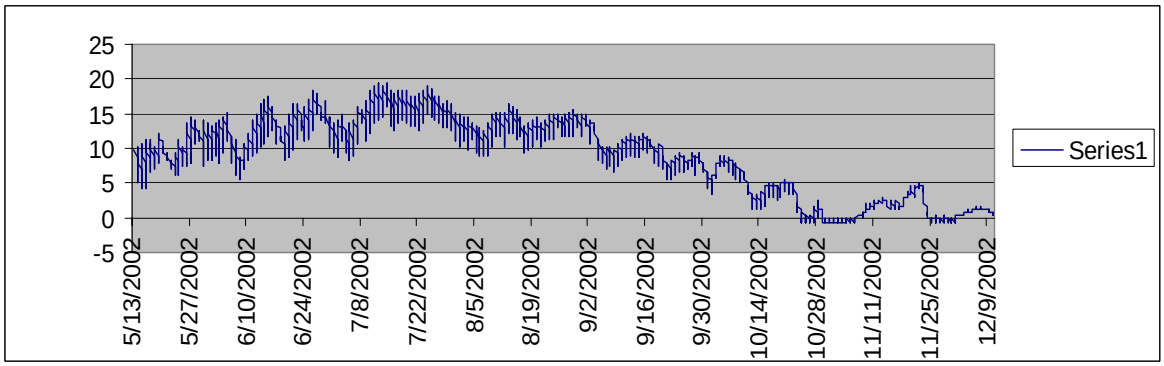


Table 10

Average	Maximum Temp	Minimum Temp	Average High Temp
9.02	19.42	-0.61	17

Thirty Mile Creek Temperatures 2002-2003

Graph 7

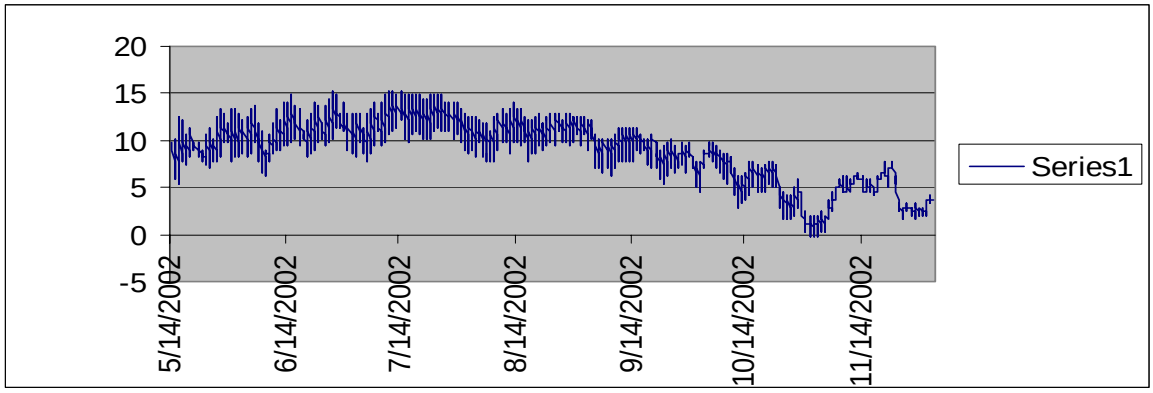


Table 11

Average	Maximum Temp	Minimum Temp	Average High Temp
8.80	15.23	-0.16	13

West Fork Hall Creek Temperatures 2002-2003

Graph 8

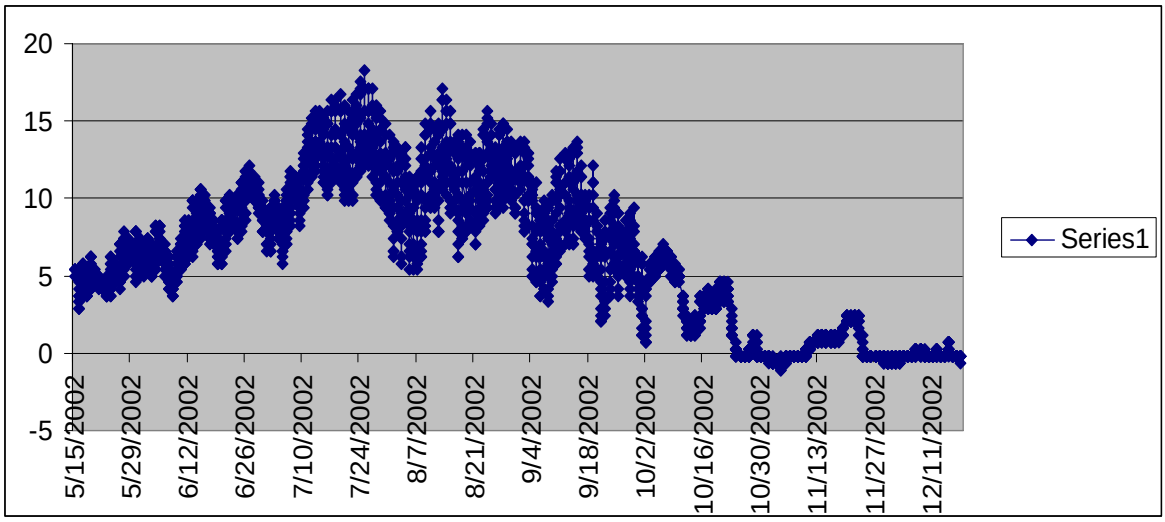


Table 12

Average	Maximum Temp	Minimum Temp	Average High Temp
6.27	18.28	-1.06	14

West Fork San Poil River Temperatures 2002-2003

Graph 9

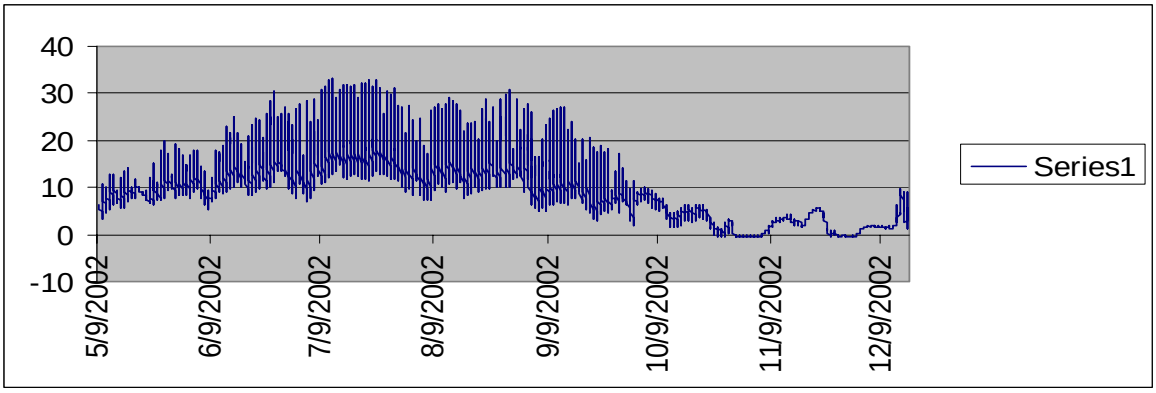


Table 13

Average	Maximum Temp	Minimum Temp	Average High Temp
9.91	33.17	-0.61	16

J. Document physical habitat parameters.
   1. Completed horizontal and habitat surveys of Thirty Mile Creek, Began inputting data collected from survey.
   2. Input data from 2002 season into Excel data sheets analyzed for 2002 annual report.
   3. GPS taken at all lower culverts in Upper Columbia for QAH with sub-basin planning.
   4. Documented physical habitat parameters at redd locations.

Other physical and chemical data collected by Colville Environmental Trust Department and parameters monitored by Project include:

Table 14

Dissolved Oxygen	Temperature	Turbidity	pH	Conductivity	Ammonia	Nitrate
Suspended Solids	Nitrite	Lead	Zinc	Phosphate	Copper	Iron
Alkalinity	Sulfate	Hardness	Fecal Coliform	Total Dissolved Solids		

K. Cooperate with NRCS on in-kind support of Bridge Creek Project to acquire off site solar water pump unit, installation of off site watering trough, and construction of riparian area fence.
   1. Applied for NRCS EQIP grant to assist with fencing, cattle guards, and water troughs through implementation site.
   2. Applied for NRCS EQIP grant to decommission roads in San Poil

3. EQIP grant for Bridge Creek and road decommissioning denied by NRCS. No explanations for denials given.
4. Purchased solar pump from Ferry County slightly used for demonstrations.

I. GPS or digitize all information on Tribal GIS system.

1. Completed GIS files defining reaches and barriers by slope and confinement. Data collected for EDT input into test section for Lower San Poil River. Continued completing same data for San Poil River Sub-basin above test section to Reservation border.
2. Started collecting data and creating files during January for EDT on the Upper Columbia sub-basin Purchased Map Tech software for slope determination for setting reach and velocity barriers in remaining area of West Fork San Poil and the Upper Columbia data placed into ArcView shapefiles.
3. Temperature monitors, trap locations, redds and redd caps GPS and converted to shapefiles for GIS use.
4. Created GIS shapefiles for all work sites for Bridge Creek All data GPS and placed into Tribal GIS system, task completed.

M. Develop contract(s) for bids/implementation.

1. Submitted "Request for Bids" to TERO qualified contractors for implementing sediment reduction EPA Grants in San Poil Sub-basin.
2. Review responses to "Request for Bids" revised scope of work for projects and resubmitted for bid. Completed selection process and completed contracting process. Work to begin as soon as fire season emergency road restrictions are lifted.
3. Developed RFP & contract for Bridge Creek Phase I implementation. Request for bids on implementation sent to TERO certified contractors.
4. Received three bids for implementation of Bridge Creek improvements
   Shiflett and Sons $89,000
   Cates and Erb $160,000
   Cable and Ditch $499,000
5. Selected lowest bids and processed contract TERO certification, insurance and all permits are in place. Task completed.

N. Determination of specific stock presence.

1. Received final report from Idaho Univ. on red band trout. Stock is extremely pure, no indication of hybridization in upper Bridge Creek fish. Report indicated that there might be more than on sub-population of redband present will need to test more than the two loci to determine how many sub-populations are present. Lower Bridge Creek adfluvial rainbow trout are a hybrid admixture of the native redband rainbow trout, planted coastal rainbow trout, and the summer steelhead that were once so abundant in the San Poil River. Pure redbands appear to be in isolated pockets above barriers where they were protected from coastal hybridization. (See report in appendix A from Center for Salmonids at Risk.)
2. Collected fin clips for DNA analysis from all fish collected during spring adult migratory trapping. Many adult adfluvial trout appear to have red

band trout markings (very few spots below midline distinct red band at midline.

3. 100 Samples for DNA testing sent to University of Idaho Center for Salmonids at Risk.

2.) Objective two - Create criteria for the prioritization for the removal of manmade fish passage barriers in the Lake Roosevelt Watershed.

Tasks:

A. Research federal, state and county agencies for previous inventories of culverts and/or fish barriers.
   1. Assessment of culverts along Highway 21 indicates 95% are passage barriers. Many are perched some are velocity barriers. Some barriers may be ok for passage during high flows. Will reassess during peak flows.
   2. Reassessment during peak flows indicates still a high percentage of the highway culverts are barriers. Research shows that the State of Washington DOT assessed barriers statewide during the 1990's and prioritized for replacement. Will contact DOT for list of planned replacement schedule and consultation regarding state funding of replacements.
   3. Contacted WA State DOT for their prioritization and culvert assessment previously completed. Recent assessments found 99% of culverts on San Poil Highway are migration barriers for fish. Attempting to convince state to fund and place on highest priority for replacement.

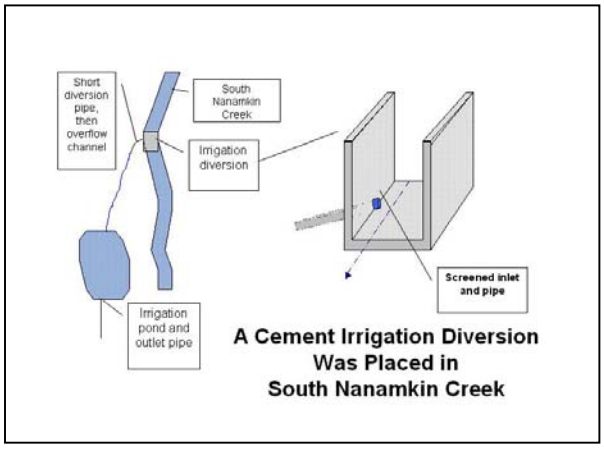
B. Design systematic inventory system for culverts/barriers/habitat limitations, assessing status of landscape processes that form and sustain habitats over space and time, and identification of and uses causing habitat degradation.
   1. Indications are that although the information gathered will be useful EDT may not perform as desired. Have begun developing shapefiles delineating various land uses and placing them across time and space.
   2. Continuous temperature collection initiated downstream of all watersheds scheduled for timber harvest activities. Have altered routing and arranged for notification and ability to designate water withdrawal sites. Coordinated with Environmental Trust Department to add biological parameters macro-invertebrate sampling to routine water quality data collection.
   3. Worked with other Departments within the Tribal Natural Resource Department setup roads work team to address updating GIS roads layer and GPS and document status of all culverts across the entire Reservation.
   4. Natural barriers have been documented by sub-basin and systematic approach using GIS data has been implemented. Multiple GIS layers have been developed mapping areas watershed impacts have and are occurring, then overlaid locations of specific habitat types such as spawning, rearing, and over-wintering. Initial assessment of current status will be needed on all watersheds prior to initiation of long term trend monitoring will continue with evaluation of watersheds with at least one complete assessment per year including horizontal and habitat surveys.

C. Design decision matrix for prioritization of optimal habitat improvement project selection. Prioritization will be based a number of factors including the use of techniques that have a high probability of success, a low variability of success reported from similar projects, response time, and expected duration of the restoration action.

1. Completed data entry on San Poil test section and remaining area of San Poil sub-basin that is within the Reservation boundary lines.
2. Information requested by Mobrand on habitat indicates that the EDT model may not produce the information on habitat degradation that was indicated before. Still no model adapted for resident fish, adfluvial rainbow or redband rainbow trout.
3. Due to uncertainty regarding BPA funding, status of funding for new projects, and status of EDT Model I have not put much effort into this task beyond what is being requested for EDT test. Reviewed literature on various restoration projects and outcomes of those projects, especially those that are similar to the type of restoration and passage improvements as current project.
4. Supplied all EDT data and assessment data to sub-basin planning consultants. Attended sub-basin planning meetings as possible. It is my understanding that the sub-basin plans will prioritize projects so I haven't worked on specifics of a decision matrix as originally planned. Input into the sub-basin plans and project prioritization has been deferred to the Sub-basin Plans.

D. Design long term monitoring plan for determining effectiveness of specific habitat improvements to tributaries in increasing adfluvial rainbow trout populations utilizing Lake Roosevelt's estuarine habitats.

1. Site visits and photos taken of all past improvements, many are dry and I was able to document failure and success of structures. South Nanamkin diversion structure has never been used. Consulted with owner of property and designed and implemented stream channel alterations to allow partial flow through diversion. Last year large boulders were placed to divert some flow during high waters through the irrigation diversion structure to fill the irrigation pond. During low flows water bypasses the structure to maximize in-stream flows. The structure increases control over timing and volume of water diversion.



A Cement Irrigation Diversion Was Placed in South Nanamkin Creek

Diversion Structure Without Flow

Functioning Diversion

2. Initiated macroinvertebrate-monitoring program with the Environmental Trust Dept. Conducted in-house training with ET Dept. and F&W Department with Father Fortyun from Gonzaga University. Will work cooperatively with doctor from University of Washington in setting up program in connection with routine water quality monitoring.
3. Surveyed past projects at high flow conditions to determine current status and base for trend monitoring. Most structures are in good condition. Peak flows in 97-98 high water years diverting channel on North Nanamkin. Gates had been used at this site for cattle control and debris had collected on gate contributing to channel diversion. Iron Creek some of the culverts installed in 1995 were washed out in peak flows and are scheduled for replacement by BIA. Iron Creek also lost some of the drop structures that had been put in place in 1993-1995 causing undercutting of a bank. Bank appears to have stabilized at this time. I will continue to monitor structures may need to place some small boulders along the undercut bank on Iron Creek.
4. Long term monitoring of all locations where improvements have been done has been initiated. Rotational monitoring similar to EMAP will occur each year. I would like to add general trend monitoring of all watersheds following initial assessments for trend monitoring.

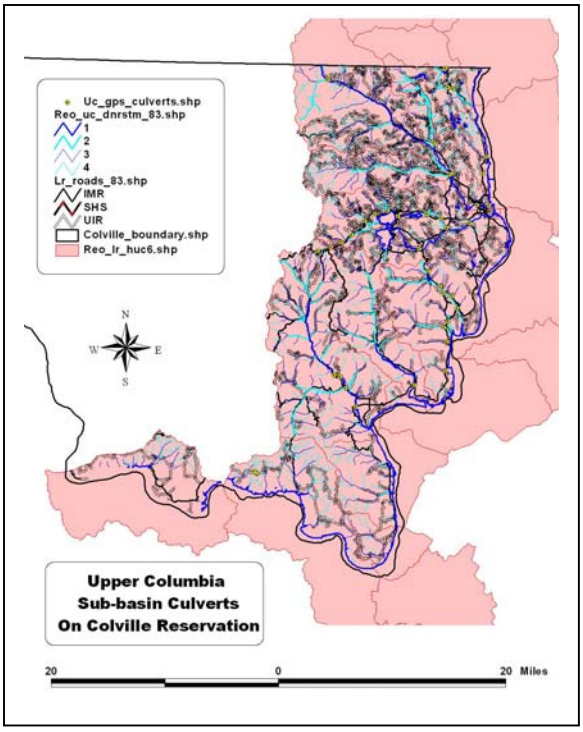
Gates on North Nanamkin with Debris Collection

Undercut Bank on Iron Creek

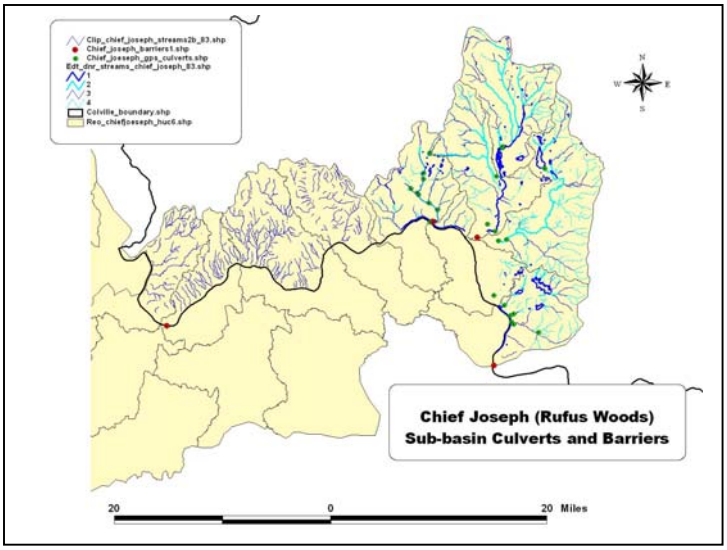
E. Continue inventory of passage barriers (GPS, photos, and Limitation Assessments) in the San Poil River Sub-basin.
    1. Applied slope data from GIS software from Map Tech to identify isolated areas of habitat and determine velocity and natural passage barriers. Map Tech software ends at start of Lost Creek. Ordered Okanogan, Baker, and Chelan Map CD to cover remaining area.
    2. All barriers in San Poil Sub-basin have been GPS & photographed except those at the highest elevations by Crawdad Lake in the Lost Creek and Moses Mountain area. Will complete when deep snow areas are accessible.
    3. Culverts at high elevations inventoried (GPS, photo, and limitation assessment for San Poil Sub-basin. Began culvert assessments in Upper Columbia and Rufus Woods Sub-basins.
    4. Task completed ongoing monitoring of all culvert locations has been arranged with the newly established Natural Resource Roads Committee. Currently I am working with other Natural Resource Departments to develop a non-BIA Roads department for routine monitoring and maintenance of all non-BIA roads.

F. Inventory passage barriers in the Upper Columbia Sub-basin with implementation of the designed systematic inventory system.
    1. Began inventory of lower elevation barriers in the Upper Columbia during the second quarter. All potential barriers identified on GIS layers then ground verified GPS taken and photo taken and status documented.
    2. Utilized systematic inventory established for the San Poil Sub-basin for inventory of Upper Columbia Sub-basin culverts using GIS to establish initial location of all possible culverts then ground verify, GPS, photograph, and conduct limitation assessment.

Map 5



Map 6



G. Electroshock/population estimates in areas under consideration to be affected with future improvement projects.
    1. Conducted Electroshock population estimates on 30-Mile Creek, Jack Creek, Brush Creek, and started 23-Mile Ck when icing of streams prevented further work.
    2. Electro-shocking done on Bridge Creek and Thirty Mile Creek where future improvement projects are planned.

H. Baseline horizontal survey and habitat survey of Thirty Mile Creek.
    1. Conducted baseline horizontal and habitat survey of Thirty Mile Creek.
    2. Survey was reported on last year but was done during the first quarter of 2003 fiscal year. Data will be presented again this year in the annual report so that data will be reported with correct year.
    3. All data collected placed into Excel database.

The 31.97 square miles of the Thirty Mile Creek Watershed is within the San Poil Sub-basin, the annual rainfall is 10-15 inches/year at the lower elevations increasing to 15-20 inches/year at the falls. Continuously increasing with elevation the headwaters receive up to 30 inches/year. All land is in Tribal Trust status with the exception of 0.69 square miles of Fee lands 0.48 square miles in the lower elevations below 2000 feet and 0.20 square miles at the 2000-4000 foot elevation and a small 0.18 square mile section in Allotment status in the lowest elevation at the confluence with the San Poil. The elevation ranges from 1720-feet at the confluence of Thirty Mile Creek and the San Poil River to 5490-feet at the summit. Frequent fire regimes in the past controlled the succession and climax species. Fire suppression during the past century has converted forests from open Ponderosa Pine to a higher density of Douglas fir. Timber harvest, roads, mining, agricultural and grazing practices have contributed to negative impacts within the watershed.

An assessment of the culverts indicated several are passage barriers and old culvert failures at the Old Keno Mine Road have caused a artificial widening of the stream. From frequent fording by Tribal Forestry staff during the planning stages of proposed Thirty Mile Timber Sale planned for 2003. I am working with the Forestry Department in replacing inadequate and barrier culverts on all roads to be used in the timber sale. One major culvert at the lower reaches of Thirty Mile Creek about one-third of a mile upstream of the confluence with the San Poil River is a barrier and outside of the sale area. I will look into funding for replacing this culvert.

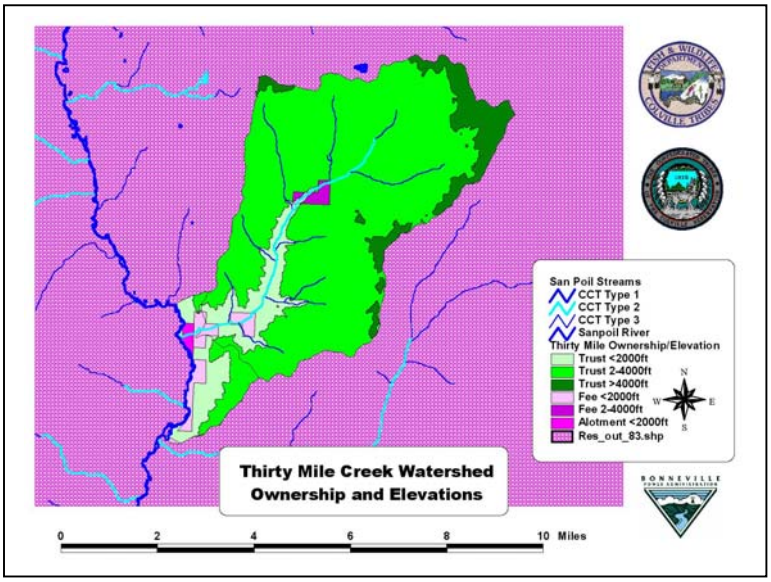
Table 15

Thirty Mile Creek Watershed in San Poil Sub-basin
Ownership Status by Elevation Zone

Ownership Status	Elevation Zone	Acres	Square Miles
Trust	Under 2000 feet	7,768.59	12.14
Trust	2000-4000 feet	28,465.19	44.48
Trust	Over 4000 feet	9,038.79	14.12

Ownership Status	Elevation Zone	Acres	Square Miles
Total in Trust Status	**All Elevation Zones**	**45,272.57**	**70.74**
Fee	Under 2000 feet	1035.79	1.62
Fee	2000-4000 feet	130.71	0.20
Total in Fee Status	**All Elevation Zones**	**1166.50**	**1.82**
Allotment	Under 2000 feet	112.37	0.18
Total in Allotment Status	**All Elevation Zones**	**112.37**	**0.18**
Total All Ownerships	**All Elevation Zones**	**46551.44**	**72.74**

Map 7



I. Install culverts/bridges/passage improvements to Bridge Creek.

1. Unable to install improvements due to BPA funding delays.
2. Contract with BPA signed with money for implementation included. Will begin NEPA process. Contact Archeology Department requested BPA to send official request for 106 Consultation with Tribal Historic Preservation Officer (THPO).
3. Bridge Creek culvert has been installed and we are ready to begin implementation on Bridge Creek above the culvert at the old State Highway. Plans are ready and contractor has been selected and contracts signed
4. Awaiting archaeological study to begin work. Tribes archaeologist was unable to do work do to the high number of wildfires on the Reservation. Contacted BPA archaeologist to contract survey to be completed by September 1, 2003. No report, BPA forgot to order survey ordered and survey begun at the end of September. Requested rescheduling of work to 2004 fiscal year, reschedule granted by BPA.

J. GPS or digitize all information on Tribal GIS system.
    1. All files are projected in UTM, NAD83 datum, zone 11, in meter units.
    2. Shape files created for all data collected for culverts, barriers, and stream reaches.
    3. GPS of all temperature-monitoring sites, trap locations, redds, and redd caps and created shapefiles for GIS use.
    4. All information has been digitized, GPS, and shapefiles created for the Tribal GIS system. Information has been shared with other Tribes, WA State, DOE, DOT, the BOR, and Sub-basin Planning Consultants.

K. Survey the main stem of the San Poil River for opportunities to reconnect side channels and other isolated habitats.
    1. Assessed lower and mid sections of San Poil River during EDT barrier site field verification for opportunities to reconnect side channels and isolated habitats. Very few exist some wetland reconnection may be possible. There is also an old oxbow just above Bridge Creek on the San Poil that may have potential.

L. Consult with Ferry County on their Bridge Creek Road improvements currently in the planning stages.
    1. Consulted with Ferry County Roads Manager Keith Muggoch on County's plans for roadwork in vicinity of Bridge Creek.
    2. Met in field with County Roads crews discussed area of road that is too close to Bridge Creek and causing sediment addition and destabilization of bank. County agrees that the site above Jennot's is the low point in the road. They have agreed to build road up at this location so that water will drain to the north or south away from the site and into field areas that will allow considerable distance between road runoff and Bridge Creek.

M. Acquire any necessary training.
    1. All training funding has been disallowed by BPA.

N. DNA analysis for determination of specific stock presence at selected sites.
    1. Electro-shocking conducted and samples collected for DNA analysis at sites selected for high probability of genetically isolated population of redband rainbow trout to occur in San Poil River tributaries.
    2. Collected fin clips for DNA analysis on each stream trapped.
    3. 100 Samples for DNA testing sent to University of Idaho Center for Salmonid Species at Risk.

O. Consult with Washington State, Trans-boundary Gas Group, and EPA on Upper Columbia Main Stem Total Maximum Daily Load (TMDL) for total dissolved gas and temperature standards.
    1. Attended Fall Trans-boundary Gas Group and TMDL meetings
    2. Wrote and submitted response to Tetra Tech Assessment for Colville and Spokane Tribes and EPA's Draft TMDL for temperature and total dissolved gas.
    3. Roosevelt's Site Inspection and the Colville Tribes response.
    4. Attended Spring Transboundary Gas Group spring meeting and Upper Columbia TMDL meeting in connection with the Lake Roosevelt Forum Conference.

3. Monitor and evaluate habitat/passage improvements by monitoring increased use by adfluvial rainbow trout derived from habitat/passage improvements.

Tasks:

A. Trap adult fish in spring for two years after implementation.
   1. This is for 2003 post implementation on Bridge Creek all other streams have been monitored from 1996-2000.
   2. Adult and juvenile traps place in streams on March. Fluctuating water levels from heavy spring rains blew out traps at end of March. Out for about a week, then trapping continued. Traps were in Bridge Creek until end of May.
   3. See Trapping Report on tables 1 and 2 for Bridge Creek data on page 21.

B. Electroshock/population estimates annually for two years after implementation.
   1. Implementation rescheduled will postpone work until 2004 after implementation completed.

C. Spawning (redd) survey in affected area annually for two years post implementation.
   1. Implementation rescheduled will postpone work until 2004 after implementation completed.

D. Survey habitat after improvements and then in accordance with the new long term monitoring plan being developed.
   1. Long term monitoring program to begin 2004. Will rotate projects that are more than two year post implementation in a rotation using an EMAP approach to site selection will use additional parameters and add non-implementation reaches to assess status and track trends.

E. Conduct Rove Creel on San Poil River
   1. Rove creel conducted randomly on San Poil until number of being caught indicated traps should be put out.

F. Trap adult fish with screw trap in San Poil River.
   1. Placed screw trap near mouth of West Fork San Poil River. West Fork contributes more than half of the flow to the San Poil River, the river's width more than doubles after the confluence with West Fork of the San Poil River. Large debris flows from Lost Creek timber sale area blocked trap on several occasions.
   2. Continue to catch large numbers of fish in screw trap but continue also to have operational problems. Logs and debris jamming trap and deer found dead in trap.
   3. Placed picket fence migratory trap in West Fork San Poil mid-August to see if Kokanee are running earlier than traditionally thought. Caught bright red mature male the first day. Will need to do further work to evaluate Kokanee population utilizing San Poil River's tributaries for spawning.

Thirty Mile Creek Summary 2003 Fiscal Year Habitat Horizontal Survey By Segment

Table 16

Thirty Mile Creek Segment 1 Data Summary			**(All data is in Meters)**					
Riffle Length	772.4		Riffle Width	122.6	# Riffles	45	Avg. Riffle Width	2.7
Pool Length	166.9		Pool Width	130.6	#Pools	40	Avg. Pool Width	3.3
Cascade Length	6.8		Cascade Width	3.0	# Cascades	1	Avg. Pool Depth	0.43
Total Length	946.1		Total Width	256.2	# Beaver Dams	1	Avg. Tailout Depth	0.2
Riffle Area	94696.2 sq. meters						Width/Depth Ratio Pools	7.6 sq. meters
Pool Area	21797.1 sq. meters							
Pool/Riffle Ratio	0.2 sq meters pool/sq. meters riffle		**Large Woody Debris for Entire Segment:**					
Bankfull Data			Large Woody Debris < 10 inches	63				
Avg. Bankfull Width	*6.16		Large Woody Debris >10 inches	22				
Avg. Bankfull Depth	2.64		* Average width at bankfull is skewed by the data at the first point at the confluence with the San Poil River. If point is removed average width is 5.19, depth 2.33, and width to depth ratio of 2.2					
Avg. Bankfull Width/Depth Ratio	2.3							
Avg. Canopy Closure	69.1							

Table 17

Thirty Mile Creek Segment 2 Data Summary			**(All data is in Meters)**					
Riffle Length	1377.3		Riffle Width	331.9	# Riffles	135	Avg. Riffle Width	2.5
Pool Length	462.8		Pool Width	439.8	#Pools	134	Avg. Pool Width	3.3
Cascade Length	0		Cascade Width	0	# Cascades	0	Avg. Pool Depth	0.43
Total Length	1840.1		Total Width	771.7	# Beaver Dams	0	Avg. Tailout Depth	0.17
Riffle Area	457125.9 sq. meters						Width/Depth Ratio Pools	7.6 sq. meters
Pool Area	203539.4 sq. meters							
Pool/Riffle Ratio	0.4 sq meters pool/sq. meters riffle		**Large Woody Debris for Entire Segment:**					**Reference Point**
Bankfull Data			Large Woody Debris < 10 inches	180				0-6
Avg. Bankfull Width	5.4		Large Woody Debris >10 inches	22				0-6
Avg. Bankfull Depth	0.32		Large Woody Debris < 10 inches	163				7-13
Avg. Bankfull Width/Depth Ratio	16.8		Large Woody Debris >10 inches	134				7-13
			Large Woody Debris < 10 inches	185				14-19
Avg. Canopy Closure	78.2		Large Woody Debris >10 inches	105				14-19

Table 18

Thirty Mile Creek Segment 3 Data Summary			**(All data is in Meters)**					
Riffle Length	110.9		Riffle Width	24.1	# Riffles	16	Avg. Riffle Width	1.5
Pool Length	405.2		Pool Width	77.2	#Pools	28	Avg. Pool Width	2.8
Cascade Length	0		Cascade Width	0	# Cascades	0	Avg. Pool Depth	0..6
Total Length	516.1		Total Width	101.3	# Beaver Dams	13	Avg. Tailout Depth	0.12
Riffle Area	2672.7 sq. meters						Width/Depth Ratio Pools	4.6 sq. meters
Pool Area	31281.4 sq. meters							
Pool/Riffle Ratio	11.7 sq meters pool/sq. meters riffle		**Large Woody Debris for Entire Segment:**					**Reference Point**
Bankfull Data			Large Woody Debris < 10 inches			131		0-6
Avg. Bankfull Width		7.80	Large Woody Debris >10 inches			37		0-6
Avg. Bankfull Depth		0.31	Large Woody Debris < 10 inches			140		7-13
Avg. Bankfull Width/Depth Ratio		20.70	Large Woody Debris >10 inches			84		7-13
Avg. Canopy Closure		63.6						

RECOMMENDATIONS:

Previous results showed that while the “increased habitat availability has probably improved fish for recruitment to Lake Roosevelt and the San Poil River Basin, some of the data collection methods to detect these changes were not adequate, possibly due to fluctuations in water flow” (LRHI Project 2000 annual report). Alterations in data collection methods and timing were implemented to reduce impacts from water flow variability on future results. Trapping in 2003 was initiated after creel surveys on the San Poil River indicate that adult fish are migrating toward up stream tributaries for spawning. Redd counts were done earlier, expanded population redband studies were completed, and additional passage barriers were assessed for passage improvements in other tributaries.

Roaring Creek will need to have the perched culvert replaced. The current culvert is perched approximately 6-feet. The culvert has greatly impaired use of in-channel habitat in the lower portions if the creek, affecting its ability to support spawning and rearing of adfluvial rainbow trout of the San Poil River system. The culvert will be removed and the crossing lowered to the existing channel elevation then install a 12-foot by 30-foot bottomless arch and recreate rock step pool structures within the bottomless arch to bring it gradually up in elevation to match the upstream slope and structure.

Two of the upper barrier culverts on Thirty Mile have been replaced under an agreement with the BIA Forestry Department, but a barrier culvert remains in the lower section at the Old State Highway. This road is under Ferry County jurisdiction and will require working with Ferry County to achieve the replacement. Thirty Mile Creek at 27.5 kilometer is the longest tributary to the San Poil River. The 1991 Report stated, “This, stream has the potential of becoming a major producer of adfluvial rainbow trout.” The perennial flows in Thirty-Mile Creek offers spawning, rearing, and over-wintering habitat for resident and adfluvial rainbow trout. Sufficient fall flows exist for kokanee use as well.

The EDT assessment was continued on the remaining upper reaches of the San Poil Sub-basin above the test section to the Reservation boundary line. The assessment used the designed systematic inventory system for culverts/barriers/habitat limitation. The system uses GIS to initially determine location of all possible stream crossings. A crew is then sent into the field to verify the status of each crossing and to GPS the site. EDT has proved to be disappointing no model was ever developed for resident fish use. With the start of Sub-basing planning assessments were changed to a QHA that is much less comprehensive and is not designed to deliver the same output as the EDT. EDT will be used for anadromous and QHA in the blocked areas for resident fish. Project prioritization anticipated with Sub-basin Plans may not deliver an accurate assessment of limiting factors since many data gaps exist and information will not be used in assessing limitations for specific species.

We are in a continuing drought situation and low flows are becoming a greater issue. Will plan to work on developing minimum flows for the San Poil Sub-basin streams. Low and intermittent flows and the associated temperature increases may restrict usable habitat and become a major limiting factor.

The use of the EDT as a tool for assessing status and trends in landscape processes that form and sustain habitats over space and time, and identification of land

uses causing habitat degradation had been planned for this year but the EDT assessment failures will require us to explore other options to achieve this goal. The design of this decision matrix or model was to be used in determining a current ecosystem's status and for the prioritization of optimal habitat improvement project selection. The QHA provided insufficient data for accurate determination of status. Prioritization should be based a number of factors including the use of techniques that have a high probability of success, a low variability of success reported from similar projects, response time, and expected duration of the restoration action. However the EDT model did not function well for resident fish in the blocked areas. There are no resident fish models developed to run the QAH data with. I believe once the steelhead model is completed, although not resident based, it should work for the adfluvial rainbow trout and mountain whitefish, although another model for fall spawning salmonids needs to be developed a kokanee model should work for kokanee and brook trout. Determination of minimum flows for biological fish needs will be of critical importance in any model developed for fall spawning salmonids.

Monitoring continues to include an evaluation with comparative analysis of pre and post implementation of habitat/passage improvements by monitoring fish populations (both juvenile and adult), examining fish passage effectiveness, instream habitat effectiveness on channel morphology, fish habitat and fish habitat utilization and effectiveness of riparian habitat improvement actions.

The long-term monitoring program will evaluate and record the success of specific improvement actions, length of time required to reach specific goals for each action, and duration of improvements on channel morphology fish habitat and fish habitat utilization and effectiveness of riparian habitat improvement actions. Until further funding is available a limited long-term monitoring program has been started. When funding is available I would like to expand the monitoring to include the San Poil Sub-basin within the Reservation boundary lines. Currently it will be limited to those areas that have had improvement actions. A rotational system utilizing an random selection approach similar to EMAP that includes specific habitat perimeters, water quality data, flow data, macro-invertebrate counts, and fish presence and abundance data collected at each site with a repeated rotation approach should indicate status and over time trends.

The conclusions in the 1999 Annual Report analysis showed that passage improvements are successful for increasing habitat availability and use. Project streams to this date have shown increases in fish density after the implementation of improvements. Some of the streams that were examined in 1990 and 1991 as part of original Phase I of this project have been further altered such that more funding was used for assessment in 2001 and assessment and improvements in 2002. Tasks scheduled for 2004 will include the rescheduled work on Bridge Creek Phase I and planning and NEPA compliance for replacements of the Thirty Mile and Roaring Creek culverts.

The 2004 season will continue with temperature data collection on several streams as part of an ongoing assessment for the prioritization and selection of streams for future improvements. Placement of temperature monitors was shifted with emphasis on data collection below areas of known impacts such as timber harvest and grazing. Data and recommendations from the original 1990-1991-Baseline Assessment has

been reviewed as part of the decision making process. Criteria for stream selection will be based on maximizing adfluvial rainbow trout spawning and rearing habitat while minimizing improvement costs. The annual reports will continue to include an evaluation of current conditions and the effectiveness of the implementation efforts. Yearly assessments of the current condition of previous improvements will continue to maintain those improvement structures and benefits.

A temperature array was placed into the lower section of Lake Roosevelt to look at possible stratification. Working with the Spokane Tribe of Indians an array was created with temperature monitors placed every ten meters to a depth of 100 meters. The array was attached to a buoy and an anchor and deployed about ten miles above Grand Coulee Dam. Considerable discussion has occurred lately regarding the use of Lake Roosevelt water to cool the lower Columbia River. The existence of a stratified cool water layer within the water column has not been established. The array may help to provide some answers to the stratification questions. The short retention time for water in the Lake Roosevelt may cause considerable mixing and not allow for strong stratification.

Phase I of Bridge Creek improvements were ready for implementation in 2003. Entrix design plans were submitted at 100% complete. NEPA compliance was on track public meetings were conducted in 2003 and newspaper and newsletter articles are also mailed out to the Tribal Membership. The contractors have been selected and contracts and required permits are in place. The Tribal archaeologist was unable to complete the planned survey due to a high number of wildfires in 2003. BPA was to contract and outside source to complete the survey but failed to do so in a timely manner requiring the rescheduling of implementation to 2004. The archaeological study was contracted and begun the last week of September and implementation will begin as soon as the Tribal Historic Preservation Officer (THPO) has approved the survey report.

Twenty-three Mile Creek appears to have great flow potential as well and a stream survey for 2004 fiscal year is planned to determine limiting factors and potential for the fishery. Surveys are usually completed October since this is the first quarter of the new fiscal year I have changed the surveys to accurately reflect the fiscal year that they are completed.

Trapping numbers in the West Fork during 2003 indicated high adfluvial use of those waters. Trapping in 2004 will be done in Gold Creek to determine the contribution of Gold Creek versus the upper West Fork. A survey of Gold Creek will be scheduled for the fall of 2004 under the 2005 fiscal year to assess the habitat, limiting factors and potential of this major tributary to the West Fork of the San Poil River.

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Appendix A

Genetic Analysis of Redband Trout Populations from the Colville Reservation

Preliminary Report

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Summary: Tissue collected from 3 separate sample populations of redband/rainbow trout (*Oncorhynchus mykiss spp.*) and/or their hybrids were examined using mitochondrial and nuclear RFLP markers along with two microsatellite loci. Sample populations were screened for detectable levels of introgressive hybridization arising from possible admixtures of hatchery rainbow trout with native redband trout. Both nuclear and mitochondrial RFLPs have been used successfully to assess genetic diversity and hybridization among and between *O. mykiss* subspecies and between *O. clarki* (Wishard et al. 1984, Wilson Thomas and Bechenbach 1985; Williams, and Jaworski 1995; Williams, et al. 1996; Williams, Leary and Currens 1997; Powell and Faler 1999; McCusker, Parkinson, and Taylor 2000; Campbell, Dillon and Powell 2002). Sample sizes for the Barnaby Creek populations were too small to be informative by themselves but were combined with data generated from samples collected from Barnaby Creek in 2001 by another agency. Two of the populations surveyed (Barnaby and Hall Creeks) indicated non-introgressed redband trout with the loci examined. Data also indicated these sample populations were likely composed of a single spawning population. The remaining population, Bridge Creek, contained a low level of admixture within the first 10 samples. However, This sample population was out of HWE and Fis values were significant and positive indicating a significant heterozygote deficiency. These data suggest this sample population contains individuals from more than a single homogenous spawning population. A may confound the dataset. It is probable that further upstream in the drainage, admixture with introduced rainbow trout is less likely to be detected as evidenced by the remaining 50 samples from this watershed showing no indication of intraspecific introgression.

Methods: Fin samples were stored in 70% ethanol or preservation/lysis buffer until DNA was extracted using methods modified from Sambrook et al., (1989) and Dowling et al. (1990). Total genomic DNA was isolated from each sample and amplified using

the polymerase chain reaction (PCR) and nucleotide primers specific for the mitochondrial cytochrome B (CytB) gene region and the nuclear Ikaros (IK) gene region (Campbell, Dillon and Powell 2002). Primers used for microsatellite analysis (for *Omy*77 and OMM1020) were obtained from Perkin-Elmer Applied Biosystems and "labeled" with a fluorochrome (HEX) which allows the amplification products to be separated and analyzed using a Perkin-Elmer model 310 automated fragment analyzer and GENESCAN software (Perkin-Elmer ABI).

Amplification products for nuclear and mitochondrial RFLPs were digested with the *Hinf* I and *Taq* I restriction enzymes. Resulting fragment
s were separated by electrophoresis using 3% agarose/TAE gels. Photographs of gels were converted into computer image files. Restriction fragment length polymorphisms (RFLPs) observed among samples were given alphabetical designations as genotypes or haplotypes. The size of each DNA fragment from each gene region is estimated by comparison to a size standard, pUC-19 marker (Bio-Synthesis). Resulting haplotypes and genotypes were compared to haplotypes and genotypes from previously analyzed populations of redband/rainbow trout from several locations in Oregon (Oregon Basins, Walla Walla River), Idaho (Bruneau Drainage, Pend Orielle Drainage, Big Wood Drainage) and Washington (Columbia Drainage) and to hatchery rainbow trout. GENOTYPER software (Perkin-Elmer ABI) was used with the 310 automated fragment analyzer to generate genotypic data for the 2 microsatellite loci.

Nucleotide diversity and divergence among and within populations was estimated using Nei (1987) equations 10.19, 10.7, 10.20, and 10.21. Nuclear RFLPs were analyzed along with microsatellite loci data using Genetic Data Analysis (GDA) software (Lewis and Zaykin 1999).

No.	Sample Population	n	mean F.L.	Comments
BA1	**Barnaby Creek**	**4**	**118.8**	**above culvert**
BA2	**Barnaby Creek**	**4**	**112.0**	**below culvert**
BR1	**Bridge Creek**	**10**	**no data**	**below falls boulder**
BR2	**Bridge Creek**	**26**	**125.8**	**above falls boulder**
BR3	**Bridge Creek**	**24**	**131.7**	**above Keno**
H1	**Hall Creek**	**32**	**136.3**	**West Fork**
		Total 100		

Results and Discussion: The frequencies of mitochondrial and nuclear RFLPs among the 3 sample populations are arranged in Table 1. Two populations Bridge Barnaby Creek and Hall Creek were fixed at both RFLP loci for redband/rainbow trout alleles/haplotypes. Conversely, Bridge Creek samples showed possible intraspecific hybridization (between redband and rainbow trout) for sample locations lower in the system (BR1 samples). Estimates are based upon genetic distance observed between redband and rainbow trout alleles, genetic distance between haplotypes (see Williams et al. 1996 for an explanation), and rare alleles/haplotypes observed among sample populations.

Results and comments for each sample location are as follows:

BA1 Barnaby Creek – (n=4) Mitochondrial haplotypes all indicate *O. mykiss* maternal origin. Genetic distances within the small sample number (N=4) suggest a non-admixed population. The "trout" examined suggest they are very closely related indicating redband origin or alternatively a complete replacement from a homogenized hatchery origin rainbow trout stock.

BA2 Barnaby Creek – (n=4) Mitochondrial haplotypes all indicate *O. mykiss* maternal origin. Genetic distances within the small sample number (N=4) suggest a non-admixed population. The "trout" examined suggest they are very closely related indicating redband origin or alternatively a complete replacement from a homogenized hatchery origin rainbow trout stock.

Summary: Samples from another 2001 collection of Barnaby Creek (n=16) showed mitochondrial haplotypes of all samples are of *O. mykiss* maternal origin. Only *O. mykiss* nuclear RFLPs and microsatellites were for observed for these individuals as well. Estimates of genetic distance across all samples indicate a non-admixed redband trout population. **Thus, genetic information on this population from two sources indicates only redband trout.**

BR1 Bridge Creek - (n=10) Mitochondrial haplotypes all indicate *O. mykiss* maternal origin. Introgression in this population is likely from a hatchery rainbow trout source. Genetic distance of nuclear alleles was high (>1.38) even within the small sample set. Available nuclear allele data indicate rainbow trout alleles are at least partially of hatchery rainbow origin or that a redband population is further admixed with hatchery rainbow trout.

BR2 Bridge Creek - (n=26) Mitochondrial haplotypes all indicate *O. mykiss* maternal origin. Genetic distances within this sample set suggest a non-admixed population and suggest they are very closely related indicating redband origin or alternatively a complete replacement from a homogenized hatchery origin rainbow trout stock.

BR3 Bridge Creek - (n=24) Mitochondrial haplotypes all indicate *O. mykiss* maternal origin. Genetic distances within this sample set suggest a non-admixed population and suggest they are very closely related indicating redband origin or alternatively a complete replacement from a homogenized hatchery origin rainbow trout stock.

Summary: Overall, 60 samples examined from this location would indicate a low level of admixture. However, Only the first 10 samples show signs of introgression. This could be explained if the first 10 samples comprised a different spawning aggregate from the remaining samples (taken from 2 other locations). Significant, positive Fis values indicate the population is not in Hardy-Weinberg Equilibrium (HWE) at the two microsatellite loci. An observed excess of homozygotes within the Bridge Creek sample set suggests there may indeed be more than a single spawning population represented