# NORTH FORK JOHN DAY RIVER BASIN ANADROMOUS FISH HABITAT

# ENHANCEMENT PROJECT

## Annual Report for February 2014 – January 2015

BPA Contracting Officer:
Jamie Cleveland

Prepared by:
John Zakrajsek, Fisheries Habitat Biologist, Project Lead

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

Project No. 2000-031-00
Contract Number 64736

January 2016

# 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 2014 using guidance from the Umatilla River Vision, 2008 Accords, John Day Subbasin Plan, Mid-Columbia Steelhead Recovery plan, and other plans or 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 2014 the project worked to finalize the 2013 ISRP Geographic Review process and collaborate with cooperators to replace two culverts forming partial passage barriers with open bottom arches, removed one failing culvert which created a complete barrier to aquatic passage, Improved the stability of Fox Creek's channel, and continued to work with the community around Ukiah, Oregon to develop interest and assess the cause of and potential treatments to excessive sediment deposition within Camas Creek. Noxious weeds were also controlled and monitoring data collected on sites where Riparian Conservation Agreements exist. Additionally, contributions to outyear efforts included input and coordination for a cooperative restoration action on Desolation Creek.

# 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 Allison Johnson, Hydrologists Caty Clifton and Ed Farren, Range Managers Tom Thompson and Brad Lathrop) and the Wallowa Whitman National Forest and its employees (Hydrologist Suzanne Fouty, 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 Jeff Neal, 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, Gene and Julia Engblom, Richard and Dorothy Allstott, Brian Prater, Robin, Mary Lou, Andy and Bill Fletcher, Rose Pedracinni, and Lois Hartley Cannady who supported our efforts by cooperating in habitat enhancements on their property.

# TABLE OF CONTENTS

# 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).

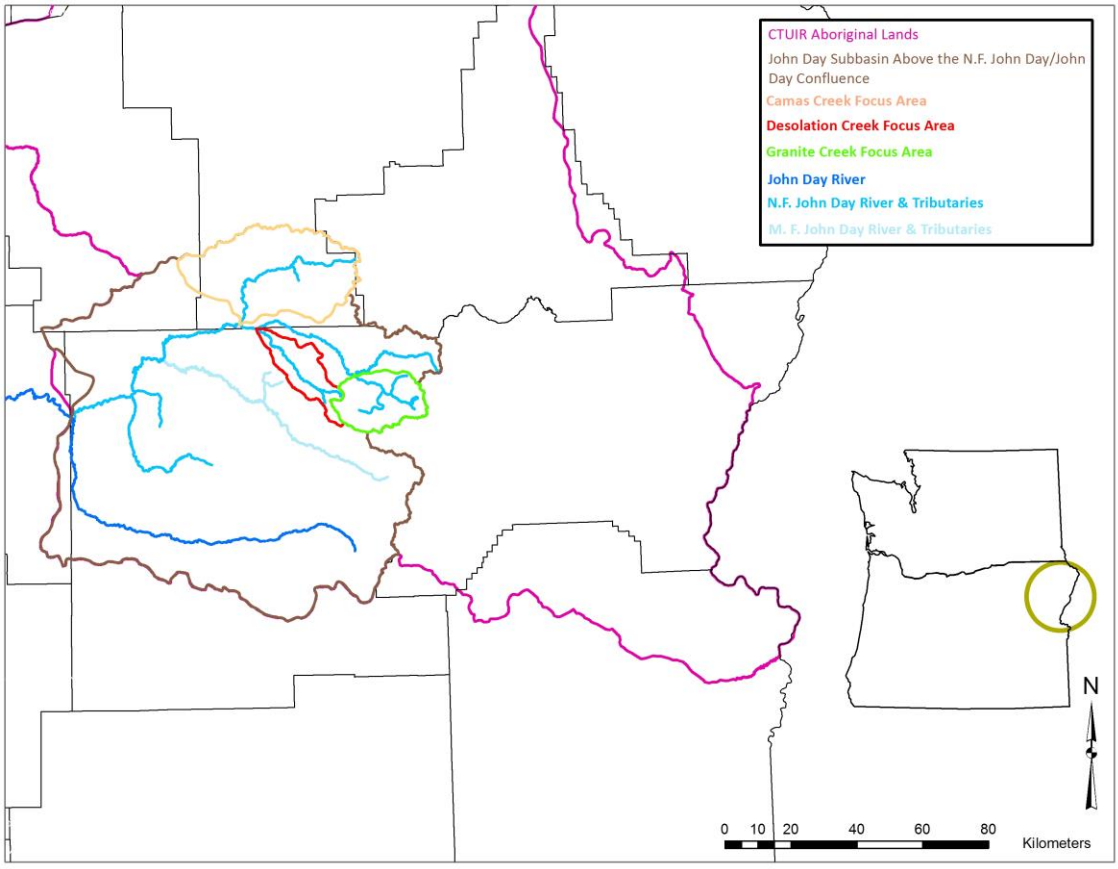


Figure 1. Map of the CTUIR ceded lands and focus basins for The Project.

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.

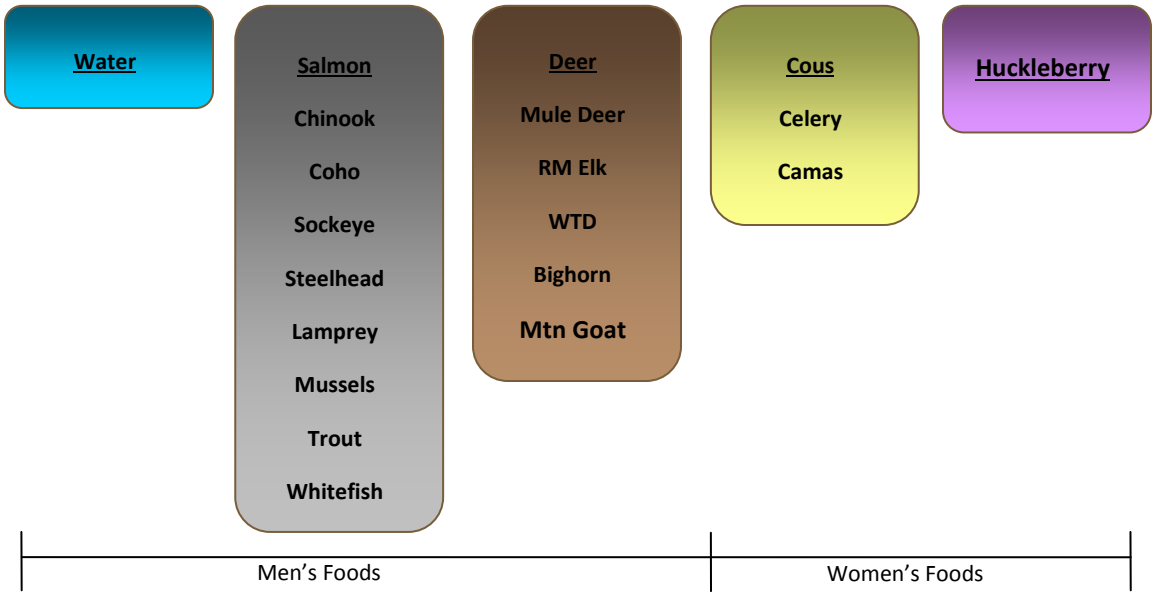


Figure 2. Characterization of the First Foods by grouping and cultural significance with respect to men's and women's foods. First Foods are listed in order of importance from left to right.

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 to remove 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) directly influencing 223.18 stream kilometers and 4,230.2 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 2014, three partial passages barriers were removed, native vegetation was planted, heavy maintenance was completed on existing fencelines, and a coordination effort near Ukiah, Oregon resulted in the development of a geomorphic assessment. 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)*.

As previously noted The Project focuses upon working with private landowners. However, this is not always possible 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 5$^{th}$ field HUCS (#1707020206, #1707020205, #1707020202, and #1707020204) in three tributaries to the North Fork John Day River including the 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 were implemented to the extent possible and in response to additional guidance from 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 began communicating more effectively and The Project began working closely with cooperators such as the Umatilla and Wallowa-Whitman National Forests UNF and WNF respectively) and the North Fork John Day Watershed Council (NFJDWC). The Project also began adopting 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. This includes;

Granite Creek

Restoration actions by the NFJD Project did not begin in the Granite Creek subbasin until 2006 when the NFJD Project partnered with the USFS to level mine tailings on Clear Creek. This action was identified by the UNF as a high priority effort and included in the 2008 Granite Creek Action Plan (USFS, 2008). Building on successful partnerships with the USFS, the NFJD Project assisted in strategically removing highly ranked passage barriers identified in the Granite Creek Action Plan (USFS, 2008). In 2010 another passage barrier was removed in Granite Creek as identified in the NFJD Project 2006 Geographic Review proposal. Since 2010, four additional high priority barriers were removed within the tributaries of the Granite Creek subbasin (Beaver Creek - one barrier in 2010, Ten Cent Creek – 3 barriers in 2012). With the development of the Bull Run Creek Action Plan (USFS, 2012) under guidance of the USFS Watershed Condition Framework (USFS, 2011), the NFJD Project was able to coordinate with cooperators and select prioritized restoration actions within a specific subbasin of Granite Creek. As a result of this document three passage barriers have been removed, two more will be removed in 2015, and planning efforts will begin to address mine tailings affecting floodplain, riparian, and stream channel processes, large wood placements, and two other passage barrier removals. Once all actions identified in the Bull Run Creek Action Plan are completed another 6th Field HUC will be chosen using the same 2011 Watershed Condition framework applied to Bull Run Creek. In essence, this process developed by the USFS to maximize their efforts falls directly in line with the NFJD Project's restoration strategy for the NFJD.

In addition to working with the USFS on priority passage and floodplain/channel restoration projects in the Granite Creek subbasin, the NFJD Project has continued outreach and education efforts to local landowners and where possible implement restoration actions adjacent to treated USFS properties with the intent of extending and connecting treated reaches further downstream. However, public sentiment against government interaction or lack of interest in working for aquatic restoration benefits may hinder abilities to complete restoration on private property in a manner that is advantageous for sequencing restoration actions to maximize aquatic or environmental response. It is therefore difficult to identify how long term restoration efforts on these private lands may occur in the future.

Desolation Creek

There are primarily two landowners in the Desolation Creek subbasin (the UNF and one private) creating conditions ideal for developing restoration priorities throughout the subbasin. Desolation Creek was identified along with Granite Creek under the USFS's 2009 region wide USFS 5th field HUC prioritization effort although it was a slightly lower priority. The UNF will focus their efforts in Desolation Creek once work has been completed in Granite Creek using the Watershed Condition Framework strategy. In conjunction with the USFS efforts on public lands, the NFJD Project has begun working with a large private landowner and NFJD cooperators in lower Desolation Creek to change land management practices and cooperatively restore floodplain processes. The 13,000 acre property includes 17.7 Kilometers of mainstem Desolation Creek along with another 12.8 Kilometers of ephemeral or perennial tributaries (approximately 8 Kilometers of the tributary habitat are used by anadromous fish species). The first step by the NFJD Project will be the development of a geomorphic assessment along with a prioritized implementation strategy for both the UNF and private properties if possible. The geomorphic assessment will complement ongoing efforts by the private landowner completing a range assessment followed by the development of a range management plan which may consider grazing management on both private lands and the adjoining public lands. Stream corridor buffers and off-channel livestock water developments in conjunction with future floodplain/channel restoration priorities identified in the planned geomorphic assessment will also be considered. This type of focused assessment and prioritized implementation strategy is what the NFJD Project intends to adopt in the future.

Upper and Lower Camas Creek

As with all the NFJD Projects focal basins the upper elevations are managed for multiple uses by the UNF or Wallowa-Whitman National Forest (WNF) with private lands located in the mid to lower elevation portions of the basin often along streams. Thus, early actions were tied specifically to private lands in mid to lower elevation areas in an opportunistic fashion. Given the limited influence of these actions upon larger scale limiting factors and more importantly, processes, the NFJD Project has worked to coordinate larger scale projects requiring the participation of multiple landowners. Over the course of the past several years the NFJD Project completed a preliminary assessment to describe geomorphic and hydrologic conditions within the broader valley surrounding Ukiah, Oregon using readily available data and rapidly sampled geomorphic data. We provided copies of the assessment to local landowners and the City of Ukiah, made several presentations at Ukiah council meetings, interviewed individual landowners and facilitated three coordination meetings after assisting the NFJDWC develop a successful OWEB Technical Assistance Grant application to assist in project facilitation. These actions have led to community support for a geomorphic assessment discussed later in this report. This type of baseline information will be required if the broader community is to begin addressing factors effecting landowners in the lower basin created or , influenced by localized and basin wide processes.

Appendix I show sites where maintenance or restoration efforts have been completed since the Projects inception on private and public lands. Private landowners who have entered into a Riparian Conservation Agreements with CTUIR include Forrest Rhinehart (Upper Camas Creek), Robin, Mary Lou, William, and Andy Fletcher (Lower Camas Creek), Gene and Julia Engblom

(Owens Creek), Richard and Dorothy Allstott (Snipe Creek), Steve Berry (Deer Creek), Billy Neal and Sheri Helms (NF John Day), Lois Harthey-Cannady (Mud Creek), and Rose Pedracinni (Granite Creek). 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), Wallowa Whitman National Forest, 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.

Bonneville Power Administration (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 2014 through 31 January 2015.

## 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 WNF. 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.

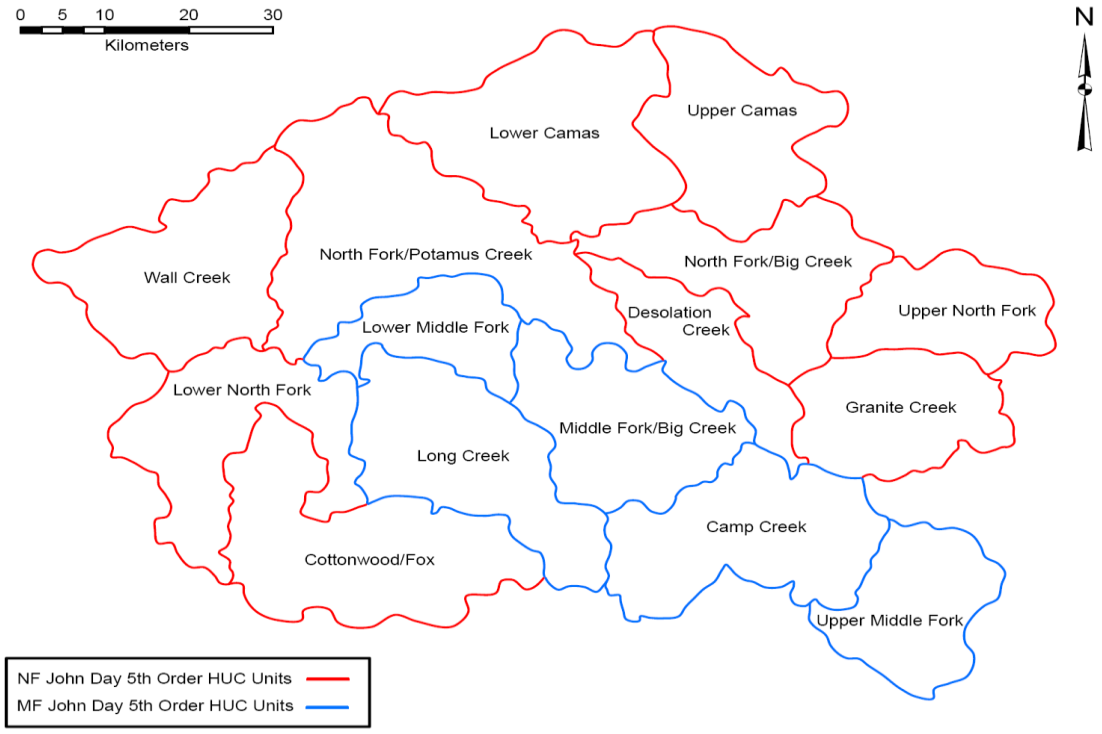


Figure 3. NFJD 5th field HUC's

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 <-18$^{o}$ 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<br>In-Stream Habitat<br>Sediment Routing<br>Water quality | Riparian Disturbance<br>Stream Channelization & Relocation<br>Grazing<br>Forest practices<br>Roads<br>Irrigation Withdrawals<br>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 | 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 | 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.

# 2014 ACCOMPLISHMENTS

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

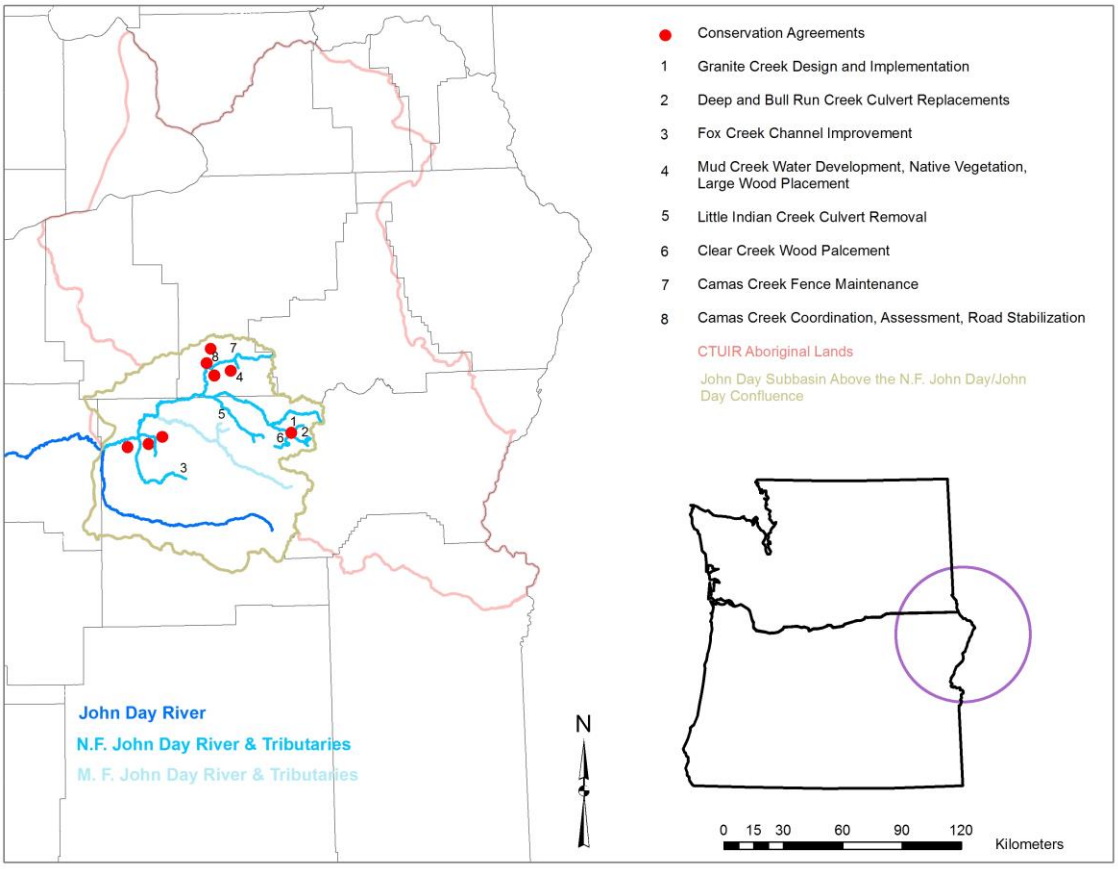


Figure 4. Restoration and Protection Site Locations.

**WE A – Identify, Prioritize and Select Habitat Project Areas**

Completed and submitted a draft Statement of Work for 2015 to BPA as required. Efforts to that end included conversations with potential cooperators within the Desolation Creek subbasin and work continues on an assessment of the Camas Creek adjacent to Ukiah, Oregon. It appears at this time that assessments in Camas Creek and Desolation Creek if they come to fruition will consume much of The Projects time and funding over the next several years.

**WE B - Produce Environmental Compliance Documentation**

Permits and requisite information was either secured by CTUIR or passed on to BPA for all efforts save WE M which will be discussed later.

**WE C – Provide Local Community-Based Outreach and Education**

Outreach during this performance period primarily consisted of attendance at NFJDWC

meetings and involvement as a member of the NFJDWC board and outreach tied to the Camas Creek Coordination effort. This included presentations and/or discussions with individual landowners while discussing background information and potential approaches or issues with proposed approaches to addressing sediment deposition in Camas Creek. One meeting open to the public occurred as part of this process during 2014 along with interviews with approximately five landowners. The meeting focused upon presenting information relative to the CTUIR First Foods Policy, The Projects actions in the past, present, and future under this doctrine, and discussion of physical and biological process involved in sediment deposition in Camas Creek.

**WE D – Maintain Water Developments**
Water developments were maintained throughout 2014 and we will continue to coordinate with landowners regarding maintenance. All issues related to maintenance were resolved.

**WE E – Investigate for Livestock Trespass**
Livestock trespass was investigated and rectified throughout the grazing season. Trespass occurred only on the Lower Camas Creek site due to the failure of a boundary fence.

**WE F – Maintain Fences**
Fence inspections throughout 2014 did not identify damage that wasn't repaired in short order. On Lower Camas Creek a boundary fence failed and was repaired by The Project where appropriate with the landowner responsible for the balance of the maintenance.

**WE G – Maintain Vegetation**
A contract for noxious weed control efforts awarded in April of 2014 used herbicides on Upper Camas, Owens, Snipe, Granite, Mud, and Deer Creeks and the NF John Day conservation agreement sites. Significant progress has been made on the Deer Creek and NF John Day River sites however, seed sources from within the site and neighboring properties continue to demand more efforts than those properties in the Camas Creek focus area. Efforts outside these areas shall continue through cooperative efforts including an agreement with the City of Ukiah for weed control on Lower Camas Creek site and adjacent properties within and around Ukiah.

**WE H – Granite Creek Implementation Design**
Unfortunately, the design for Granite Creek was not completed due to the staff's time spent learning Civil3D, working through issues related to the Fox Creek Channel Improvement effort, and a considerable amount of time spent working through responses tied to the Independent Scientific Review Committee 2013 Geographic Review process. The design was pushed to 2015 and will be completed with the help of a BPA engineer.

**WE I – Granite Creek In-stream Implementation**
This Work Element could not be completed without the design from WE H.

**WE J & K– Deep Creek and Bull Run Creek Culvert Replacements**

This Work Element replaced two culverts (Figure 5 & 6) creating partial barriers with pre-cast concrete bridges in Deep Creek and Bull Run Creek through a cooperative effort in cooperation with the Wallowa-Whitman National Forest and the NFJDWC. This action returned access to approximately 10 miles of stream channel for all life stages of steelhead and bull trout. Additionally, U.S.F.S. Rd 7370 was realigned to eliminate two 90 degree turns in Deep Creek where the culvert passed flows under the road and allowed for the reestablishment of several stream meanders in Deep Creek while eliminating the potential for erosion of the road prism. These actions used natural channel design practices and will effectively pass sediment and debris during high flows. The engineer's estimate ($450,000) for these replacements was accurate and all funds allocated for this effort by The Project were spent.

These culverts were identified in the Wallowa-Whitman National Forest's Bull Run Creek Action Plan (USFS, 2012) and follows a previous culvert replacement by the cooperators in 2013 on Bull Run Creek and has been deemed successful, an effective use of resources, and will provide a long term benefit to aquatic species while reducing infrastructure maintenance costs. Native planting which haven't survived being replanted will be supplemented with plantings by the Wallowa-Whitman National Forest. Other restoration actions completed in the Bull Run Creek subbasin will be implemented in 2015 and consecutive years.

Figure 5. Photographs of the Deep Creek culvert looking downstream before replacement (left) and after replacement (right). Note the 'after' photograph was taken from where the old culvert was located showing the meanders created and the new Deep Creek Culverts relative location (60 meters downstream of the old culvert).

Figure 6. The Bull Run Culvert before replacement (left) and after replacement (right).

**WE L – Fox Creek Channel Realignment**

A considerable amount of time by the NFJDWC, BPA, permitting entities, and The Project was spent in early 2014 to identify a suitable approach to treat concerns rising from the 2013 implementation effort. Concerns included drop heights greater than six inches across rock structures and bank cutting around the upper most of three structures. In the end BPA, the NFJDWC, and The Project improved three rock structures through the incorporation of 30 junipers and 30 yards of rock (Figure 7). As a result of these actions the landowner has noticed improved hay production in an adjacent field.

Figure 7. Finished top and middle structures (top left), bottom structure looking upstream (bottom left) and bottom structure looking upstream (below).

**WE M – Mud Creek Water Development**

The Project solicited bids from qualified contractors prior to requesting funds from BPA per new budgeting requirements. This resulted in implementation being delayed due to the contractor selection process and a subsequent funding from BPA. When funding arrived in early winter weather prevented drilling which was further complicated by a change in drilling location and subsequent cultural resource surveys. Drilling will be completed during 2015 once the new well location has been cleared by cultural resource surveys.

**WE N – Mud Creek Native Vegetation Planting**

Upon the arrival of permits in November The Project planted quaking aspen in one location within the riparian enclosure created by fencing constructed during 2013. Unfortunately, early winter weather and frozen ground resulted in a total loss of

plantings. These plantings will be replaced in 2015 with 1.5 meter horse fence enclosures around individual plants to prevent browse by wildlife.

**WE O – Mud Creek Wood Placement**

The Mud Creek wood placement effort was included in the 2014 Statement of Work to reduce potential delays in contracting between BPA and CTUIR once the effort was fully developed. Conversations between the landowner and The Project did not progress far enough to identify a final solution. While the conversation has not been dropped the action has been put off until the stock water well and plantings have been completed.

**WE P – Little Indian Creek Culvert Removal**

In cooperation with the Umatilla National Forest The Project removed a 1970's era culvert consisting of large wood and soil/rock over burden (Figure 8). The culvert was identified as a partial barrier for steelhead trout and its removal returned access to 0.8 kilometers of Little Indian Creek. This action was associated with a cooperative riparian fence construction during 2013 between the Umatilla National Forest, NFJDWC, and The Project.

The Project provided design specifications and input to complete NEPA permitting requirements to the Umatilla National Forest who also provided implementation oversight. The Project rented equipment and provided operators for the implantation which occurred over one week during the 15 July to 15 August in-stream work window. During this time suspended sediment monitoring did not result in any delays and the final product was approved by the Umatilla National Forest. The Project planted native alder during the following fall and will be collecting photopoint data in the future.

This proved to be an effective use of cooperator resources for both entities and juvenile salmonids were identified in 2015 above the barrier. The site is thus far stable with grasses and alder plantings growing and sediment loading from the culvert eliminated. Similar actions may occur in the future if a similar opportunity arises.

Figure 8. Little Indian Creek culvert looking across the stream from river right before removal (top), after removal (middle and bottom). Rocks in the lower right of the bottom picture were placed to prevent excessive erosion from water flowing down a decommissioned road. The sediment barrier replaced with straw waddles in late 2014.

**WE Q – Clear Creek Wood Placement**

The Umatilla National Forest' Fish Biologist from the North Fork John Day Ranger Station and The Project met on site to discuss several options and The Project collected topographic data to base drawings upon. However, the changes in Umatilla National Forest staff and timing with respect to bring on new their replacement prevented the development of a permitted design suitable to all parties. For the proposed action materials were to be provided by the Umatilla National Forest and The Project intended to provide funding for a suitable contractor. This action may be considered for implementation at a later date.

**WE R – Camas Creek Fence Maintenance**

Currently there are over 310 miles of fence on the south half of the Umatilla National Forest that excludes or limits cattle to streams which protect over 90 miles of Designated Critical Habitat for Mid-Columbia River steelhead and over 215 miles of streams within the John Day River Watershed. The Umatilla constructed many of these fences using BPA funds which are approaching 20 years in age and are in need of repair. To continue the commitment of protecting streams in the John Day River Watershed on the Umatilla National Forest from livestock grazing heavy maintenance was completed on 28 miles of fence protecting 14 miles of floodplain, riparian, and in0stream habitats. During this effort right of ways were cut out 6' wide on each side of the fences complementing the addition of new steel posts, stretching wires, removing multiple

splices in wires, reconstructing rock jacks, adding stays, reconstructing stretch points, and reconstructing gates as needed.

This effort proved to be an effective use of existing Umatilla National Forest and The Project's staff and complementary resources. Because of this, additional fence maintenance will continue over the next several years in The Project's focus subbasins.

**WE S – Camas Creek Coordination Effort**

In total, three meetings were held by The Project and the NFJDWC during early 2014 in an effort to build community consensus and support for a coordinated effort to deal with excessive sediment deposition in Camas Creek. This deposition has created concern amongst local citizens regarding the potential for flooding and the loss of aquatic species and their habitat over time. The most successful meeting and where the community members in attendance supported a CTUIR funded geomorphic and hydrologic assessment occurred after high water created a fair amount of concern. Since then two of the residents who supported the assessment have withdrawn their support, however, this The Project's efforts will continue until WE T has been completed and the presented to the community. In the end the community will have to decide if specific treatments are to be identified, designed, permitted, and implemented. The Project will continue to assist the community by facilitating discussion and assisting with design, permitting, and implementation efforts assuming the solution is acceptable to The Project.

**WE T – Camas Creek Assessment**

After the community voiced support for a CTUIR funded geomorphic and hydrologic assessment a request for proposals was developed in cooperation with the NFJDWC to develop an understanding of and identify effective treatments to deal with substantial sediment deposition which is filling Camas Creek's channel within and below Ukiah. For this effort the Camas Creek basin above Ukiah, Oregon was split into the Primary Assessment Area (PAA) (between Ukiah, and Cable Creek approximately five miles upstream) and a Secondary Assessment Area (SAA) (the balance of the basin above Ukiah). This strategy allowed for the consideration of large scale processes and constraints which have bearing upon the broad alluvial valley around Ukiah while concentrating efforts upon the area of most concern to residents. Historically the PAA was likely a sediment transport reach in its upper portions and a depositional area in its lower portions. However, more recent land management techniques, flood control strategies, and transportation infrastructure developments have negatively influenced Camas Creek's ability to maintain natural sediment loading and deposition trends. At this time Camas Creek channel within the PAA largely consists of a plain-bed armored channel with little to no structure and several localized headcuts within the broader valley surrounding Ukiah eight to ten feet deep or perched above the surrounding floodplain.

During 2014 five contractors attended the mandatory bid tour and submitted proposals. The proposals were scored by NFJDWC and The Project's staff and all five presented their strategies at an open meeting in Ukaih where the public was invited to attend and several of them were invited to participate in scoring the presentations. The arrival of funding in late 2014 and early winter weather prevented LiDAR data collection.

However, the selected contractor was able to begin collecting background data and prepare for full implementation of the assessment in 2015.

**WE U – Camas Creek Road Stabilization**
This WE was included in the 2015 SOW as a treatment to show how relatively small structures could produce a significant effect. Specifically, several J-hook structures were to be placed to reduce near bank shear stress during high flows along SR 244's road prism. However, given the way WE S progressed and resistance from an adjacent landowner to any treatment the effort was set aside. The Project will rely of WE T to identify the causes behind sediment mobilization/deposition with the broader valley about Ukiah, Oregon and potential treatments and their affect before discussing this with community members again.

**WE V – Submit Annual Report**
This Report fulfills this WE.

**WE W – Submit Status Reports**
Submitted on time as required.

**WE X – Produce Project Deliverables**
All milestones for this WE were met. In completion of this WE one of The Project's staff attended the 2014 AGU Annual Conference and another attended the River Restoration Northwest Symposium. Photopoints were collected at designated locations and temperature data was collected and tabulated. The Project has entered and temperature data into the CTUIR database and has begun, to the extent possible, entered information into the CTUIR Project Manager Database. This will continue until all past and current data and information is contained within the databases.

The Project spent a considerable amount of time working through the 2013 ISRP Geographic Review process. A second and third response to qualifications was developed by either The Project's staff or in cooperation with CTUIR and BPA staff.

# DISCUSSION

**Restoration Strategies**

During 2014 the four restoration efforts not implemented fell victim to changes in staffing and unforeseen complications. With respect to the Clear Creek Wood Placement changes in staffing could not be predicted while developing the 2014 Statement of Work and the UNF's staff workload personnel prohibited the completion of planning and permitting actions. In the end, this effort will likely be rolled into a Desolation and Granite Creek restoration plan.

The Granite Creek Design and Implementation actions were to be a cooperative effort between BPA and CTUIR. However, staffing obligations of both parties prohibited these actions being completed. Although unfortunate, they were included in the 2015 SOW in the hope that both entities could make time to carry through on both actions. If staffing obligations again prohibit our ability to complete these tasks a contractor will be brought in to complete the designs for implementation in 2017.

Two efforts under the Mud Creek Conservation Agreement (well and plantings) were delayed as a result of a permits late arrival and the onset of winter weather. This could have been avoided if all tasks under the conservation agreement were identified prior to signing the agreement and permitting was completed up front. In fact, we strive to approach all efforts in this manner; however, this was not possible as the landowner has been actively modifying his land management strategies since the agreement was signed. Another byproduct of this has been the loss of the grazing management plan contained within The Projects 2013 Geographic Review proposal. The landowner has entered into an agreement with a responsible permittee who maintains a consistent presence on the property during the grazing season and has been moving cattle according to conditions on the ground. This differs from the previous permittees 'drop them off and let them be' approach which the landowner was unhappy with and resulted in the proposed plan. The wood placement was inserted in the 2014 Statement of Work as a placeholder given preliminary discussions just prior the statements development. Follow-up discussions with ODFW and the landowner suggested a greater need to place wood Hideway Creek which would provide a greater benefit to aquatic species. The discussions continue and this will occur once the specifics have been agreed upon.

The Camas Creek Road stabilization was included in the Statement of Work as a demonstration project for the Camas Creek Coordination effort. However, given the movement toward a more comprehensive assessment The Project does not consider the loss of this small project to be significant. While this may suggest a need to assess and modify our planning approach to restoration the 2012 production of 'A Brief on Conditions and Potential Approaches for Sediment and Stream Channel Management on Camas Creek near Ukiah, Oregon' (Zakrajsek, 2012) explaining on the ground conditions and resulting discussions was a significant step toward building interest across multiple private land ownerships to address larger scale issues influencing an entire community. This approach will be used in other locations where opportunities exist.

The balance of restoration actions were completed using previously developed strategies save the Little Indian Creek culvert removal. This culvert removal was a first in that the UNF and CTUIR agreed to use CTUIR staff and equipment rental to provide information for UNF permitting and implement the action. While the culvert was relatively small the action was implemented successfully and if possible this approach will be repeated for similar actions in the future. The Project will continue to incorporate lessons learned and new strategies to build interest and involve private and public landowners in the

future. We will continue to work toward establishing larger scale collaborative efforts in priority areas for restoration.

**Monitoring**

Monitoring data collected by the CTUIR occurred on two levels. The first consists of geomorphic and biological data collected by the CTUIR's Bio-Monitoring Project (BPA Project #2009-014-00) and photopoints and stream temperatures by The Project. Data collected by the Bio-Monitoring Project for the Granite Creek Conservation Agreement Site (Site GCT00001 (CHaMPS, 2015)) began in 2013. The data has not yet been analyzed by the Bio-Monitoring Project although it will be presented in their annual report when available and referred to in our annual reports. Additional sites will be incorporated based upon the Bio-Monitoring Project's protocols as they become available such as the Desolation Creek site if/when a conservation agreement is signed.

The second effort consists of water temperature and photopoint data collected where conservation agreements exist and other select locations. This tactic was introduced in the 2013 ISRP's Geographic Review Process and will continue pending final review and comment through this process.

Water temperatures were collected using Hobo Pendant data loggers recording at one hour intervals. Logger locations are specific to an individual site and do not change over time and loggers are located 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. Our intent was to begin using non-parametric analysis to investigate categorical data (i.e. number of days over a lethal limit of $25^{o}$ Celsius) and use air temperatures as a comparison to water temperatures. Unfortunately this analysis has not yet been developed by the CTUIR. Photopoints are taken at dedicated sites at standardized locations and views.

For the 2014 data results will be presented using a seven day maximum moving window average chart and comparison to 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). For Threatened Mid-Columbia steelhead trout a lethal limit of $23.9^{o}$ Celsius and a preferred range of $10 – 13^{o}$ Celsius referred to in Bjornn and Reiser (1991) will be used. Data for five sites including Lower Camas Creek, Owens Creek, Snipe Creek, Kelsay Creek, and Deer Creek area available.

Lower Camas Creek

The Lower Camas Creek site has thus far received 1,100 feet of levee removal, placement of five J-hooks, one mile of riparian fence construction, five upland stock water developments, and native plantings under the Farm Services Agency's CREP Program (5000 plantings). A second planting by the CTUIR (200 native species) occurred in 2008. Plantings have thus far not been successful due to wildlife predation, high water, and long duration inundation. Additionally, sediment deposition and channel migration has reduced the effectiveness of J-hooks and plantings (Figure 9). The Camas Creek coordination effort may play a role in understanding the role of sediment upon this site. The Project's ability to implement additional measures is hampered by a CREP contract the landowner has on approximately 400 floodplain acres. At this point in time Lower Camas Creek does not contain a significant amount of high quality habitat as it is lacking shade, in-stream habitat complexity, and continues to be plagued by sediment and water quality issues. The site however continues to be influenced to an unknown extent by groundwater inputs bring cool water to the channel.

Upper and lower data loggers show a divergence of water temperatures in early July when air temperatures approach and maintain maximum temperatures around $30^{o}$ Celsius. This also coincides

with the onset of baseflow after a pulse of flow in late June (Figure 10). By late September water temperatures at the lower end of the site are again mimicking those at the upper end as fall rains begin and air temperatures cool. Temperature profile divergence between July and early September are likely the result of atmospheric thermal inputs as temperatures rise and a lack on-site shade and a general lack of shade throughout much of the basin. Temperatures suggest the groundwater inputs are not of sufficient volume to offset solar inputs.

Figure 9. Photopoint collected for the Snipe Creek site during 2014 (right) looking upstream from the middle of the reach. The left photo was collected in 2007 a year after levee removal looking downstream upon the 2014 photopoint located on river left just below the lowest J-hook structure.

Water temperatures rose above the 19.1° Celsius threshold where feeding stops for juvenile Chinook salmon in 27% of maximum averaged temperatures at the upper logger compared 62% at the lower logger without breaching the lethal 25° Celsius level although they came close on several occasions. Except for the period between 2 July and 10 July (Figure 11) where water temperatures exceeded the 10 – 15° Celsius range preferred by juvenile Chinook salmon (referred to in Yankee et al., 2007) aquatic species were not subjected to consistently high temperature which have resulted in fish kills such as those in the Middle Fork John Day River. This may suggest considerable potential for improving floodplain complexity and water temperatures through successful native plantings and creating channel complexity.

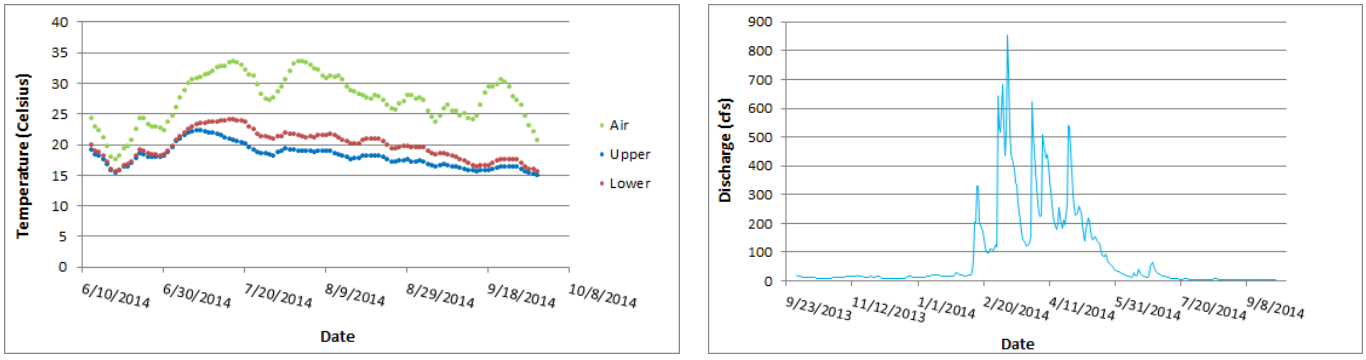


Figure 10. Seven day moving window average for the Lower Camas Creek site (top) and flow data for a streamflow gage 14042500 operated by the Oregon Department of Water resources for the period 1 October 2013 to 30 September.

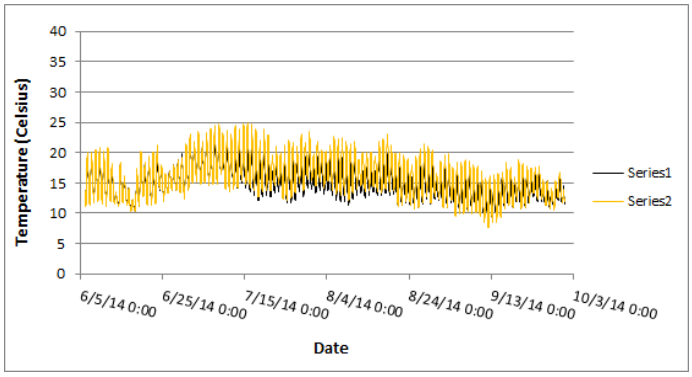


Figure 11. Raw water temperature data collected for the Lower Camas Creek site between 6 June and 30 September 2014 at the upper (black) and lower (orange) locations.

Owens Creek

The Owens Creek site has thus been witness to the construction of riparian fencing and the development of two off-channel stock water sites fed through a single well. Due to the sites location immediately above the SR244 bridge, low valley and channel gradient (< 0.5%), and short stream length (0.5 Km) additional work to improve in-stream complexity hasn't occurred. The stream channel through this reach during baseflow receives little input from above and the channel is over widened with very low water velocities throughout the summer. Although the site is located near the Lower Camas Creek site the watershed above this point typically loses its snowpack or a significant portion of it before that of the Lower Camas Creek site. Based upon this and the condition of higher elevation meadows upstream site we would expect water temperatures to become elevated before those at the Lower Camas Creek site.

Inflow from upstream reaches, thermal inputs from the atmosphere, and a general lack of site specific shade likely contribute to water temperatures that breech the 23.9$^{o}$ Celsius threshold between 5 July and 20 July (Figure 12). Given this extended period of time where water temperatures limit juvenile steelhead trout are feeding above their preferred temperature range fish and are likely moving into Lower Camas Creek until temperatures drop. Without a significant effort upstream in meadows noted in the Snipe Creek discussion little can be done to improve wildlife habitat at this site although keeping cattle off the creek is valuable in and of itself.

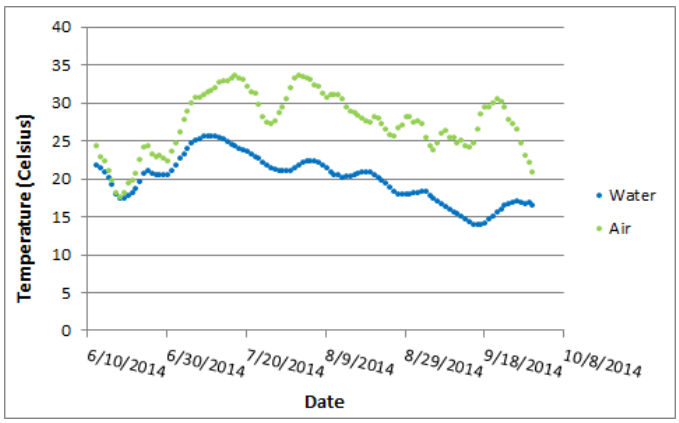


Figure 12. Seven day moving window average for the Owens Creek site (top) and the raw data profile for data collected between 6 June 2014 and 30 September 2014 for the upper and lower data loggers.

Snipe Creek

The Snipe Creek site consists of two riparian enclosures with associated upland water developments well off the stream channel. The extent of restoration efforts at this site included the riparian fencing and stock water developments as well as native hardwood plantings. The first enclosure is located in a narrow well vegetated canyon (Figure 13) containing a B4 stream channel (Rosgen, 1996 classification).

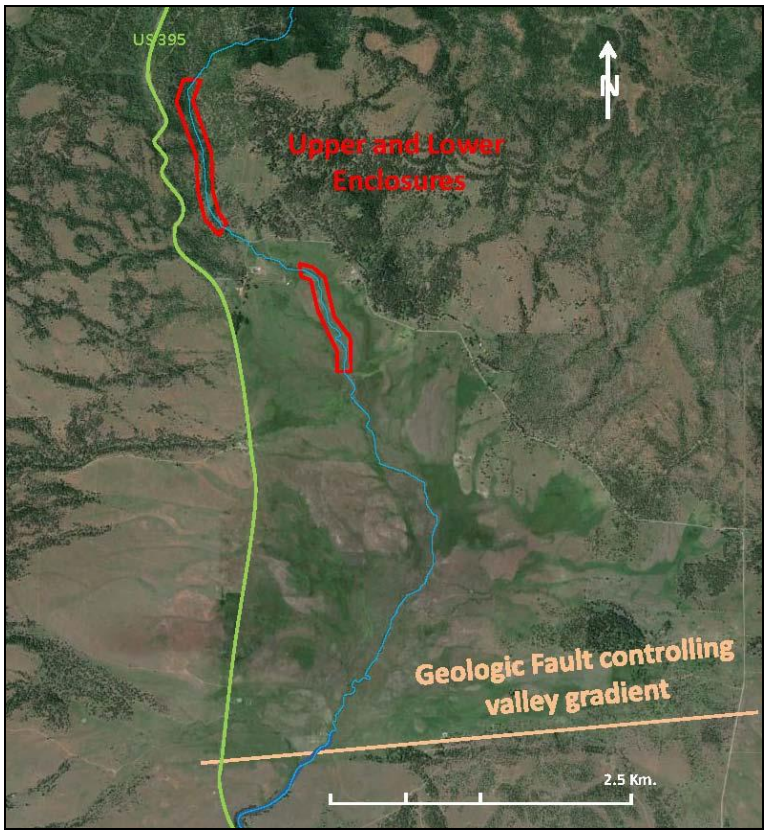


Figure 13. Aerial photograph showing the two Snipe Creek enclosures and the extent of channel incision below the site to a geologic knickpoint controlling valley gradient. Streamflows are from the top of the photograph to the bottom. Photo taken from Google Maps.

The second enclosure is located approximately 0.5 Km below in a broad alluvial valley which historically would have contained an E5 (Rosgen, 1996 classification) or similar channel type. At this point in time excessive erosion downstream of the site combined with land management strategies creating and/or exacerbated a head-cut which has severely compromised natural processes associated with the broad meadow and its ability to buffer snowmelt and late summer water quality. The measures implemented have been successful in that they removed cattle from Snipe Creek and allowed the site to begin recovery through natural processes. This likely resulted a significant drop in sediment loading and bank cutting although pre-implementation data does not exist.

Loggers monitoring water temperatures were located in both the upper and lower enclosures (one logger/enclosure) with the air temperature logger located at the lower end of the upper enclosure and in the middle part of the lower enclosure. Differences in stream temperature character are quite evident (Figure14) with the seven day averaged maximum temperatures in the upper enclosure only briefly exceeding the 10 – 13$^{o}$ Celsius preferred window for steelhead trout. A healthy riparian vegetation community protects the stream quite well from thermal inputs. Signs of browse by deer and elk have

been seen while completing fence maintenance efforts.

Conversely, the lower Snipe Creek site displays a much more variable and erratic character even exceeding air temperatures. This is the result of one primary factor, that being, the headcut beginning approximately four Kilometers downstream of the lower enclosure extending to approximately half way though that enclosure (Figure14) and subsequent loss of in-stream flows which occurs periodically as it did in 2014 around the first week in August. The temperature signals erratic behavior where logger temperatures are elevated above water and air temperatures indicates the data logger has been stranded in a dry channel. This was confirmed while checking on data loggers. The inset channel lies approximately five feet below the surrounding meadow surface at the lower end of the lower enclosure and aerial photos suggest this inset floodplain and channel may be approximately 10 meters in width below the lower enclosure. Without access the headcuts depth remains unknown although the lower enclosure's depth may be telling.

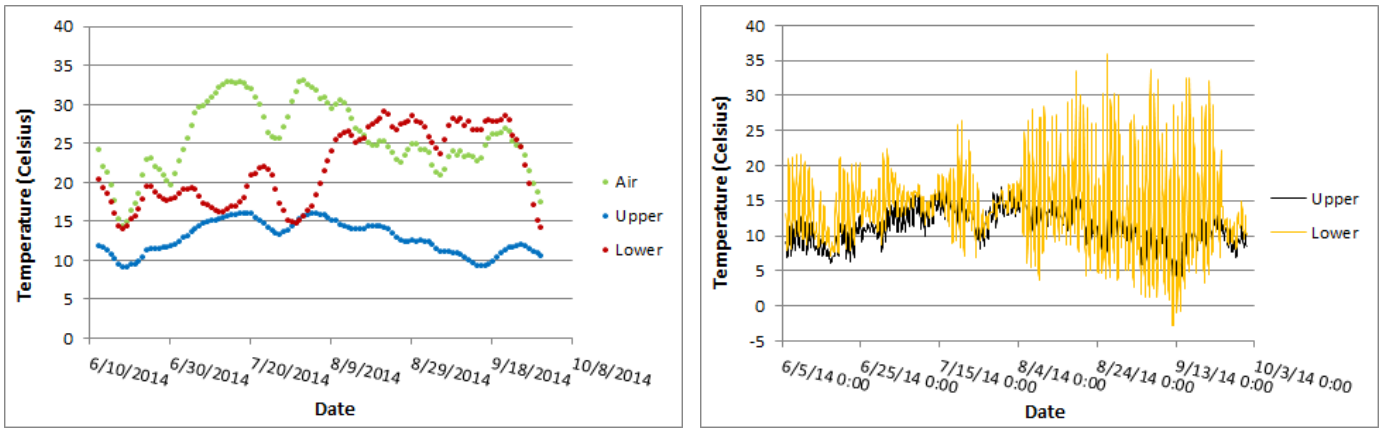


Figure 14. Seven day moving window average for the Snipe Creek site (top) and the raw data profile for data collected between 6 June 2014 and 30 September 2014 for the upper and lower data loggers.

Due the channel's incision native plantings were largely unsuccessful even with watering. Native Ponderosa Pine (Figure 15) is however colonizing the surrounding floodplain within the enclosure which in and of itself suggests a significant change in the sites ability to buffer snowmelt and provide high quality streamflows during the summer. Without an extensive effort to treat the head cut below this site additional restoration efforts on the landowner's property will not produce a satisfactory result.

Figure 15. Photopoints collected for the Snipe Creek site during 2002 (left) and 2014 (right) from the lower end of the lower enclosure looking upstream.

Deer Creek

Prior to the CTUIR installing riparian fencing and stock water developments to prohibit cattle access to Deer Creek and utilize upland forage more effectively the property was used as winter pasture for cattle. As such, floodplain and riparian conditions were severely degraded. Over time riparian vegetation has recovered (Figure 16) although deer and elk are still influencing the site to an unknown extent. Records of pre-implementation water temperatures or riparian vegetation aren't available and the earliest data collected in 2004 (water temperatures) shows anomalous behavior which cannot be explained with any certainty. It does however suggest that water temperatures increase through the site as does the 2014 data (Figures 17 & 18).

Figure 16. Photopoints collected for the Deer Creek site during 2010 (left) and 2014 (right) and the upper logger location. Note the 2004 picture was taken in early summer and while the 2014 picture was collected in late summer.

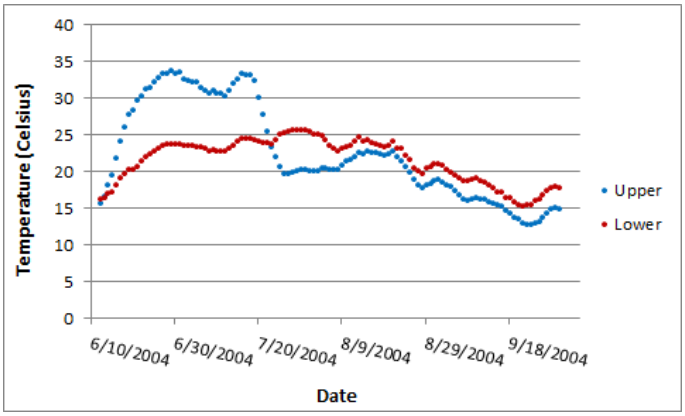


Figure 17. Seven day moving window average for the Deer Creek site collected between 6 June and 30 September 2004 for the upper and lower data loggers.

Air temperatures tied to the Deer Creek site have the capacity to significantly influence water temperatures due to the areas arid climate and temperatures which exceed 35$^{o}$ Celsius during the summer (Figure 18) especially if riparian vegetation is ineffective. Dissimilarities in water temperature begin in early June suggesting the onset of baseflow and increased thermal inputs to the stream channel. Stream discharge data is not available for this site; however, given its elevation and climate, weak soil profiles, and low snowpack relative to the Camas Creek site this is not unexpected. Additionally, raw data (Figure 18) suggests the stream is reactive to atmospheric temperatures at this site in that that the difference between lower temperatures when considering diurnal fluctuations are equal or slightly cooler during early summer and late fall or slightly warmer during the summer when

comparing the lower temperature logger to the upper logger. Conversely, maximum temperatures at the lower logger may be up two three degrees Celsius higher than those of the upper data logger during the summer.

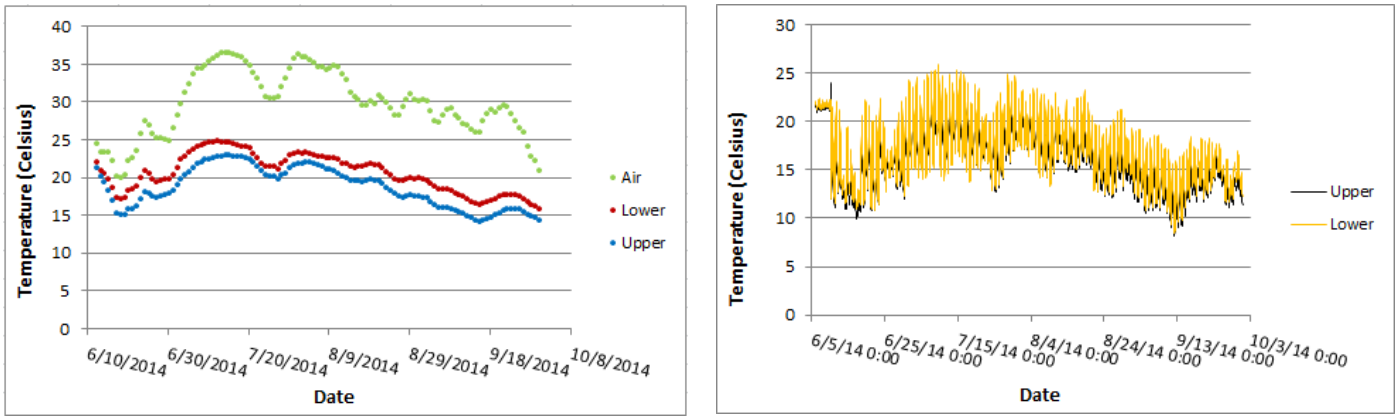


Figure 18. Seven day moving window average for the Deer Creek site (top) and the raw data profile for data collected between 6 June 2014 and 30 September 2014 for the upper and lower data loggers.

Maximum averaged daily water temperatures during 2014 did exceed the 23.9° Celsius threshold during 1 and 17 July 2014 as well as the 10 – 13° Celsius preferred range. As other physical or biological data was not collected we cannot confirm the presence of aquatic species during this period. Given the extended periods during which temperatures were above the 13° Celsius threshold it is possible fish moved down into the North Fork John Day River unless cool water microhabitats were available in Deer Creek. In previous years while collecting geomorphic data young of the year and year one juvenile steelhead were present although data suggests water temperatures were slightly lower than in 2014.

Kelsay Creek

Temperature loggers and photopoints are collected at the Kelsay Creek site at the upper and lower ends of the site which is approximately one mile in length. 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 stringer meadows 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.

The temperature profile for maximum daily average water temperatures collected in 2008 and compared to those of 2014 (Figure 19) suggest the treatment has not influenced water temperatures to a noticeable degree as the temperature signal remains relatively constant between the two years. Air temperature data is not available for 2008 and therefore we cannot identify the role atmospheric temperatures may have influenced Kelsay Creek. While it is fortunate that maximum average daily temperatures rose above the 23.9° Celsius threshold only breifly at the upper logger location during 2014 it's unfortunate that maximum averaged temperatures are generally above the preferred 10 – 13° Celsius window during early July through mid-August. However, diurnal cycling allows a reprieve from elevated temperatures thereby reducing the potential for mortality related to sustained high temperature water (Figure 20). As with the upper site diurnal variations at the lower data logger maintain temperatures during a portion of the day within the 10 – 13 ° Celsius preferred range although to a greater extent than the upper site.

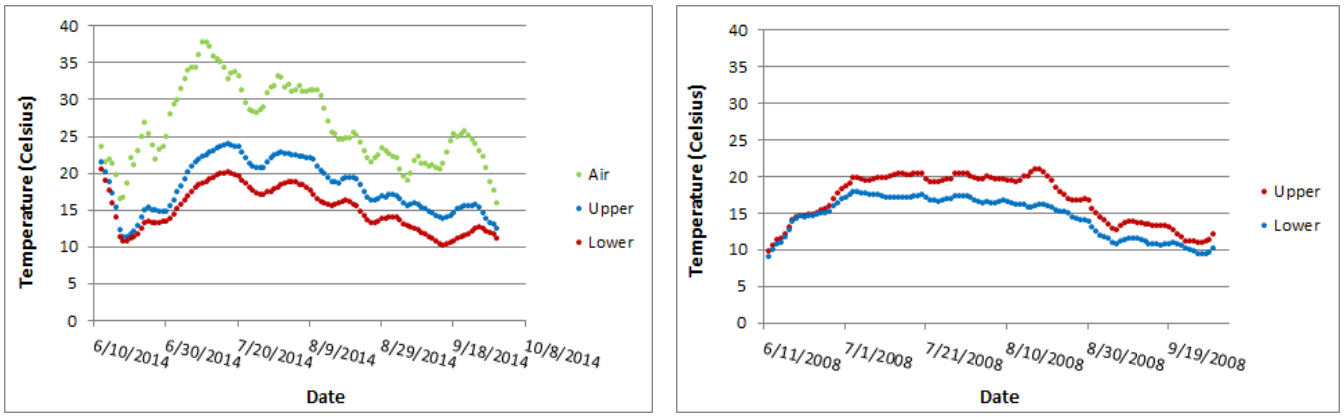


Figure 19. Seven day moving window average for data collected at the Kelsay Creek site during 2008 (top) and 2014 (bottom) for data collected between 6 June and 30 September in their respective years.

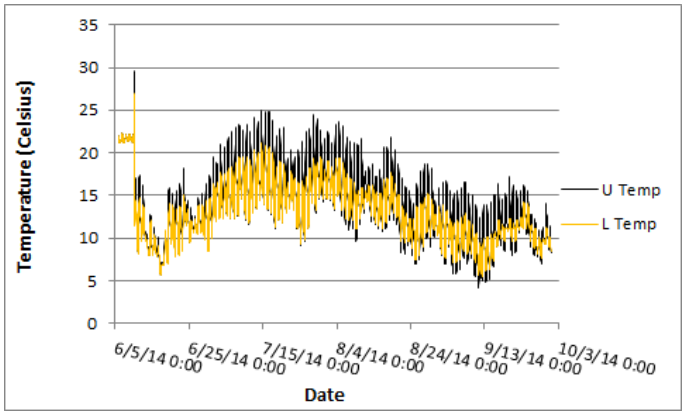


Figure 20. Raw data profile for data collected between 6 June 2014 and 30 September 2014 for the upper and lower data loggers. The data point showing 29 $^{o}$ Celsius cannot be explained.

Photopoint data (Figure 21) does however suggest that the exclusion of cattle has allowed native vegetation to recover over time and streambanks are not being disturbed to the level they once were. Elk and deer still have access to the site and therefore retard vegetative recovery though browse to an unknown extent. Without the requisite data we cannot determine the influence of nearby springs in moderating Kelsay Creek's water temperatures.

Figure 21. Photopoints collected for the Kelsay Creek site during 2008 (left) and 2014 (right) and the upper logger location.

# REFERENCES


Accords, 2008, 2008 Columbia Basin Fish Accords Memorandum of Agreement between the Three Treaty Tribes and FCRPS Action Agencies

Bjornn, T.C., and Reiser, D.W., 1991, Influences of Forest and Rangeland Management on Salmonid Fishes and their Habitat. American Fisheries Society Special Publication 19,

Carmichael, R.W., 2006, DRAFT Recovery Plan for Oregon's Middle Columbia River Steelhead Progress Report, Oregon Department of Fish and Wildlife.

CHaMPS, 2015, Columbia Habitat Monitoring Program, https://www.champmonitoring.org/

Columbia BM RC&DA (Columbia-Blue Mountain Resource Conservation & Development Area). March 15, 2005. John Day Subbasin Revised Draft Plan. Prepared for Northwest Power and Conservation Council.

CRITFC (Columbia River Inter-Tribal Fish Commission). 1995. Wy-Kan-Ush-Mi-Wa- Kish-Wit Spirit of the Salmon. Columbia River Anadromous Fish Plan of the Nez Perce, Umatilla, Warm Springs and Yakima Tribes. Portland, Oregon.

ICBEMP (Interior Columbia Basin Ecosystem Management Project), 2000, Final Environmental Impact Statement, Department of Agriculture Forest Service and the United States Department of Interior Bureau of Land Management.

Jones, K. L., G. C. Poole, E. J. Quaempts, S. O'Daniel, T. Beechie, 2008. Umatilla River Vision. Prepared for the Confederated Tribes of the Umatilla Indian Reservation, 31 pp. http://www.umatilla.nsn.us/DNRUmatillaRiverVision.pdf

McCullough, D. A. 1999. A Review and Synthesis of Effects of Alterations to the Water Temperature Regime on Freshwater Life Stages of Salmonids with Special Reference to Chinook Salmon, U. S. Environmental Agency, Seattle WA, Document #910-R-99-010.

Narum, S. L., Schultz, T. L., Van Doornik, D. M., and Teel, D., 2008, Localized Genetic Structure Persists in Wild Populations of Chinook Salmon in the John Day River Despite Gene Flow from Outside Sources, Transactions of the American Fisheries Society 137:1650–1656.

NMFS, 2008. Conservation and Recovery Plan for Oregon Steelhead Populations in the Middle Columbia River Steelhead Distinct Population Segment. National Marine Fisheries Service (NMFS) Northwest Region.

NPCC. 2005. Revised draft John Day Subbasin Plan. Prepared by Columbia-Blue Mountain Resource Conservation And Development Area, Available from: http://www.nwcouncil.org/fw/subbasinplanning/johnday/plan.

Rosgen, D., 1996 Applied river morphology. Wildlands Hydrology, Pagosa Springs, Colorado.

USFS, 2008. Watershed Action Plan to remove barriers and improve stream function on National Forest System Lands within the Granite Creek Watershed. September 22, 2008.

USFS, 2011. Watershed Condition Framework, U.S. Department of Agriculture, U.S. Forest Service, Document FS-977

USFS, 2012. FY 2012 Watershed Restoration Action Plan, Bull Run Creek Watershed; HUC 170702020202 September 24, 2012

USFWS, 2002. Chapter 9, John Day River Recovery Unit, Oregon. 82 p. In: U.S. Fish and Wildlife Service, Bull Trout (Salvelinus confluentus) Draft Recovery Plan, Portland, Oregon.

Yanke, J. A., Van Dyke, E. S., Alfonse, B. M., Kimbro, J. P., Steele, J. W., Wilson, I. P., Jonasson, B. C., Carmichael, R. W. 2007. Investigations into the Early Life History of Naturally Produced Spring Chinook Salmon and Summer Steelhead in the Grande Ronde River Subbasin, Annual Report 2007, Oregon Department of Fish and Wildlife, La Grande, OR.

Zakrajsek, 2012, A Brief on Conditions and Potential Approaches for Sediment and Stream Channel Management on Camas Creek near Ukiah, Oregon, Produced for the Confederated Tribes of the Umatilla Indian Reservation's North Fork John Day Fisheries Habitat Project , Pendleton, Oregon.

# APPENDIX I

| Limiting Factors[1/] | Code | Objectives | Code |
|---|---|---|---|
| Habitat Diversity | HD | Preserve and maintain existing habitat | 1 |
| Key Habitat | KH | Improve riparian and floodplain complexity | 2 |
| Harassment | HA | Improve sediment routing and sorting | 3 |
| Sediment Load | SL | Improve stream channel complexity and morphology | 4 |
| Water Quality (non-sediment) | W | Improve or preserve water quality | 5 |
| Obstruction | O | Improve floodplain connectivity | 6 |
| | | Improve passage to existing high quality habitats | 7 |

[1/] Limiting factors for the North fork John Day subbasin are from NPCC (2005), pages 24--243.

| 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 | HD, KH, HA, SL | 1, 2, 3, | 2001 | 14 | 0.5 | 5.2 | no | - 481 meters of 4-strand barbed wire riparian fence constructed.<br>- One stock well developed and with associated troughs.<br>- Structure maintenance and noxious weed treatments for the life of the agreement. | 2 cross sections<br>1 photopoint | none |
| Upper Snipe Creek Conservation Agreement 2001-16 | HD, KH, HA, SL, W | 1, 2, 3, 4, 5 | 2001 | 14 | 1.3 | 34 | no | - 2,218 meters of 4-strand barbed wire riparian fence constructed.<br>- Two spring developments constructed.<br>- Structure maintenance for the life of the agreement. | 2 cross sections<br>2 longitudinal profiles<br>1 photopoint | 2 cross sections |
| Lower Snipe Creek Conservation Agreement 2001-16 | HD, KH, HA, SL, W | 1, 2, 3, 4, | 2001 | 14 | 1.3 | 54 | no | - 4,237 meters 4-strand barbed wire riparian fence constructed.<br>- Three stock wells developed.<br>- 7,000 native hardwoods planted.<br>- Structure maintenance and noxious weed treatments for the life of the agreement. | 2 cross sections<br>2 longitudinal profiles<br>2 thermistors<br>1 photopoint | 2 cross sections - vegetative survival count |
| Deer Creek Conservation Agreement 2003-18 | HD, KH, HA, SL, W | 1, 2, 3, 4, 5 | 2003 | 112 | 3.8 | 219 | no | - 2,736 meters of 4-strand barbed wire fence constructed and 2,889 meters of fence refurbished.<br>- 11 spring developments constructed.<br>- Approximately 7,500 native hardwoods planted.<br>- Structure maintenance and noxious weed treatments for the life of the agreement. | 2 cross sections<br>2 longitudinal profiles<br>2 thermistors<br>1 photopoint | 2 cross sections |
| Lower Camas Creek Conservation Agreement 2006-2021 | HD, KH, HA, SL, W | 1, 2, 3, 4, 5, 6 | 2006 | 9 | 1.6 | 40 | no | - 335 meters of levee removed<br>- One mile of riparian fence constructed<br>- Three stock water ponds constructed<br>- One stock water pond improved<br>- Two spring developments created<br>- Approximately 5,300 native hardwoods planted<br>- Structure maintenance and noxious weed control treatments for the life of the agreement | 3 cross sections<br>1 longitudinal profile<br>2 thermistors<br>3 pebble count sites<br>1 photopoint | Three cross sections |
| Upper Camas Creek Conservation Agreement | HD, KH, HA, SL, W | 1, 3, 4, 5 | 2009 | 3 | 1.3 | 256 | no | - 2,450 meters of 4-strand barbed wire riparian fence and 3 water gaps constructed.<br>- 3,090 meters of upland 4-strand barbed wire fence constructed.<br>- One upland well developed.<br>- Structure maintenance and noxious weed treatments for the life of the agreement. | 12 cross-sections<br>1 longitudinal profile<br>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 Wilderness Survey 2010 | HD, KH | 1 | 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 | O, SL | 3, 7 | 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 | O | 3, 7 | 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 | O, SL | 3,7 | 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 | O | 7 | 2010 | 2 | 0.18 | 1 | no | - Removed 5 log drops, sealed the stream channel with bentonite, and reshaped the stream channel. | 3 cross sections<br>1 longitudinal profile | ODFW annual spring spawner surveys |
| Ten Cent Creek Culvert Replacements | O | 3, 7 | 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, KH, SL | 2, 3, 6 | 2006 | 2 | 3.8 | 45 | no | - Recontoured approximately 276,000 cubic meters of mine tailings.<br>- Reestablished an inset floodplain to promote floodplain connectivity and sediment / debris deposition. | none | none |
| Kelsay Creek Riparian Fence | HD, KD, HA, SL, W | 1, 2, 3, 5 | 2008 | 2 | 1.6 | 100 | no | - 4,425 meters 'New Zealand' and one water gap along constructed. | 4 photopoints<br>2 thermistors<br>**USFS permtte maintenance** | none |
| Taylor Creek Riparian Fence | HD, KD, HA, SL, W | 1, 2, 3, 5 | 2010 | 1 | 1.6 | 46 | no | - 3,200 meters of 4-strand barbed wire fence constructed. | Photopoint<br>**USFS permtte maintenance** | none |
| Sugarbowl Creek Riparian Fence | HD, KD, HA, SL, W | 1, 2, 3, 5 | 2010 | 1 | 0.8 | 18 | no | - 1,600 meters of 4-strand barbed wire fence constructed. | Photopoint<br>**USFS permtte maintenance** | none |
| Morsay Creek Riparian Fence | HD, KD, HA, SL, W | 1, 2, 3, 5 | 2010 | 1 | 3.2 | 100 | no | - 11,747 meters of 4-strand barbed wire fence constructed. | Photopoint<br>**USFS permtte maintenance** | none |
| Bruin Creek Riparian Fence | HD, KD, HA, SL, T | 1, 2, 3, 5 | 2010 | 1 | 0.8 | 19 | no | - 695 meters of three strand 'New Zealand' fence constructed. | Photopoint<br>**USFS permtte maintenance** | none |
| Butcherknife Creek Riparian Fence | HD, KD, HA, SL, W | 1, 2, 3, 5 | 2012 | 1 | 1.5 | 1200 | no | - 3,621 meters of four strand barbed wire fence constructed. | UNF PIBO | none |

| Site | Limit. Fact. | Obj. | Year Implem. | Years Treat. | Stream Km. Affected | Acres Leased / Affected | Cntl. Site Id'd. | Metrics | Phys. Monitoring | Bio. Monitoring |
|---|---|---|---|---|---|---|---|---|---|---|
| Five Mile Creek Fence Maintenance | W | 5 | 2012 | 1 | 2.5 | 90 | no | - Heavy maintenance on 8 Kilometers of riparian exclusion fencing. | Photopoint **USFS permtte maintenance** | none |
| Fox Creek Leafy Spurge Control | HD, KH | 2 | 2010 | 3 | 65 | 260 | no | - Approximately 215 acres treated with herbicide and biological controls.<br>- 45 acres survey for infestations and tracking the progress of previous treatment. | none | visual surveys of selected areas<br>2 transects |
| Granite Creek Native Vegetation Plantings | HD, KH | 2 | 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, KH | 2 | 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, KH | 2 | 2010 | 1 | 4.8 | 40 | no | - 40 acres of riparian and floodplain habitats surveyed for noxious weeds.<br>- 28.5 acres of riparian and floodplain areas treated with herbicides for noxious weeds | none | visual surveys of selected areas |
| NFJD River Push-up Dam Removal and Water Right Certification | SL | 3 | 2009 | 1 | 0.15 | 80 | no | - One irrigation point of diversion moved approximately 152 meters to a permanent scour hole.<br>- One water gap removed.<br>- Water right POD change completed. | 4 cross sections<br>4 pebble counts | Greenline survey |
| Fox Creek Channel Enhancement | HD, KH, W | 2, 4, 5, 6 | 2013 | 2 | 0.6 | 8 | no | - Placed 25 pieces of large wood in the original stream channel.<br>- 20 plugs restricting flow through 700 meters of the Corps channel. | photopoint | none |
| Lower Camas Creek Coordination | HD, KH, SL | 4, 5 | 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 | O, SL | 3,7 | 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 | ND, HA, | 1, 2, 4 | 2013 | 2 | 1.6 | 190 | no | - 2,407 meters of six strand high tension wire fence constructed.<br>- One stock water well developed with associated solar pump, panels, and water trough. | photopoints | none |
| Red Boy Pipeline Replacement | W | 5 | 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. | | |
| Taylor Creek Fence Maintenance | HD, KD, HA, SL, W | 1, 2, 3, 5 | 2013 | 1 | 1.6 | 10 | no | - Heavy maintenance completed on one mile of riparian fence constructed in the 1980s. | Photopoints **USFS permtte maintenance** | none |
| Little Indian Creek Riparian Fence | HD, KD, HA, SL, W | 1, 2, 3, 5 | 2013 | 1 | 1.0 | 25 | no | - 2,103 meters of four strand barbed wire fence constructed. | Photopoints **USFS permtte 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 |
|---|---|---|---|---|---|---|---|---|---|---|
| Smith Creek Riparian Fence | HD, KD, HA, SL, W | 1, 2, 3, 5 | 2013 | 1 | 4.0 | 90 | no | - 1,219 meters of four stand barbed wire fence constructed. | Photopoints **USFS permtte maintenance** | none |
| Granite Creek Conservation Agreement 2013-23 | HD, KH, SL, W | 1, 2, 3, 4, 6 | 2013 | 2 | 0.6 | 40 | 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 | HD, KH, SL, W, O | 2, 3, 4, 5, 6, 7 | 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 | O, SL | 3, 7 | 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 | O, SL | 3, 7 | 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 | O, SL | 3, 7 | 2014 | 1 | 0.5 | 0 | no | - Removed partial barrier to high quality summer steelhead trout habitat. | photopoints | Spawner surveys for 2 years following replacement by the NFJD Project |
| Camas Creek Fence Maintenance | HD, KD, HA, SL, W | 1, 2, 3, 5 | 2014 | 1 | 45 | 230 | no | - Heavy maintenance of fence constructed in the 1980/90sprotecting 35 Kilometers of stream channel and floodplain habitats | UNF PIBO **USFS permtte maintenance** | none |