NORTH FORK JOHN DAY RIVER BASIN ANADROMOUS FISH HABITAT ENHANCEMENT PROJECT Annual Report for February 2016 – January 2017

BPA Contracting Officer:
Jesse Wilson

Prepared by:
John Zakrajsek, Fisheries Habitat Biologist, Project Lead
Delbert Jones, Fisheries Technician

Confederated Tribes of the Umatilla Indian Reservation
Department of Natural Resources
Fisheries Program

Prepared for:

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

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ABSTRACT

The Confederated Tribes of the Umatilla Indian Reservation North Fork John Day Anadromous Fish Enhancement Project continued to develop and implement habitat improvements during 2016 using guidance from the Umatilla River Vision, 2008 Accords, John Day Subbasin Plan, Mid-Columbia Steelhead Recovery plan, and other plans and management documents. Cooperative efforts between private landowners and public entities such as the North Fork John Day Watershed Council, Umatilla National Forest, and Wallowa-Whitman National Forest prioritized, designed, and implemented specific habitat restoration efforts. During 2016 the project worked to complete the Desolation Creek Geomorphic Assessment and Action Plan, Desolation Creek Stock Water Developments, Battle Creek Refit, Bull Run Creek Mine Tailing Permitting, Granite Creek Design, Five Mile Creek Fence Maintenance, and the Camas Creek Fence Construction and Stock Water Developments. Two proposed actions, the Boundary Creek Culvert Replacement and the Mud Creek Shallow Water Developments, were not completed due to the inability to secure a completed design and late arrival of cultural resource permits respectively. Noxious weeds were controlled and monitoring data collected on sites where Riparian Conservation Agreements exist or where the CTUIR's Bio-Monitoring Project (BPA Project #2009-014-00) established monitoring sites.

ACKNOWLEDGMENTS

The Confederated Tribes of the Umatilla Indian Reservation wish to thank the Bonneville Power Administration for funding the project and its personnel Jamie Swan, Jenna Peterson, Sean Welch, and others for their assistance. We would also like to give thanks to the North Fork John Day Watershed Council for providing a forum for tribal input and promoting the Confederated Tribes of the Umatilla Indian Reservation's habitat recovery efforts; the Umatilla National Forest and its employees (Fishery Biologists Kathy Ramsey and Hugo Magana, Hydrologist Ed Farren, Range Manager Brad Lathrop) and the Wallowa Whitman National Forest and its employees (Engineer Brett Yaw, Biological Science Technician Ray Lovisone) for assistance with cooperative restoration efforts and providing information, and Oregon Department of Fish and Wildlife's Trevor Watson, Mike Jensen, Russell Powell, and Josh McCormick. Thanks also to Confederated Tribes of the Umatilla Indian Reservation staff, whose cooperation and contributions are evident in this report. Special thanks to Delbert Jones in assisting with monitoring efforts and implementing and maintaining improvements, to Julie Burke, Celeste Reeves, and Michelle Thompson for administrative support, and Gary James and Mike Lambert for support and guidance. We would like to acknowledge cooperating landowners, Steve Berry, Brian Prater, Robin, Mary Lou, Andy and Bill Fletcher, Rose Pedracinni, and Lois Hartley Cannady who supported our efforts through conservation agreements and implemented actions on their property.

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INTRODUCTION

Funding approved in 2000 by the Bonneville Power Administration charged the Confederated Tribes of the Umatilla Indian Reservation's North Fork John Day River Habitat project (The Project) with enhancing terrestrial and aquatic habitat. While the tools and strategies have evolved over time restoration has and will continue to be implemented through direct action or modifying land management strategies in the North Fork John Day (NFJD) basin (Figure 1).

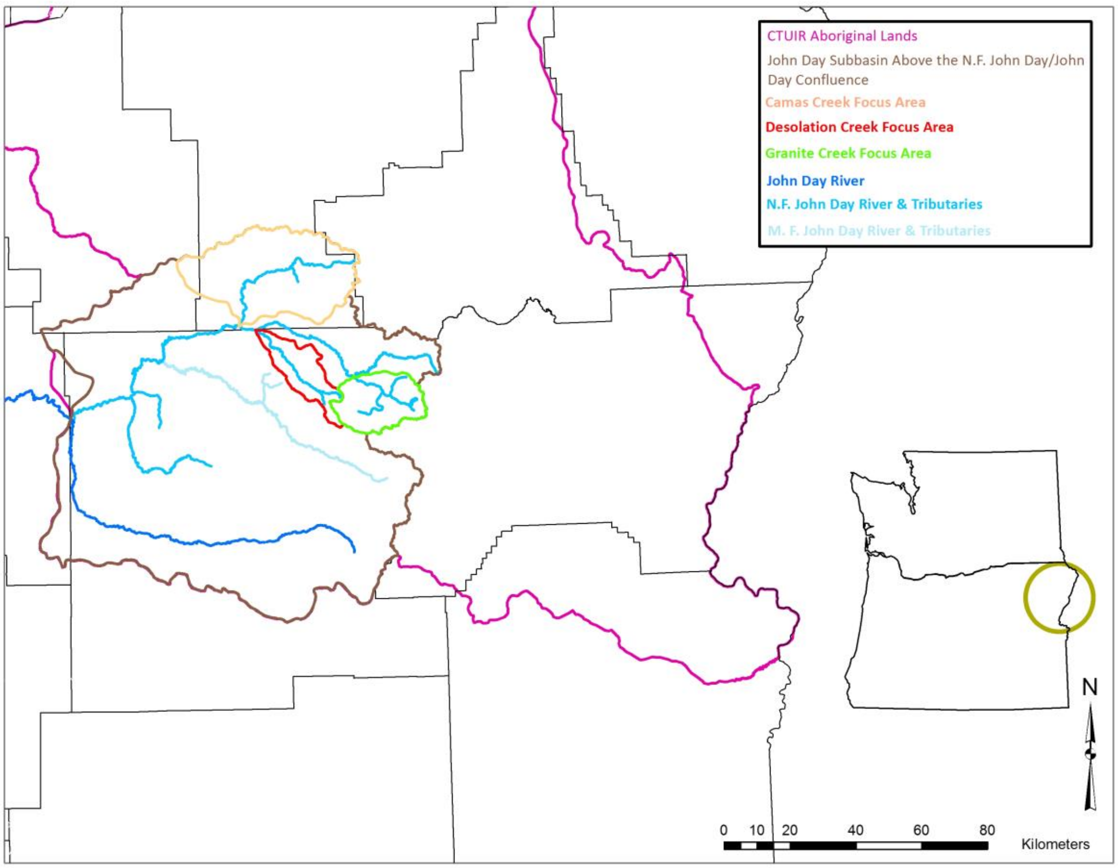


Figure 1. Map of the CTUIR ceded lands and focus basins for The Project.

Since 2000 subasin plans and recovery documents have been used as a basis for establishing The Project's strategy as they became available. However, the development of the Confederated Tribes of the Umatilla Indian Reservation's (CTUIR) First Foods (Figure 2) has more recently formed the basis for all of The Project's efforts. The First Foods are integral to native culture and religion and their perpetuation in effect provides for the continuation of CTUIR's society. In other words, they constitute the minimum ecological products necessary to sustain the CTUIR's culture. The mechanism by which the First Foods management or enhancement occurs within the CTUIR's Department of Natural Resources was developed in 2008 and published as the Umatilla River Vision (Jones, 2008). The strategy identified a holistic process driven approach enveloping five touchstones (hydrology, connectivity, geomorphology, aquatic biota, and riparian vegetation). Incorporating these touchstones into development, design, monitoring, and reporting efforts holistically perpetuates the First Foods.

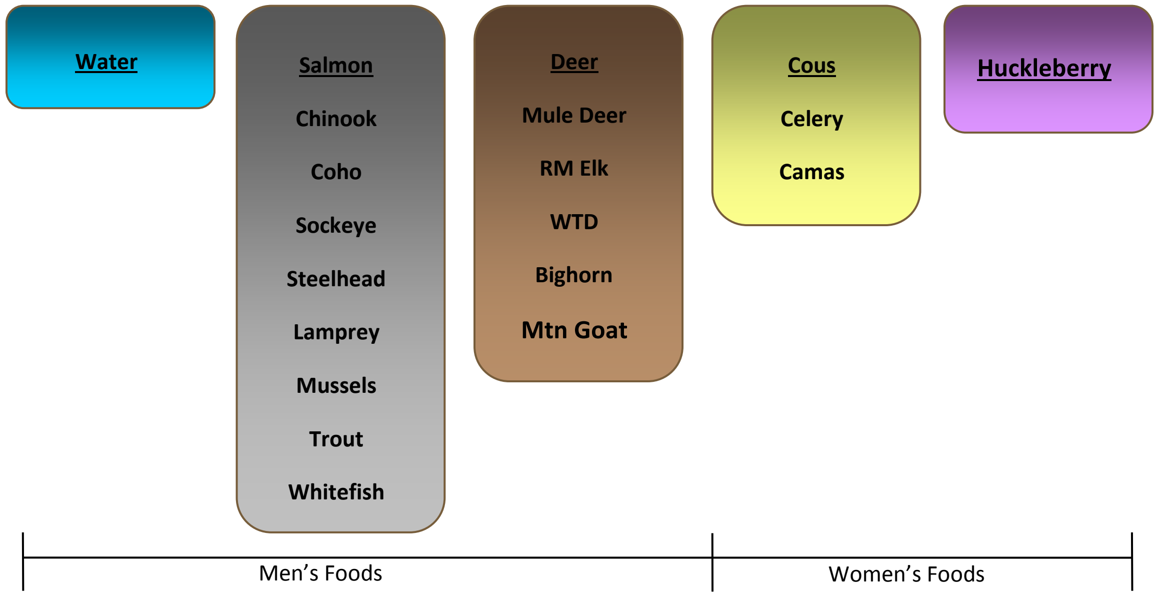


Figure 2. Characterization of the First Foods by grouping and cultural significance with respect to men's and women's foods. First Foods are listed in order of importance from left to right.

Since 2000 The Project has focused upon improving habitat for aquatic species on private lands and to that end early restoration actions were passive in nature and occurred as opportunities arose and typically included removing grazing cattle from sensitive stream channel and riparian habitats. These early efforts were in part hampered by the public's unfamiliarity with the CTUIR or habitat restoration in general. As The Project provided educational opportunities and more restoration actions were undertaken this changed to some extent. Since 2000 The Project has implemented a variety of actions (Appendix 1) influencing 263 stream kilometers and 8068 acres through a mix of riparian fencing construction and maintenance, stock water development, passage barrier removal, native plantings, mine effluent efficiency improvements, and stream channel improvement efforts as well as several surveys and assessments. During 2016 we continued implementing measures to protect sensitive riparian, floodplain, and wetland habitats, continued design efforts, and made progress in strategic planning through the development of assessments. The cumulative effect of these actions are expected increase juvenile and adult freshwater survival resulting in greater numbers of Endangered Species Act listed Mid-Columbia River Summer Steelhead trout (*Oncorhynchus mykiss*) and Bull trout (*Salvelinus confluentus*) in addition to Spring Chinook salmon (*Oncorhynchus tshawytscha*) and redband trout (*Oncorhynchus mykiss gairdnerii)*.

The Project originally focused its efforts upon working with private landowners. However, this has proven to be difficult for a variety of reasons and as such we've began cooperating with public land management agencies. This approach was accepted by the Independent Scientific Review Panel (ISRP) during their 2006 Geographic Review process, the proposal for which, identified four 5th field HUCS (#1707020206, #1707020205, #1707020202, and #1707020204) in three tributaries to the North Fork John Day River including upper and lower Camas, Granite, and Desolation Creeks as focus basins (Figure 1). The designations were based upon Restoration and Protection Potentials contained within the John Day Subbasin Plan and other guidance documents. For the 2013 ISRP Geographic Review these same focus basins were again submitted as priority areas for restoration. The actions listed in this proposal would be implemented to the extent possible before the end of 2018 using guidance not limited to the 2005 John Day Subbasin Plan (NPPC, 2005), 2008 Mid-Columbia Steelhead Recovery Plan (NMFS, 2008), 2002 Bull Trout Recovery Plan (USFWS, 2002), and CTUIR's adoption of the First Foods policy and Umatilla River Vision (Jones, 2008). Throughout this period BPA sponsors within the John Day River Basin began communicating more effectively and The Project began working closely with cooperators such as the Umatilla and Wallowa-Whitman National Forests (UNF and WWNF respectively) and the North Fork John Day Watershed Council (NFJDWC). The Project also adopted different restoration action criteria and strategies to undertake reach scale or larger efforts which were presented in the Project's 2013 ISRP Geographic Review Proposal. Under this strategy the three focus basins remain although the approach to restoration reflects the qualities of each basin.

Within Granite Creek focus area the Granite Creek Action Plan (USFS, 2008) and the Bull Run Creek Action Plan (USFS, 2012) form the basis for cooperative restoration actions on public lands. The Project has attempted to work on private lands with limited success but will, where possible, implement restoration actions adjacent to treated USFS properties with the intent of extending and connecting treated reaches further downstream.

Within Desolation Creek The Project is working with collaborators to develop a basin wide action plan by incorporating prioritized actions on private and public lands into a single scientifically defensible strategy for restoration. Thus will be further discussed in the 'Accomplishments' section.

Within Upper and Lower Camas Creek The Project has been coordinating with the UNF and Wallowa-Whitman National Forest (WWNF) where they manage lands in the basin's headwater areas and private landowners in the balance of the basin. The Project funded a geomorphic assessment which established a strategy for addressing sediment deposition in Ukiah, Oregon. Although not a comprehensive action plan for the entire Camas Creek basin it outlines typical treatments which will address ecological concerns moving forward throughout the basin. This does not preclude The Project's participation in any future effort to develop a Camas Creek basin wide action plan using Bonneville Power Administration's (BPA) ATLAS or equivalent framework should public and private priorities and sentiment support such an action.

Appendix I show sites where maintenance or restoration efforts have been completed since the Projects inception on private and public lands. On private lands the CTUIR has entered into eight conservation agreements with private landowners. Cooperative partners with whom CTUIR hasn't entered into a Riparian Conservation Agreement have included the North Fork John Day Watershed Council (NFJDWC), the Umatilla National Forest (UNF), WWNF, Grant Soil and Water Conservation District, National Resource Conservation Service (NRCS), and the Farm Services Agency (FSA) among others. Conversations with these and other groups or agencies are proving useful for identifying additional restoration opportunities and dispersing information regarding the benefits of cooperative restoration efforts to develop trust with small rural communities within the NFJD Basin. For example, the NFJDWC has proven invaluable for reaching out to the 1200 people residing within the basin that may otherwise be reluctant to cooperate with a tribal or government entity.

BPA initially approved the Project in 2000 with on-the-ground actions following in 2001 to provide partial mitigation for the loss of native salmon and steelhead resulting from the construction of dams on the Columbia River. Additional habitat restoration funds are secured through entities such as the FSA, NRCS, Oregon Watershed Enhancement Board (OWEB), Oregon Department of Fish and Wildlife (ODFW), U.S. Bureau of Reclamation (BOR), the U.S. Army Corps of Engineer (Corps) and other private or public. In an effort to reduce costs associated with overhead the UNF's North Fork John Day Ranger District provides office and storage space while vehicles and equipment are shared with:

(1) BPA Project #198710001 – CTUIR's Umatilla River Basin Anadromous Fish Habitat Enhancement Project
(2) BPA Project #199604601 – CTUIR's Walla Walla Basin Habitat Enhancement Project
(3) BPA Project #199608300 – CTUIR's Grande Ronde Basin Habitat Enhancement Project
(4) BPA Project #200820100 – CTUIR's Protect and Restore the Tucannon Watershed

This annual report covers efforts conducted from 1 February 2015 through 31 January 2016.

SITE DESCRIPTION

The NFJD River (Figure 1.) is the largest tributary to the John Day River flowing westerly for 180 kilometers to join the mainstem John Day River near Kimberly, Oregon. The NFJD River's basin covers 47,885 square kilometers consisting of 37% private, 62% federal, and 1% state lands. The NFJD has been designated as a Wild and Scenic River from Camas Creek upstream to the head waters including one portion classified as "Wild," two as "Scenic," and two as "Recreational." These segments are primarily managed by the UNF and WWNF. State Scenic Waterways designated by the State of Oregon, stretch from Monument, OR upstream to the NFJD Wilderness boundary and from the confluence with the North Fork John Day River upstream to the Crawford Creek Bridge on the Middle Fork John Day River. The Middle Fork John Day River (MFJD) (Figure I) flowing into the NFJD is generally considered and primarily managed as a separate system by ODFW, the Confederated Tribes of the Warm Springs Reservation of Oregon, and The Nature Conservancy. The NFJD contains fifteen 5th Field HUC's (Figure 3) of which four, the Upper and Lower Camas Creek, Desolation Creek, and Granite Creek units are considered 'priority' areas for the purpose of concentrating the Project's restoration efforts.

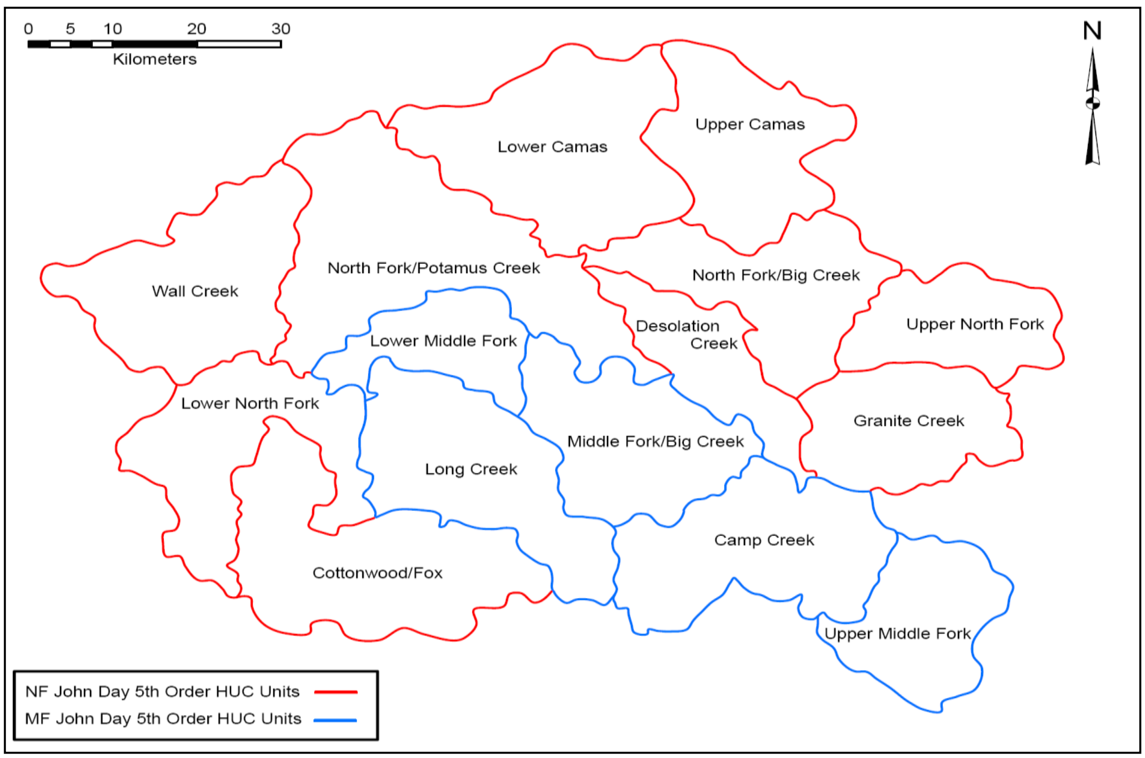


Figure 3. NFJD 5th field HUC's

Diverse land forms and geology range from 558 meters at the mouth to 2530 meters in elevation in the headwaters and consist of Columbia River Basalts, oceanic crust, volcanic materials, historic river and lake deposits, and recent river and landslide deposits. The North Fork John Day basin has a continental climate influenced by maritime weather patterns in the higher elevation areas which are characterized by low winter and high summer temperatures, low to moderate average annual precipitation and dry summers. Climate ranges from sub-humid in the upper elevations to semi-arid in the lower elevations with 0.33 to 0.5 meters annually contributing 60% of the flow in the lower John Day River, primarily through November and March. Mean annual temperatures are 3° C in the upper sub-basin and 14° C in the lower sub-basin and range from less than -18° C in the winter to over 38° C during the summer. The average frost-free period is 50 days in the upper sub-basin and 200 days in the lower sub-basin. The Blue Mountains in the basin's higher elevations produce a range of microclimates unlike the lower basins typical warmer and more stable patterns.

Historically, the John Day River was one of the most significant anadromous fish producers in the Columbia River Basin (CRITFC, 1995) due to its stability, strong summer stream flows, high water quality, and heavy riparian cover. Riparian areas were densely populated with aspen, poplar, willow, and cottonwood and beaver were abundant. Large spring and fall Chinook salmon migrations and numerous beaver sightings indicated the John Day River contained extensive in-stream habitat diversity. Resident trout species including westslope cutthroat (*Oncorhynchus clarki lewisi*), interior redband and bull trout gave way as habitat changed in response to land management objectives. These changes favored introduced species such as brook trout (*Salvelinus fontinalis*), smallmouth bass (*Micropterus dolomieui*), and redside shiner (*Richardsonius balteatus*) in places historically dominated by native resident salmonids. The NFJD currently supports strong native runs of spring Chinook salmon and summer steelhead in the Columbia River Basin with minimal influence from hatchery stocks. Narum et al. 2008 confirmed the John Day River's status as a viable refuge for wild stocks with limited anthropogenic influence.

Historic and current land use practices or threats (Table I) within the have reduced river stability, decreased high quality summer stream flows and water quality, reduced heavy riparian and floodplain cover, and compromised physical and biological processes related to these associations and structures. The loss of abundant riparian and flood plain vegetation, once robust beaver populations, and large spring and fall Chinook salmon migrations suggest the NFJD has lost a significant amount of in-stream habitat diversity and may now have an altered hydrologic cycle. Changes in the hydrologic cycle attributed to altered riparian and floodplain areas and stream morphology and processes can be indicated by increased runoff, altered peak flow regimes, reduced ground water recharge and soil moisture storage, and low late-season flow and elevated water temperatures. Historic and current land management strategies, in combination with possible changes in the hydrologic cycle, have contributed to stream channel instability (i.e., channel widening and downcutting) in some portions of the NFJD. Additionally, wildlife habitat has become increasingly fragmented, simplified in structure, and infringed upon or dominated by non-native plants (ICBEMP, 2000).

Major Limiting Factors	**Threats**
Floodplain & Channel Structure In-Stream Habitat Sediment Routing Water quality	Riparian Disturbance Stream Channelization & Relocation Grazing Forest practices Roads Irrigation Withdrawals Mining & Dredging

Table I. Limiting factors and threats within the North Fork John Day Basin.

Limiting habitat factors identified in the NFJD basin (Table 1) and designated in Carmichael (2006), Columbia BM RC&DA (2005), and various management plans include water quality (temperature, modified flows, nutrient input), in-stream habitat (structure, cover, sediment loading, channel morphology and processes,), and riparian health. Most streams in the NFJD basin are considered to be in relatively good condition, with the exception of elevated late summer water temperatures that exceed Oregon Department of Environmental Quality standards. In general, most indicators of channel condition within the NFJD suggest the basin is "functioning at risk".

Primary limiting factors identified in the 2008 Columbia Basin Fish Accords Memorandum of Agreement between the Three Treaty Tribes and FCRPS Action Agencies (Accords, 2008) align with the previously noted limiting factors (Table 2). Additionally, the document links benefits based upon limiting factors for listed fish to projects funded under the agreement, of which, The Project is one. The North Fork John Day River and its tributaries between the Middle Fork John Day River up to and including Camas Creek score lower than the Upper North Fork John Day River for current and expected habitat function. This is likely due in part to more land being intensively managed for agriculture, warmer and dryer climactic conditions, and higher concentrations of human populations and their related infrastructure. Upper Camas Creek maintains some of the qualities of the Upper North Fork John Day River and its tributaries. With improved strategies to identify and implement habitat restoration actions and improved coordination amongst basin cooperators limiting factors are being addressed more effectively than in the past.

Watershed	**Primary Limiting Factors**	**Estimated Current Function**	**Estimated Future Function**		**Estimated Current Watershed Function**	**Estimated Future Watershed Function**	
			Estimate 10 years	**Estimate 25 years**		**Estimate 10 years**	**Estimate 25 years**
Mid N Fk. JD and tribs (M Fk. to and including Camas Cr.	In-channel Characteristics	40	50	60	45	56.5	68
	Passage / Entrainment	54	70	90			
	Riparian / Floodplain	40	50	60			
	Sediment	50	60	70			
	Water Quality - Temperature	50	60	70			
Upper N Fk. JD and tribs above Camas Creek	In-channel Characteristics	60	70	80	62	72	82
	Passage / Entrainment	70	80	90			
	Riparian / Floodplain	60	70	80			
	Sediment	60	70	80			
	Water Quality - Temperature	60	70	80			

Table 2. Primary limiting factors by watershed in the North Fork John Day River Basin and estimated current and future function correlated to habitat restoration. Adapted from Accords, 2008 Attachment G.

2016 ACCOMPLISHMENTS

A description of individual Work Elements to which efforts were directed during 2014 (Figure 4) include;

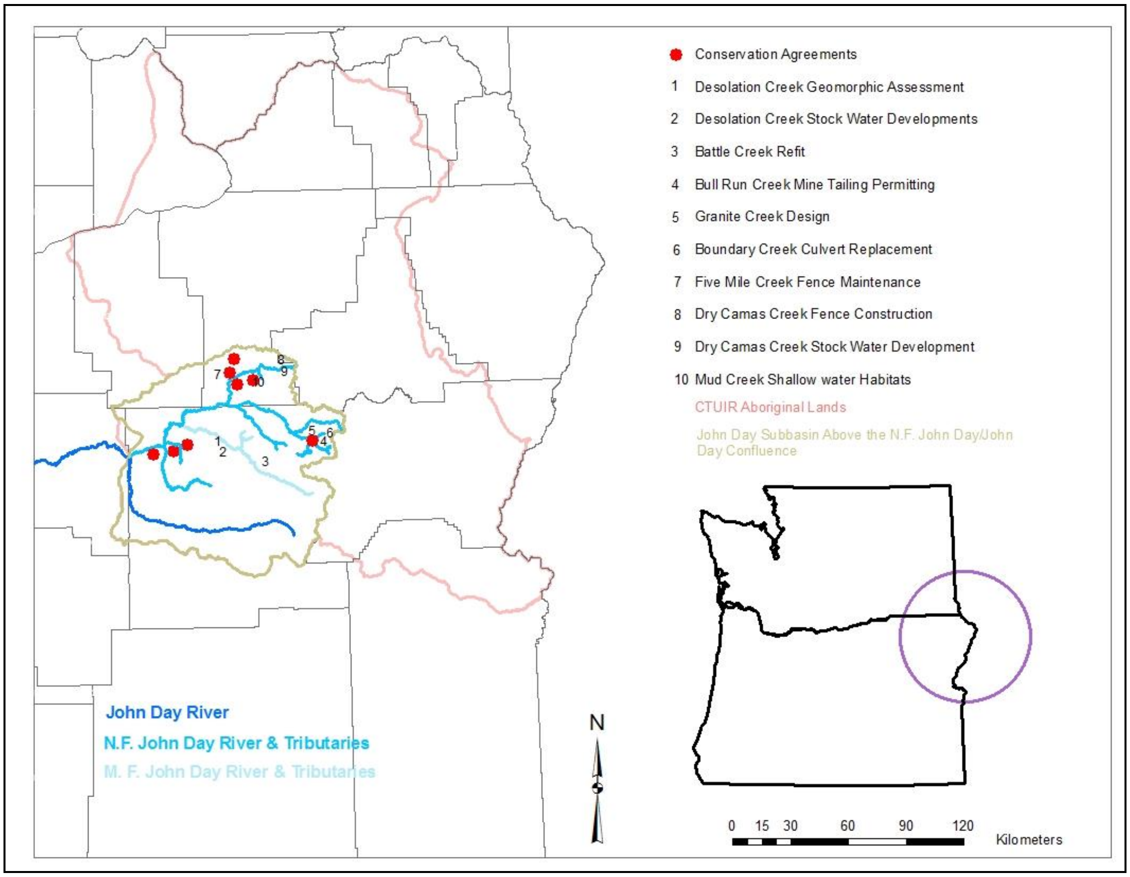


Figure 4. Restoration and Protection Site Locations.

WE A – Identify, Prioritize and Select Habitat Project Areas

Completed and submitted to BPA a draft Statement of Work for 2017 as required. In an effort to reduce contracting delays the 2017 Statement of Work was delayed slightly while bids were secured to detail design costs for private property on Granite Creek. The 2017 Statement of Work outlined work in the three established focal basins and continues The Projects strategy of adopting focus basin specific strategies for restoration.

Two conservation agreements were secured in January which will facilitate the Granite Creek design as it moves forward.

WE B - Produce Environmental Compliance Documentation

All permits and/or requisite information were secured by CTUIR or passed on to BPA.

WE C – Provide Outreach and Education

Outreach during this performance period consisted of attendance at various meetings. Ten NFJDWC meetings were attended with other efforts completed as a board member.

In support of providing a tribal perspective the staff attended three meetings developed by Oregon State Parks to identify a solution palatable to Oregon State Parks, Friends of Bates State Park, and interested parties. The meetings were held to identify an approach for meeting ODFW fish passage criteria for Bates State Park's mill pond as the existing fish ladder precludes passage by juvenile salmonids while the pond temperatures contribute to poor water quality. As a result of these meetings a concept was identified through consensus which will be developed with additional input by those who participated in the previous meetings.

At the request of local community members the project lead spoke with the Ukiah City Council to continue working toward addressing excessive sediment deposition within and adjacent to Ukiah, Oregon. The Ukiah City Council later decided to not contribute to such an effort and community support for addressing sediment deposition appears minimal at this time.

WE D – Maintain Water Developments

Water developments were maintained throughout 2016 and The Project will continue to coordinate with landowners regarding maintenance. All issues related to maintenance were resolved.

WE E – Investigate for Livestock Trespass

Trespass was addressed in one instance on Mud Creek. Work on the boundary fence rectified the problem.

WE F – Maintain Fences

Fence inspections throughout 2016 did not identify damage that wasn't repaired in short order.

WE G – Maintain Vegetation

A contract for noxious weed control efforts awarded in April of 2016 used herbicides on Granite, Mud, Desolation and Deer Creeks and the NF John Day conservation agreement sites. The CTUIR collaborated with the City of Ukiah for weed control on Lower Camas Creek site and adjacent properties within and around the city. Treatment records were submitted to BPA in fulfillment of HIP III requirements.

The CTUIR is now requiring that the contractor provide GPS data of treatments along with spray reports so that over time trends can be recognized.

WE H – Desolation Creek Geomorphic Assessment

Work on the Desolation Creek Assessment and Acton Plan continued collaboratively with the UNF, NFJDWC, CTWRSO, ODFW, and CTUIR through regular communication and two meetings in Ukiah, Oregon. Data collection and analysis, development of the action plan, and design work progressed although there were unexpected delays. The foremost of which was a need to rectify elevation errors within the 2006 LiDAR dataset and the inadequacy of 2015 Green LiDAR and its reacquisition in July of 2016.

The 60% Draft Desolation Creek Assessment including the draft action plan was delivered to the CTUIR in January of 2017. A 15% conceptual design for the Desolation Creek's mainstem and North and South Forks was accepted in October of 2016 and a 30% conceptual design arrived in January of 2017 for the highest priority, Reach 6, and an adjoining canyon reach.

Discussions between the UNF and Desolation Creek LLC identified a potential road relocation associated with the Reach 6 design resulting in splitting Reach 6 in two with the intent to implement the completed Upper Reach 6 design in 2017. During late 2016 and early 2017 the UNF and Desolation Creek LLC discussed potential routes for the road relocation.

WE I – Desolation Creek Stock Water Developments

Through a joint effort with the Desolation Creek LLC (landowner) and NFJDWC the CTUIR for development of seven upland stock watering sites. This is part of the landowner's strategy to improve upland forage use and replace lost stock watering opportunities from Desolation Creek. Over the past several years the landowner and ODFW have been constricting a riparian fence corridor along Desolation Creek to restrict access to Desolation Creek's floodplain and stream channel habitat where they have historically had unrestricted access.

The CTUIR provided $9,120.42 (Table 3) funding for the purchase of seven 600 gallon aluminum troughs. In total, 23,164 feet of four strand barbed wire meadow exclusion fence was constructed to protect associated wet meadows. Maintenance of these developments will be completed through joint permittee/landowner efforts for the life of the grazing permit.

Item	CTUIR	NFJDWC
Personnel		$4,442.00
Contracted Services		$73,123
Materials/Supplies	$9,120.42	$1,809.00
Travel		$342.00
Total	$9,120.42	$79,716.00

Table 3. Cost share associated with the 2017 Desolation Creek Stock Water Development effort.

WE J – Battle Creek Culvert Refit

During the spring of 2011 high flows resorted large and small stream simulation materials within the Battle Creek culvert resulting in an estimated 100 yd^3 loss of channel substrate and discontinuous flows during baseflow (Figure 5). The UNF, NFJDWC, ODFW, and CTUIR discussed several options to restore passage through the culvert since a contractors bid exceeded available funds in 2015. The agreed upon low impact treatment entailed washing in fines and creating a low flow channel. While our ability to wash in fines was minimized by an insufficient amount of available fine material the treatment combined with the low flow channel proved adequate. Flows and passage were reestablished and the treatment was stable through spring flows in 2017.

Figure 5. Resorted stream simulation material prohibiting passage through the Battle Creek Culvert (left) and plastic sheeting ‘purse’ passing stream flows during implementation.

In support of the effort the UNF provided permitting and oversight, ODFW provided a truck and backhoe with two of their staff, and the NFJDWC provided a technical crew (Figure 6) funded by the CTUIR who also secured a skid steer. Passage for both water and fish were realized through the use of a plastic sheeting purse (Figure 5) along the culvert’s footer and the inset floodplain was created with the skid steer pushing larger material aside to protect culvert footers. The technical team then created a low flow channel and washed in fine material by hand.

Figure 6. Youth crew excavating the low flow channel within the inset floodplain (left) and the finished inset floodplain and low flow channel.

Cost share for this effort’s implementation was equally split between the ODFW and CTUIR. The CTUIR provided $5,975 for the technical crew and $732 for the skid steer rental. The technical crew (18-21 year old women and men) gained practical work experience and a better understanding of why and how this action was being undertaken through their questions and explanations by UNF and CTUIR staff.

WE K – Bull Run Creek Mine Tailing Permitting

During 2016 a contractor was selected through a competitive bid process which included the participation of staff from the Wallowa-Whitman National Forest Staff, NFJDWC, and CTUIR. The design contract was signed in early September and the consultant spent the rest of 2016 gathering existing data, developing a Relative Elevation Map (Figure 7) and working with the collaborators to develop a Statement of Goals and Objectives. The on-site kick-off meeting was rescheduled to 2017 once snow melted and flows subsided so that field data could be collected at the same time. For 2016 the CTUIR considered this action complete while acknowledging that design work will continue through 2017. The final design was expected before the end of the 2017 performance period barring unforeseen difficulties.

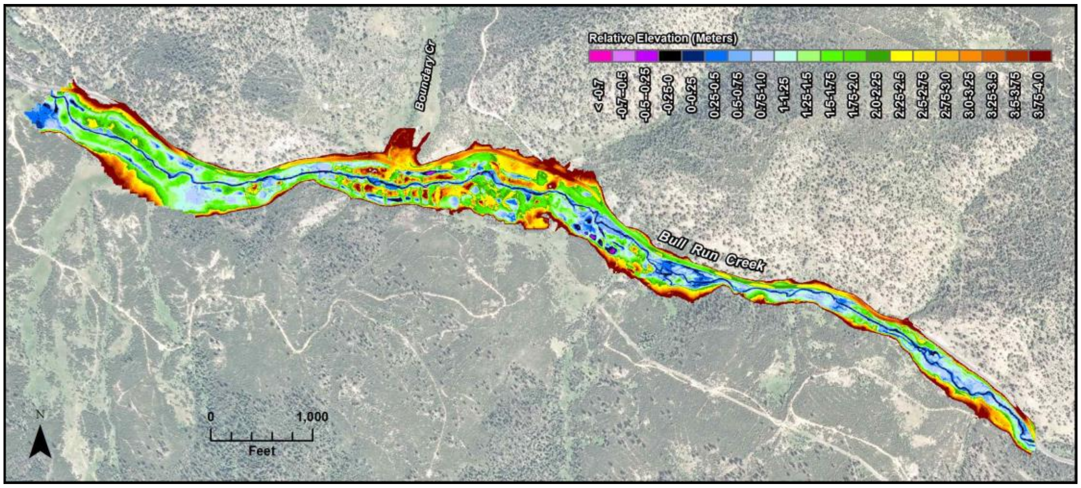


Figure 7. Relative Elevation Map developed from Green LiDAR data collected in 2016 for the Bull Run Creek design site.

WE L – Granite Creek Design

The selected design contractor collected Green LiDAR data and other field data in early 2016. A 15% conceptual design was submitted to BPA by the design contractor and CTUIR in June of 2016 and subsequently forwarded to the RRT. The RRT visited the site in early October and proposed an expansion of the project's scope to include four adjacent properties. The CTUIR accepted the RTT's comments and worked with the contractor to adjust the Scope of Work and budget accordingly. Two private landowners and the UNF agreed to collaborate in this effort in 2016 while discussions with the third private landowner continued into 2017.

For 2016 the CTUIR considered this action complete while acknowledging the scope revision will push design work into 2017 and implementation efforts into 2018. A final design is expected during the 2017 performance period.

WE M – Boundary Creek Culvert Replacement

The Boundary Creek culvert replacement did not occur during 2016 as a direct result of WWNF's staff being temporarily assigned out of the area which precluded the possibility of completing design work. U.S. Forest Service design efforts are an integral part of their cost-share and as such securing a design from a third party is typically not considered. Under these circumstances funding for design work would need to come from the CTUIR or another source thereby reducing available monies identified for implementation.

As this task was identified as a high priority in the Bull Run Creek Action Plan (USFS, 2012) the WWNF and NFJDWC will be pursuing design efforts and implementation funding at a later date.

WE N – Five Mile Creek Fence Maintenance
Following up on heavy fence maintenance in the Camas Creek basin in 2014 the CTUIR collaborated with the UNF to complete additional maintenance on fences protecting riparian areas and associated water quality on Five Mile Creek. Fences were initially constructed in the 1980s, 1990, and 2000s (Table 4) and while maintained by permittees their disrepair has increased over time.

Allotment	Stream Name	Miles Fenced	Year Constructed	Priority for 2016
F.G. Whitney Allotment and Matlock Allotments	Five Mile Creek	35	1989	1
F.G. Whitney Allotment	Taylor Creek	14.5	1993-2005	1
	Sugarbowl Creek	10.5	2005	2
	Morsay Creek	4.8	2005	2

Table 4. Streams that are currently fenced within the Five Mile Creek Watershed

Originally a total of 64.8 Km were identified for heavy maintenance by UNF staff and contractors where they would be more efficient. Due to delays and other staff obligations only 26.5 Km of heavy and general maintenance were completed (Table 5).

Allotment	Stream Name	Miles Fenced	Work Performed
F.G. Whitney Allotment	Taylor Creek/Five Mile Creek Fences	7	Heavy Maintenance
	Sugarbowl Creek Fences	10.5	General Maintenance
	Morsay Creek Fences	4.8	General Maintenance
	Total	26.5	

Table 5. Fences and total Kilometers where maintenance occurred.

The description of heavy maintenance and general maintenance are;

- Heavy maintenance of existing riparian fences will occur with the Five Mile Creek Watershed. This will involve right-a-way clearing, replacing stretch points (wood materials that have rotted over the years). Replacing old materials with new materials (wood stays, wire, etc.) where needed.

- General Maintenance of existing fences included; cutting and cleaning existing fence right-a-way; tightening loose or broke wires; adding staples and wood stays, clips and nails where necessary.

WE O –Camas Fence Construction
After the construction of State Route 244 in the 1970s a barbed wire fence was constructed along the right of way to keep cattle off the road. The resulting pasture included riparian areas along Camas Creek where grazing cattle would loiter throughout the summer. In an effort to protect these sensitive areas and water quality the WWNF

and CTUIR collaborated to replace 0.5 miles of four stand barbed wire fence with 0.75 miles of fence located well above the floodplain (Figure 7). WWNF cost share consisted of fence materials and the CTUIR supported WWNF construction staff time. Fence construction occurred during May of 2016 with the action being carried out as planned.

Figure 7. New fence constructed on a hillslope above Camas Creek and its floodplain.

WE P – Camas Creek Stock Water Development

With the fence construction of WE O stock watering opportunities from Camas Creek were limited. To offset this loss an existing pond was improved and a second was developed (Figure 8). These ponds capture and hold runoff from rain and snow events. For this action the WWNF contracted with a qualified company to develop and improve the ponds. Construction occurred during November of 2016.

Figure 8. The pond developed through this action to improve stock watering opportunities (left) and the improved pond which was deepened and widened (right).

Costs from a recent pond development in an adjacent pasture were used as justification for this effort in late 2015. However, bids came into the WWNF higher than expected so funding from within the CTUIR's budget was shifted to cover costs. Final cost share for both the fence construction and pond development/improvement are shown in Table 6.

Item	WWNF		CTUIR	
Salaries	$	7,875	$	11,047
Travel	$	690	$	-
Equipment	$	30	$	-
Supplies/Materials	$	1,250	$	2,543
Other	$	-	$	15,579
Overhead	$	693	$	-
Sub-Totals	$	10,538	$	29,169
		Project Total	**$**	**39,707**

Table 6. WWNF and CTUIR cost share for WE O & P

WE Q – Mud Creek Shallow Water Habitats
Cultural resource surveys for this action were completed during the summer of 2016 but final reports for consultation with SHPO didn't arrive in time to implement this action. This delayed the action's implementation until 2018; however, potential costs associated with the Desolation Creek Priority Design and Granite Creek design may consume all available funds. The landowner was able to meet obligations under his NRCS contract through an action which did not involve the CTUIR save through a discussion of alternative locations on the property.

WE R – Submit Annual Report for 2015 Performance Period
The annual report for the February 2015 to 31 January 2016 performance period was submitted prior to 1 February 2016.

WE T - Submit Annual Report for 2016 Performance Period
This report fulfills the CTUIR's annual reporting obligations for the 1 February 2016 to 31 January 2017 performance period.

WE T - Submit Status Reports
Submitted as required.

WE U – Produce Project Deliverables
All milestones for this WE were met save attendan6 Design consumed time identified for attendance at the workshop. In completion of this WE The Project's staff attended the 2016 River Restoration Northwest Symposium.

DISCUSSION

Responses to ISRP Qualifications resulting from the 2013 Geographic Review processes are contained in Appendix 2. RM&E data and results can be found in annual reports developed by the CTUIR's Bio-Monitoring Project (BPA Project # 2009-014-00) although their findings are summarized in this report.

Monitoring data collected by the CTUIR occurs on several levels including photo points and stream temperatures by The Project and geomorphic and biological data collected by the CTUIR's Bio-Monitoring Project. Monitoring data collection and analysis by The Project consists of photo point data collected annually in late summer and water temperatures collected from early June through late September. Both data are gathered where conservation agreements exist and other select locations. Water temperatures are collected using Hobo Pendant data loggers recording at one hour intervals at dedicated locations at the upstream and downstream ends of a site. Beginning in 2014 data loggers recording air temperatures were also placed to provide additional data and analysis. The use of non-parametric analysis such as that noted in Arismendi et al (2013) would provide for a more robust analysis then the seven day moving average used by ODEQ for the North Fork John Day River Total Maximum Daily Load (ODEQ, 2010), however we do not have that capacity at this time. As such, Analysis of Variance has been used to develop an understanding of the relationship of water temperatures at the upper and lower extents of each site. Although this techniques speaks to cooling or warming trends it inherently masks qualities of the temperature signal such as shorter term variation and lagging, buffering, and a combination of effects described by Arragoni et al (2008). In an effort to speak to the temperature signal's influence upon species of interest descriptions of data will also refer to the seven day maximum moving window average and a lethal 25^{o} Celsius threshold for Chinook salmon (McCullough, 1999) and a 19.1^{o} Celsius threshold where feeding stops for Chinook salmon (McCullough, 1999). A 10 – 15.6^{o} Celsius range preferred by juvenile Chinook salmon (McCullough, 1999) will also be used for comparison. Survival and growth rates as they are tied to water temperature acclimation periods will not be referred to. Although Snipe, Owens, Kelsay, and Deer Creeks don't contain spring Chinook salmon water temperatures suitable for spring Chinook salmon we'll refer to them as reasonable examples of expected outcomes of restoration actions.

Data collected and analyzed by the CTUIR's Bio-Monitoring Project (BPA Project # 2009-014-00) for the Granite Creek (Site GCT00001) and Desolation Creek (Site DesolationCreek_Control2/_Treatment2) began in 2013 and 2015 respectively (CTUIR, 2016). The Bio-Monitoring Project has been developing Annual Reports from which The Project summarizes relevant information below. Both biological data and physical habitat data are collected using established protocols. Available biological data will be discussed below for relevant sites. Physical habitat data will not be presented here at this time as its analysis wasn't completed in time for incorporation into this report.

Lower Camas Creek

In total 1,100 feet of levee removal, placement of five J-hooks, one mile of riparian fence constructed five upland stock water developed, and native plantings under the Farm Services Agency's CREP Program (5000 plantings) 2008 on the Lower Camas Creek site. A second planting by the CTUIR (200 native species) occurred in 2008. These plantings weren't successful due to wildlife predation, long term duration inundation directly resulted in the 2015 development of 2.75 meter tall enclosures to protect 233 trees planted in 2015 from wildlife. This method has proven to be more successful than those used before, however, 34 plantings were culled by wildlife that gained access to the enclosure during the winter of 2015/16 and another 65 died the following summer despite weekly watering.

Photo points (Figure 9) continue to show streambank erosion and the isolation of J-hooks placed in 2006 as stream sinuosity increases over time. A larger more comprehensive restoration effort would address process to a significant degree and improve in-stream habitat complexity. Unfortunately, we are unable to supplement previous in-stream efforts due to restrictions imposed by the landowner's CREP contract. Noxious weed control efforts will continue for the life of the conservation agreement.

Figure 9. Photo point collected for the Lower Camas Creek site (right) 2007 a year after levee removal looking downstream with the lowest two J-hook structures visible. During 2016 (left) looking downstream from the middle of the reach where the lowest two J-hook structures is visible

Data loggers collecting water temperature data show water temperatures tracking diurnal atmospheric fluctuations and the movement of fronts through the area on approximately one week cycles (Figure 10). This is not unexpected as a general lack of effective riparian vegetation and channel/habitat form (plainbed riffle with little structure or pool habitat) upstream of the site within Camas Creek and tributaries such as Cable Creek provide ample opportunity for thermal inputs to Camas Creek. So much so that the seven day maximum average stream temperatures did not consistently drop below the 19.1^{o} Celsius threshold until 5 September.

During 2016 water temperatures fell within the preferred 10 – 15.6^{o} Celsius range for Chinook salmon 43.96% (upper) and 69.39% (lower) of the entire sampling period and did not exceed the 19.1^{o} Celsius threshold another 69.070% (upper) and 97.169% (lower) of the sample (Table 7). Diurnal temperature fluctuation regularly entered the 10 – 15.6^{o} Celsius range which improves species ability to survive short duration high temperatures (Bjornn and Reiser, 1991) thereby reducing the potential for fish kills. Perhaps the greatest unknown at this site is the role of groundwater entering the stream channel which can be felt by placing ones hand on the substrate. Neither fish use nor the extent of groundwater inflow to the stream channel has been quantified although the exercise would provide useful information regarding aquatic species ability to withstand higher temperatures in Camas Creek through behavioral thermoregulation.

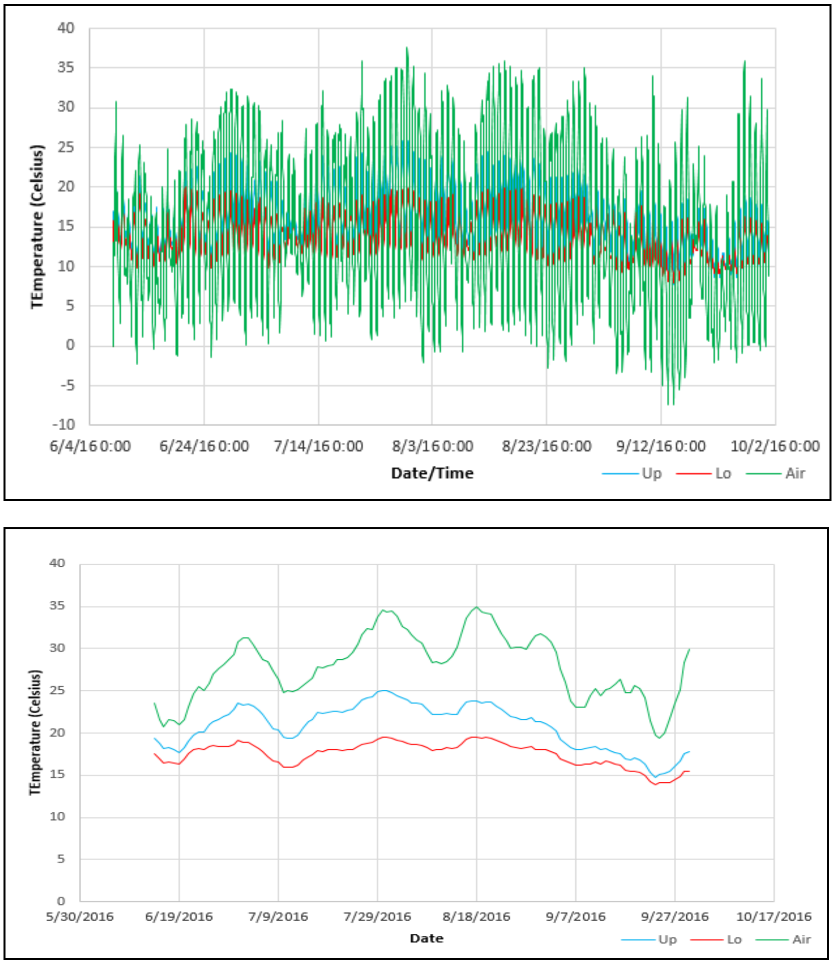


Figure 10. Water temperature data collected at the Lower Camas Creek site between 7 June 2016 and 30 September 2016. All data collected (top) and the seven day moving window daily maximum temperatures (bottom).

	Up		Lo	
Temperature Range (Degrees Celsius)	Count	%	Count	%
< 10.000	2	0.107	16	0.855
10.000 – 15.699	823	43.96	1299	69.39
15.7 - 19.099	468	25	504	26.92
>19.1	579	30.93	53	2.831
SUM	1872	100	1872	100

Table 7. Temperature count and percent in category tabulated for the 2016 upper and lower temperature records at the Lower Camas Creek site.

When viewed across years the change in data points within temperature categories as identified by percent change (Table 8) there isn't a clear trend. During 2004, 2008, 2012, 2013, and 2014 data point counts increased at the lower data logger while in 2007 and 2016 data point counts increased at the upper logger. This data suggest that water temperatures are more often warming and tend to be greater than the 19.1^{o} Celsius threshold than they are cooling and within the preferred 10-15.6^{o} Celsius range.

Temperature Range (Degrees Celsius)	2004	2007	2008	2012	2013	2014	2016
< 10.000	0.0	0.1	-22.3	-0.2	0.0	0.4	0.7
10.000 – 15.699	-7.5	8.0	8.5	-12.8	-21.6	-17.5	25.4
15.7 - 19.099	-6.5	-1.2	10.2	-5.4	-0.7	0.3	1.9
>19.1	13.9	-6.9	3.5	18.4	22.3	16.8	-28.1

Table 8. Change in the number of data points by percentage between the upper and lower data loggers reflecting colder than preffered growth (<10º Celsius), preferrred growth temperatures (10-15.6º Celsius), preferrred growth temperatures to the threshold where feeding stops (15.6º - 19.1º Celsius), and greater than the feeding threshold (>19.1º Celsius) for Chinook salmon. Negative values reflect a decrease in the number of data points within categories while positive values reflect a gain in data points per category. Based on data collected between 2004 and 2016.

ANOVA analysis also reflects this inconsistently between years as the 2004 the mean summer temperature was 16.7 (+- 0.25) °Celsius at the upper probe compared to 17.9 (+-0.32) °Celsius at the lower probe indicating a warming through the restoration area. Whereas in 2007 the lower site was cooler compared to the upper site (17.87 °Celsius +- 0.38, and 18.99 °Celsius +- 0.38 respectively). This then returned to the upper site being cooler in 2008, 2012, 2013, and 2014, with the lower site again being cooler in 2016 (14.2 °Celsius +- 0.29 compared to 16.89 °Celsius +- 0.28). From these data it does appear that 2016 was a particularly cool year for Camas Creek. Pooling data for all years and comparing mean summer temperatures between the upper and lower site resulted in a statistically significant difference (p = <0.0001 – Welch's Test), with the upper site being cooler.

A comparison of air temperatures as part of the ANOVA analysis doesn't suggest that for 2014 and 2016 (p = <0.0001 – Welch's Test) there is a difference between the two sample records suggesting atmospheric temperature is not driving the discrepancy. Given this information The Project considered the potential influence of stream discharge by comparing mean daily stream flows for 2014 and 2016 between 1 January and 30 September (Figure 10) using data gathered by the Oregon Department of Water Resources for gauge #14042500 (OWRD, 2017). Based upon average daily flow the total flow for this period was 21.8% higher in 2014 than 2016 and flows persisted longer into the year as indicated by peaks around 14, 18, and 28 June and 14 August which likey represented percipitation events. Given this information it dosen't appear likey that stream discharge influenced Lower Camas Creek's temperatures as we would expect the slightly lower stream discharge of 2016 would be more responsive to thermal flux into the stream.

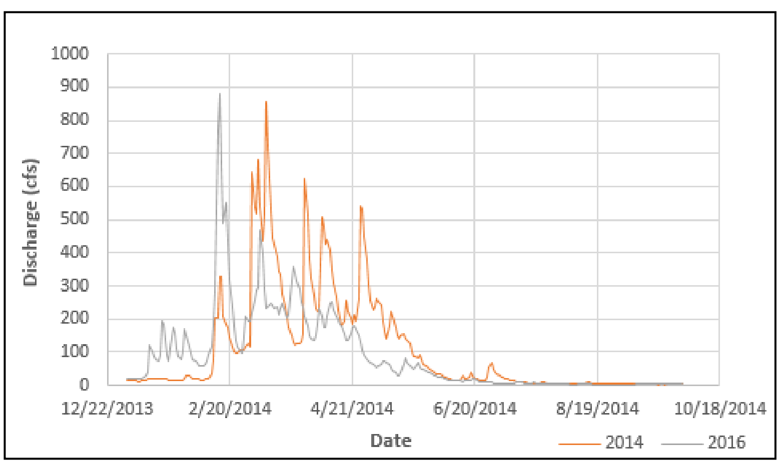


Figure 10. Stream discharge for Camas Creek between 1 January and 30 September for 2014 and 2016

The most significant question which The Project cannot answer is how and to what extent geomorphic processes and hyporheic flows influencing stream temperatures. Given that the CTUIR's Bio-Monitoring Project has not been collecting data at this site our ability to ascertain the role of either is limited. Figure 11 indicates Camas Creek has migrated over time; particularly between the removed levees which is why the j-hooks placed in 2006 are no longer located along streambanks. Camas Creek's alignment shifted up to 51 meters in one location although lateral migration is generally 25 meters in some locations and predominantly less than nine meters since 2005. Because of this channel sinuosity has increase from 1.25 in 2005 to 1.29 in 2016. Channel width appears to be relatively consistent between 2005 and 2016 although widths have decreased from 23 meters (2005) to 9 meters in 2016 within the removed levees to 9 meters in 2016. As a result of this evolution we would expect hyporheric flows would become stronger at least with regard to shorter cycles. That said, however a lack of large wood or similar structure to create and maintain scour could be a limiting factor and reduce the potential for hyporheic flows to moderate stream temperatures.

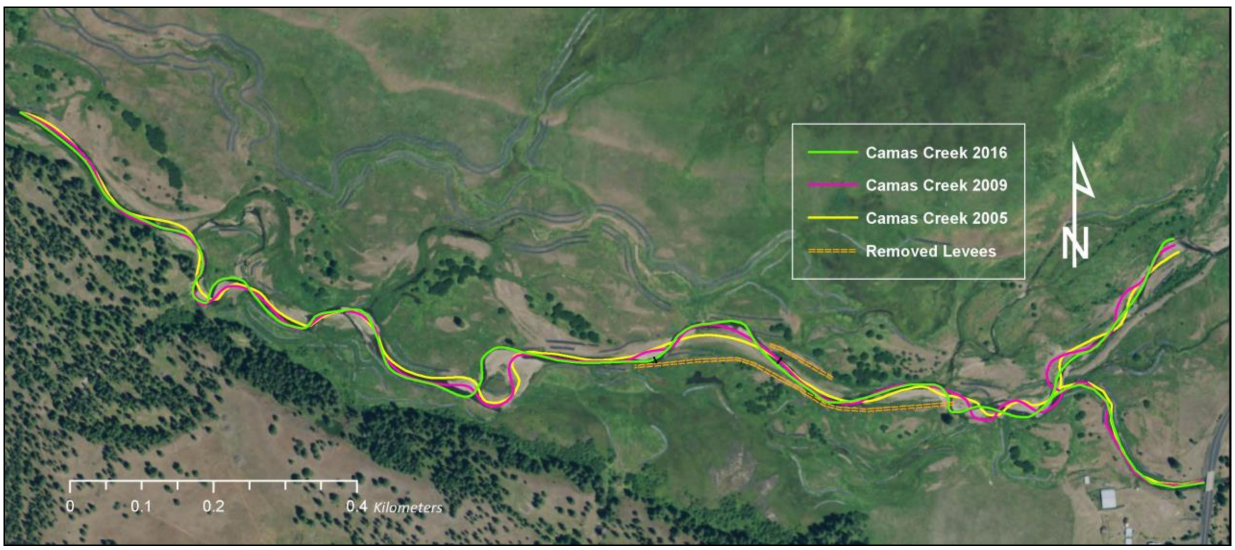


Figure 11. Aerial imagery showing changes in the thalwag alignment for 2005, 2009, and 2016 on the 2016 aerial imagery for the Lower Camas Creek site.

Another potential influencing factor based upon qualitative observations suggests that sediments are being mobilized from or more likely passed through Camas Creek within and adjacent to the City of Ukiah and deposited in the project area. Floodplain connectivity appears to have increased since 2005 while channel depths appear to have decreased, especially at the upper end of the project area. Although difficult to quantify, aerial imagery (Figure 12) for 2005 and 2016 suggests that gravel bars are much more robust then they were in the past. If gravels are in fact being deposited more frequently one could expect an increase in hyporheic exchange even without hard structures to create and maintain more localized scour which could be reflected in the temperature record. The role deposited sediments potentially creating shallower and a narrower channel hasn't been quantified either.

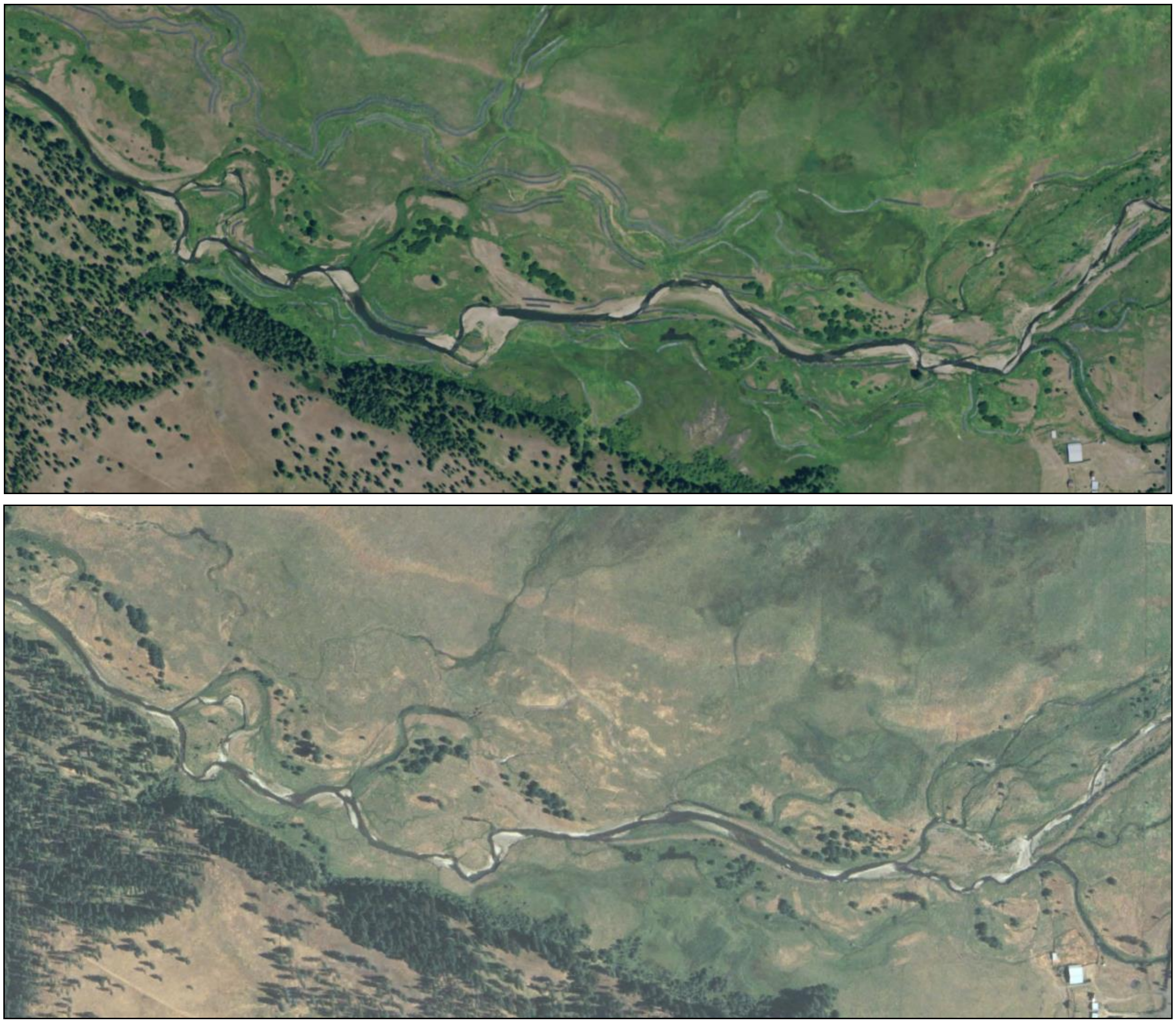


Figure 12. Aerial NAIP imagery from 2005 (bottom) and 2016 (middle) for the Lower Camas Creek site.

<u>Owens Creek</u>

Actions undertaken on this property were developed to improve grazing on the property through better utilization of upland forage and passive improvement of stream channel and floodplain conditions through the removal of cattle. Riparian fencing and off-stock water developments were completed at the conservation agreement's onset to reduce the influence of grazing cattle upon Owens Creek. Due to the landowner's reluctance to implement additional treatments, the sites location immediately above the SR 244 bridge, low valley and channel gradient (<0.5%), short stream length (0.5 Km), and limited baseflow additional work to improve in-stream complexity did not occur. The stream channel through this reach is wider than one would likely expect in an undisturbed or minimally disturbed setting due to the past influence of cattle grazing practices. The conservation agreement ended on 29 May 2016 as the new owner did not have an interest in renewing the agreement. Monitoring and evaluation data hasn't collected at the site by the CTUIR's Bio-Monitoring Project.

Photo point data isn't available to document the site's condition at the onset of the conservation agreement. Photo points collected in 2004 and 2015 (Figure 13) suggest that streambanks maintained stable grass, sedge, and forb coverage. Unfortunately, woody vegetation hasn't prospered, the reason for which, is not known. The most recent new landowner continues to maintain the constructed riparian fence and graze the riparian areas within using flash-grazing techniques.


Figure 13. Photo points collected in 2004 (left) and 2015 (right) at the Owens Creek site.

The fence and stock water development and maintenance implemented over the last 15 years have proven successful as they restricted cattle access to sensitive riparian habitats and prevented degradation from bank cutting and over grazing. However, given a lack of pre-implementation data changes resulting from treatments is limited. The Project hasn't identified readily available information which would provide a quantitative assessment of site changes over time.

As with Snipe Creek, Owens Creek fell victim to the influence of larger scale processes in that upstream of the site large areas of Owens Creek are incised and simplified and native hardwoods are often limited or non-existent in riparian and floodplain areas; including expansive meadows. The net effect of which is significantly reduced ground water storage, more immediate response to storm events and spring runoff, and reduced opportunities for salmonid rearing and spawning. Considering our understanding of the efforts goals and objectives relative to the cost of a well, associated water troughs, and riparian fencing the action is considered a success, all be it a minor one.

<u>Snipe Creek</u>

Actions undertaken on this property were developed to address grazing improvements through the use of underutilized upland forage and the passive improvement of stream channel and floodplain conditions through the removal grazing cattle. Treatments consisted of two riparian enclosures (Figure 14) located in a narrow well vegetated canyon containing a B4 stream channel (Rosgen, 1996 classification) (upper site) and another approximately 0.5 Km downstream in a broad alluvial valley which historically would have contained a channel form similar to an E5 (Rosgen, 1996 classification) (lower site). Implemented actions included two upland spring and two off-channel well developments, riparian fencing, and native plantings. The Conservation Agreement associated with this property ended on 29 May 2016.

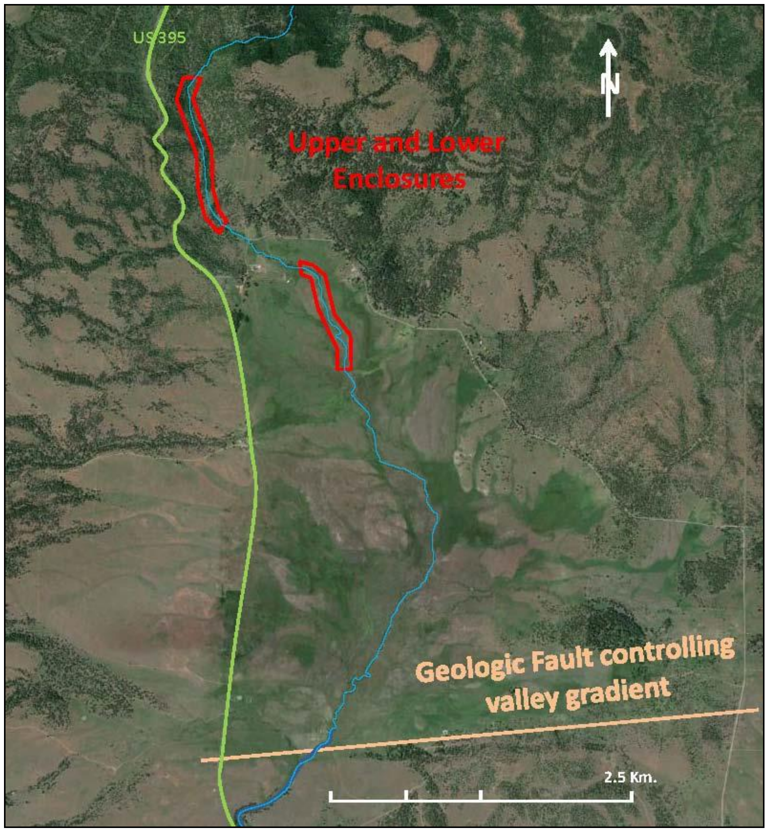


Figure 14. Aerial photograph showing the two Snipe Creek enclosures and the extent of channel incision below the site to a geologic knickpoint controlling valley gradient. Streamflows are from the top of the photograph to the bottom. Photo taken from Google Maps (Google, 2017) and fault denoted in RMS-1 (2001).

During the Conservation Agreement's term the landowner maintained cattle grazing on the property with the use of water developments contributing to the more effective use of upland forage. Riparian fences successfully prevented cattle access to Snipe Creek beyond rare occasions of trespass which were quickly rectified. The protection of Snipe Creek's stream channel, riparian, and floodplain habitats afforded by riparian fencing reduced sediment entrainment allowed for vegetative growth. The growth of native vegetation was further advanced through noxious weed treatments during the conservation agreements term. The stream channel within the upper enclosure improved through the natural recruitment of wood from upstream sources and vegetation which quickly recovered after fence construction. In the lower enclosure streambanks continued to collapse although their failure served to stabile the incised channel and prevent further streambank collapse and channel widening as native grasses, forbs, and sedges continued to grow on collapsed banks. Beaver contributed to improved steam channel conditions to a limited extent through the periodic development of dams at the lower site's upper end. Unfortunately, this came at the expense of Quaking aspen plantings which initially survived predation adjacent to the creek in the lower enclosure's upstream end. Plantings consisted of native hardwoods and Ponderosa pine but given the site's conditions Quaking aspen only survived in the previously noted location while Ponderosa pine took hold across the floodplain. Survival largely appeared to be a function of water availability as hardwoods planted on the floodplain and in natural swales did not survive summer months despite watering by The Project.

Water temperatures proved difficult to sample due to logger displacement by wildlife and Snipe Creek's periodically losing all flows during baseflow periods. Three years of data were available for analysis and all reflect similar behavior. As Table 9 indicates, water temperatures at the lower data logger warmed considerably. ANOVA analysis supports this as it finds the lower data logger consistently shows warmer mean summer temperatures compared to the upper probe for each year of deployment and there were between year differences in mean summer temperature for both sites. For example, the lower site was cooler in 2012 compared to 2004 (14.2 °Celsius +- 0.29 and 14.75 °Celsius +- 0.26 respectively), and the upper site was also warmer in 2004 compared to 2012 (12 °Celsius +- 0.24 and 10.6 °Celsius +- 0.18 respectively). Pooling data for all years and comparing differences between the upper and lower mean summer temperatures was also significant (p = <0.0001 – Welch's Test) with the lower site being warmer.

Temperature Range (Degrees Celsius)	2004	2006	2012
< 10.000	-19.8	-16.4	-23.9
10.000 – 15.699	-5.6	-4.6	-12.5
15.7 - 19.099	14.3	7.8	25.9
>19.1	11.2	13.3	10.6

Table 9 Change in the number of data points by percentage between the upper and lower data loggers reflecting colder than preffered growth (<10^{o} Celsius), preferrred growth temperatures (10-15.6^{o} Celsius), preferrred growth temperatures to the threshold where feeding stops (15.6^{o} - 19.1^{o} Celsius), and greater than the feeding threshold (>19.1^{o} Celsius) for Chinook salmon. Negative values reflect a decrease in the number of data points within categories while positive values reflect a gain in data points per category. Based on data collected between 2004 and 2012.

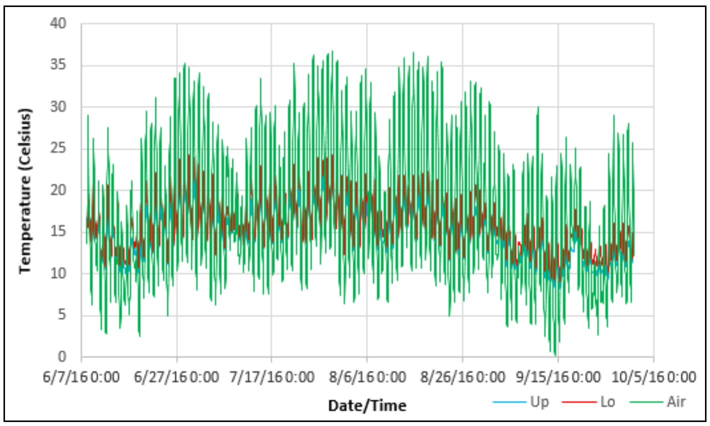
The lack of success with native plantings is indicative of the altered channel form influencing hydrologic conditions and in turn floodplain function. A significant head-cut migrating upstream from a natural grade control point approximately 4 km downstream (Figure 14) reached into the lower half of the lower enclosure prior to its development. Snipe Creek' periodic loss of flow through the lower enclosure during baseflow periods, loss of hardwoods, and ponderosa pine establishing itself across the floodplain suggests groundwater storage has been significantly impaired by the head-cut. The landowner's renewal in the Farm Services Agency's CREP program prevented the development of additional restoration actions for the contract's term and without the cooperation of several more downstream landowner's actions undertaken within the conservation agreement's footprint cannot effectively address the localized symptoms of the much larger problem. That said and considering the efforts original goals and objectives as we understand them, The Project considers the implemented treatments a success. While stream channel incision could not be effectively addressed, natural streambank collapse and the growth of native grasses on the collapsed banks contribute to a form of stability by reducing the head-cut's rate of growth. Additionally, the collapsed streambanks and vegetative growth upon them are decreasing solar inputs to Snipe Creek much more than what can occur where a wider in-set floodplain is created and maintained without vegetation.

<u>Deer Creek</u>

Prior to the CTUIR installing riparian fencing and stock water developments the property was used as winter pasture for cattle. As such, floodplain and riparian conditions were severely degraded although to what extent we cannot say without pre-implementation monitoring data. Over time riparian vegetation recovered to some extent although the degree to which this occurred cannot be determined.

Monitoring and evaluation data hasn't collected at the site by the CTUIR's Bio-Monitoring Project.

Maximum raw or averaged daily water temperatures (Figure 15) did not exceed the lethal 25° Celsius threshold for spring Chinook salmon for the upper or lower data loggers. Although maximum daily temperatures exceeded the 19.1° Celsius threshold regularly between 20 June and 21 August minimum daily temperatures were within the preferred 10-15.6° Celsius rearing range and as such sustained maximum temperatures which would have stressed aquatic species were potentially minimized. Maximum temperatures for the lower data logger also exceeded the 19.1° Celsius threshold all be it less frequently. Minimum daily temperatures for the lower site were predominantly within the 15.6° - 19.1° Celsius range.



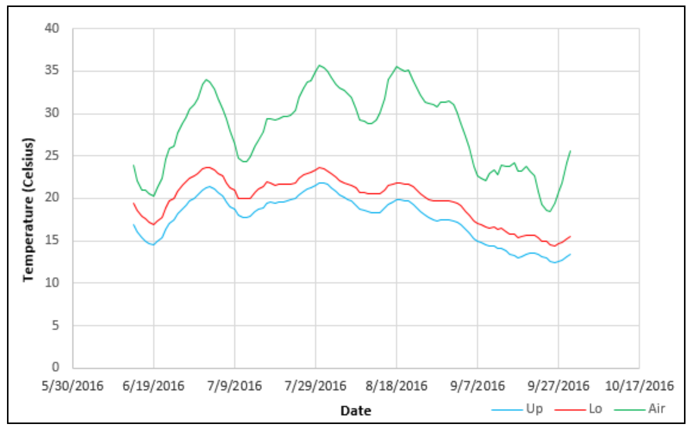


Figure 15. Data for all data collected at the Deer Creek site between 6 June 2016 and 30 September 2016 (left) and the seven day moving window daily maximum temperatures for the same period (right).

Changes in the number of data points presented as percent change between the upper and lower logger sites indicate the upper logger site is cooler than the lower (Table 10). Additionally ANOVA analysis of the data indicates that Deer Creek consistently had warmer summer temperatures at the lower site compared to the upper for the deployment between 2007 and 2016 and all within year differences were statistically significant. This was also evident when pooling data for all years and comparing differences between the upper and lower mean summer temperatures (p = <0.0001 – Welch's Test).

Temperature Range (Degrees Celsius)	2007	2008	2010	2011	2012	2013	2014	2015	2016
< 10.000	-1.8	-2.5	-4.4	-4.4	-2.8	-1.2	-0.6	-0.8	-1.8
10.000 – 15.699	-9.2	-10.4	-9.1	-9.1	-13.3	-8.9	-10.0	-7.0	-11.3
15.7 - 19.099	-0.6	-0.5	4.8	4.8	2.0	0.0	-0.4	-2.2	0.6
>19.1	11.5	13.5	8.7	8.7	14.1	10.1	11.0	10.0	12.5

Table 10. Change in the number of data points by percentage between the upper and lower data loggers reflecting colder than preffered growth (<10° Celsius), preferrred growth temperatures (10-15.6° Celsius), preferrred growth temperatures to the threshold where feeding stops (15.6° - 19.1° Celsius), and greater than the feeding threshold (>19.1° Celsius) for Chinook salmon. Negative values reflect a decrease in the number of data points within categories while positive values reflect a gain in data points per category. Based on data collected between 2007 and 2016.

Monitoring and evaluation data isn't collected at this site so a detailed analysis of changes in habitat isn't possible. It is however most likely that temperature changes are a response to thermal inputs from the atmosphere given the sites climate, elevation, and east/west orientation. The recovery of vegetation as suggested by photo points (Figure 16) may in time minimize the influence of air temperatures. Raw streambanks visible in 2004 and Deer Creek's floodplain continue to be colonized by cattails (*Typha* genus) and willow (*Salix* genus). Water temperature may also continue to improve in response to beaver colonization of the project site.

Figure 16. Photo points for the Deer Creek site collected in 2010 (left) and 2016 (right).

Kelsay Creek

A 2008 and 2009 effort constructed riparian fencing to prohibit cattle access to stringer meadows along Kelsay Creek and protect several nearby springs and seeps up to 30 meters from the creek. Prior to the fence construction cattle would loiter in meadows consuming or knocking grasses and sedges to the ground, cutting streambanks, and disturbing stream habitat for Threatened Mid-Columbia steelhead trout which have been known to spawn nearby. Building upon a previous effort downstream by the UNF the UNF and CTUIR cooperated to construct 4.4 Kilometers of 'New Zealand' fence along 1.6 Kilometers of Kelsay Creek. Monitoring for this effort included photo points and water temperature loggers at two locations. Fence maintenance has been completed by the UNF's grazing permittee with oversight by the UNF's Range Conservationist.

Photo point data (Figure 17) suggests that cattle exclusion allowed native vegetation to recover and streambanks are not being disturbed to the level they once were. Elk and deer still have access to the site and likely influence hardwood vegetative recovery to an unknown extent. Plantings will likely repopulate the site in time as they have in the previously constructed downstream enclosure. A useful exercise would be to place wood in Kelsay Creek to improve channel complexity and sediment retention which may occur as part of the UNF's meadow enhancements identified in the Desolation Creek GAAP (WE L).

Figure 17. Photo points from 2008 (left) and 2015 (right) collected at the downstream end of the Kelsay Creek site.

Kelsay Creek's temperature signal suggests that water temperatures are cooling through the site (Figure 18) as the upper data logger shows diurnal fluctuations being greater than those of the lower data logger. This is not surprising given Kelsay Creek's upstream riparian and floodplain condition and presence of grazing cattle as compared to cattle prohibition within the enclosure and response in vegetation. However, diurnal temperature cycles regularly fall within the preferred 10-15.6^{o} Celsius preferrred growth temperature range for spring Chinook salmon which would benefit summer steelhead trout. Cooling within the enclosure is most prevalent from mid-July through the end of the dataset save where all temperatures converge which we expect reflects cool/cold weather periods. The seven day maximum moving average (Figure 19) and number of data points presented as a percentage of the distribution between upper and middle loggers and middle and lower loggers (Table 11) indicates there is a slight warming between the middle and lower logger which may be the result of increased thermal inputs as flows move through a broader portion of the meadow.

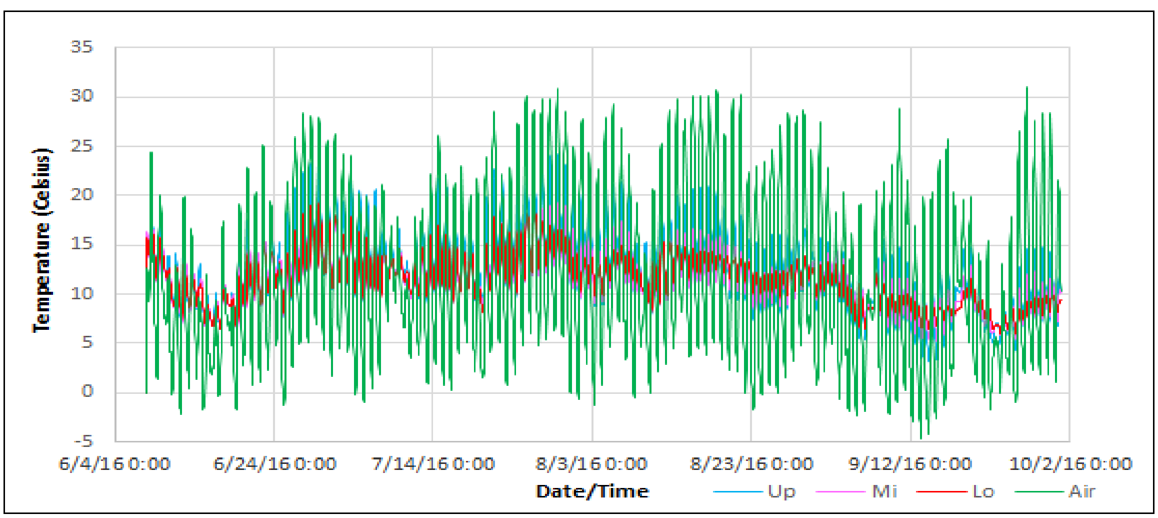


Figure 18. Data for all data collected at the Kelsay Creek site between 6 June 2016 and 30 September 2016

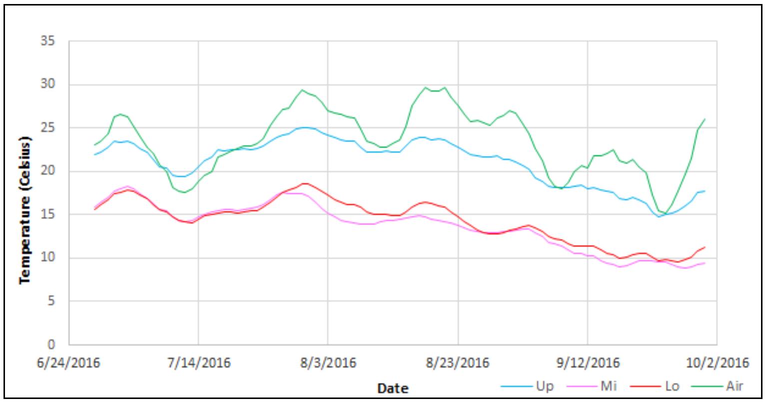


Figure 19. Seven day maximum temperature moving window average for data collected at the Kelsay Creek site between 6 June 2016 and 30 September 2016.

Temperature analysis using ANOVA techniques indicated supported the findings above in that the upper probe had mean summer temperatures warmer than both the middle and lower probes each summer period, and there were no statistical differences between the middle and lower probes. However the mean temperature for the upper probe was 12.9 °Celsius with a max of 25.3 °Celsius compared to a mean of 12.2 °Celsius at the lower site with a max of 26 °Celsius. Pooling data for all years and comparing differences between the upper, middle, and lower mean summer temperatures was also significant (p = <0.0001 – Welch's Test).

Temp Range (Degrees Celsius)	2008 Up/Mid	2008 Mid/Lo	2010 Up/Mid	2010 Mid/Lo	2011 Up/Mid	2011 Mid/Lo	2012 Up/Mid	2012 Mid/Lo
< 10.000	-1.3	2	10.1	7.3	-9.6	12.8	1.3	2.6
10.000 – 15.699	5.7	0.9	-7.6	-15.7	23.7	-20.6	6.3	-1.1
15.7 - 19.099	1.1	-1.6	2.1	0.2	-9.3	6.4	1.3	-2.1
>19.1	-5.5	-1.3	-4.6	8.1	-4.9	1.3	-8.9	0.7
Temp Range (Degrees Celsius)	**2013 Up/Mid**	**2013 Mid/Lo**	**2014 Up/Mid**	**2014 Mid/Lo**	**2015 Up/Mid**	**2015 Mid/Lo**	**2016 Up/Mid**	**2016 Mid/Lo**
< 10.000	0.6	0.3	1.7	-1.7	1.6	2.2	1.6	-0.3
10.000 – 15.699	11.7	2.5	5.5	1.9	10	2	10.1	1.9
15.7 - 19.099	-2.7	-2.9	1.7	-0.8	-4.4	-4.6	-3.7	-1.6
>19.1	-9.6	0	-8.9	0.5	-7.3	0.4	-8	0

Table 11. Change by percentage between the upper and middle and middle and lower data loggers reflecting colder than preferred growth (<10° Celsius), preferred growth temperatures (10-15.6° Celsius), preferred growth temperatures to the threshold where feeding stops (15.6° - 19.1° Celsius), and greater than the feeding threshold (>19.1° Celsius) for Chinook salmon. Negative values reflect a decrease in the number of data points within categories while positive values reflect a gain in data points per category. Based on data collected between 2008 and 2016.

Granite Creek

During 2013 four large wood structures were developed to protect an existing trailer pad located atop placer mine tailings and create low and high flow channel margin habitat. Thus far the structures have maintained their stability and native vegetation is recovering. Willow cuttings can be seen in the 2016 photo point (Figure 20) along with a naturally occurring mountain alder. A second effort currently in design and scheduled to be completed by the end of the 2017 performance period will improve stream channel and side channel attributes, increase stream channel complexity for aquatic species, increase available side channel habitats, and include a more comprehensive native vegetation component.

Figure 20. Photo points collected at the Granite Creek site during 2013 (left) and 2016 (right).

Data collected and analyzed during 2016 by the CTUIR's Bio-Monitoring Project (CTUIR, 2016) constitutes the fourth year in which pre-implementation data at the Granite Creek site was collected for treatment and control sites. For the purpose of collecting data pre-implementation is considered prior to the implementation of design plans currently under development which will comprehensively address channel and floodplain complexity through the property and adjoining properties. Data collected and analyzed suggests that pre-restoration spawner survey data collected by ODFW from 2009 to 2016 shows no significant difference in spring Chinook salmon redds per kilometer of stream between the treatment and control reaches. They were unable to identify a difference in juvenile summer steelhead trout or spring Chinook salmon densities between the treatment and control sites between 2013 and 2016. Summer steelhead trout average densities were 0.0361 fish/m^2 and 0.1366 fish/m^2 in the treatment and control sites respectively. Spring Chinook salmon densities were higher in the treatment site (0.1068 fish/m^2) than the control site (0.3466 fish/m^2) (CTUIR, 2016). These numbers aren't surprising as neither the treatment or control sites contain significant quantities of complex rearing and spawning habitat for either species. Unfortunately, physical habitat monitoring data wasn't available for incorporation in this report and will be discussed in subsequent annual reports. A full list of metrics is available on the Action Effectiveness Monitoring website (www.aemonitoring.org) for each site and each year of sampling.

Desolation Creek

To determine progress toward meeting goals and objectives of the Desolation Creek GAAP and resulting restoration designs pre-implementation data were collected during 2015 and 2016 between RM 10.5 and 11.8 (treatment) and at the control site near RM 16 by the CTUIR's Bio-Monitoring Project. Similar habitat condition upstream of the treatment site could not be located to use as a control site. Therefore, the selection of a "pristine" condition control site representing an ideal post-implementation condition was chosen. Spring Chinook salmon spawner surveys conducted by ODFW personnel between 2009 and 2016 indicated that spawning activity was significantly higher in the control reach than in the treatment reach (CTUIR, 2016). Unfortunately, summer steelhead trout spawner surveys produced insufficient data to analyze either the treatment or control reaches. Juvenile summer steelhead trout and spring Chinook salmon densities were similar in the treatment and control in 2015 and 2016 although summer steelhead trout size class distributions appear different between the two sites. At the control site, 71.69% of summer steelhead trout were 50-69mm in length while only 35.2% of summer steelhead trout in the treatment reach were of similar size in 2016. Trends were similar in 2015 with summer steelhead trout size class frequency being 10mm smaller in the control than the treatment site. Fish above 129mm weren't present in the control site during 2015 and 2016. Within the treatment site 5.2% and 7.14% of summer steelhead trout were 130-210mm during 2016 and 2015 respectively.

In general, habitat complexity is much more diverse in the control versus the Desolation Creek's Upper Reach 6 treatment site. Unfortunately, physical habitat monitoring data wasn't available for incorporation in this report and will be discussed in subsequent annual reports. A full list of metrics is available on the Action Effectiveness Monitoring website (www.aemonitoring.org) for each site and each year of sampling.

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APPENDIX I

Limiting Factors	Code	Objectives	Code
Channel Characteristics	CC	Improve stream channel complexity and morphology	1
Habitat Diversity	HD	Preserve desirable or improve degraded aquatic habitat	2
Floodplain Confinement	FC	Improve floodplain connectivity	3
Riparian & Floodplain	RF	Improve riparian and floodplain complexity	4
Water Quality (non-sediment)	WNS	Improve or preserve temperatures and chemistry	5
Water Quality (sediment)	WS	Improve sediment routing and sorting	6
Stream Discharge	SD	Improve streamflow during base flow periods	7
Passage Barriers/Entrainment	P	Improve passage to existing high quality habitats	8

Site	Limit. Fact.	Obj.	Year Implem.	Years Treat.	Stream Km. Affected	Acres Leased / Affected	Cntl. Site Id'd.	Metrics	Phys. Monitoring	Bio. Monitoring
Owens Creek Conservation Agreement 2001-16	CC, HD, WS, WNS	1, 2, 7	2001	15	0.5	5.2	no	- 481 meters of 4-strand barbed wire riparian fence constructed. - One stock well developed and with associated troughs. - Structure maintenance and noxious weed treatments for the life of agreement.	2 cross sections 1 photo point	none
Upper Snipe Creek Conservation Agreement 2001-16	CC, HD, RF, WNS, WS	1, 2, 3, 4, 5, 6	2001	15	1.3	34	no	- 2,218 meters of 4-strand barbed wire riparian fence constructed. - Two spring developments constructed. - Structure maintenance for the life of the agreement.	2 cross sections 2 longitudinal profiles 1 photo point	2 cross sections
Lower Snipe Creek Conservation Agreement 2001-16	CC, HD, RF, RFC, WNS, WS	1, 2, 3, 4, 5, 6	2001	15	1.3	54	no	- 4,237 meters 4-strand barbed wire riparian fence constructed. - Three stock wells developed. - 7,000 native hardwoods planted. - Structure maintenance and noxious weed treatments for the life of agreement.	2 cross sections 2 longitudinal profiles 2 thermistors 1 photo point	2 cross sections - vegetative survival count
Deer Creek Conservation Agreement 2003-18	CC, HD, RF, RFC, WNS, WS	1, 2, 3, 4, 5, 6	2003	13	3.8	219	no	- 2,736 meters of 4-strand barbed wire fence constructed and 2,889 meters of fence refurbished. - 11 spring developments constructed. - Approximately 7,500 native hardwoods planted. - Structure maintenance and noxious weed treatments for the life of agreement.	2 cross sections 2 longitudinal profiles 2 thermistors 1 photo point	2 cross sections
Lower Camas Creek Conservation Agreement 2006-2021	CC, HD, RF, RFC, WNS, WS	1, 2, 3, 4, 5, 6	2006	10	1.6	40	no	- 335 meters of levee removed - 1.6 Km of riparian fence constructed - Three stock water ponds constructed - One stock water pond improved - One spring developments created - Approximately 5,500 native hardwoods planted - Structure maintenance and noxious weed treatments for the life of agreement	3 cross sections 1 longitudinal profile 2 thermistors 3 pebble count sites 1 photo point	Three cross sections
Upper Camas Creek Conservation Agreement	CC, HD, RF, RFC, WNS, WS	1, 2, 3, 4, 5, 6	2009	3	1.3	256	no	- 2,450 meters of 4-strand barbed wire riparian fence and 3 water gaps constructed. - 3,090 meters of upland 4-strand barbed wire fence constructed. - One upland well developed. - Structure maintenance and noxious weed treatments for the life of agreement.	12 cross-sections 1 longitudinal profile 2 thermistors	3 cross sections

Site	Limit. Fact.	Obj.	Year Implem.	Years Treat.	Stream Km. Affected	Acres Leased / Affected	Cntl. Site Id'd.	Metrics	Phys. Monitoring	Bio. Monitoring
NFJD Conservation Agreement	RF, WS	3, 6	2005	10	1.6	6.0	no	- 1.6 Kilometers of four strand barbed wire fence constructed to remove cattle from riparian areas. - One well installed to replace watering them the NFJD. - 250 native vegetative plings	Photo points	none
NFJD Wilderness Survey 2010	HD	2	2010	1	0	0	no	- Surveyed of noxious weeds along 217 Kilometers of trail within the NFJD Wilderness area.	none	none
Battle Creek Culvert Replacement	WS, P	6, 8	2010	2	13.7	0	no	- Removed complete barrier to high quality summer steelhead trout habitat.	UNF road inspections	Spawner surveys for 2 years following replacement by the NFJD Project
Granite Creek Culvert Replacement	WS, P	6, 8	2010	1	4.3	0	no	- Removed partial barrier to high quality summer steelhead trout habitat.	UNF road inspections	Spawner surveys for 2 years following replacement by the NFJD Project
Bruin Creek Culvert Replacement	WS, P	6, 8	2011	1	8.5	0	no	- Removed partial barrier to high quality summer steelhead trout habitat.	UNF road inspections	Spawner surveys for 2 years following replacement by the NFJD Project
Beaver Creek Reconnect	P	8	2010	2	0.18	1	no	- Removed 5 log drops, sealed the stream channel with bentonite, and reshaped the stream channel.	3 cross sections 1 longitudinal profile	ODFW annual spring spawner surveys
Ten Cent Creek Culvert Replacements	WS, P	6, 8	2011	1	9.6	0	no	- Removed partial barrier to high quality summer steelhead trout habitat.	UNF PIBO & road inspections	Spawner surveys for 2 years following replacement by the NFJD Project
Clear Creek Mine Tailing Redistribution	HD, RF, RFC, WS	2, 3, 4, 5	2006	2	3.8	45	no	- Recontoured approximately 276,000 cubic meters of mine tailings. - Reestablished an inset floodplain to promote floodplain connectivity and sediment / debris deposition.	none	none
Kelsay Creek Riparian Fence	CC, HD, RF, WNS, WS	1, 2, 3, 5, 6	2008	2	1.6	100	no	- 4,425 meters 'New Zealand' and one water gap along constructed.	4 photo points 2 thermistors USFS permttiee maintenance	none
Taylor Creek Riparian Fence	CC, HD, RF, WNS, WS	1, 2, 3, 5, 6	2010	1	1.6	46	no	- 3,200 meters of 4-strand barbed wire fence constructed.	Photo point USFS permttiee maintenance	none
Sugarbowl Creek Riparian Fence	CC, HD, RF, WNS, WS	1, 2, 3, 5, 6	2010	1	0.8	18	no	- 1,600 meters of 4-strand barbed wire fence constructed.	Photo point USFS permttiee maintenance	none
Morsay Creek Riparian Fence	CC, HD, RF, WNS, WS	1, 2, 3, 5, 6	2010	1	3.2	100	no	- 11,747 meters of 4-strand barbed wire fence constructed.	Photo point USFS permttiee maintenance	none
Bruin Creek Riparian Fence	CC, HD, RF, WNS, WS	1, 2, 3, 5, 6	2010	1	0.8	19	no	- 695 meters of three strand 'New Zealand' fence constructed.	Photo point USFS permttiee maintenance	none

Site	Limit. Fact.	Obj.	Year Implem	Years Treat	Stream Km. Affected	Acres Leased / Affected	Cntl Site Id'd.	Metrics	Phys. Monitoring	Bio. Monitoring
Butcherknife Creek Riparian Fence	CC, HD, RF, WNS, WS	1, 2, 3, 5, 6	2012	1	1.5	1200	no	- 3,621 meters of four strand barbed wire fence constructed.	UNF PIBO	none
Five Mile Creek Fence Maintenance	CC, HD, RF, WNS, WS	1, 2, 3, 5, 6	2012	1	2.5	90	no	- Heavy maintenance on 8 Kilometers of riparian exclusion fencing.	Photo point USFS permttiee maintenance	none
Fox Creek Leafy Spurge Control	HD, RF	2, 3	2010	3	65	260	no	- Approximately 215 acres treated with herbicide and biological controls. - 45 acres survey for infestations and tracking the progress of previous treatment.	none	visual surveys of selected areas 2 transects
Granite Creek Native Vegetation Plantings	HD, RF	2, 3	2010	1	0	24.5	no	- Planted 8,400 native hardwoods in floodplain and riparian areas.	none	visual surveys of selected areas
Clear Creek Native Vegetation Plantings	HD, RF	2, 3	2010	1	2	4	no	- Planted 5,040 native hardwoods in floodplain and riparian areas.	none	visual surveys of selected areas
Granite Creek Noxious Weed Control	HD, RF	2, 3	2010	1	4.8	40	no	- 40 acres of riparian and floodplain habitats surveyed for noxious weeds. - 28.5 acres of riparian and floodplain areas treated with herbicides	none	visual surveys of selected areas
NFJD River Push-up Dam Removal and Water Right Certification	WS	6	2009	1	0.15	80	no	- One irrigation point of diversion moved approximately 152 meters to a permanent scour hole. - One water gap removed. - Water right POD change completed.	4 cross sections 4 pebble counts	Greenline survey
Fox Creek Channel Enhancement & Fencing	CC, HD, RF, WNS	1, 2, 3, 5	2013	2	0.6	8	no	- Placed 25 pieces of large wood in the original stream channel. - 20 plugs restricting flow through 700 meters of the Corps channel. - 600 meters of riparian fence constructed	Photo point	none
Lower Camas Creek Coordination	CC, HD, RF, RFC, WNS, WS, SD	1, 2, 3, 4, 5, 6, 7	2013	2	9	1,000	no	- Completed brief detailing past and existing conditions, possible influences of existing geomorphology, and a strategy for developing appropriate treatments.	nothing established to date beyond cross-sections and pebble count data collected as baseline information	none
Corrigal Springs Culvert Replacement	WS, P	6, 8	2013	1	5.8	0	no	- Removed partial barrier to high quality summer steelhead and bull trout habitat.	UNF road inspections	Spawner surveys for 2 years following replacement by the NFJD Project
Mud Creek Conservation Agreement 2013-27	CC, HD, RF	1, 2, 3	2013	2	1.6	100	no	- 2,407 meters of six strand high tension wire fence constructed. - One water gap installed - One stock water well developed with associated solar pump, panels, and water trough.	Photo points	none
Red Boy Pipeline Replacement & Signs	WS	6	2013	1	0.25	0.5	no	- Six inch PVC drain pipe between the mine audit and settling ponds was replaced with 250 meters of 12" HDPE pipe and the number of cleanouts increased from two cleanouts to five manholes and two cleanouts. - 2 information signs developed and installed	Pipeline and settling pond maintenance by landowner	none
Taylor Creek Fence Maintenance	CC, HD, RF, WNS, WS	1, 2, 3, 5, 6	2013	1	1.6	10	no	- Heavy maintenance completed on 1.6 Kilometers of riparian fence constructed in the 1980s.	Photo points USFS permttiee maintenance	none

Site	Limit. Fact.	Obj.	Year Implem.	Years Treat.	Stream Km Affected	Acres Leased / Affected	Cntl Site Id'd.	Metrics	Phys. Monitoring	Bio. Monitoring
Little Indian Creek Riparian Fence	CC, HD, RF, WNS, WS	1, 2, 3, 5, 6	2013	1	1.0	25	no	- 2,103 meters of four strand barbed wire fence constructed.	Photo points USFS permttiee maintenance	none
Smith Creek Riparian Fence	CC, HD, RF, WNS, WS	1, 2, 3, 5, 6	2013	1	4.0	90	no	- 1,219 meters of four stand barbed wire fence constructed.	Photo points USFS permttiee maintenance	none
Granite Creek Conservation Agreement 2013-23	CC, HD, RF, RFC, WNS, WS	1, 2, 3, 4, 5, 6	2013	2	0.6	10	yes	- Four large wood structures and one rock weir installed to reduce sediment entrainment in Granite Creek.	CTUIR Bio-Monitoring Project	CTUIR Bio-Monitoring Project
CTUIR Monitoring Plan Development	CC, HD, RF, RFC, WNS, WS, SD, P	1, 2, 3, 4, 5, 6, 7, 8	2013	0	0	0	no	- Developed a reached scale monitoring plan to standardize the CTUIR's Fishery Habitat Program's monitoring efforts.	none	none
Deep Creek Culvert Replacement	WS, P	6, 8	2014	1	3.2	1	no	- Removed partial barrier to high quality summer steelhead and bull trout habitat.	UNF road inspections	Spawner surveys for 2 years following replacement by the NFJD Project
Bull Run Creek Culvert Replacement	WS, P	6, 8	2014	1	16.2	0	no	- Removed partial barrier to high quality summer steelhead and bull trout habitat.	UNF road inspections	Spawner surveys for 2 years following replacement by the NFJD Project
Little Indian Creek Culvert Removal	WS, P	6, 8	2014	1	0.5	0	no	- Removed partial barrier to high quality summer steelhead trout habitat.	photo points	Spawner surveys for 2 years following replacement by the NFJD Project
Camas Creek Fence Maintenance	CC, HD, RF, WNS, WS	1, 2, 3, 5, 6	2014	1	35	230	no	- Heavy maintenance of riparian fence constructed in the 1980/90s protecting 35 Kilometers of stream channel and floodplain habitats	UNF PIBO USFS permttiee maintenance	none
Camas Creek Geomorphic Assessment and Action Plan	CC, HD, RF, RFC, WNS, WS, SD, P	1, 2, 3, 4, 5, 6, 7, 8	2015	1	9	1000	no	- Geomorphic Assessment concentrating on the primary assessment area extending from river mile 12.0 to 17.8 A secondary assessment area included all portions of the watershed above river mile 17.8.	LiDAR River Form Metrics 1D & 2D Hydrologic Modeling Aerial Photographs	none
Desolation Creek Fence Maintenance	CC, HD, RF, WNS, WS	1, 2, 3, 5, 6	2015	1	18.9	33.7	no	- Heavy maintenance on 39 Kilometers of riparian fence constructed in the 1980/90s protecting 18.7 Kilometers of stream channel and floodplain habitats	USFS permttiee maintenance	none
Desolation Creek Stock Water Developments	CC, RF, WS	1, 2, 3, 6	2015/16	2	0.0	1.0	no	- One spring developed to include spring box, trough, and spring fenced off	none	none
Fox Creek Riparian Fence	CC, HD, RF, WNS, WS	1, 2, 3, 5, 6	2015	1	0.8	1.7	no	- 800 meters of four strand barbed wire fence constructed to protect summer steelhead trout habitat from cattle.	None Landowner maintenance	none

Site	Limit. Fact.	Obj.	Year Implem	Years Treat	Stream Km Affected	Acres Leased / Affected	Cntl Site Id'd.	Metrics	Phys. Monitoring	Bio. Monitoring
Battle Creek Refit	WS, P	6, 8	2016	1	13.7	0	no	- Restored passage through the baggier through washing in fine material and creation of an inset low flow channel	none	none
Five Mile Creek Fence Maintenance	CC, HD, RF, WNS, WS	1, 2, 3, 5, 6	2016	1	9.6	2693	no	- 26.5 Km of fence received heavy or general maintenance	UNF PIBO USFS permttiee maintenance	none
Camas Creek Fence and Stock Water Developments	CC, HD, RF, WNS, WS	1, 2, 3, 5, 6	2016	1	8	1	no	- 1.2 Km of four strand barbed wire fence constructed	none	none
								- one stock water pond created and one existing stock water pond deepened	Permttie and landownere maintenance	none
Desolation Creek Geomorphic Assessment and Action Plan (GAAP)	CC, HD, RF, RFC, WNS, WS, SD, P	1, 2, 3, 4, 5, 6, 7, 8	2015/17	3	11	135	no	- Geomorphic assessment concentrating on the primary assessment area extending from river mile 1.2 to 11.8 with the balance of the basin considered the secondary assessment area	LiDAR River Form Metrics	none
								- Desolation Creek basin wide Action Plan to guide restoration efforts	1D Hydrologic Modeling Aerial Photographs	
Desolation Creek Upper Reach 6 Design	CC, HD, RF, RFC, WS	1, 2, 3, 4, 5	2016/17	2	0.4	6	Yes	- Developed a design for the highest priority identified in the GAAP	CTUIR Bio-Monitoring Project	CTUIR Bio-Monitoring Project

APPENDIX 2

ISRP Qualification - Lessons Learned: The proponent is requested to provide a more comprehensive summary of lessons learned. This documentation should be provided in annual project reports to BPA.

For 2016 the lesson learned fell upon the Battle Creek refit and the Desolation Creek Assessment. The first was simply the potential for a low technology cost approach to addressing interrupted passage through the Battle Creek culvert. While the selected material contained overly large components the tactic proved to be useful, especially when combined with the creation of a baseflow channel. Should an opportunity such as this arise in the future The Project will need to ensure a mixture of sand, silt, and clay is available for washing in. This information will prove to be especially useful as The Project works through the Granite Creek design and implementation where riffles will form grade control and need to be locked in very well to prevent the loss of surface flows.

The second lesson learned was simply a better understanding of ATLAS and its agility when adapting the framework to a specific area. This would have been a useful exercise when working through the Camas Creek Assessment although The Project still feels such an effort wouldn't have had the support of the local community. This introduction proved useful during 2017 as the John Day Partnership worked through the John Day Basing Action Plan which utilized the ATLAS framework.

ISRP Qualification - Roles and Responsibilities: Given the scope and complexity of the NFJD project, additional emphasis on coordination is likely to reduce project costs and to make the best use of the wide array of skills available to the project—both within the subbasin and from the region. It would be particularly useful to have a written, initial framework that identifies broad roles and responsibilities among key partners and players. It could start by addressing the CTUIR organization, with a focus on Natural Resources, and then progress through discussions/agreements with key partners. These discussions should be useful for the long term success of the project. Documentation does not need to be detailed but should be sufficient to capture major agreements and responsibilities among participants. It should be included in the next annual progress report to BPA.

The CTUIR staff has a considerable range of experience and knowledge The Project has and will continue to tap into. Efforts undertaken by these programs improve coordination and individual outputs by collectively refining CTUIR policies and outputs at the program, department, and tribal levels. It's through the collective efforts of staff and projects that the CTUIR has been able to undertake and influence larger scale actions and issues. The CTUIR's DNR staff attend an annual department meeting where information is shared and by all programs. The Project regularly interacts with the following programs within the Department of Natural Resources including;

- Department of Natural Resources Management – Department management and administration including but not limited to setting department standards and expectations, reporting to tribal government, and supporting department efforts through representation on appropriate state and regional committees or boards.
- Fisheries Habitat Program – Implementation of fisheries habitat improvement efforts within the Walla Walla, Tucannon, Grande Ronde, Umatilla, and North Fork John Day River Basins. Staff provides technical input related to restoration actions, opportunities for collaboration, data collection, analysis, and reporting, and project management. Semi-annual coordination

meetings are held where staff discuss ongoing and potential restoration actions, share lessons learned, and visit implemented restoration actions.

- Wildlife Program – Conducts wildlife restoration efforts, manages conservation areas, and leads lands acquisition efforts for the Department of Natural Resources. The Project has coordinated with the wildlife program when acquisitions have been considered.
- Forestry and Range Management Program – This manages CTUIR forestry and range resources and consult with CTUIR staff/programs regarding forestry and grazing management practices. The Project has worked with this program on several occasions to determine effective management and assessment strategies tied to grazing management and fisheries restoration efforts.
- Water Resources – This program provides information related to water quality standards and monitoring (surface and ground waters) through consultation to CTUIR programs and projects.
- Cultural Resources – Conducts cultural resources activities for the CTUIR. The Project coordinates with them as needed and they provide comment to BPA in response to solicitation related to BPA funded actions.
- Information and Technology Services – Develop and manage the CTUIR's Central Data Management System's (CMDS) in cooperation with natural resources staff collecting, and analyzing data. The CMDS is improving and standardizing effective data management and sharing for the Department of Natural Resources through a single integrated point of access for storing and accessing data. Eventually data requests from non-CTUIR staff will be possible.

<u>NFJD Basin</u>

Within the North Fork John Day Basin restoration actions are developed and undertaken through singular and collaborative efforts in response to specific requests for assistance. Actions have been and will continue to be based upon direct communication between collaborators although this is changing somewhat as the John Day Partnership is being developed. Collaborators The Project commonly works with include;

- North Fork John Day Watershed Council – action cost share and management
- Umatilla National Forest – action prioritization and permitting, cost share, and management
- Wallowa-Whitman National Forest - action prioritization and permitting, cost share, and management
- Oregon Department of Fish and Wildlife - action cost share and management
- Confederated Tribes of the Warm Springs Indian Reservation - action cost share and management
- City of Ukiah - action cost share and management
- Private landowners – access to restoration sites and action cost share

The BPA has continued to hold annual coordination meetings for its sponsors in the John Day Basin. During these meeting each entities staff discuss potential, current, and future plans for the purpose of sharing information relevant to coordinating, developing and implementing restorations. A completed restoration sites typically toured as well. This also provides the sponsors an opportunity to share resources or collaborate if the opportunity exists.

During 2016 the John Day Partnership continued its development and the CTUIR became a signatory. The Projects' lead is a member of The Partnership's technical committee and contributes to the North Fork John Day River subcommittee while the CTUIR's Fishery Habitat Program Manager is a member of the steering committee. The Partnership does not intend to supplant the efforts of individual partnership members. It will act as a forum for improving communication and when possible secure funding to complement the efforts of its members.

During 2016 the Partnership hired a contractor to collect and compile existing data and present options for the development of an Action Plan. In the end BPA's ATLAS strategy was chosen with development beginning in 2017. The Action Plan is under development by the Technical Committee and once completed the Partnership will move on to securing funding for distribution to partners.

During 2016 The Project coordinated with the CTWSRO, ODFW, UNF, and NFJDWC to develop the Desolation Creek Geomorphic Assessment and Action Plan. The document which will be completed in 2017 will establish a prioritized plan from which collaborators can select and develop restoration actions backed by a defensible strategy. The collaborators will hold regular meeting on an annual or bi-annual schedule to update the action plan as new information comes available and restoration actions are completed.

Region

The Project's role and responsibilities at the regional level typically occur through collaboration with or through higher level CTUIR staff, cooperation in monitoring efforts, and interaction with others not limited to BPA and CRITFIC. While such commitments do not necessarily require formal agreements they promote the tribal perspective and influence through;

- The Project's reporting to and communication with CTUIR managers informs them of progress and has bearing in some form upon policy and how the CTUIR approaches issues at the regional level. Participation by higher level staff on boards and in committees expands the understanding of tribal culture. Additionally The Project has been involved with higher level staff and committees responsible for reviewing and signing agreements or similar documents which have bearing upon The Project's efforts.

- Cooperation with the Bio-Monitoring Project and development of the Physical Habitat Monitoring Strategy integrates the evolution of fishery habitat enhancement efforts, lessons learned, and policy into regional efforts to improve and manage our natural resources.

- Interacting with BPA and CRITFIC improves and maintains funding for restoration efforts and coordination, incorporates technical and policy guidance into project level efforts, and supplements technical resources to improve staff capabilities.

ISRP Qualification - Data Management: The primary concern is how data will be managed during the 2-3 years while development of the CTUIR data management system is being completed. Additionally, it does not appear that there are contingency plans to deal with possible delays in full implementation of the data management system. Does the completion of the data management system by 2018 mean that temporal analyses cannot occur before then? Is there a priority list for bringing modules on line? These are important concerns from the perspective of program effectiveness. A written response to these concerns should be included as part of the project's next annual report to BPA.

Development of the CTUIR's Central Data Management System (CMDS) continued through 2016. By the end of 2016 the Monitoring and Evaluation, Operations and Maintenance, and Water Temperature and Water Quality datasets had been developed and were being populated. The Project has entered all current and historic water quality data into the data base. Development of the Habitat dataset began at the very end of 2016 and was completed during 2017.

The CMDS consists of a Project Tracker and all data repositories and was established to store information related to an actions goals, objectives, ties to First Foods, Umatilla River Vision, limiting factors, ecological concerns, dates, and ancillary documentation. From this information progress reports for CTUIR use can be developed to inform CTUIR managers, policy, and tribal government. The most recent version of the Project Tracker is on line as of this report's date and The Project began populating the Project Tracker in 2017. The Project will continue to move files associated with restoration actions from dedicated servers where data has been/stored to the Project Tracker until all relevant current and past data and information are uploaded.