2008 Annual Report

Document ID #P111998

Improvement of Anadromous Fish Habitat and Passage in Omak Creek. February 1, 2008 to January 31, 2009 For BPA Project 2000-001-00

Prepared By
Rhonda Dasher
Edited By
Christopher Fisher
Colville Confederated Tribes

Prepared For
U.S. Department of Energy
Bonneville Power Administration
Division of Fish and Wildlife
P.O. Box 3621
Portland, OR 97208-3621

Table of Contents

ACKNOWLEDGEMENTS	3
Project background	3
Abstract	4
Work Elements-Planning and Administration.....	5
Work Elements A and D: Complete Pisces Status Reports and Annual Report	5
Work Element B: Identify and Select Projects.	5
Work Element C: Environmental Compliance.....	6
Work Element E: Complete processing of accounts payable, invoices, and subcontracts.....	6
Work Elements-Construction and Implementation	6
Work Element I: Abandon Road near Trail Creek.	6
Work element J: Rock approach to corrals.	6
Work Element L: Replace five culverts and remove three culverts.....	6
Work Element N: Replace undersized culvert on unnamed tributary to Omak Creek.....	7
Work Element O: Replace Marchand Culvert with bridge.....	7
Work Element P: Replace Sam Culvert with bridge.....	7
Work Element N: Install video weir above Mission Falls.....	7
Work Element S: Remove fish passage barrier at Mission Falls.	7
Work Elements- Monitoring and Evaluation	8
Work Element F: Conduct Redd and Fry Surveys on Stapaloop Creek	8
Conduct snorkel surveys in Omak Creek for fry abundance.....	8
Work Element G: Conduct photo monitoring of riparian vegetation and canopy closure.....	10
Work Element S: Monitor culverts during high flows.....	12
Work Element N: Replace undersized culvert on Omak Creek.....	12
Narrative	13
References.....	15
APPENDIX A.....	16
APPENDIX B	24
APPENDIX C	28

ACKNOWLEDGEMENTS

I would like to recognize Bonneville Power Administration (BPA) for funding the Omak Creek Habitat and Fish Passage Project. The projects implemented in 2008 would not have been possible without the funding received. Tribal technicians Arnold Abrahamson and John Pakootas were diligent in collecting and editing data for this report. I appreciate contributions from John Arterburn and Keith Kistler, for providing enumeration and spatial distribution of steelhead redds and GIS layers for riparian fencing. In addition, I would like to recognize Tony Moore and Tim Erb for assisting in conducting snorkel surveys which provided the relative abundance of juvenile summer steelhead. Thanks to Christopher Fisher for editing and providing historical data regarding Omak Creek. Finally, I want to acknowledge the Omak Creek Technical Advisory Group: Todd Thorn, representing Environmental Trust; Kris Ray, representing Range, and Will Keller, representing Natural Resource Conservation Service (NRCS). The TAG has been pivotal in revising strategies and updating the Omak Creek Watershed Assessment.

Project background

Omak Creek has cultural significance to the Colville Confederated Tribes (CCT). Historically, Omak Creek was a stream where native people fished for salmon and steelhead. Currently, Omak Creek is inhabited by summer steelhead, a species that is listed as “endangered” under the Endangered Species Act (ESA). During 1995, the Natural Resources Conservation Service (NRCS) and the Colville Confederated Tribes developed the Omak Creek Watershed Plan/Environmental Assessment. As a result, several impairments to water quality and fish habitat were identified within the Omak Creek Watershed. The greatest impediments hindering anadromous fish populations in Omak Creek are fish passage barriers, water temperature and high amounts of fine sediment.

Two fish passage barriers, one at RM 1.0 (culvert) and one at RM 5.1 (large boulders within a gorge at Mission Falls), existed until 1998. During 1998, approximately 28,000 cubic yards of boulders were removed from within the gorge at the falls, however, there remained an impediment at the base of the gorge. Efforts to improve passage at this site continued with the installation of 3 in-stream structures installed in late summer/early fall of 2005. The recently installed structures (2005) improved passage but have not resulted in definitive passage above the falls. An observation of steelhead attempting to navigate falls above the uppermost structure revealed a decreased pool depth that resulted in the majority of fish being unable to successfully pass above the falls. NRCS engineer Joe Lange assessed the area and developed a strategy to improve pool depth and redirect flows above the pool to increase passage. In 2008 and 2009, NRCS, U.S. Fish and Wildlife Service (USFWS) and funding from BPA will work collaboratively to resolve the issue identified by NRCS.

Thermal barriers (water temperature exceeding 75F), lethal for steelhead (Bell 1986), have been recorded during previous years in the lower reach (RM 0.0 to RM 5.1) of Omak Creek. Much of the increase in stream temperature can be linked to minimal canopy closure (8.4%) from RM 2.9 to 4.7, due to unmanaged, over-winter grazing by livestock. A Tribal resolution passed during 2001 prevents livestock grazing in this area, specifically RM 2.9 to 4.7, for the next 50 years. Canopy closure within this reach, surveyed during July 2002, indicated an average of 30% canopy closure over two 1,000 m reaches. In addition, during the winter of 2002, stream restoration occurred at 17 sites to improve bank stability where banks were actively eroding and riparian vegetation was overgrazed. Riparian vegetation was planted at these stream restoration sites during the spring of 2003. Additional riparian plantings will occur in 2008 to further improve closure.

The third factor that is adversely affecting water quality and fisheries resources in Omak Creek is increased sediment yield from uplands and along the stream banks. Based on sediment yield models and the Omak Creek Watershed Plan/Environmental Assessment, roads were identified as a significant source of fine sediment ($< 1/4''$ dia.) and contributed to embeddedness (volume of fine sediment) within the Omak Creek basin waterways. An extensive road transportation system (900 miles) exists throughout the Omak Creek Watershed. The road system was determined from ortho-photographs and may not include the total linear distance of roads. Even so, using 900 miles, the result is a road density of 6.35 miles/sq. mile within the watershed. Road densities of 4.0 miles/square mile have been found to produce sediment exceeding four times the natural erosion rate (Cederholm 1981). Therefore, the emphasis of habitat improvement efforts have been directed towards reducing the amount of sediment delivered to the surface waters within the Omak Creek watershed. Improved range practices, road relocation and abandonment and riparian enclosure fencing are part of a new strategy developed by the interdisciplinary Technical Advisory Group (TAG). The TAG is currently revising the Omak Creek Watershed Assessment. In 2009, the NRCS riparian technical team will assist the TAG in assessing current conditions.

Abstract

During the 2008 season, projects completed under BPA project 2000-100-00 included installation of riparian fencing, maintenance of existing riparian fencing, monitoring of at-risk culverts and installation of riparian vegetation along impacted sections of Omak Creek. Redd and snorkel surveys were conducted in Omak Creek to determine steelhead production. Canopy closure surveys were conducted to monitor riparian vegetation recovery after exclusion of cattle since 2000 from a study area commonly known as the Moomaw property.

Additional redd and fry surveys were conducted above Mission Falls and in the lower portion of Stapaloop Creek to try and determine whether there has been successful passage at Mission Falls. Monitoring adult steelhead trying to navigate the falls resulted in the discovery of shallow pool depth at an upper pool that is preventing many fish from successfully navigating the entire falls. The Omak Creek Habitat and Passage Project has worked with NRCS to obtain additional funds to implement projects in 2009 that will address passage at Mission Falls, culvert replacement, as well as additional riparian planting.

The Omak Creek Technical Advisory Group (TAG) is currently revising the Omak Creek Watershed Assessment. In addition, the group is revising strategy to focus efforts in targeted areas to provide a greater positive impact within the watershed. In 2008 the NRCS Riparian Technical Team was supposed to assess areas within the watershed that have unique problems and require special treatments to successfully resolve the issues involved. The technical team will be scheduled for 2009 to assist the TAG in developing strategies for these special areas.

Work Elements-Planning and Administration

Work Elements A and D: Complete Pisces Status Reports and Annual Report.

Reports regarding activities identified in the FY08 BPA proposal and associated activities were entered into Pisces and submitted to the COTR Dave Roberts.

Product: The quarterly reports were completed and submitted in Pisces as requested by the COTR. The annual report is being attached to the current contract. The reports have detailed activities which have been completed and explanations for activities that have been delayed and won't be completed by the forecasted date in the BPA contract. Any requests for no-cost time extensions or additional reports have been submitted as requested by the COTR.

Work Element B: Identify and Select Projects. Coordinate multiple disciplines and agencies in the activities and associated requirements of tasks outlined in the BPA Scope of Work and Budget as well as additional activities funded through other Fish and Wildlife programs.

Product: A designated CCT biologist, Rhonda Dasher coordinated activities by working with both tribal departments and other agencies to accomplish the tasks described in the scope of work. This included TAG meetings (Technical Advisory Group), 3P meetings (inter-disciplinary tribal) and consultations with NRCS, Washington Department of Fish and Wildlife (WDFW), National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries (NMFS), Bureau of Indian Affairs (BIA), and other relevant agencies. The TAG worked together to prioritize and select projects for the 2009-2010 cycle.

Work Element C: Environmental Compliance. Develop biological assessments and hydraulic permit authorizations, coordinate with cultural resources.

Product: BA's and HPA's were completed by Chris Fisher and/or Rhonda Dasher prior to activities being conducted that could have an impact on natural or cultural resources.

Applications were submitted to the proper department and approval given for projects completed under this BPA contract. Environmental compliance was coordinated through Michelle O'Malley, BPA compliance officer.

Work Element E: Complete processing of accounts payable, invoices, and subcontracts.

Product: During the course of this contract, supplies have been purchased and invoices paid for projects completed under FY08 BPA contract. Any questions regarding payment of contracts or requests for extensions have been directed to Dave Roberts (COTR) at BPA. All necessary adjustments and payments have been made prior to closeout of the fiscal year.

Work Elements-Construction and Implementation

Work Element I: Abandon Road near Trail Creek.

Product: A section of road near Trail Creek that had been previously abandoned need additional work to address sediment issues. Contractors re-contoured the hillside to produce a more natural slope. Areas identified as natural water pathways were contoured and reinforced to allow natural water flow down the hillside. Disturbed areas were mulched with a straw mat and seeded. Banks where a culvert had been removed were sloped back to a 3:1 and the stream channel was restructured to simulate a natural stream channel. This project was cost shared with NRCS and an NRCS engineer was on site to ensure that all modifications were to engineered specifications.

Work element J: Rock approach to corrals.

Product: A 60' wide x 200' long approach to livestock corrals that were relocated away from Omak Creek was constructed to eliminate issues with Semi trucks getting stuck in the mud in the spring and fall when loading animals. The disturbed ground was diverting surface water towards the creek, allowing sediment to enter the stream. The newly constructed approach is wide enough to allow trucks to pull in and turn around without getting stuck or disturbing wet ground. This project was finished to specifications and was checked in the fall. It is functioning as intended and will effectively eliminate any further sediment introduction from this source into Omak Creek.

Work Element L: Replace five culverts and remove three culverts.

Product: All pertinent permits were obtained prior to this project proceeding. Four culverts in the Stapaloop Creek drainage were replaced to engineered specifications. One culvert in the

Grindstone drainage was replaced and a new culvert installed to engineered specifications. Three culverts were removed and the streambed restructured to have a natural meander and armoring to simulate a natural channel. All work was performed to engineered specifications. This project was cost shared with NRCS, who supplied the engineer to oversee installations and finish work. All disturbed areas were mulched and seeded. Riparian plantings of critical areas will occur in 2009.

Work Element N: Replace undersized culvert on unnamed tributary to Omak Creek.

Product: This project was supposed to be included in the package of culvert removals and replacements implemented in work element L. Due to lack of permission letters by private owners on the road that this culvert is located, the project has been rescheduled for 2009 to allow more communications to occur and permission letters to be signed.

Work Element O: Replace Marchand Culvert with bridge.

Product: An undersized culvert located on a private access road was scheduled to be replaced by a pre-formed bridge span and set on a precast sill. This project is cost shared with NRCS and the engineers responsible for developing the needed specifications failed to submit the plans to the project lead in a timely manner. Therefore, needed permits could not be obtained and bridge products could not be ordered in a timely manner to ensure implementation of this project within the low water window. This project had to be rescheduled to 2009 for implementation. Cost share includes NRCS and USFWS.

Work Element P: Replace Sam Culvert with bridge.

Product: An undersized culvert located on a BIA access road was scheduled to be replaced by a pre-formed bridge span and set on a precast sill. This project is cost shared with NRCS and the engineers responsible for developing the needed specifications failed to submit the plans to the project lead in a timely manner. Therefore, needed permits could not be obtained and bridge products could not be ordered in a timely manner to ensure implementation of this project within the low water window. This project had to be rescheduled to 2009 for implementation. Cost share includes NRCS and USFWS.

Work Element N: Install video weir above Mission Falls.

Product: The locations for the video weir were identified and steps have been taken to bring power to the designated sites. Due to permitting and internal Tribal processes, this project was not fully implemented in 2008. All of the equipment has been acquired and power will be put in prior to migration of adult steelhead in Omak Creek. Data will be collected in 2009.

Work Element S: Remove fish passage barrier at Mission Falls.

Product: In 2007 and area in Mission Falls was identified as a fish passage barrier. A large boulder remnant from a small grade railroad that had been built along Omak Creek had not been

removed in 2001 when other boulder remnants were removed. The pool below this structure was also full of boulders and reduced the pool depth so that steelhead could not get the momentum necessary to make the leap to ascend the falls beyond that point. Due to delays in permitting and contracting, this project took place the second week in December. The contractor was able to remove rubble from one of the passage structures and some debris from the pool below the boulder. In addition, the boulder was broken into small chunks and only a small portion of the original boulder remains. Weather came in and prevented all of the rock from being removed. The project will be extended into 2009, when the remaining debris will be removed. With the current configuration of the area, there is still potential for passage in 2009. Because the boulder has been effectively removed, fish will be able to navigate around the structure and continue upstream.

Work Elements- Monitoring and Evaluation

Work Element F: Conduct Redd and Fry Surveys on Stapaloop Creek

Product: Redd surveys were conducted in the lower reach of Stapaloop Creek to determine whether any adults that might have made it up Mission Falls may have spawned below the perched culvert at state highway 155. Surveys were conducted in late June and early July. No obvious steelhead redds were seen, although there were some small redds (possible resident redds). Adult steelhead were observed navigating passage structures at Mission Falls but couldn't negotiate an upper pool due to compromised pool depth. No adults were observed passing above the pool. Surveys above the falls gave no indication that steelhead effectively passed above the falls.

We conducted fry surveys in late August/early September, which was well after the estimated incubation time for any late spawning fish. Snorkelers surveyed the confluence of Omak Creek and Stapaloop Creek as well as the lower portion of Stapaloop according to protocol developed by Thurow (USFS, 1994). Although O. Mykiss were present in the areas surveyed, they were not seen in significant numbers and were believed to be of resident origin. See Appendix A for maps and photos.

Conduct snorkel surveys in Omak Creek for fry abundance.

Product: Snorkel surveys were conducted in mid August and early September in selected reaches of Omak Creek known to contain spawning habitat. There were 1206 juvenile salmonids under 100mm, 473 juvenile salmonids over 100mm, 200 suckers, 23 eastern brook trout and 18 sculpin observed (see table 1) during the snorkel survey. Tim Erb, senior technician, Tribal technician Tony Moore and a Tribal biologist conducted the surveys. Water conditions were favorable in 2008, providing juvenile salmonids with a large area of rearing habitat. The numbers of fish observed and the diversity indicates improving conditions in the creek.

Figure 1. *Snorkeling in Omak Creek to estimate juvenile abundance of summer steelhead. August 18, 2008.*

Table 1 2008 Omak Creek Snorkel Surveys were conducted in reference reaches to estimate fish distribution and densities. These numbers were compared to the OBMEP reaches for comparison (see appendix A).

Omak Creek Snorkel Survey 2008													
			Number Observed										
Location	Reach	Length (m)	RBT <100mm	RBT >100mm	WF	SMB	LMB	EBT	Sculpin	Sucker	NO ID fish	RBT Density (Fish/m)	Snorkelers initials
Mill	0-101	100	13	5	0	0	0	0	0	0	2	0.2	RD
Mill	200-301	100	25	3	0	0	0	0	0	0	0	0.28	RD
Mill	400-501	100	22	2	3	0	0	2	0	0	0	0.29	RD
Mill	600-701	100	162	33	6	0	0	0	2	3	0	2.06	RD
Mill	800-901	100	175	53	6	0	0	0	0	4	0	2.38	RD
Lower Reach Average			79.4	19.2	3	0	0	0.4	0.4	1.4	0.4	1.042	
Moomaw	0-101	100	78	23	3	0	0	0	0	4	0	1.08	RD
Moomaw	200-301	100	84	48	0	0	0	1	1	6	0	1.4	RD
Moomaw	400-501	100	122	39	5	0	0	5	7	16	0	1.94	RD
Moomaw	600-701	100	65	52	0	0	0	4	4	36	0	1.61	TE/TM
Moomaw	800-901	100	46	23	0	0	0	6	1	18	0	0.94	TE/TM
Lower Moomaw Average			79	37	1.6	0	0	3.2	2.6	16	0	1.394	
Moomaw	1000-1101	100	102	44	0	0	0	3	2	27	0	1.78	RD/TM
Moomaw	1200-1301	100	85	40	0	0	0	1	0	35	0	1.61	RD/TM
Moomaw	1400-1501	100	91	28	0	0	0	0	1	22	0	1.42	RD/TM
Moomaw	1600-1701	100	77	31	0	0	0	1	0	15	0	1.24	RD/TM
Moomaw	1800-1901	100	59	49	0	0	0	0	0	14	0	1.22	RD/TM
Upper Moomaw Average			82.8	38.4	0	0	0	1	0.6	22.6	0	1.454	
Moomaw Reach Average			80.9	37.7	0.8	0	0	2.1	1.6	19.3	0	1.424	
Total Fish Mill Reach			397	96	15	0	0	2	2	7	2	5.21	
Total Fish lower Moomaw Reach			395	185	8	0	0	16	13	80	0	6.97	
Total Fish Upper Moomaw Reach			414	192	0	0	0	5	3	113	0	7.27	
Rainbow trout/ Steelhead = RBT													
Smallmouth bass = SMB			Whitefish = WF										
Largemouth bass = LMB			Unidentified Fish = NO ID Fish										
NOTE: heavy beaver activity has resulted in numerous beaver dams throughout the reaches.													
The increased ponds could explain the increase in sculpins and suckers seen in the different transects.													
We need to revisit the site in spring 2009. There seems to be a more defined age class separation,													

Work Element G: Conduct photo monitoring of riparian vegetation and canopy closure.

Product: Within this reach (RM 2.9 to 5.1), livestock have been excluded from this area since 2000. To evaluate the effectiveness of the livestock exclusion, 4 photo-monitoring points were established (2000). Also, for a quantitative assessment, canopy closure has been measured using

a concave densiometer (Platts, 1983). Canopy closure is measured annually at 20 sites within two 1,000-meter reaches. Furthermore, water temperature has been monitored to determine the effectiveness of reducing peak summer temperatures within the lower reach of Omak Creek. Comparison of densiometer readings for 2008, show a continued increase in canopy coverage within the study area. Canopy closure rates (see Table 2) clearly indicate improvement. The change in vegetation is clearly visible (see figure 6) since pressure from livestock has been eliminated.

Figure 3 Photo point 1 downstream. Top left is 2004, top right, 2006, bottom left 2007 and bottom right 2008.

Work Element H: Develop Fish Module and test

Product: A completed fish module for the database.

There is now a fish module for the database to contain data collected in Omak Creek regarding anadromous summer steelhead. Modifications to the database occurred in 2008 to further refine the query capabilities and level of data contained in the module. The database will be accessible

through the OBMEP website. In 2009, templates for data entry will be installed on handheld computers and used by field staff to collect data. This will help reduce errors and will have the capability to link PIT tag data with individual fish to help increase the complete data file for each fish.

Work Element S: Monitor culverts during high flows

Product: debris removed from at-risk culverts to prevent failing. During the early spring of 2008 a Tribal fisheries technician assessed culverts that have been identified as “at-risk” of failing. Any risk factors such as excessive debris or beaver dams were noted and culverts that were identified as undersized and had either of these additional risks were ranked as priority for additional monitoring. Undersized culverts without the additional risk factors were monitored less frequently. Beaver sticks placed near undersized culverts were removed prior to increased water flows. During the spring a Tribal technician repeatedly removed debris from culverts to prevent overtopping and failure. This effort has proven to be successful in preventing blockages that can contribute to failure of the area surrounding the culvert during spring flows.

In 2009 there are several undersized culverts scheduled for replacement, which will occur during the low water period in August and September. Monitoring of culverts will occur during the spring of 2009 to ensure debris is cleared and the risk of failure is minimized until the culverts can be replaced.

Work Element N: Replace undersized culvert on Omak Creek

Product: Undersized 48” culvert replaced with an 84” culvert. This project was rolled over from 2007 into 2008 to be implemented with a culvert replacement contract put in place in late 2007. During implementation of the contract it was found that language regarding this culvert had been omitted from the contract and therefore could not be installed until a new RFP was completed. This culvert will be included in the 2009 culvert RFP scheduled for advertisement March 1, 2009.

Work Element T: Plant Riparian Vegetation

Product: Native vegetation planted along impacted areas on Omak Creek. During 1999 a culvert was removed in the lower portion of Omak Creek. The culvert was a passage barrier to fish and with its removal the old channel was reconstructed to recreate the natural sinuosity of the creek. Riparian vegetation was planted along the new channel. Between 2001 and 2005 there were consecutive low water years that resulted in riparian vegetation along the channel dying from lack of water. In 2007 native plants were planted into areas that did not recover after two normal water years (2006, 2007) along the reconstructed channel. Maintenance of the newly planted vegetation occurred in 2008 to ensure the plants were well established. The increased vegetation will help improve canopy closure in this lower section which will help improve water temperatures, rearing and spawning habitat for anadromous summer steelhead.

During 2007 ground cover, shrubs and a variety of native trees were planted along the creek downstream of the reconstructed channel on the newly acquired property to stabilize the ground and improve shading of the creek channel. Maintenance of the vegetation occurred during 2008

to ensure the plants are well established. The areas will be assessed in 2009 and additional plants will be added if necessary to continue the growth of native vegetation along the riparian corridor.

Figure 4 Riparian vegetation above the Omak Trap in October of 2008. Just upstream of the rock wingwall to the right are young alders planted in 2007.

Narrative

During 2008, biologists and crews for CCT were able to accomplish the majority of tasks listed in the scope of work for Omak Creek. In Omak Creek, 2008 was a normal water year, although melt-off was delayed until late March/early April. While drought years can impact survival due to low water and high temperatures, high water can impact survival by scouring redds. The snorkel surveys conducted in September were positive, indicating that the flows in Omak Creek did not destroy the majority of redds in the creek. A variety of size classes were observed during snorkel surveys as well as observed during photo point surveys and during electrofishing in late summer. Observations indicate improved survival conditions for juvenile fish holding over.

Monitoring various elements over time (such as photo points) is a good indicator of how the system is functioning during variable conditions. As a system becomes healthier it is better able to recover after stressful conditions brought on by extended periods of drought or moisture. A

degraded system has little vegetation diversity, which compounds problems with water temperature and even water retention. The photo point of Omak Creek from 2002 shows a more uniform height of vegetation, indicating a lack of diversity. The same picture taken in 2006 shows a more varied canopy and an overall height increase (look at height compared to hillside in the background). If trees are allowed to mature, their root structure helps hold soil in place, reducing erosion during high water flows. The mature trees also make a substantial contribution to shading the water, which helps control extreme water temperatures during extended hot weather. In addition to the riparian health, elements such as sediment transport and large woody debris also contribute to stream health.

During extended periods of low water, stream functions are lowered. Sediment accumulates, downed trees and debris stay in one area and the system as a whole suffers. When this period is followed by “normal” water levels, sediment is transported down the system, carrying with it the woody debris. If a large amount of sediment has accumulated during low flows, it may take as many years of normal water to return the system to a healthy state. Watersheds are dynamic because they are influenced by so many variables. Projects proposed for Omak Creek are designed to address the cause of some problems instead of just treating symptoms. Repairing a damaged ecosystem is much like caring for an open wound; it needs treatment and monitoring to make sure the problem doesn’t resurface.

The projects completed in 2008 addressed causes of increased sediment and riparian destruction (livestock, undersized culverts). This doesn’t mean that the problems are solved, only that we’ve made the system healthier by decreasing elements that were causing stress. As we watch the changes occurring in the Omak Creek Watershed we will use adaptive management strategies to continue addressing items that are impacting, or have the potential, to negatively impact ecosystem health.

Budget Expenditures

During fiscal year 2008 approximately \$39,800,000 from our contract was spent on administrative tasks such as doing biological assessments, coordinating meetings, preparing applications and producing reports. CCT staff also monitored progress of projects, documenting improvements and verifying work done by contractors. The new fiscal year end is January 31, which took a little transition to get in sync with BPA.

During the 2008 field season approximately \$22,600 in funds were used to pay salaries for two Tribal technicians to carry out tasks described in the scope of work. Arnold Abrahamson and John Pakootas joined our staff in early March and conducted preliminary assessments of culverts that had been identified as “at-risk” of failing or over-topping. Culverts were monitored during spring flows to prevent debris from beaver dams or downed trees from blocking flows through undersized culverts. Photo documentation was taken and GPS points used to verify location points. Two significant undersized culverts (Sam and Marchand) will be replaced during the low water period in 2009. They were scheduled for replacement in 2008 but NRCS engineers did not deliver specifications in a timely manner. Consequently, the bridge projects had to be rolled over to 2009. Additional smaller culverts will also be replaced but monitoring will occur again in the

spring to keep these culverts free of debris accumulation. Additional photos and location Maps are in appendix B following this report.

Tribal technician Tony Moore conducted assessment and repair of riparian fencing that included upper Omak Creek, Stapaloop Creek, Swimptkin Creek, Clark Creek and Trail Creek. Areas of repair were documented by GPS points and photographs of the fence before and after repair. Downed trees and aging fence line were the major causes of fence damage. Approximately \$10,200 in field supplies were needed to properly equip the field crews. A chainsaw, replacement parts, safety gear, fencing tools, measurement wheels, camera and other supply costs for 2009 will be greatly reduced due to the equipment being maintained and a fencing supply inventory in place for the start of 2009. The purchase of two Polaris Rangers (one-2 man, One-crew) with associated accessories and trailer cost approximately \$42,000. These units are expected to be in service for at least 10 years. Due to the remote locations and installation of steel posts and corner braces (to minimize fire damage) these vehicles are necessary to get supplies to the areas of fence repair. A tractor, implements and trailer were purchased with BIA funds (\$56,000) and will also be used to help implement various habitat project in the Omak Creek Watershed. The fencing report, including maps and photos is located in appendix C following this report.

Approximately \$12,800 was used to purchase riparian vegetation, mulch, tools and related supplies to install these plants along the lower portion of Omak Creek that has been impacted by livestock. The Colville Tribes purchased the Robbins' property with BPA funds in 2007 which included approximately a ¼ mile of riparian area along the creek. Previous to the land purchase, cattle were allowed to graze the riparian vegetation and erode the stream banks by hoof shear. Since the cattle have been removed, suppressed plants are becoming reestablished. Supplemental planting occurred to help create an understory using native plants. Supplemental planting also occurred along the reconstructed channel just upstream of the Robbins' property. Native plants were used to close gaps in the canopy and create more diversity in plant species. Both of the areas planted were maintained during 2008 and assessed for health in the fall. Additional maintenance will occur in 2009 based on results of the health assessment in late summer of 2008.

Changes in work element budgets have been coordinated through COTR Dave Roberts and through Tribal CO Colette Adolph as well as Tribal accounting Administrator Diana White. Any budget modifications have been approved by Colville Tribal Council.

References

Arterburn, J. E., et al. 2007 Okanogan Basin Steelhead Spawning Surveys. BPA project #200302200. Colville Confederated Tribes Department of Fish and Wildlife, Anadromous Fish Division.

- Bell, M. C. 1986. Fisheries handbook of engineering requirements and biological criteria. Portland, Oregon: U.S. Army Corps of Engineers, Office of the Chief of Engineers, Fish Passage Development and Evaluation Program.
- Cederholm, C. J., Reid, L. M., & Salo, E., O. 1981. Cumulative effects of logging road sediment on salmonid populations in the Clearwater River, Jefferson County, Washington. Proceedings, conference on salmon spawning gravel: as renewable resource in the Pacific Northwest? Pullman, Washington: Washington State University, Water Research Center Report 39, Pages 38-74.
- Fisher, C. J., J. E. Arterburn, S. Sears and J. P. Fisher. 2003. Impact to Aquatic Resources in Omak Creek from Fire Suppression Activities Associated with the Mission Falls Fire WA-COA-100.
- Fisher, C. J., Dasher R. E.. 2006. Steelhead Surveys in Omak Creek 2006 Report. Omak, Washington: Colville Confederated Tribes.
- Kistler, K, Arterburn, J. E. 2007 Okanogan Basin Snorkel Surveys. BPA project #200302200. Colville Tribes Department of Fish and Wildlife, Anadromous Fish Division.
- Platts, W. S., Nelson, R. L., Casey, O., & Crispin, V. 1983. Riparian stream habitat conditions on Taber Creek, Nevada, under grazed and ungrazed conditions. Proceedings of the Annual Conference Western Association of Fish and Wildlife Agencies, 63,162-174.
- Roni, P., & Quimby, E. (Eds.). 2005. Monitoring Stream and Watershed Restoration. Bethesda, Maryland: American Fisheries Society.
- Thurow, R. 1994. Underwater Methods for Study of Salmonids in the Intermountain West. USDA Forest Service, Intermountain Research Station, 1994. General Technical Report INT-GTR-307.
- Waters, T. F., 1995. Sediment in streams: sources, biological effects, and control. American Fisheries Society Monograph 7.
- Wydoski, R. S., and R. R. Whitney. 2003. Inland Fishes of Washington. *American Fisheries Society, Bethesda, MD.*

APPENDIX A

Snorkel Survey Map and Photos

Omak Creek Redd Surveys 2008

Figure 1 Specific sites snorkeled by OBMEP in Omak and Stapaloop Creeks, showing number of fish counted per site and breakout by species. The OBMEP sites are different than the control reaches surveyed in the fall by the Omak Creek Habitat and Passage team.

The presence of increasing numbers of crayfish indicate a healthier, more diverse system developing as canopy closure improves and sediment issues are addressed.

Group of *O. mykiss* observed in the lower portion of Omak Creek

A group of Juvenile whitefish (Wydoski, 2003) observed in lower Omak Creek.

Table 1 2007 snorkel survey results. During the 2008 season we took more pictures of the same areas for comparison of density and diversity of fish species.

Omak Creek Snorkel Survey 2007													
			Number Observed										
Location	Reach	Length (m)	RBT <100mm	RBT >100mm	WF	SMB	LMB	EBT	Sculpin	Sucker	NO ID fish	RBT Density (Fish/m)	Snorkeler s initials
Mill	0-100	100	2	1	0	0	0	1	0	2	0	0.06	RD
Mill	200-300	100	14	2	1	0	0	0	0	5	0	0.22	RD
Mill	400-500	100	25	7	0	0	0	0	1	3	0	0.36	RD
Mill	600-700	100	32	15	2	0	0	0	2	12	0	0.63	RD
Mill	800-900	100	45	10	0	0	0	0	0	45	0	1	RD
Lower Reach Average			23.6	7	0.6	0	0	0.2	0.6	13.4	0	0.454	
Moomaw	0-100	100	195	59	0	0	0	1	0	1	0	2.56	RD
Moomaw	200-300	100	179	51	2	0	0	0	3	54	0	2.89	RD
Moomaw	400-500	100	86	47	0	0	0	3	6	27	3	1.72	RD
Moomaw	600-700	100	40	61	0	0	0	7	2	6	0	1.16	TE/TM
Moomaw	800-900	100	77	5	0	0	0	0	0	8	0	0.9	TE/TM
Lower Moomaw Average			115.4	44.6	0.4	0	0	2.2	2.2	19.2	0.6	1.846	
Moomaw	1000-1100	100	152	23	0	0	0	2	0	4	0	1.81	RD/TM
Moomaw	1200-1300	100	72	24	0	0	0	2	1	0	0	0.99	RD/TM
Moomaw	1400-1500	100	94	33	0	0	0	0	0	7	0	1.34	RD/TM
Moomaw	1600-1700	100	45	23	0	0	0	0	2	7	0	0.77	RD/TM
Moomaw	1800-1900	100	85	7	0	0	0	4	0	3	0	0.99	RD/TM
Upper Moomaw Average			89.6	22	0	0	0	1.6	0.6	4.2	0	1.18	
Moomaw Reach Average			102.5	33.3	0.2	0	0	1.9	1.4	11.7	0.3	1.513	
Total Fish Mill Reach			118	35	3	0	0	1	3	67	0	2.27	
Total Fish low er Moomaw Reach			577	223	2	0	0	11	11	96	3	9.23	
Total Fish Upper Moomaw Reach			448	110	0	0	0	8	3	21	0	5.9	
Rainbow trout/ Steelhead = RBT													
Smallmouth bass = SMB		Whitefish = WF											
Largemouth bass = LMB		Unidentified Fish = NO ID Fish											
NOTE: Observed 3 bluegill in transect 400-500 IN Lower Moomaw Reach

Table 2 Number of fish observed during snorkel surveys by species and stream reach for Omak Creek during summer of 2008.

Omak Creek Snorkel Survey 2008													
			Number Observed										
Location	Reach	Length (m)	RBT <100mm	RBT >100mm	WF	SMB	LMB	EBT	Sculpin	Sucker	NO ID fish	RBT Density (Fish/m)	Snorkelers initials
Mill	0-101	100	13	5	0	0	0	0	0	0	2	0.2	RD
Mill	200-301	100	25	3	0	0	0	0	0	0	0	0.28	RD
Mill	400-501	100	22	2	3	0	0	2	0	0	0	0.29	RD
Mill	600-701	100	162	33	6	0	0	0	2	3	0	2.06	RD
Mill	800-901	100	175	53	6	0	0	0	0	4	0	2.38	RD
Lower Reach Average			79.4	19.2	3	0	0	0.4	0.4	1.4	0.4	1.042	
Moomaw	0-101	100	78	23	3	0	0	0	0	4	0	1.08	RD
Moomaw	200-301	100	84	48	0	0	0	1	1	6	0	1.4	RD
Moomaw	400-501	100	122	39	5	0	0	5	7	16	0	1.94	RD
Moomaw	600-701	100	65	52	0	0	0	4	4	36	0	1.61	TE/TM
Moomaw	800-901	100	46	23	0	0	0	6	1	18	0	0.94	TE/TM
Lower Moomaw Average			79	37	1.6	0	0	3.2	2.6	16	0	1.394	
Moomaw	1000-1101	100	102	44	0	0	0	3	2	27	0	1.78	RD/TM
Moomaw	1200-1301	100	85	40	0	0	0	1	0	35	0	1.61	RD/TM
Moomaw	1400-1501	100	91	28	0	0	0	0	1	22	0	1.42	RD/TM
Moomaw	1600-1701	100	77	31	0	0	0	1	0	15	0	1.24	RD/TM
Moomaw	1800-1901	100	59	49	0	0	0	0	0	14	0	1.22	RD/TM
Upper Moomaw Average			82.8	38.4	0	0	0	1	0.6	22.6	0	1.454	
Moomaw Reach Average			80.9	37.7	0.8	0	0	2.1	1.6	19.3	0	1.424	
Total Fish Mill Reach			397	96	15	0	0	2	2	7	2	5.21	
Total Fish lower Moomaw Reach			395	185	8	0	0	16	13	80	0	6.97	
Total Fish Upper Moomaw Reach			414	192	0	0	0	5	3	113	0	7.27	
Rainbow trout/ Steelhead = RBT													
Smallmouth bass = SMB			Whitefish = WF										
Largemouth bass = LMB			Unidentified Fish = NO ID Fish										
NOTE: heavy beaver activity has resulted in numerous beaver dams throughout the reaches.													
The increased ponds could explain the increase in sculpins and suckers seen in the different transects.													
We need to revisit the site in spring 2009. There seems to be a more defined age class separation.													

In 2008 more sculpins were observed throughout transects surveyed and whitefish were seen as well. We have not seen any significant numbers of warm water species in the surveyed reaches. This could indicate low winter survival for these fish.

During our surveys we took a variety of pictures that were reviewed to determine accuracy of species seen and numbers counted. This proved very beneficial by documenting groups of possible resident fish as well as fish that were listed as unknown. Through review of the photos taken we were able to identify a spring chinook parr. This indicates successful reproduction of at least some of the adult spring chinook that were passed upstream between the end of May and early July. In addition to fish observed in the Moomaw reaches of Omak Creek, we also saw increased numbers of fish in the lower section of the creek where channel

reconstruction occurred in 1999. Riparian vegetation was planted after the construction but consecutive low water years in the early years following planting caused mortality of some plants and stress on others. In both 2006 and 2007, Omak creek had normal to above average flows. Stressed vegetation began to recover in 2006 and by 2007 natural reproduction was coming up along Omak Creek in areas that had mortality during low water years. Better growth of vegetation resulted in more shading and improved conditions for young O. Mykiss coming up out of the gravel.

The purchase of land (Robbin's property) containing a significant portion of Riparian area and the subsequent removal of livestock from the property has had a positive impact on the area just downstream of the channel reconstruction. The creek is responding to the riparian rehabilitation. An increase in the number of fish seen in the reference reaches in the lower portion of Omak Creek during snorkel could be influenced by a variety of factors. Surveys were conducted in August/September during 2008 instead of October, water temperatures were cool but not cold enough to cause juveniles to hide in the gravel. Approximately 15 redds were documented below the adult trap during redd surveys (Arterburn, 2008), which is an increase from previous years. All of the above factors may have contributed in part to the increased counts in lower Omak Creek.

APPENDIX B

Culvert Monitoring Maps and Photos

Photos 1 and 2 The above photo shows the upstream portion of the Marchand culvert during the pre-season assessment. This culvert had beaver sticks obstructing flow. Below is the upstream picture of the Sam culvert during the pre-season assessment. The Sam culvert also had beaver sticks obstructing flow.

Culvert Monitoring and Maps and Photos

Photos 4 and 5. Above is the pool portion of the channel that flows under the road. Water flow was severely decreased and eventually halted when the obstruction at the upstream side of the culvert was removed and kept clear. Below is a clear picture of the channel that has been formed by water flowing under the road at the Marchand culvert.

Culvert Monitoring Maps and Photos

Photos 6 and 7 Pictured above is the volume of debris removed from the upstream portion of the Sam culvert. Water had backed up on the upstream side as a result of the obstruction and began flooding an adjacent low point. Below is a picture of the flooded area shortly after the debris had been removed and the water level was continuing to go down. The Sam culvert was also listed as a priority culvert in 2008 due to constant beaver activity.

Omak Creek Culvert monitoring 2008

APPENDIX C

2008 Riparian Fencing Maintenance Maps

Overview

During the 2008 season, lead technician Tony Moore, conducted assessments and repair of riparian fencing along various tributaries to Omak Creek. Much of the fencing was installed with cost share between NRCS and BPA funds but has not been properly monitored due to lack of funding for BIA range. Consequently, there were segments of fence compromised, allowing range cattle access to sensitive riparian areas. Our maintenance crew took before and after photos as well as GPS points for every area repaired. Areas of concern were noted so that assessments could be done in 2008 to determine if repair is necessary. Assessments were completed and with two years of data, we can already see areas that continue to need yearly maintenance.

Environmental factors play a large part in fence damage. High winds in a burned area can blow down trees and fences. Fires can burn wooden posts and cause trees and limbs to topple. Erosion and constant attempts from livestock can weaken and compromise fence line. Much of the riparian fencing was accessible only by hiking to the location. Materials had to be carried in instead of driven due to increased fire danger in the summer. Tony Moore used TANF summer youth to assist him with repairs and by doing so was able to cover the areas shown in the following maps.

In 2008 riparian fencing along Grindstone was added to the maintenance list. Over six thousand feet of fencing was installed in 2007 to protect riparian vegetation and to help reduce sediment from livestock disturbance. We will be monitoring the riparian area to document the response to livestock exclusion. Natural reproduction should fill in any areas impacted by livestock. Through effective maintenance, fence life is extended and habitat goals are more easily achieved.

The following map layers were developed by Tony Moore and Keith Kistler then plotted on quad maps. Specific points can be listed separately for exact coordinates to each point shown. Photos of each location will follow the respective map. Any reference or citation regarding the fence repair sites should include: Tony Moore and Keith Kistler as well as a 2008 date.

Due to the increase in riparian fencing, the Omak Creek project has invested in equipment to make sure that fencing and repairs can be completed in-house and on schedule. The project purchased a tractor and implements, including an auger, sprayer, water tank, mower, snow plow, trailer and forks. We can now load and transport needed materials to the site for installation. In addition, two Polaris Rangers were purchased to assist in conducting fence assessments and repair in remote areas that aren't practical for the use of the tractor. The Rangers are equipped with spark arrestors to minimize fire danger. Both units will also have portable hand pumps to extinguish any small fires.

Clark and Swimptkin Creek Fence Repair Sites 2008

Figure 1 representative samples of areas needing repair in Clark and Swimptkin rainages.

Omak Creek Fence Repair Sites 2008

Figure 2 Top- shows broken line. Bottom- shows rough terrain and downed trees that are an annual occurrence in fencing maintenance..

Stapaloop Creek Fence Repair Sites 2008

Figure 3 Downed trees and compromised fence were found in the Stapaloop area.

Trail Creek Fence Repair Sites 2008

Figure 4 Tree damage was heavy on Trail creek, the most remote site surveyed.

Photos of Fence line After Repairs

Clark and Swimptkin Creeks

Figure 5 finished line in Clark and Swimptkin Creeks.

Photos of Fence line After Repairs Omak Creek

Figure 6 Old wooden fence posts are being replaced with more durable steel posts which will increase the life span of the fence.

Photos of Fence line After Repairs Stapaloop Creek

Figure 7 Finished repairs on Stapaloo Creek.

Photos of Fence line After Repairs Trail Creek

Figure 8 repaired fence line along Trail Creek. Work on Trail Creek was completed with just a two person crew due to remoteness.