NORTH FORK JOHN DAY RIVER BASIN ANADROMOUS FISH HABITAT ENHANCEMENT PROJECT Annual Report for February 2018 – January 2019

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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 2018 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 2018 the project worked to complete the Implement the Desolation Creek Upper Reach 6 Design, develop restoration designs for projects on Desolation Creek Reach 3, Hidaway Creek, and Bull Run Creek, maintained existing conservation agreements and collaborated with others in the John Day River basin through participation in the John Day Partnership, North Fork John Day Watershed Council and others opportunities as they arose. 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 Jesse Wilson, Israel Duran, 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 (District Paula Guenthner, Fishery Biologists Kathy Ramsey and Steve Boe, Hydrologist Richard Cissel, Range Manager Brad Lathrop) and the Wallowa Whitman National Forest and its employees (Engineer Brett Yaw, Biological Science Technician Ray Lovisone, Fish Biologist Joe Vacirca) for assistance with cooperative restoration efforts and providing information, the North Fork John Day Watershed Council's staff for collaborating on restoration actions and coordination, 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 program management support and guidance. We would like to acknowledge cooperating landowners, Ecotrust Forest Management, Steve Berry, Brian Prater, Mary Lou, Andy, and Bill Fletcher, Robert Pedracini, Bob and Cody McConnell, Don Hartley, and Karen Flagg who supported our efforts through conservation agreements and actions implemented 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 fishery habitat tools and strategies have evolved over time actions will continue to be implemented to benefit wildlife and land management strategies in the North Fork John Day (NFJD) basin (Figure 1).

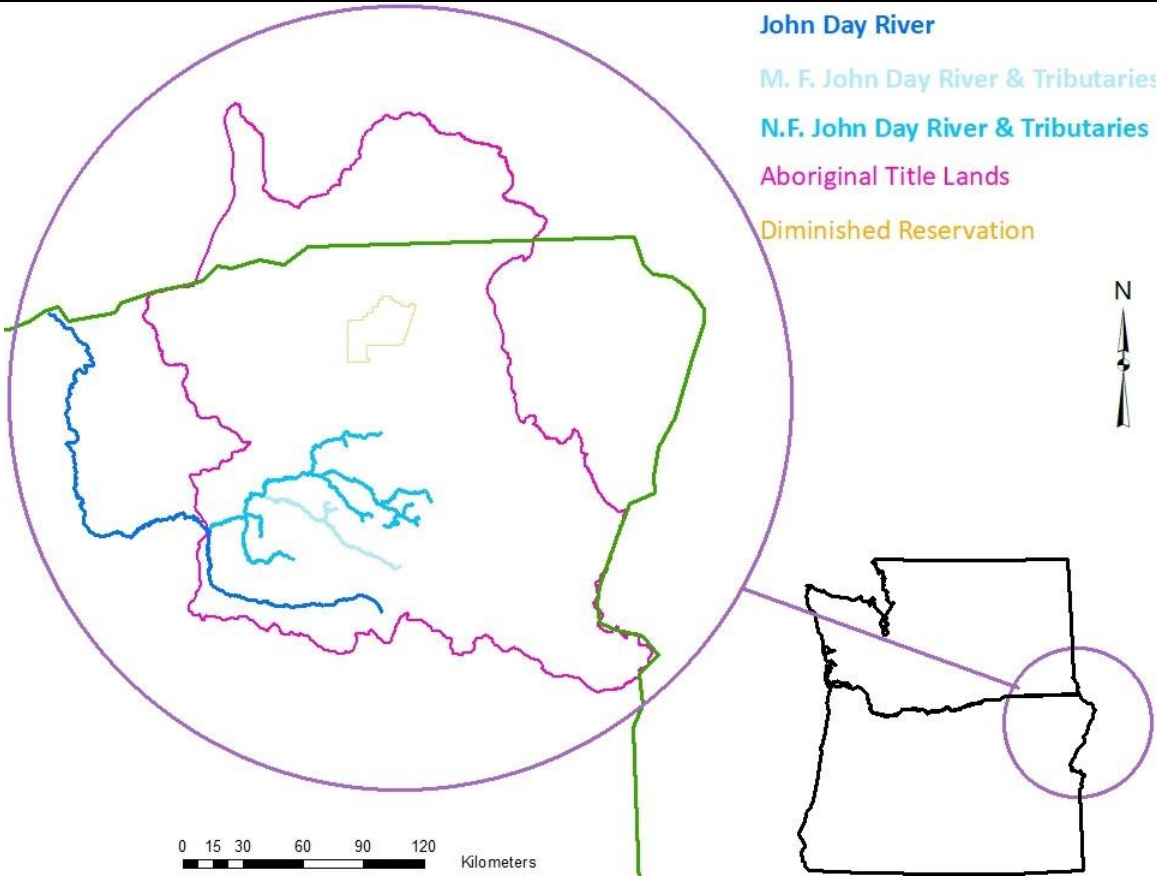

Figure 1. Map of the CTUIR ceded lands and focus basins for The Project.

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 Policy which identifies groups of men's and women's foods critical to tribal traditions (Figure 2) that has more recently formed the basis for all of The Project's efforts. In other words, the First Foods 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.

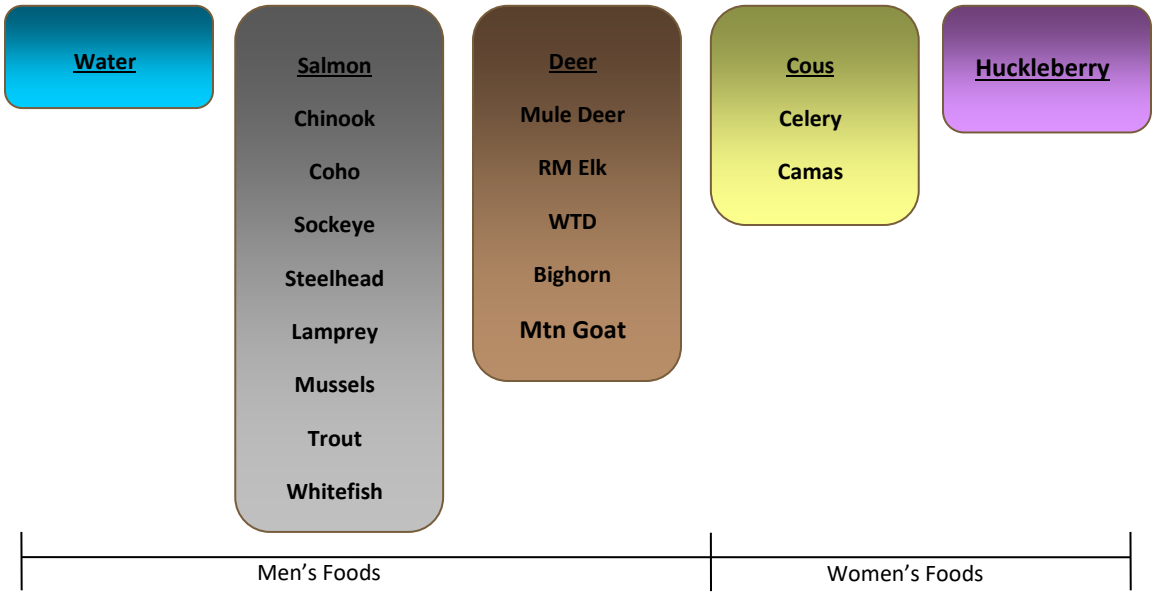

Figure 2. Characterization of the First Foods by grouping and cultural significance with respect to men's and women's foods. First Foods are listed in order of importance from left to right.

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. Over time, a variety have been developed and implemented to address limiting factors influencing 295 stream kilometers and 8102 acres (Appendix 1) 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 2018 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 effects 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 resulting in greater collaboration 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. 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 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 the Granite Creek focus area the Granite Creek Action Plan (USFS, 2008) and the Bull Run Creek Action Plan (USFS, 2012) formed the basis for cooperative restoration actions on public lands. Within Desolation Creek The Project has used BPA's ATLAS prioritization tool to identify Tier 1, 2, & 3 reaches for restoration. Within Upper and Lower Camas Creek The Project will base actions upon the 2016 Camas Creek Assessment. Although this was not a comprehensive basin wide assessment the information contained within will guide future restoration actions.

More recently the John Day Partnership's development and guidance documents are having a greater influence upon restoration prioritization and funding potential. The Partnership accepted BPA's ATLAS tool to prioritize restoration opportunities throughout the John Day Basin. Priorities developed as part of the Desolation Creek Assessment will be incorporated into the partnership's ATLAS process in its entirety. Elsewhere The Project will reconcile the partnership's ATLAS guidance when developing a ranking potential restoration actions with accepted guidance noted above as opposed to relying solely upon the partnership's ATLAS rankings.

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 currently maintains five conservation agreements with private landowners. Cooperative partners with whom CTUIR hasn't entered into a Riparian Conservation Agreement include the North Fork John Day Watershed Council (NFJDWC), 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 2018 through 31 January 2019.

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) flowing into the NFJD is generally considered and primarily managed as a separate system by ODFW and the Confederated Tribes of the Warm Springs Reservation of Oregon. 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.

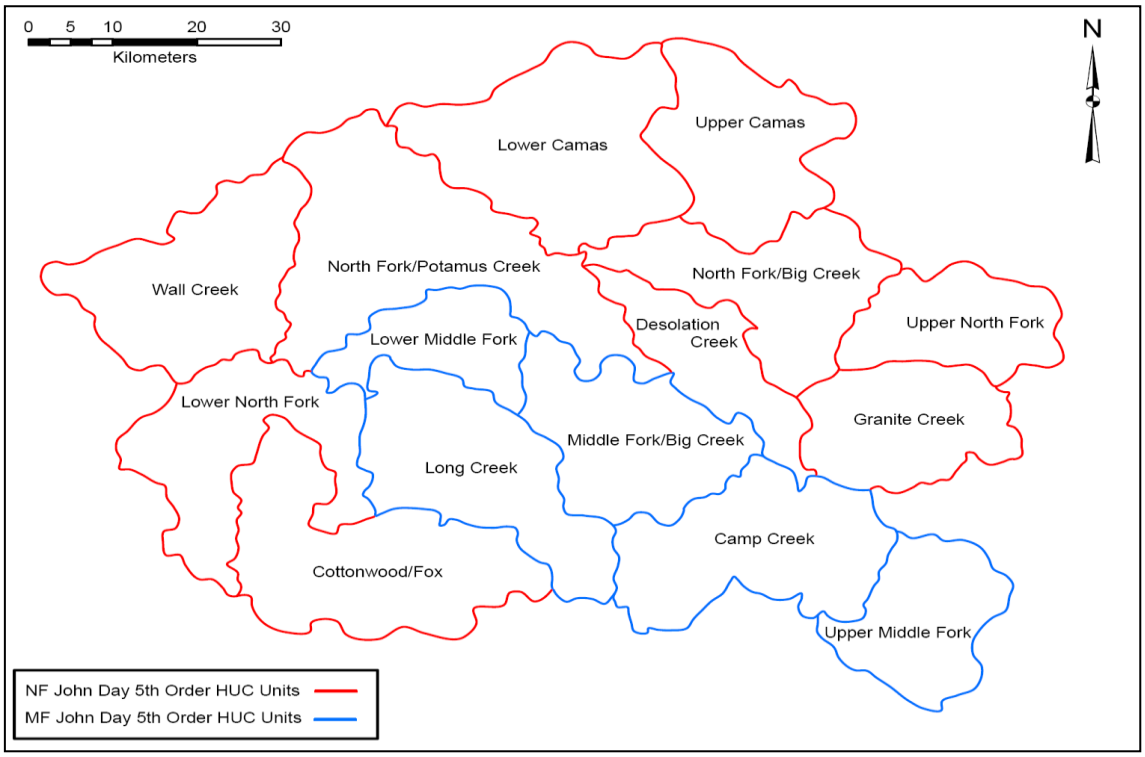

Figure 3. NFJD 5th field HUC's

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.

Past and current land use practices or threats have generally compromised 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).

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".

Major Limiting Factors	Threats
Floodplain & Channel Structure In-Stream Habitat Sediment Routing Water quality	Riparian Disturbance Stream Channelization & Relocation Grazing and Forest Practices Transportation Infrastructure Irrigation Withdrawals Mining & Dredging

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

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.

2018 ACCOMPLISHMENTS

A description of individual Work Elements to which efforts were directed during 2018 (Figure 4) include;

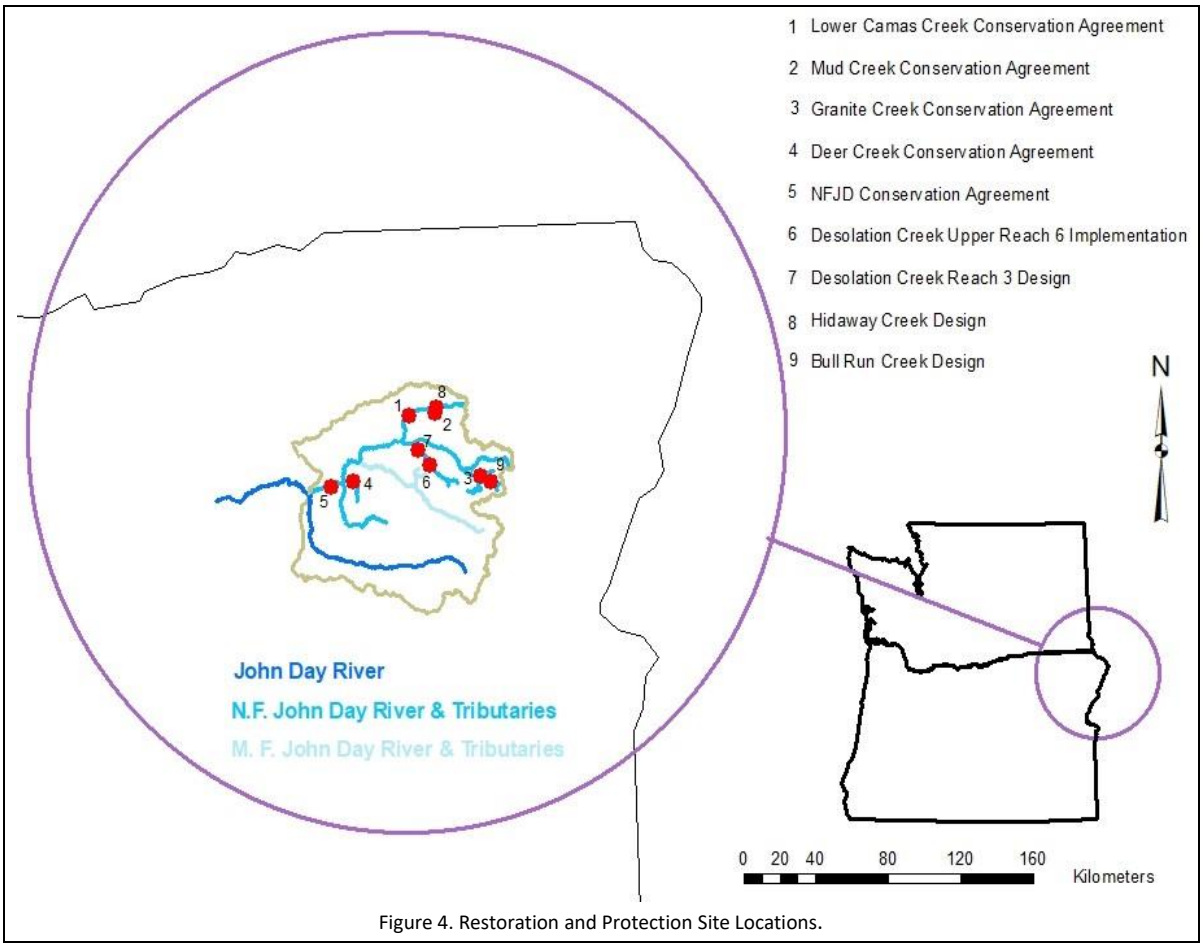

Figure 4. Restoration and Protection Site Locations.

WE A – Produce Project Deliverables

Staff focused on identifying and developing restoration actions for the 2019 performance period and beyond centered on the CUIR's focus basins and increasing coordination through participation in the John Day Partnership. To that end CTUIR staff contributed through participation In the Steering Committee, North and Middle Fork Working Groups, Technical Committee, and development of the partnership's prioritization schedule development and the OWEB FIP grant opportunity. Project staff attended a CTUIR Fisheries Habitat Enhancement Program Workshop in Walla Walla, Washington and NFJDWC meetings.

WE B - Identify, Prioritize and Select Habitat Project Areas

For this work element a draft 2019 Statement of Work and associated budget was developed and submitted to BPA. The 2019 Statement of Work outlined work in the three established focal basins and continues design efforts associated with Hidaway Creek, Desolation Creek Reach 3, and Bull Run Creek.

WE C - Produce Environmental Compliance Documentation
All permits and/or requisite information were secured by CTUIR or passed on to BPA. Efforts were largely centered upon getting fill/removal permits cultural resource surveys lined out for the Desolation Creek Upper Reach 6 Implementation effort. No lamprey were seen during the Desolation Creek Upper Reach 6 Implementation.

WE D – 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.

WE E – Investigate for Livestock Trespass
Fence maintenance occurred although no instances of trespass were noted.

WE F – Maintain Fences
Fence inspections throughout 2018 did not identify damage that wasn't repaired in short order.

WE G – Maintain Water Developments
Water developments were maintained throughout 2018 and The Project will continue to coordinate with landowners regarding maintenance.

WE H – Noxious Weed Control
A contract for noxious weed control efforts awarded in April of 2018 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. Species treated included but weren't limited to Scotch thistle, Cutleaf teasel, Houndstoung, Dalmation Toadflax, Bull thistle, St. Johnswort, and Poison hemlock. Treatment records were submitted to BPA in fulfillment of HIP III requirements.

WE I – Desolation Creek Upper Reach 6 Implementation Floodplain Enhancement
During the instream work window 18 large wood structures (Figure 5) and associated willow cuttings were developed as designed. However, the alcove and associated structures were not developed to avoid disturbing sensitive wetland habitat. We determined that incorporating the treatment into the Lower Reach 6 Implementation at a later date would allow for more effective implementation as the 10 Road is obliterated. Implementation occurred in an upstream direction where completed areas were not re-entered with heavy equipment once completed. The only complication not foreseen was the need for extra overburden required to stabilize the largest wood jam structures, however, we were able to locate said material within permit constraints. Native vegetation beyond cuttings associated with individual structures or in specific locations on gravel bars were put off. Plantings will occur once the site has had some time to adjust to implemented treatments.

Figure 5. Large wood structures developed in Desolation Creek's primary channel.

WE J - Desolation Creek Upper Reach 6 Implementation Side Channel Development

Approximately 500 feet of excavated plug reintroduced flows to 4.000 feet of side channel disconnected as a result of human floodplain manipulation (3,500 feet), natural process influenced by human activity (500 feet), or a combination thereof (1,500 feet). Within the reconnected side-channel 17 large wood structures (Figure 6) were developed to increase complexity and provide habitat for juvenile aquatic life stages. An additional three structures were developed in what was once Desolation Creek's thalwag until a log jam forced channel avulsion. Although this channel is minimally or not active throughout the year decomposing logs will likely allow flows within five to ten years at least during spring run-off. Side-channels contained active flows within several hours once plugs were removed and spring Chinook salmon were seen spawning in the lower portion on one immediately after implementation.

Figure 6. Large wood features developed in reactivated side channels.

WE K – Desolation Creek Upper Reach 6 Implementation Road Decommission

All temporary access roads and 0.5 miles of the USFS 406 road were ripped and seeded with a native grass seed mix. Multiple passes were made thereby significantly reducing road compaction and improving the potential for vegetative regrowth.

WE L – Collect Water Temperature and Photo Point Data

Water temperatures were collected at dedicated locations for the Lower Camas, Deer, Kelsay, and Granite Creek sites between 7 June and 30 September. Photo Points at the Lower Camas, Deer, Kelsay, Granite, NFJD, and Mud Creek sites. Data is presented in the Discussion section.

WE M – Desolation Creek Meadow Storage Feasibility

Six piezometers (Figure 7) 1.25" in diameter were installed in Wassen Meadows to a depth of approximately 8' between 15 and 19 October of 2018 although several were installed to slightly deeper. Installation depth reflected design expectations and the need to chase water levels if they did not conform to an 8' depth. Hand held vibrators were used to install the piezometers after an initial shallow excavation by mini excavator. Loggers were placed several inches above the bottom of the piezometer. Bulk density of soils were collected at the time of piezometer installation with

transducers placed shortly thereafter in early November.

Figure 7. Location of piezometers installed to monitor water levels in Wassen Meadows (left) and piezometer installation using hand held vibrators (above).

WE N – Hidaway Creek Design

BPA and CTUIR staff discussed potential types of treatments on several occasions and BPA staff provided examples of plan sets to be used by the CTUIR as examples during plan set development. However, CTUIR staff were unable to develop a CAD plan set as computing capacity was lacking. New computers arrived shortly after the end of the 2018 performance period. The CTUIR developed a draft plan set during 2019.

WE O – Periodic Status Reports for BPA

Status reports were completed as required.

WE P – Submit Annual Progress Report for 2016 Performance Period

This report fulfills the CTUIR's annual reporting obligations for the 1 February 2018 to 31 January 2019 performance period.

WE Q – Bull Run Creek Design Desolation

The CTUIR spent a considerable amount of time discussing types of treatments with Wallowa-Whitman National Forest staff and the design engineer. Disagreements centered on the appropriateness of geomorphic treatments posed by some collaborators. A meeting held in late January of 2018 did not produce consensus regarding the type of approach to be developed. Because of this the CTUIR developed

three alternatives in February of 2019 based on previous discussions and asked the Wallowa-Whitman National Forest's District Ranger whether they could accept one of the three alternative with the intent to move forward to the final design. The ranger accepted this proposal and analysis and design efforts resulted in the 30% Conceptual Design's arrival in January or 2019. Collaborator comments were then incorporated into the document to meet the NNFJDWC's needs in meeting grant funding obligations by 31 March 2019.

WE R – Desolation Creek Reach 3 Design

A request for proposals emphasizing a less engineered large wood feature approach to restoration than the treatments developed for Upper Reach 6 resulted in a design contract signed in September of 2018. Fifteen percent design alternatives and their selection occurred by the end of the year. Deliberations brought up a question of whether to relocate the 1003 Road Bridge or not which continued beyond the January 2019 arrival of the 30% conceptual design. Design concepts were passed on to BPA for review by NOAA and NMFS staff at each design step.

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).

Monitoring data collected by the CTUIR includes photo points and stream temperatures by The Project and geomorphic and biological data collected by the CTUIR's Bio-Monitoring Project. Photo point data is collected annually in late summer while water and air temperatures are collected from early June through late September. Both types of data are gathered where conservation agreements exist and other select locations. Water temperatures are collected using Hobo Pendant or Pro 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. Temperature analysis uses Oregon Department of Environmental Quality's seven day moving average developed for the North Fork John Day River Total Maximum Daily Load (ODEQ, 2010). Although this technique 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). Analysis also refers to the 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. Although 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 summarizing analysis's from collected data.

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 in the short term than those used before, however, only 75 trees remain, most of which, are Quaking aspen.

Photo points (Figure 8) 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 throughout the conservation agreement's term.

Figure 8. Photo point collected for the Lower Camas Creek site 2007 (right) a year after levee removal looking downstream with the lowest two J-hook structures visible. During 2018 (left) looking downstream from the middle of the reach where the lowest two J-hook structures are visible.

Data loggers show water temperatures tracking diurnal atmospheric fluctuations and the movement of fronts through the area on approximately one week cycles (Figure 9). This is not unexpected as a general lack of effective riparian vegetation and channel/habitat form (plainbed riffle with little structure or pool habitat) provides ample opportunity for thermal inputs to Camas Creek. While maximum daily water temperature violated the 19.1° Celsius threshold frequently they did not exceed 25° Celsius and daily minimum temperatures were consistently within or slightly below the 10° - 15.7° Celsius range. The extent to which cooling occurs within the project site is mixed although water temperatures generally decrease through the site. Cooling was most prominent between 27 June and 24 July although this was reversed between 6 – 20 August (Figure 9). After 20 August both warming and cooling occurred although temperature differences varied by approximately 0.5° Celsius or less. This is further reflected in temperatures complied by temperature range. Water temperatures primarily fell within the <10° and 15.7° – 19.099° Celsius range and increased slightly between the upper and lower loggers while those within the 10° – 15.699° and > 19.1° Celsius range decreased slightly (Table 3).

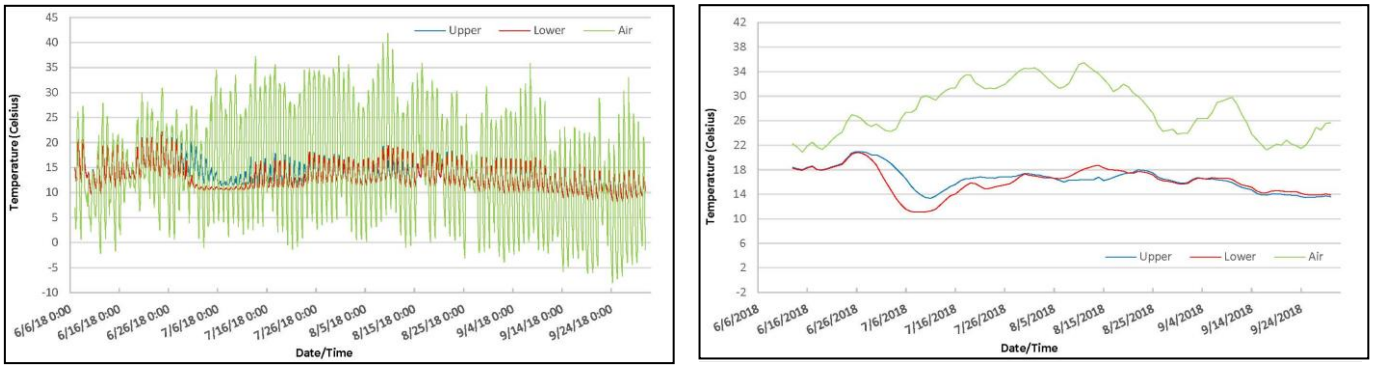

Figure 9. Water temperatures collected between 7 June and 30 September 2018 at the Lower Camas Creek site. Raw atmospheric temperature data with data from the site's upper and lower extents collected at one hour intervals (top). The data using a seven day moving average window for daily maximum temperatures is displayed below.

	Upper Logger Location		Lower Logger Location	
Temperature Range (Degrees Celsius)	**Count**	**%**	**Count**	**%**
< 10.000	135	4.85	152	5.46
10.000 – 15.699	2136	76.72	2123	76.26
15.7 - 19.099	430	15.45	440	15.80
>19.1	83	2.98	69	2.48
SUM	2784	100	2784	100

Table 3. Water temperature change for 2018 at the Lower Camas Creek site by the number of data points within ranges 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.

The most significant question which cannot be answered at this point is how and to what extent geomorphic processes and hyporheic flows are influencing stream temperatures. Given that the CTUIR's Bio-Monitoring Project has not been collecting data at this site and a lack of pre-implementation data our ability to ascertain the role of either is limited. Groundwater inputs and deeper more stable hyporheic flows will continue to influence stream temperatures as will shallower hyporheic flows as they evolve with the stream channel. Photopoint data (Figure 8) continues to suggest Camas Creek is migrating over time now that levees are gone as suggested by isolation of j-hooks placed in 2006 which are no longer located along streambanks. Additionally, sediments mobilized from upstream sources have been deposited within the City of Ukiah, Oregon and downstream through the site. The net result has been aggradation upon gravel bars, loss of some deeper pools, and what appears to be more inundation of the floodplain. This can be expected to continue for the foreseeable future as residents of Ukiah and the surrounding area haven't shown a willingness to properly address sediment deposition within city limits or process associated with the alluvial fan upstream of Ukiah.

Deer Creek

The conservation agreement established for this site in 2003, expired on 31 August 2018, and was not renewed. During the agreement's term the CTUIR installed riparian fencing and stock water developments to passively restore damage by cattle as Deer Creek and it floodplain were used as winter pasture by previous owners. As a result habitat for listed summer steelhead trout was severely degraded although to what extent we cannot say without pre-implementation monitoring data. Over time riparian vegetation has recovered to some extent and native fish and beaver are currently present in Deer Creek and the floodplain is inundated by beaver dams in multiple locations.

Raw data suggests water temperatures armed through the site throughout the 7 June to 30 September sampling period. Maximum raw or averaged daily water temperatures (Figure 10) recorded during 2018 exceed the lethal 25° Celsius threshold for spring Chinook salmon at the lower logger location on 17 July and 9 August with temperatures and exceeded the 19.1° Celsius threshold regularly between 20 June and 21 August. That said, they fell into the 10-15.6° Celsius range or nearly so daily. As such sustained maximum temperatures stressing aquatic species were likley 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.

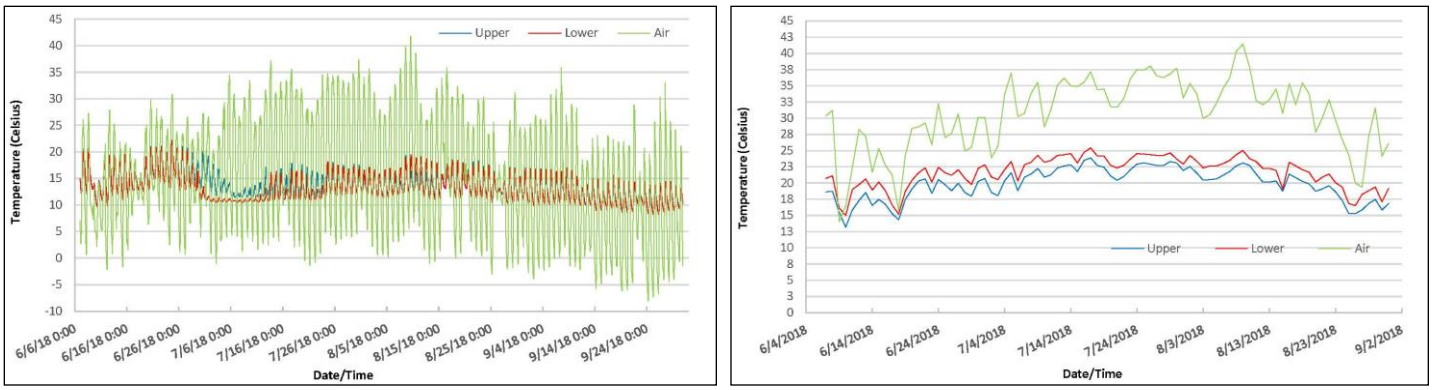

Figure 10. Water temperatures collected between 7 June and 30 September 2018 at the Deer Creek site. Raw atmospheric temperature data with data from the site's upper and lower extents collected at one hour intervals (left). The data using a seven day moving average window for daily maximum temperatures is presented to the right.

	Upper Logger Location		Lower Logger Location	
Temperature Range (Degrees Celsius)	**Count**	**%**	**Count**	**%**
< 10.000	198	7.11	70	2.51
10.000 – 15.699	1405	50.47	1229	44.15
15.7 - 19.099	796	28.59	856	30.75
>19.1	385	13.83	629	22.59
SUM	2784	100	2784	100

Table 4. Water temperature change for 2018 at the Deer Creek site by the number of data points within ranges 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.

Native hardwood vegetative recovery over the conservation agreement's term as suggested by photo points (Figure 11) may in time minimize the influence of air temperatures. Raw streambanks visible in 2004 are now not evident and Deer Creek's floodplain continue to be colonized by cattails (*Typha* genus) and willow (*Salix* genus). Water temperature will likely continue to improve as beaver have re-inhabited the site and continue to develop wetland complexes.

Figure 11. Photo points for the Deer Creek site collected in 2010 (left) and 2016 (right).

The sudden temperature decrease note in 2017 annual report between 2 - 17 August did not appear in the 2018 data. Conversations with Monument SWCD staff strongly suggest this behavior reflects the

landowner exercising irrigation rights. Temperatures likely decreased and remained at lower levels once a considerable amount of surface flows were shunted to fields and cooler hyporheic flows and/or ground water returns from irrigation influenced remaining surface flows to a greater extent. The landowner did not irrigate in 2018 near as we can tell.

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

Kelsay Creek's temperature signal suggests water temperatures are cooling through the site (Figure 12) as the upper data logger shows diurnal fluctuations being greater than those of the lower data logger throughout the sampling period. This is not surprising given Kelsay Creek's higher elevation location, existing riparian and floodplain condition, and prohibition of cattle when compared to upstream reaches still inhabited by cattle. While maximum daily temperatures exceeded the 19.1 degree Celsius threshold within the site's upper end without exceeding 25 degrees Celsius they fell back to within preferred 10-15.6^{o} Celsius preferrred growth temperature range daily. Tempeatures at the lower logger exceeded the 19.1 degree threshold only on 21 July and again on August 24th and 25th. While the earlier transgression appears to be the result of weekly weather patterns the later high temperatures may represent

represent low stream flow or more likley logger disturbance by passing deer or elk. That said, water temperatures are within the preferred 10-15.6° Celsius preferrred growth temperature range daily thereby mitigating, at least to some extent, delaterious temperature effects.

The seven day maximum moving average (Figure 13) shows daily maximum temperatures exceeding the preferred 10-15.6° Celsius preferrred growth temperature range between 20 July and 23 August in the site's upper extent and between 5 July and 27 July in the site's lower end thereby further indicating cooling through the site. Data points presented as a percentage of the distribution within upper, middle, and lower data logger locations (Table 5) shows a cooling effect as the proportion of data points residing within the preferred 10-15.6° Celsius preferrred growth temperature range increased from 49.78% to 59.63% moving downstream. This cooling is likely a combination of hyporheic flows moving downstream through the floodplain and hillslope and/or spring contributions.

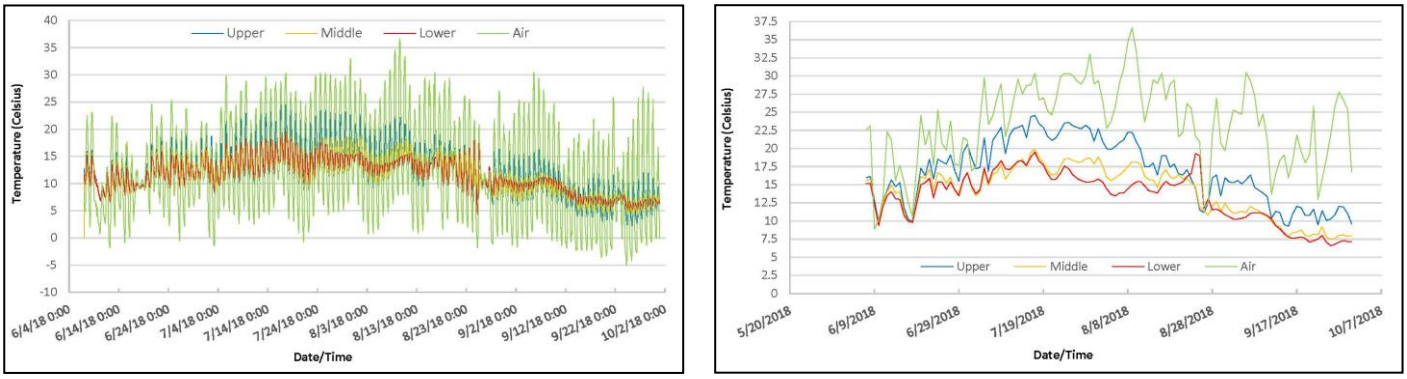

Figure 13. Water temperatures collected between 7 June and 30 September 2018 at the Kelsay Creek site. Raw atmospheric temperature data with data from the site's upper, middle, and lower extents collected at one hour intervals (top).

	Up		Middle		Lo	
Temperature Range (Degrees Celsius)	**Count**	**%**	**Count**	**%**	**Count**	**%**
< 10.000	824	29.60	906	32.54	896	32.18
10.000 – 15.699	1386	49.78	1521	54.63	1660	59.63
15.7 - 19.099	349	12.54	351	12.61	222	7.97
>19.1	225	8.08	6	0.22	6	0.22
SUM	2784	100	2784	100	2784	100

Table 5. Water temperature change for 2018 at the Kelsay Creek site by the number of data points within ranges 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.

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 14) along with a naturally occurring mountain alder. A second effort to be implemented in 2020 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 14. Photo points collected at the Granite Creek site during 2013 (left) and 2016 (right).

Water temperatures were collected between 7 June and 30 September 2018 by data loggers located at the site's upstream and downstream extents. Prior to this data had not been collected because the implemented actions were not likely to influence water temperatures given their scale relative to that of historic mining disturbance. Water temperatures at the site's upper and lower extents (Figure 15) tracked rather closely throughout the sampling period although lower logger maintained slightly higher peaks while the upper logger maintained slightly lower troughs. Water temperatures at both sampling locations did not exceed the 25° Celsius lethal limit although they did come close betweeen 8 July and 13 August ranging between 21.282 and 24.641° Celsius. Daily minimum temperatures consistently fell into the 10-15.6° Celsius preferrred growth temperature daily range thereby mitigating the delaterious effects of higher water temperture at least to some extent. Data filtered using a seven day moving window also shows this warming behaviour while suggesting it's most prevelant, although marginally so, prior to 31 July which may sugges cooling by hyporheic flows during later baseflow periods. Data points propotioned by previously noted temperature range (Table 6) also reflect this warming trend with the proportion of data in the 10-15.6° Celsius rage decreasing from 49.57% to 48.31% while the proportion of those above 15.7° Celsius increased.

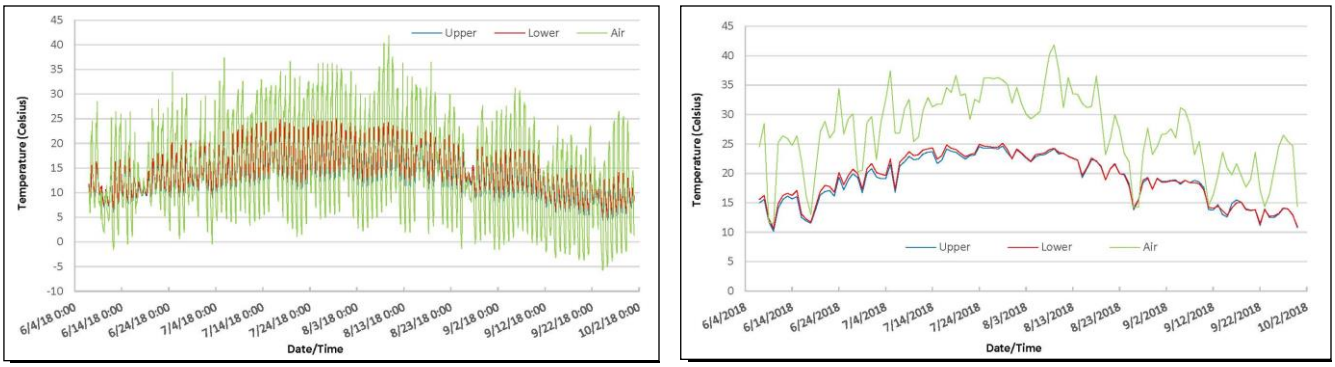

Figure 15. Water temperatures collected between 5 June and 30 September 2018 at the Granite Creek site. Raw atmospheric temperature data with data from the site's upper and lower extents collected at one hour intervals (left). The data using a seven day moving average window for daily maximum temperatures is presented to the right.

	Upper Logger Location		Lower Logger Location	
Temperature Range (Degrees Celsius)	**Count**	**%**	**Count**	**%**
< 10.000	514	18.46	403	14.48
10.000 – 15.699	1380	49.57	1345	48.31
15.7 - 19.099	494	17.74	583	20.94
>19.1	396	14.22	453	16.27
SUM	2784	100	2784	100

Table 6. Water temperature change for 2018 at the Granite Creek site by the number of data points within ranges 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.

Given current site conditions we do not find this behavoir to be suprising. Outside of over turned floodplain and stream channel habitats and loss of hyporheic complexity water temperatures are strongly influenced by atmospheric inputs given a general lack of effective floodplain vegetation. The shift from slight warming to relativly even temperatures after 31 July reflects a potential cooling effect by hyporheic flows as baseflows decrease. This in and of itself suggest the potential for lower flow temperatures with improved channel form, appopriate floodplain complexity, and vegetation may significantly decrease water temperatures. Regardless of the loss of loss of fine material and complexity within the floodplain from past mining activity. Nightime air temperatures relarly near 51° Celsius at night.

Desolation Creek

During 2018 staff worked to collect discharge data for Desolation Creek. The site developed in late 2017 and early 2018 is located one mile upstream of the Desolation Creek N. Fk. John Day River confluence consists of a cableway stretched between a large tree and eyebolt embedded in bedrock. While the cable's height of ~20 feet above Desolation Creek isn't ideal this is the best location for collecting discharge data. Unfortunately data during the year's highest flow was not collected as gear was damaged during collection. We did learn a valuable lesson and now have extra parts on hand in case this happens again.

In total, five discharges were collected during this performance period (Table 7). A ratings curve was applied to estimate discharge in correlation with a Hobo Level Logger which was also installed at the site (Figures 16 and 17). Staff will install a staff gauge during 2020 to further enhance data collection and facilitate the development of a ratings curve.

Date	Time	Sensor Depth (Ft)	Measured Flow (CFS)
3/22/2018	10:00-1055	1.97	91.8
4/25/2018	0930-1130	2.783	145.9
9/4/2018	0700-0750	0.826	4.88907068
10/18/2018	1340-1430	0.89	22.7215938
11/29/2018	0800-0850	1.061	15.4833605

Table 7. Measured discharge at Granite Creek in correlation with level logger sensor.

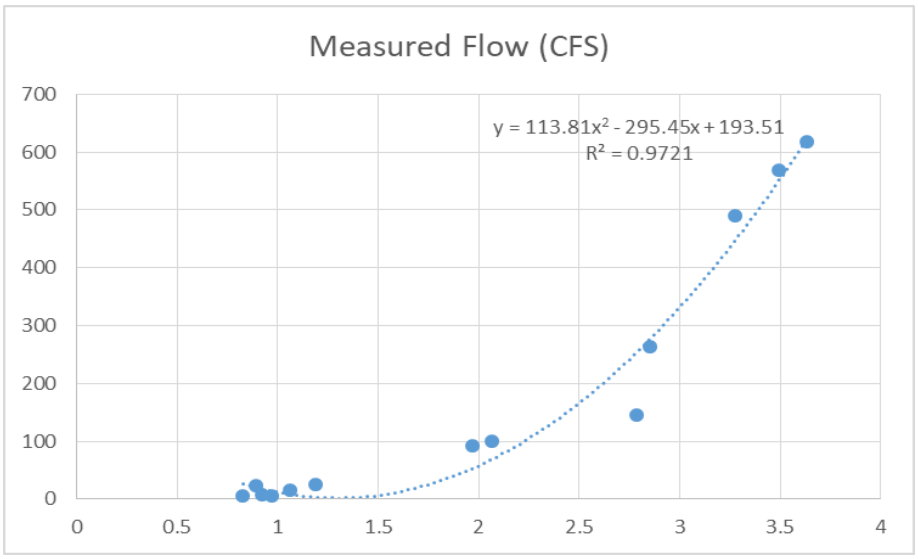

Figure 16. Ratings curve for correlating measured flow with sensor depth for extrapolated flow estimates.

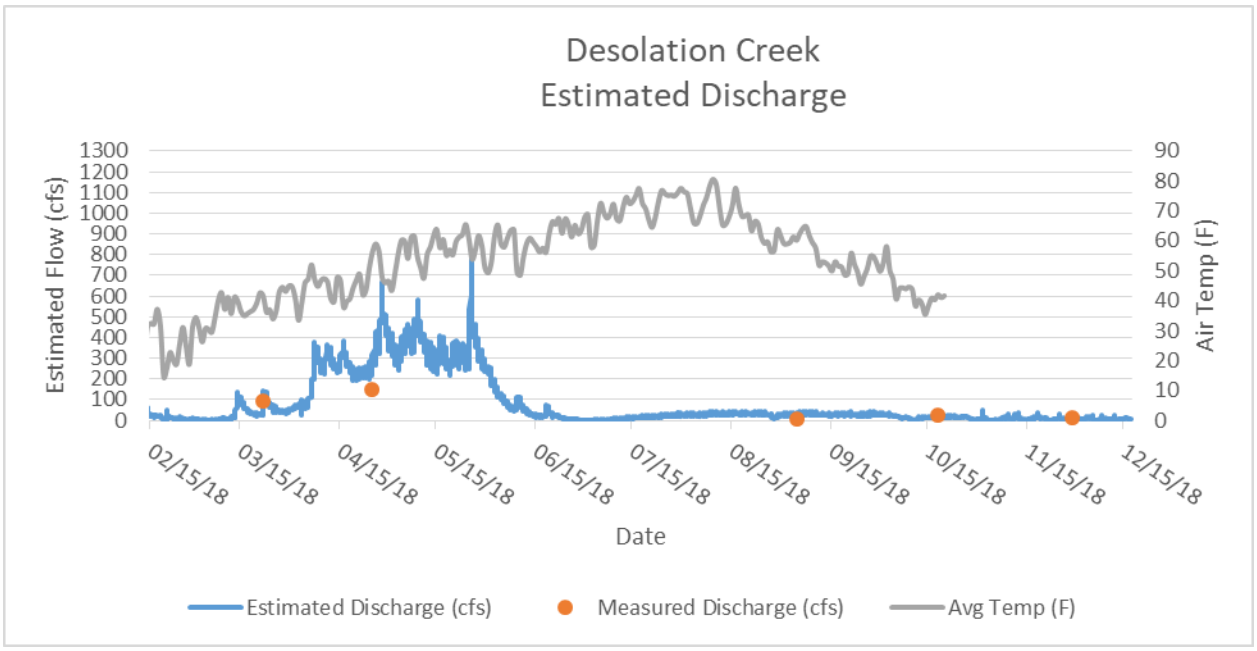

Figure 17. Flow estimates for Desolation Creek for 2018 along with ambient air temperature.

Mud Creek

Photo points taken at Mud Creek (Figure 18) in 2018 do not suggest significant vegetative recovery within the floodplain. However, given that this site typically is dry throughout the summer save within its lowest extent grass recovery constitutes modest floodplain improvement. Hardwood recovery, while occurring, will be much slower.

Figure 18. Photo points collected in 2013 (left) and 2018 (right).

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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, FC, 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, FC, 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, FC, 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, FC, 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, FC, 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, FC, 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, FC, 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, FC, 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. 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, FC, 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 & Implementation	CC, HD, RF, FC, WS	1, 2, 3, 4, 5, 6	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
Hidaway Creek RM 1.3 Design	CC, HD, RF, WNS	1, 2, 3, 4, 5, 6	2018	1	3.2	0	no	- Develop a design to address limiting factors	Photopoints (ODFW)	none
Bull Run Creek RM 2 Design	CC, HD, RF, FC, WNS, WS	1, 2, 3, 4, 5, 6	2018	1	3.2	50	yes	- Develop a design to address limiting factors	CTUIR Bio-Monitoring Project	CTUIR Bio-Monitoring Project
Desolation Creek Reach 3 Design	CC, HD, RF, FC, WS	1, 2, 3, 4, 5, 6	2018	1	3.2	65	No	- Develop a design to address limiting factors	Photopoints	none

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 2018 the lesson learned fell upon review of Desolation Creek Upper Reach 6 design and implementation. While the selected treatment reflected previously developed goals and objectives it relied upon large wood structures and excavation to reactivate existing side channels and increase in-stream complexity. The treatment reduces stream power by splitting flows much of the floodplain, at least in the short term, is not activated and the most stable in-stream wood is large engineered structures which do not necessarily reflect what would naturally occur in this reach. An approach which used more of a 'Stage Zero' approach to increase side channel presence and fill the existing thalwag may have proven more effective at increasing floodplain connectivity and off-channel habitat. For these core reasons, without detracting from the Upper Reach 6 treatments, prospective design contractors were asked to think outside of the box when developing Desolation Creek Reach 3 design proposals. The selected contractor blended a 'Stage Zero' style approach with more engineered features reflecting site conditions, potential, and constraints. Although Reach 3 will not be monitored by the CTUIR's Bio-Monitoring Project how the design develops, is implemented, and how the treatments fair will inform future design and implementation efforts.

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.

<u>CTUIR</u>
See previous descriptions.

<u>NFJD Basin</u>
Over the past several years the John Day Partnership has been evolving from a loose group to a well-defined and supported entity capable of submitting applications for funding in support of its membership. The partnership received capacity funding from the Oregon Watershed Enhancement Board's Focused Investment Partnership to develop an Operation Manual, Memorandum of Understanding from entities participating in the Partnership, and develop an Action Plan for the John Day basin. The Partnership consists of a steering committee is responsible for high level guidance of the general partnership, three subbasin groups representing the lower mainstream, upper mainstream, and north and middle fork regions, a technical committee, an outreach committee, and a financial committee. The CTUIR has actively participated in all committees.

During 2018 the Partnership continued development of internal structure and the collection of existing data into a central database. During this period discussions evaluated potential tools to be used in the development of a John Day basin Action plan. In the end the Bonneville Power Administration's ATLAS

prioritization framework was selected. This in part due to Bonneville Power Administration's presence and existing capacity within the John Day Basin. Additionally the ATLAS's use complemented previous and ongoing prioritization by basin collaborators.

CTUIR staff continued contributing to development and operation of the partnership through participation on the Steering, Finance, Outreach, and Technical committees. Staff also contributed to the North and Middle Fork Working Group.

Region

The Project's role and responsibilities at the regional level has been largely discussed in previous annual progress reports. However, the John Day Partnership's development and maturity has required coordination with the CTUIR's higher echelons such as management staff within the Department of Natural Resources, the CTUIR's Fish and Wildlife Committee, and executive director level staff. Their interactions with The Project and the John Day Partnership are reflected in coordination with CTUIR staff and that of other organizations as the role of the CTUIR and funding for future actions is developed.

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.

During 2018 the CTUIR launched the version 2 of the Central Data Management System (CDMS) which included upgrades to the user interface and streamlined back end code. The CDMS v2 isolated internal and external access with all fisheries data isolated on paluut.ctuir.org. This approach allows for CTUIR access to the system off network and isolation of habitat sites and documents by watershed.

The CTUIR's North Fork John Day Fisheries Habitat Enhancement Project continued to review old project files and isolate those of value from redundant or insignificant files. Once finalized organized files will be uploaded to the CDMS. Water temperature data is uploaded annually once proofed.