The Umatilla River Anadromous Fish Habitat Project

2017-18 Annual Report

Prepared by:
Richard L. Christian and Ethan D. Green

Confederated Tribes Umatilla Indian Reservation
Department Natural Resources Fish and Wildlife Programs
Nixyaawii Governance Center
46411 Timíne Way
Pendleton, Oregon 97801

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P.O. Box 3621
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Administrative Summary

Project Headquarters:

Confederated Tribes of the Umatilla Indian Reservation
Department of Natural Resources
Fish and Wildlife Programs
46411 Ti'Mine Way
Pendleton, OR 97801

Administrative Contact:

Julie Burke
Fish and Wildlife Administrative Manager
Phone: 541-429-7292
E-mail: julieburke@ctuir.org
Fax: 541-429-7292

Technical Contacts:

Richard L. Christian
Project Leader
Phone: 542-429-7283
E-mail: richardchristian@ctuir.org
Fax: 541-429-7283

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Cover Image: Photograph of side channel large wood placement on the Meacham Creek Bonifer Reach Floodplain Restoration and In-stream Enhancement Project at RM 5.6, October 9, 2017. Image by CTUIR.

This report was funded by the Bonneville Power Administration (BPA), U.S. Department of Energy, as part of BPA's program to protect, mitigate, and enhance fish and wildlife affected by the development and operation of hydroelectric facilities on the Columbia River and its tributaries. The views in this report are the author's and do not necessarily represent the views of BPA.

ACRONYMS

BA	biological assessment
B&G	Bauer & Gustafson
BDSS	beaver dam support structure
BIA	Bureau of Indian Affairs
BPA	Bonneville Power Administration
cfs	cubic feet per second
COTR	Contracting Officer Technical Representative
CREP	Conservation Reserve Enhancement Program
CTUIR	Confederated Tribes of the Umatilla Indian Reservation
cy	Cubic Yards
dbh	diameter at breast height
EPA	United States Environmental Protection Agency
ESA	Federal Endangered Species Act
ft	foot/feet
FY	fiscal year
in	inch/inches
JPA	Joint Permit Application
km	kilometer/kilometers
LWD	large woody debris
m	meters
mi	mile/miles
MOA	Memorandum of Agreement
NOAA	National Oceanic and Atmospheric Administration
NMFS	National Marine Fisheries Service
NPPC	Northwest Power Planning Council
NPCC	Northwest Power and Conservation Council
NRCS	Natural Resource Conservation Service
ODA	Oregon Department of Agriculture
ODEQ	Oregon Department of Environmental Quality
ODFW	Oregon Department of Fish and Wildlife
ODSL	Oregon Department of State Lands
OWEB	Oregon Watershed Enhancement Board
OWRD	Oregon Water Resources Department
PCSRF	Pacific Coastal Salmon Recovery Fund
RM	river mile
SOW	Statement of Work
SE	Standard error
TMDL	total maximum daily load
UBAFHP	Umatilla Basin Anadromous Fisheries Habitat Project
UBNPME	Umatilla Basin Natural Production Monitoring and Evaluation Project
UBWC	Umatilla Basin Watershed Council
USDA-FS	United States Department of Agriculture Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UPRR	Union Pacific Railroad

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INTRODUCTION

The CTUIR retain aboriginal and treaty rights related to fishing, hunting, pasturing of livestock, and gathering of traditional plants within the Umatilla River Subbasin. The CTUIR Department of Natural Resources (DNR) has developed and accepted a First Foods organization and approach to ecosystem management based on the cultural traditions and practices of the Longhouse. The organization follows the serving order of food and conceptually "Extends the Table" to manage for sustainability within the Umatilla River Subbasin. The First Foods are considered to be the minimum ecological products necessary to sustain CTUIR culture (Quaempts et al. 2018). The order is watershed-based beginning with water at the first and lowest point and progresses up to salmon, deer, cous, and huckleberry. This creates clear links to treaty rights and resources and sets direction and goals that relate to the community culture. In addition the DNR developed the Umatilla River Vision that provides a description of the processes and conditions needed to protect and provide for First Foods. The River Vision describes physical and biological processes in support of 5 touchstones; hydrology, geomorphology, connectivity, riparian vegetation, and aquatic biota. The work accomplished through this project is directly related to the First Foods of water and salmon and the 5 touchstones, which incorporates goals of restoring high water quality and healthy and sustainable salmonid fish populations.

CTUIR's right to fish in its historical fishing places was acknowledged in the Treaty of 1855 that stated: "the exclusive right of taking fish in the streams running through and bordering said reservation is hereby secured to said Indians, and at all other usual and accustomed stations…" (Treaty of 1855, Articles of Agreement, Article 1, page 3). Decreased salmonid abundance has significantly impacted the livelihood of the Tribal community and altered their way of life.

Overfishing, sweeping changes to rivers and streams, and policies that changed the landscape have endangered salmon and created a "salmon crisis" (Montgomery 2003). It is the challenging duty of the CTUIR Umatilla Basin Anadromous Fisheries Habitat Project (UBAFHP) to restore and sustain healthy conditions of local watersheds to both assist in salmon recovery and ensure they provide adequate quantities of sustainable natural resources to satisfy the CTUIR's needs and preserve opportunities for traditional ways of life.

As part of the Northwest Power Conservation Council's Columbia Basin Fish and Wildlife Program, this project is one of Bonneville Power Administration's (BPA) many efforts at off-site mitigation for damage to salmon and steelhead runs, their migration, and wildlife habitat caused by the construction and operation of FCRPS dams. The Umatilla Anadromous Fish Habitat Project (UBAFHP; #1987-100-01) initiated by CTUIR in 1987 is an integral component of the Umatilla River Subbasin Salmon and Steelhead Production Plan (NPPC 1990), and project work is supported both locally and regionally by multiple planning documents: Umatilla/Willow Subbasin Plan (NPCC 2005), Umatilla River Basin TMDL and Water Quality Management Plan (2001), CTUIR TMDL (2005), Umatilla River Vision (Jones et al. 2008; Existing Project Document ID: P130339), Conservation and Recovery Plan for Oregon Steelhead Populations in the Middle Columbia River Steelhead Distinct Population Segment (NMFS 2009), Recovery Plan for the Coterminous United States Population of Bull Trout (*Salvelinus confluentus*) (USFWS 2015), Meacham Creek Watershed Analysis and Action Plan (Andrus and Middel 2003), Umatilla and Meacham Watershed Assessment (UNF 2001), and the Birch Creek Watershed Action Plan (CTUIR 2016).

The Final Umatilla/Willow Subbasin Plan (NPCC 2005; Subbasin Plan) provided a systematic vision of a healthy ecosystem with abundant, productive, viable, and diverse populations of aquatic and terrestrial species with goals, objectives, and management strategies necessary to reach the subbasin vision. The vision entails several broad goals for habitat: 1) Protect existing high quality fish and wildlife habitat and strongholds, 2) restore and enhance degraded and diminished fish and wildlife habitats to support population restoration goals and to mitigate impacts from the construction and operation of the Columbia basin hydropower system and other anthropogenic impacts, and 3) restore the health and function of ecosystems in the Umatilla subbasin to ensure continued viability of their natural resources (Management Plan, page 5-3). Specific aquatic qualitative objectives and strategies were developed in to support the

subbasin vision and goals. Quantitative management objectives relative to the UBAFHP work activities include 1) maintain and enhance natural production, productivity, abundance, life history characteristics and genetic diversity of fish and mussels throughout the Umatilla Subbasin using habitat protection and improvement and 2) maintain and enhance passage of adult and juvenile steelhead and Chinook throughout the Umatilla Subbasin with passage protection and restoration (Management Plan, page 5-5). The Umatilla Subbasin Plan (NPCC 2005) determined that the limiting factors could be addressed through habitat restoration and implementation ("Phase III") of the Umatilla Basin Project (pages 5-10). An identification and analysis of limiting factors/conditions and priority areas for action are fully described within the Subbasin Plan (Section 3.5) including passage barriers/entrainment, in-channel characteristics, habitat diversity (LWD), floodplain confinement, high water temperatures, high turbidity, inadequate flows, and poor riparian/floodplain vegetation. Priority management strategies are being conducted by the UBAFHP in accordance with the Final Umatilla Willow Subbasin Plan (NPCC 2005; pages 5-8 & 5-9) to address limiting factors within the subbasin:

- Increase water conservation and irrigation efficiency
- Large Wood/Boulder Structure Placement
- Fence/Plant Riparian Zones
- Modify Channel Floodplain Function
- Construct Pool/Riffle – In-stream Modification
- Modify Detrimental Land use Activities
- Restore Upstream/Headwater Attributes to Improve Downstream Conditions
- Increase Passage Efficiency

The UBAFHP continues to protect, enhance, and restore functional floodplain, channel, and watershed processes to provide sustainable and healthy habitat for aquatic species in the Umatilla River Subbasin. Habitat restoration efforts fit within a holistic watershed approach supporting capacity building and long-term progress towards 1) achievement of the CTUIR DNR River Vision and First Foods mission statements, 2) Endangered Species Act delisting of Columbia River bull trout and middle Columbia River steelhead, and 3) addresses water quality limiting factors per the Clean Water Act 303d list.

During the 31-year project history, the CTUIR has helped administer and implement a number of fisheries habitat enhancement projects in the Umatilla River Subbasin. The CTUIR maintains partnership habitat enhancement projects along Meacham Creek, Isquúlktpe Creek, Birch Creek, Wildhorse Creek, East and West Birch Creek and the mainstem Umatilla River, among other sites. The CTUIR has developed effective interagency partnerships and is effectively working at the policy and project levels with various federal, state, and county agencies and private landowners.

The UBAFHP is an integral component of the *Umatilla River Subbasin Salmon and Steelhead Production Plan* (1990) and is well integrated into the framework of the *Umatilla Subbasin Plan* (NPCC 2005) established by the NPCC to better coordinate habitat restoration work in the Umatilla River Basin. The CTUIR, ODFW, Natural Resource Conservation Service (NRCS), Umatilla National Forest, Umatilla Basin Watershed Council (UBWC), and other participating agencies and organizations have made significant progress towards restoring and protecting vital salmonid habitat in the basin.

The major project accomplishments during the 2017-18 contract periods are described in Table 1 below. This only includes the major implementation activities. The planning and design related activities for future implementation projects are contained in Table 2.

Table 1. Summary of Implementation work accomplished in 2017-18.

Work Element	Location	Description
Conservation Agreements	Wildhorse Creek	Executed 2 new conservation agreements.
	Wildhorse, Birch, EFK Birch, WFK Birch, Cottonwood, & Umatilla River	Maintain current conservation agreement terms and conditions on 16 agreements, including maintaining fencing and watering plantings.
Weed Treatment	Meacham Creek	Controlled noxious weeds on 236 acres of conservation agreements and previously implemented habitat projects using chemical and mechanical treatments. Biological control treatments are ongoing.
Planting	Meacham Creek	1,000 willow/dogwood cuttings were installed.
		9,209 containerized plants were installed.
Meacham Creek – Bonifer Project (Project Areas 3 & 4)	Meacham Creek	Removed 3,385 linear feet of levees and dikes, constructed 2,340 linear feet of stream channel to reconnect and additional 3,206 linear feet of relic channel, and installed 550 pieces of large wood (plus tops) individually and in 69 engineered log jams.
Dillon Dam Removal	Umatilla River	Collaborated with ODFW and the UBWC to remove Dillon Dam on the mainstem Umatilla River and develop and alternative water delivery system for water users.
Athena Fish Passage Mitigation	Wildhorse Creek	Purchased a prefabricated modular bridge to be installed at the crossing of 3rd Street and Wildhorse Creek in Athena, OR to rectify a major passage barrier. Contracted installation in 2019.

Table 2. Major designs and project planning for the 2019 field season.

Project	Description
Athena Fish Passage Mitigation	Completed an engineered design to remove a fish passage barrier and construct a roughened riffle passage channel through the project reach on Wildhorse Creek. Partnered with the UBWC and ODFW to produce designs for a prefabricated, modular concrete bridge structure to replace the current passage barrier.
East Birch Creek Floodplain Restoration and In-stream Enhancement Project	Began the design process to produce an engineered design for a floodplain reconnection and in-stream habitat enhancement project on East Birch Creek. Design anticipated to be completed in 2019 and implementation in 2020.
Taylor Dam Removal	Collaborated with BPA engineering staff to begin the process of producing an engineered design for removal of the defunct Taylor Dam on the mainstem Umatilla River. Design anticipated in early 2019 and implementation to take place during the 2019 in-water work window.
UmaBirch Conservation Easement	Collaborated with the landowner and began scoping and planning tasks to complete a conservation easement on the UmaBirch property. Conservation Easement anticipated to be completed in 2019.
Isquúlktpe Creek Road Impact Evaluation	Surveyed and inventoried roads in the Isquúlktpe Creek watershed.
Isquúlktpe Creek Road Relocation Project	Produced a design to relocate the Isquulktpe Creek Road away from the creek where it consistently washes out. Provided design to CTUIR Public Works for implementation.
Umatilla River Assessment	Began collecting existing data, identifying data gaps, and scoping the assessment within CTUIR. Assessment anticipated to be completed in 2020.
Wildhorse Creek Beaver Dam Support Structure Complex	Coordinated with the Umatilla County SWCD to design and begin permitting a beaver dam support structure (BDSS) pilot project on a recently acquired property on Wildhorse Creek. Implementation is anticipated in 2019.

Project results are reported in various BPA formats including Pisces status reports, project completion reports, and annual reports. The CTUIR maintains a complete database on project planning, proposals, permitting, implementation, and results through the completion of required project deliverables. For a complete list of reports submitted by the CTUIR's UBAFHP since 1989, please consult the following website at URL: http://www.efw.bpa.gov/integratedfwp/reportcenter.aspx.

Project Area

The UBAFHP is defined by the boundaries of the Umatilla River Subbasin, which is located in the northwest portion of the Blue Mountain Ecological Province in northeast Oregon. The Umatilla River Subbasin comprises 1,465,600 acres of the 6,400,000 acres of ceded CTUIR land (CTUIR 1995) as identified by the Treaty of 1855. Figure 1 illustrates the vicinity of the Umatilla River Subbasin within the Blue Mountain Province (Project map: *http://www.cbfish.org/Project.mvc/Map/1987-100-01).* The Umatilla River drains an area of approximately 2,540 square miles (mi.^{2}) (6,579 square kilometers [km^2]) and flows approximately 89 mi. (143 km) from where it branches into the north and south forks of the Umatilla River to the mouth at the confluence with the Columbia River. Each fork adds another approximately 10 mi. (16 km) of length. The Umatilla River originates at elevations up to 4,228 feet (ft.; 1,289 m) and flows west and north to its confluence with the Columbia River (USFWS 2002) at an elevation of about 269 ft. (82 m).Other major tributaries include Meacham Creek, Birch Creek, McKay Creek, Butter Creek, and Wildhorse Creek.

The Umatilla River Subbasin historically supported viable and harvestable populations of spring/summer and fall Chinook salmon (*Oncorhynchus tshawytscha*), coho salmon (*O. kisutch*), sockeye salmon (*O. nerka*), summer steelhead (*O. mykiss*), Pacific lamprey (*Entosphenus tridentatus*), bull trout (*Salvelinus confluentus*), steelhead-rainbow trout (*O. mykiss sp*.), mountain whitefish (*Prosopium williamsoni*) and a variety of additional native species. Anthropomorphic alterations have negatively impacted the watershed and caused significant reductions of endemic salmonid populations. Beginning in the late 1800s, fish populations started to decline due to habitat degradation. In fact sockeye and coho were extirpated by the early 1900s. Irrigation and agricultural development throughout the basin in the early 1900s is believed to be the primary cause of the decline of steelhead and the extinction of salmon. Since the signing of the Treaty of 1855, aquatic and riparian habitats have been degraded through irrigation diversions, water extractions, channelization, livestock grazing, logging, agriculture and urban development (NPCC 2004). Subsequently, the abundance of Chinook, steelhead, bull trout, and other fish species has also been dramatically reduced. The Umatilla River population of spring Chinook salmon was reported extinct in 1926 (Boyce 1986). With declining fish populations, Tribal governments, federal, state and international agencies were obligated to eliminate or significantly reduce subsistence and sport fisheries by the mid-1970s. The Federal government listed Middle Columbia River summer steelhead and Columbia River bull trout in the Umatilla Subbasin as threatened species under the ESA in 2006 and 1999, respectively.

In the mid-1980s, a successful, hatchery-based salmonid reintroduction effort for the Umatilla River was instituted using neighboring strains of various salmonid species. Although hatchery programs currently support subsistence and restricted sport fishing opportunities for steelhead and Chinook and coho salmon, there remains significant need to re-build viable, harvestable, and sustainable naturally-produced fish stocks throughout the basin.

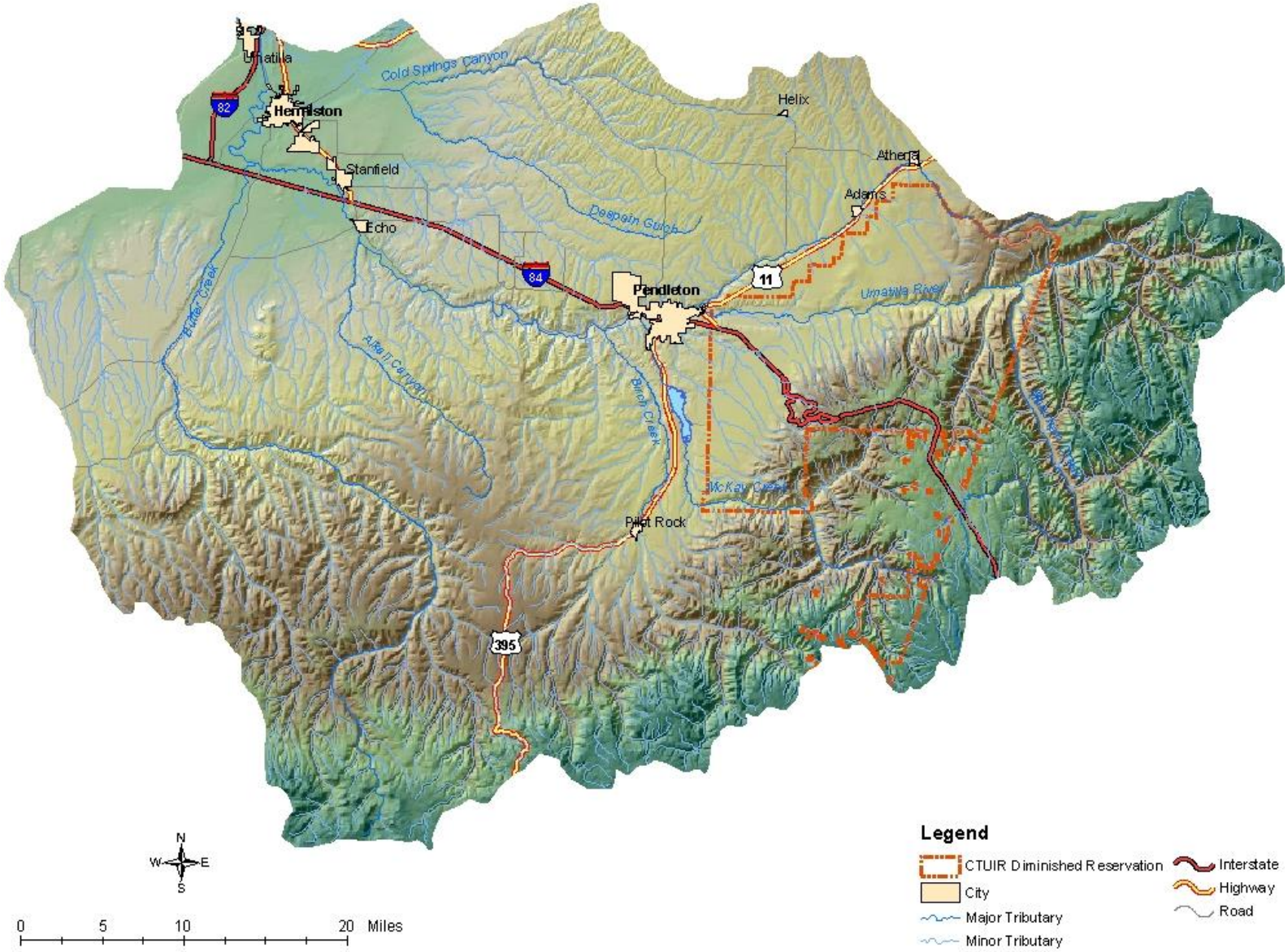


Figure 1. Umatilla River Subbasin

Our primary area of focus for restoration and monitoring work in FY 2017-18 was Meacham Creek, Birch Creek and mainstem Umatilla River (Figure 2).

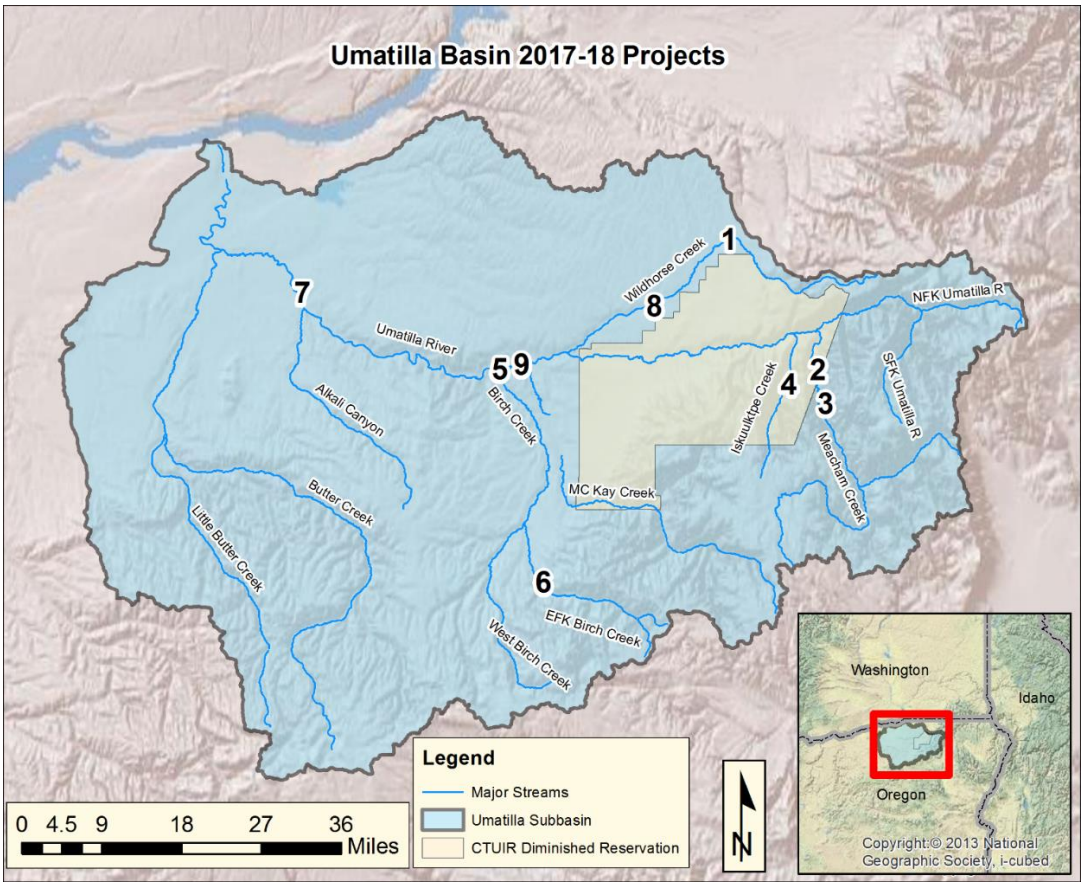


Figure 2. Umatilla River Basin FY 2017-18 UBAFHP Project Sites

1: Wildhorse Creek Fish Passage Rectification – 2017-18: Fish passage rectification and bridge replacement at 3rd Street crossing.

2: Meacham Creek (Bonifer Reach) – 2017-18: Constructed nearly 2 miles of full floodplain restoration on Meacham Creek (Project Areas 3 and 4).

3: Meacham Creek – 2017-18: Additional weed treatment, plantings as part of the 2011-13 Floodplain Restoration and In-stream Enhancement Project.

4: Isquúlktpe Creek Road Relocation Design and Transportation Network Survey - 2017: Designed a small road relocation and surveyed the existing transportation network in the watershed.

5: UmaBirch Conservation Easement– 2017-18: Executed a Conservation Agreement and worked toward a conservation easement to protect over 300 acres of floodplain at the confluence of the Umatilla River and Birch Creek. Concurrently developing a restoration design.

6: East Birch Creek Floodplain Restoration Design – 2017-18: Worked collaboratively with private landowner to execute a conservation agreement and design a floodplain restoration project on their property.

7: Dillon Dam Removal – 2017: Collaborated with partners to complete irrigation diversion change and complete full dam removal.

8: Beaver Dam Support Structures – 2017-18: Designed a BDSS complex on Wildhorse Creek.

9: Taylor Dam Removal Design – 2018: Worked collaboratively with BPA engineers to design removal of defunct Brown's Dairy Dam on the Umatilla River.

COMPLETED WORK

This section highlights and describes completed work elements in an outline similar to our statement of work on CBFish.org. Each work element with associated identifier code and milestone are listed, followed by a comprehensive summary of completed work under each work element. In addition to a description of completed work elements specific to restoration activities, we briefly highlight habitat inventory results specific to UBAFHP efforts outlined for this contract period.

Contract 73982 REL 13 (CY 2017)

Work Element A: 132. Produce (Annual) Progress Report
Work Element Title: Produce Annual Progress Report CY16 (Jan. 1, 2016, thru Dec. 31, 2016)
Milestone Deliverable: Completed annual report

A. Review progress report format requirements
B. Upload finalized RM&E technical report for BPA to publish
C. Distribute progress report for BPA review and comment
D. Upload non-technical progress report to Pisces
E. Review progress report format requirements
F. Draft CY2016-17 RM&E technical report
G. Interagency/tribal review
H. Confirm BPA posted received

The CY2016 BPA Annual Progress Report was completed and was uploaded to BPA through Pisces in the fall of 2017.

Work Element B: 185. Produce Pisces Status Report
Work Element Title: Periodic Status Reports for BPA
Milestone Deliverable: Complete Periodic Pisces Status Reports

CTUIR reported to BPA periodically during the contract period on the status of each statement of work element, and milestones and deliverables using the computer program Pisces:
February-June (2/1/2017 - 6/30/2017)
July-September (7/1/2017 - 9/30/2017)
October-December (10/1/2017 - 12/31/2017)
Final January (1/1/2018 - 1/31/2018)

The BPA Contracting Officer Technical Representative (COTR) reviewed the Pisces status reports, recommended changes as necessary and accepted them electronically upon approval. Additionally, upon completion of each deliverable milestone, we provided metrics and final project location (latitude and longitude) when required. These Pisces status reports provide a tool for the BPA COTR and administrative staff to track project progress in meeting contract requirements.

Work Element C: 119. Manage and Administer Projects
Work Element Title: Manage and Administer Project
Milestone Deliverable: Upload Statement of Work, Budget, Property Inventory for Upcoming Contract Period to Pisces

A. Per COTR, revise/finalize the new contract package (statement of work, environmental compliance documentation, budget, and property inventory).
B. Accrual – submit September estimate to BPA.

C. Funding package – conduct internal review (e.g., supervisor or interagency).

This work element includes a suite of management actions required to administer the project, including preparation of annual operations and maintenance budgets, managing and preparing statements of work and budgets, and property inventory to the assigned BPA COTR for the following contract period. The project leader reports quarterly or as necessary on milestones and metrics to BPA using the BPA Pisces Program, supervises, trains, and directs staff activities, conducts vehicle and equipment maintenance and management, performs payroll, purchasing, obtains quotes and subcontracting for services, and administers habitat enhancement activities.

Work Element D: 114. Identify and Select Projects
Work Element Title: CTUIR Umatilla Subbasin Restoration Coordination
Milestone Deliverable: List of Final Projects

A. Coordinate regularly with project partners and landowners
B. List projects

CTUIR UBAFHP staff annually coordinated and planned projects with State, Federal, and local partners, and private landowners to develop habitat restoration and enhancement projects consistent with local planning documents. CTUIR project development is guided and prioritized by project activities that are supported by the Umatilla River Vision and the CTUIR Department of Natural Resources First Foods mission statements to enhance or protect ecological and physical processes thus sustaining biota production and (Jones et al. 2008). The CTUIR is guided in its habitat restoration activities by multiple planning documents:

Final Umatilla Willow Subbasin Plan (NPCC 2005),
Middle Columbia River Steelhead Recovery Plan (NMFS 2009),
Recovery Plan for the Coterminous United States Population of Bull Trout (*Salvelinus confluentus*) (USFWS 2015),
Meacham Creek Watershed Analysis and Action Plan (Andrus & Middel, 2003), and
Birch Creek Watershed Action Plan (CTUIR 2016).

Projects were identified, prioritized and developed with project partners (ODFW, UBWC, and SWCD) who implement restoration projects within the Umatilla River Basin. Projects that were ranked by priority, CTUIR identified funding sources and projects were prepared for planning, engineering design, permitting and implementation and included in the FY 2017 BPA statement of work and budget.

Work Element E: 191. Watershed Coordination
Work Element Title: Umatilla River Watershed Coordination Duties
Milestone Deliverable: Coordinate Watershed Association Activities

A. Coordinate with Umatilla Basin Watershed Council
B. Coordinate with NRCS and local conservation districts
C. Network with professionals in the field of habitat restoration
D. Coordinate with co-manager ODFW and other Federal agencies

CTUIR UBAFHP staff participated and coordinated with multiple agencies and stakeholders in the Umatilla River Subbasin through the Umatilla Subbasin Restoration Team (Restoration Team), including ODFW, USDA-FS, NRCS, the Umatilla County SWCD, Umatilla Basin Watershed Council and local stakeholders to enhance natural resources, identify problems and solutions, coordinate efforts to prevent duplication, enhance communication and cooperation and identify funding and cost share opportunities within the Umatilla River Subbasin. Staff further coordinated with other agencies (e.g. USFWS, NOAA, EPA, BPA and etc.) in planning and implementing partner habitat restoration and enhancement projects, ESA planning processes, and project prioritization and selection processes. The Restoration

Team was established in 2010 and is an informal group formed of agency or entity representatives that do restoration work within the Umatilla River /Willow Creek Basin floodplain and riverine system. The Restoration Team coordinated several passage projects in Birch Creek, and upcoming project activities in the lower Umatilla River. CTUIR staff prepared agreements, if necessary, to assign duties and responsibilities to the appropriate entities. We also developed documents, press releases, web sites, and other communications to impart information to participating stakeholders and the public. Furthermore, CTUIR UBAFHP staff updated the Restoration Team, UBWC, CTUIR Committees and Commissions, and permitting agencies on project activities by presentation and in writing on project activities.

Work Element F: 122. Provide Technical Review
Work Element Title: Review and Provide Technical Input on Issues and Topics that Affect the Areas Natural Resources
Milestone Deliverable: Provide Technical Input and Summaries to Enhance or Protect Natural Resources in the Subbasin

A. Conduct review and provide input as necessary on natural resource preservation issues.
B. Review and provide technical input on issues that may adversely affect natural resources.

CTUIR UBAFHP staff reviewed and provided technical input as applicable on plans and proposals by entities within the Umatilla River Basin that may adversely impact floodplain or riverine processes and biota productivity, public project planning relevant to floodplain, river and wetland restoration or impacts, development and review of grant funding proposals, and proposed landowner projects. Project staff provided input to multiple CTUIR departments on annual activities relevant to work within the floodplain, rivers, and wetlands, US Army Corps of Engineers/Oregon Division of State Lands removal-fill permit applications, and CTUIR Stream Zone Alteration (SZA) Permit applications on work proposed within the floodplain on Reservation land.

Work Element G: 165. Produce Environmental Compliance Documentation
Work Element Title: Produce Environmental Compliance Documentation
Milestone Deliverable: Receipt of Environmental Compliance Clearance from BPA

The following milestones were completed for FY 2017 projects:

- Meacham Creek – Bonifer Reach Floodplain Reconnection
- Lower Mainstem Umatilla River – Dillon Dam Removal
- Wildhorse Creek – Athena Bridge Fish Passage Improvement

CTUIR successfully submitted many applicable documents to the appropriate federal, tribal, state, county entities for select implementation projects in a timely manner required under work elements related to producing environmental compliance documentation in FY2017. Secondary environmental compliance accomplishments during the reporting period included coordination with various compliance personnel to prepare supplemental documentation and reporting for ongoing and planned management actions. Environmental compliance methods include development of appropriate documentation under various federal, Tribal, state and county laws and regulations governing federally funded project work. Methods involve coordination with various federal and state entities agencies and development and submittal of permit applications, cultural clearances, biological assessments, National Environmental Policy Act checklists, etc., as necessary. Part of the environmental compliance work element includes planning and developing site-specific proposals tailored to accomplish fisheries goals and meet compliance standards. The details concerning the implementation of treatments and preparations for putting efforts on the ground, including preparations for subcontracting, and specifics in regarding the safeguarding of ESA-Listed species during the implementation process are outlined in the proposals.

Cultural Resource Protection and Preservation
CTUIR submitted a letter and attachments with necessary project descriptions and geo-referenced maps for assisting BPA with Section 106 National Historic Protection Act consultations and environmental compliance. The following projects were submitted for compliance:

1) Dillon Dam Removal Fish Passage Improvement Project – Dam Removal;
2) Meacham Creek Bonifer Reach Floodplain Reconnection and In-steam Enhancement Project;
3) Wildhorse Creek – Athena Fish Passage Project

Cultural Resources protection and preservation compliance was ongoing during this contract period. The CTUIR Cultural Resources Protection Program is anticipated to deliver a final report to BPA in early 2018.

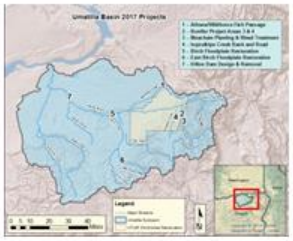
1) UBAFHP Environmental Compliance Documentation
2) ESA consultation with NMFS for FY 2017 project activities was covered under the Terms and Conditions of the HIP III Programmatic Biological Opinion (HIP III BO). Project activities covered under the HIP III BO included:
3) Operate and Maintain Habitat/Passage/Structure (WE I: 186; WE J: 186): CTUIR monitored and maintained existing easements and habitat improvement sites. Maintenance included vegetation watering and installing bioengineering treatments to stabilize habitat features.
4) Maintain/Remove Vegetation (WE L: 198): Project activities included watering and maintaining plants on NRCS CREP tracts and treating noxious weeds.
5) Plant Vegetation (WE M: 47): Project activities included planting in the newly constructed Meacham Creek Bonifer Reach project and in the previously constructed Meacham Creek Phase I project are (RM 4.9-6.1).
6) Install Fish Passage Structure (WE P: 184): CTUIR assisted in completing environmental compliance for the removal of Dillon Dam on the mainstem Umatilla River (RM 25.2).
7) Meacham Creek Construction (WE Q: 180; WE S: 180; WE T: 29; WE U: 30): CTUIR began implementation of a nearly 4-mile reach of full floodplain restoration on Meacham Creek. Project activities included levee removal, side channel construction, off-channel habitat construction, and large wood addition.

Work Element H: 99. Outreach and Education
Work Element Title: Public Outreach and Education
Milestone Deliverable: Complete Outreach and Education Activities

CTUIR UBAFHP staff educated the public on natural resource protection and restoration principles, and communicated on project activities throughout the year. This work included giving project tours and presentations (field, written, and verbal) and participating in local and regional workshops, symposia, technical teams and/or conferences (training, project presentation, and memberships), newspaper articles and public education (local school districts or college programs).

CTUIR UBAFHP staff completed CTUIR semi-annual reports summarizing project objectives and outputs, expected outcomes, and resulting impacts of project restoration activities (Figure 3). These reports are used by the CTUIR Department of Natural Resources to inform CTUIR staff and government officials, other agencies and entities, and the public of project activities.

Confederated Tribes of the Umatilla Indian Reservation
DNR Fisheries Program Project Semiannual Report
Project: Umatilla Subbasin Fish Habitat Restoration
Period: January 1 – June 30, 2017



Project Statement/Goal: Protect, enhance, and restore functional floodplain, channel, and watershed processes to provide sustainable and healthy habitat for aquatic species of the First Food order.

Project Objectives: 1) Permitting & Implementation Meacham – Bonifer; 2) Dillon Dam Removal; 3) Athena Bridge Design; 4) Maintain existing project locations and easements; 5) Complete quarterly and annual progress reports; and, 6) Monitor implemented projects.

Project Inputs:	Funding	2017 Budget	Permanent Staff	New Staff
	BPA	$1,558,989	2 Biologist; 4 Technicians	None
	EPA	$99,859	New funding secured during this period	
	OWEB	$378,822		
	Staff: Richard Christian-Project Leader Bio III, Ethan Green-Bio II, Randy Bonifer & Larry Allen - Technician II, Jesse Bevis & Sean Van Pelt-Tech I			
	Collaborators: BPA, USFS, UBWC, ODFW, ODOT, OWEB, SWCD, NRCS, UPRR, EPA, USFWS, NOAA, Umatilla County and the City of Athena.			

Outputs: (specific 6-mo task accomplishments)
- Completed spring planting and weed treatment.
- Completed project maintenance on projects.
- Finalized permits and approvals for Meacham – Bonifer Reach Floodplain Restoration
- Began construction contract for Meacham – Bonifer.
- Spent OWEB and EPA Grants for Meacham – Bonifer Implementation.
- Began the design on Athena Bridge Fish Passage Project.
- Dillon Dam Removal Project complete.
- Initiated 7 new conservation agreements.

Outcomes: (broader results/changes from cumulative accomplishments)
- Began to utilize the Action Plan for restoration of East Birch Creek to develop a project.
- Continue to develop partnerships with agencies and landowners for new future projects.
- Finalized internal permits and BIA lease documents and initiated construction on the Meacham – Bonifer Project.
- Enhancement of floodplain and channel connectivity, channel function, fish habitat availability and use, and promoting vegetative recovery over 2 miles of Meacham Creek.
- Participated in educational activities.

Impacts (work supports long-term progress towards):
- Contribute achievement of healthy watersheds (DNR River Vision) and increased traditional first food abundance and use opportunities.
- Contribute to achievement of Subbasin Plan and ESA Recovery Plan goals.
- Assist in recovery of Endangered Species Act subject species (spring/summer Chinook, summer steelhead, bull trout).
- Address water quality limiting factors as per Clean Water Act 303d list.

Meacham – Construction

Salmon Camp Weed Treatment/Education

Figure 3. CTUIR semi-annual report for the Umatilla Subbasin Fish Habitat Restoration Project, January – June, 2017.

The UBAFHP participated in a number of community outreach and education opportunities in 2017. In March, 2017, the UBAFHP participated in a CTUIR Department of Natural Resources "open house." During this event, the UBAFHP educated the tribal community about the work that the Project recently completed and work that was upcoming in the recent months, including the Meacham Creek Bonifer Reach Floodplain Restoration and In-stream Enhancement Project. Also in March the UBAFHP hosted a group of students from Whitman College on a service learning trip. The UBAFHP provided the group with a tour of the Meacham Creek floodplain restoration projects, educated them about the project and floodplain processes, and the group got hands-on restoration experience pulling noxious weeds in the Meacham Creek floodplain. The UBAFHP again participated in the Watershed Field Days program to educate local elementary school children about the importance of stream and watershed health. Additionally, the UBAFHP assisted in the annual CRITFC Salmon Camp in June, 2017, to educate middle school students on salmon habitat restoration. UBAFHP staff spent a day educating the Salmon Camp attendees on salmon habitat and the importance of restoration and conservation and spent a few hours hand pulling noxious weeds (Figure 4). The UBAFHP also participated in local media outreach for the Dillon Dam removal project resulting in print articles in the Confederated Umatilla Journal (Phinney 2017) and the East Oregonian (Plaven 2017).

Additionally, the UBAFHP hosted a summer intern in 2017 through the CTUIR Tribal Member Internship program. The intern spent over 400 hours getting hands-on work experience in fisheries habitat restoration and helped collect habitat

inventory data in the 2017 field season. She returned to her studies at the end of the internship intending to complete a degree in natural resources conservation.

Numerous tours were also conducted of the previous work that has been completed on Meacham throughout the 2017 contract year. Some of these tours were for other resource professionals, while some of them were for educational purposes.

Figure 4. UBAFHP outreach and education activities. Clockwise from top left: Whitman College service learning field trip searching for weeds in Meacham Creek; CRITFC Salmon Camp attendees learning about noxious weeds and salmon habitat; UBAFHP summer intern observing a recreational rock dam, a potential summer fish passage barrier, prior to obliteration; UBAFHP staff assisting local elementary school students plant native plants at the annual Watershed Field Days.

Project staff also developed and fostered relationships with participating experts in related fields by attending training, professional workshops and working groups, and gained professional advancement and improved project success through informative, instructional interactions. CTUIR UBAFHP and DNR Fisheries Habitat Program staff attended multiple professional conferences and workshops, and participated in poster presentations of project activities including:

River Restoration Northwest (2017 – Poster)
Ecological Response to Floodplain Reconnection and In-stream Habitat Enhancement – Michael Lambert, Kaylyn Costi, David Wooster, Richard Christian, Ethan Green, and Craig Contor

Work Element I: 186. Operate and Maintain Habitat/Passage/Structure
Work Element Title: Inspect and Maintain Function of In-stream Improvement Structures
Milestone Deliverable: Maintain Proper Operation of In-stream Habitat Structures

A. Environmental compliance requirements complete.
B. The inspection, replacement and/or maintenance of passage and habitat structures.
C. Hire contractor to perform work.

CTUIR monitors 6 passage rectification projects to assure that treatments are effectively working and to insure that intrusive objects are not interfering with the designed function of the passage structures (Table 7). Routine quarterly scheduled site visits of individual projects are conducted either independently by the CTUIR or jointly with project partners such as ODFW. Site visits typically follow significant flow events or responses to landowner requests at project sites. Project maintenance included, but was not limited to, meeting specified conditional language in state and Federal permits, maintaining debris that is routinely captured or caught on in-stream structures, responses to landowner requests and concerns, and completion of post-treatment surveys to monitor and quantify changes to physical and ecological responses.

Work Element J: 186. Operate and Maintain Habitat/Passage/Structure
Work Element Title: Maintenance of Habitat Features Associated with Project Conservation Easements
Milestone Deliverable: Maintenance of Land or Structures Associated with Conservation Easements

A. Environmental compliance requirements complete.
B. Adhere to details of existing easements and/or initiate additional agreements as feasible.

The purpose of these conservation easements is to protect, enhance, and restore functional floodplain, channel, and watershed processes to provide sustainable and healthy habitat for aquatic species in the Umatilla River subbasin. The UBAFHP have and will continue to maintain the individual projects to ensure that project structures and fencing are functioning and habitat recovery is progressing towards meeting projects goals and objectives. The CTUIR currently maintains 16 conservation agreements. Current agreements provide secured access and protection of resources for functional floodplain, channel watershed processes to provide sustainable and healthy habitat for aquatic specifies 26 miles of stream. CTUIR routinely conducts custodial maintenance on individual projects to ensure that project structures and fencing are functioning and habitat recovery is progressing towards meeting projects goals and objectives. Activities include, but are not limited to, installing and repairing riparian cattle exclusion fences, maintaining or installing water gaps, riparian and floodplain plantings and maintenance, noxious weed control, maintenance of fish habitat improvement structures, and landowner coordination and education.

Work Element K: 157. Collect/Generate/Validate Field and Lab Data
Work Element Title: Project Effectiveness Photo Point Monitoring
Milestone Deliverable: Upload project effectiveness photo point photos to CTUIR data repository.

A. Environmental compliance requirements complete.
B. Review, revise, and publish protocol, study design and methods in monitoringmethods.org.
C. Conduct photo point documentation of project conditions related to specified project areas.
D. Upload photo point photos and site data to the CTUIR photo point data depository.

The CTUIR UBAFHP continued its intensive photo point monitoring in the 2017 contract years. Photo points were conducted in the spring of 2017 and uploaded to the UBAFHP internal photo point data depository (Figure 5).

2011	2017
	
	
	

Figure 5. Before (2011) and after (2017) photos of the Meacham Creek Floodplain Restoration and In-stream Enhancement Project RM 6-7 taken at photo point monitoring locations.

Grid-intersect analysis of photo point data from 2011 to 2017 revealed that the proportion of the bankfull channel that supports perennial woody vegetation has been steadily increasing since the completion of the Meacham Creek Floodplain Restoration and In-stream Enhancement Phase I project in 2011. Immediately after construction, approximately 36.6% ± 4.9% (mean ± SE) of the bankfull channel supported perennial woody vegetation, whereas in 2017, 67% ± 9.8% was vegetated (Figure 6).

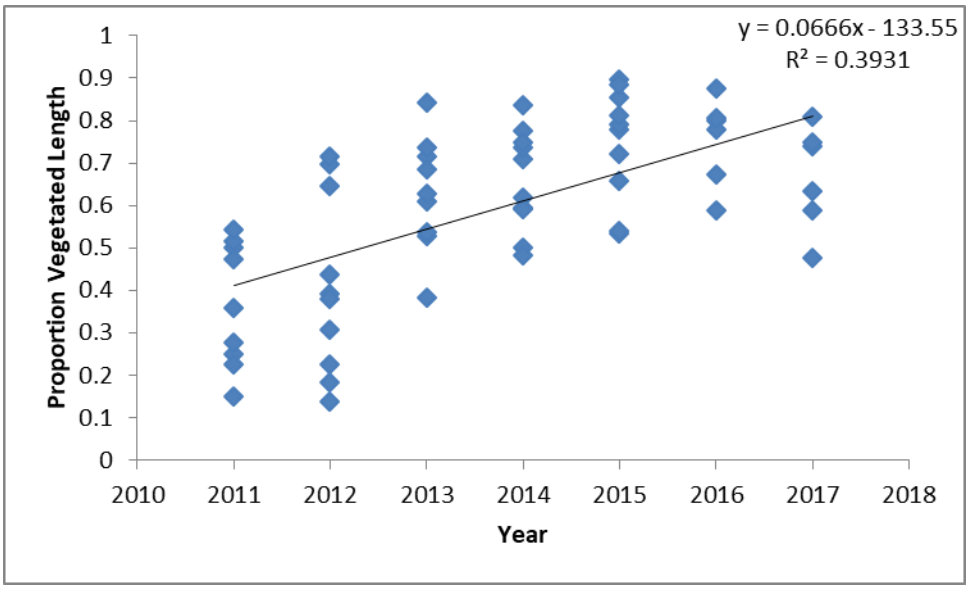


Figure 6. Proportion of vegetated bankfull channel length within the Meacham Creek Floodplain Restoration and In-stream Enhancement Phase I project area by year based on grid-intersect analysis of photo point data.

Work Element L: 198. Maintain Vegetation
Work Element Title: Maintain Vegetation and Control Noxious Weeds in Project Areas within the Umatilla River Subbasin
Milestone Deliverable: Maximize Survival of Native Vegetation in Enhancement Project Areas

A. Environmental compliance requirements complete.
B. Physical removal of non-preferred species of vegetative growth from project area.
C. Weed control in project areas by chemical means.
D. Water vegetation and reduce weed competition to improve survival at CTUIR project areas.
E. Till established weed areas as necessary for noxious weed control.

Project activities conducted in 2017 included the monitoring and maintenance of 16 conservation agreements on numerous individual landowner properties. Watering, weeding and maintenance methods for each conservation easement and project area is important for enhanced native vegetation and project site but maintenance varies by site conditions. Strategies to address weeds are included in agreements that are either completed by the landowner, CTUIR, subcontractor, and/or through the County Weed Control Board. CTUIR staff provides assistance to landowners by coordinating and managing herbicide application, providing funding, and developing treatment strategies. Manual, biological and chemical treatment options are utilized by CTUIR and may be employed when consistent with existing standards. Weed control is essential in establishing native grass and plant species. The UBAFHP maintains a licensed pesticide applicator on staff to spray/control noxious weeds on sites where chemical application is necessary. This staff member identifies problem weeds, determines the appropriate herbicide and selects the most effective application methods and rates in accordance with the National Oceanic and Atmospheric Administration's (NOAA) Biological Opinion under BPA's Habitat Improvement Program. The UBAFHP utilizes backpack spraying applications to treat perennial, annual and biennial weed species. All herbicide applications are consistent with Oregon Revised Statue (ORS).570.505 and Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) Regulations. CTUIR complies with BPA standards and supplies a report to BPA detailing the types and quantities of herbicides applied to specified locations.

In 2017 the UBAFHP completed 93 acres of mechanical and chemical weed treatment on current and completed project areas (Table 4).

Work Element M: 47. Plant Vegetation
Work Element Title: Meacham Creek Floodplain Restoration and In-Stream Enhancement, RM's 4.9-6.1
Milestone Deliverable: Complete Scheduled Tree and Shrub Plantings in Project Areas

A. Environmental compliance requirements complete.
B. Agreement with the Native Plant Nursery for Growing Plants and Developing Plant Protocol.
C. Establish Planting Locations in Existing Project Areas for Increased Recovery.

UBAFHP staff annually plant vegetation and distribute native grass seed in areas we have implemented existing or new habitat enhancement projects or have identified a need in maintained riparian conservation easement areas. In 2017, the UBAFHP completed a small spring planting effort within the previously implemented Meacham Creek Floodplain Restoration and In-stream Enhancement Project (Phase I & II) area, replanting areas where previous plantings failed to meet survival goals (

Total Acres Treated	**236.0**

Table 6). The majority of the UBAFHP planting effort took place in the fall immediately following disturbance from the 2017 construction season on the Meacham Creek Bonifer Reach Floodplain Reconnection and In-stream Enhancement Project. The fall 2017 planting effort included installing 984 containerized plants.

Planting tasks include site planning and development of planting strategies, collection and preparation of materials (pruning and conditioning of live willow material), pre-order coordination with the CTUIR Tribal Native Plant Nursery, and installation. Planting techniques are customized for conditions within each project area. Planting location, species, age, form (cuttings, saplings, bare-roots, potted, plugs), and soil/substrate conditions were considered and addressed during the implementation planning phase. The CTUIR UBAFHP staff work closely with the Tribal Native Plant Nursery to collect local seed and plant stock to provide native plants for particular project areas by elevation and planting zones.

Work Element N: 175. Produce Design and/or Specifications
Work Element Title: Collect Data on Roads and Culverts to Identify Aquatic Impacts
Milestone Deliverable: Collect Data on Roads in the Isquúlktpe Creek Watershed to Develop Treatment Options

Currently, the main access road for the Isquúlktpe Creek Watershed is an ATV trail that makes numerous crossings of the active stream channel. The number and extent of these crossings was largely unknown, as were the extent of existing and historic roads and stream crossings in the headwaters and on side roads off the main access. To answer address these data gaps and aid in planning of restoration actions, the CTUIR UBAFHP conducted a survey of the existing transportation network.

Methods

The UBAFHP used a modified Geomorphic Road Analysis and Inventory Package (GRAIP) data collection procedure to obtain physical characteristics of all roads that were physically surveyed within the watershed. Data collected on each road segment included the least capable vehicle that could travel on the road, estimated gradient, description, vegetation on the road, vegetation on cut slope, vegetation on fill slope, and road surface composition. Data collected on all stream crossings surveyed included crossing type, if live water was present at the time of the survey, bankfull width of the stream at the crossing, road width at the crossing, length of road on the fill of the crossing, stream length underneath the road, material, structure length, if fish were observed, if the stream is fish bearing, structure diameter, and depth of fill over structure. Data collected on all road saturation points included the source of saturation, the condition of the road (cut, fill, or road surface saturated), and any erosion present. Data collected on any erosion feature included the type of erosion, road width at the erosion feature, the length and width and depth of the erosion feature, the length and width and depth of any debris on the road, and if the erosion is connected to the stream. Data was also collected on any road closures that were encountered and all road junctions. On roads that were publicly accessible, data was collected in ESRI ArcPad software on Juniper Systems Archer2 mobile computers. On private roads that were not accessible to survey staff, data was collected via remote sensing (aerial imagery, LiDAR) in ESRI ArcMap software. All data collected was spatialized.

Results

Overall, the CTUIR UBAFHP physically surveyed 62.07 miles of roads and trails in the Isquúlktpe Creek watershed. An additional 67.45 miles of inaccessible roads were surveyed via remote sensing, bringing the total road miles in the Isquúlktpe Creek watershed to 129.5. The density of surveyed roads in the watershed was calculated to be 3.67 mi/mi^2. Of the 129.5 miles of roads in the watershed, 94.2 miles are located on private property, whereas 35.3 miles are located on public or Tribally owned lands. Nearly half of the road mileage (60.6 miles) in the watershed was located 100m from a stream and 33.1 miles were located 50m or less from water (Figure 7).

In the miles of stream surveyed, the UBAFHP identified 73 stream crossings including 1 bridge, 19 culverts, 49 fords, and 4 unknown stream crossings. The majority of these stream crossings were on the main access road up mainstem Isquúlktpe Creek.

In the course of the survey, 28 instances of road prism erosion were identified. Four cutslope failures were observed, none of which were connected to the stream network. Of the 17 fillslope failures identified, 9 were connected to the stream network. Seven instances of gully and other surface erosion were observed, including 3 that were directly connected to the stream network. Fourteen saturated road segments were also identified during the surveys. The source of road prism saturation was mostly due to inadequate drainage for seeps and springs on the cutslope.

UBAFHP staff also encountered 28 road closures including 13 access restriction points (i.e., gates and fences) and 15 permanent closures (i.e., boulders, tank traps). The majority of the road closures encountered were functional, but 6 were driven around and did not adequately prevent motor vehicles from accessing the road.

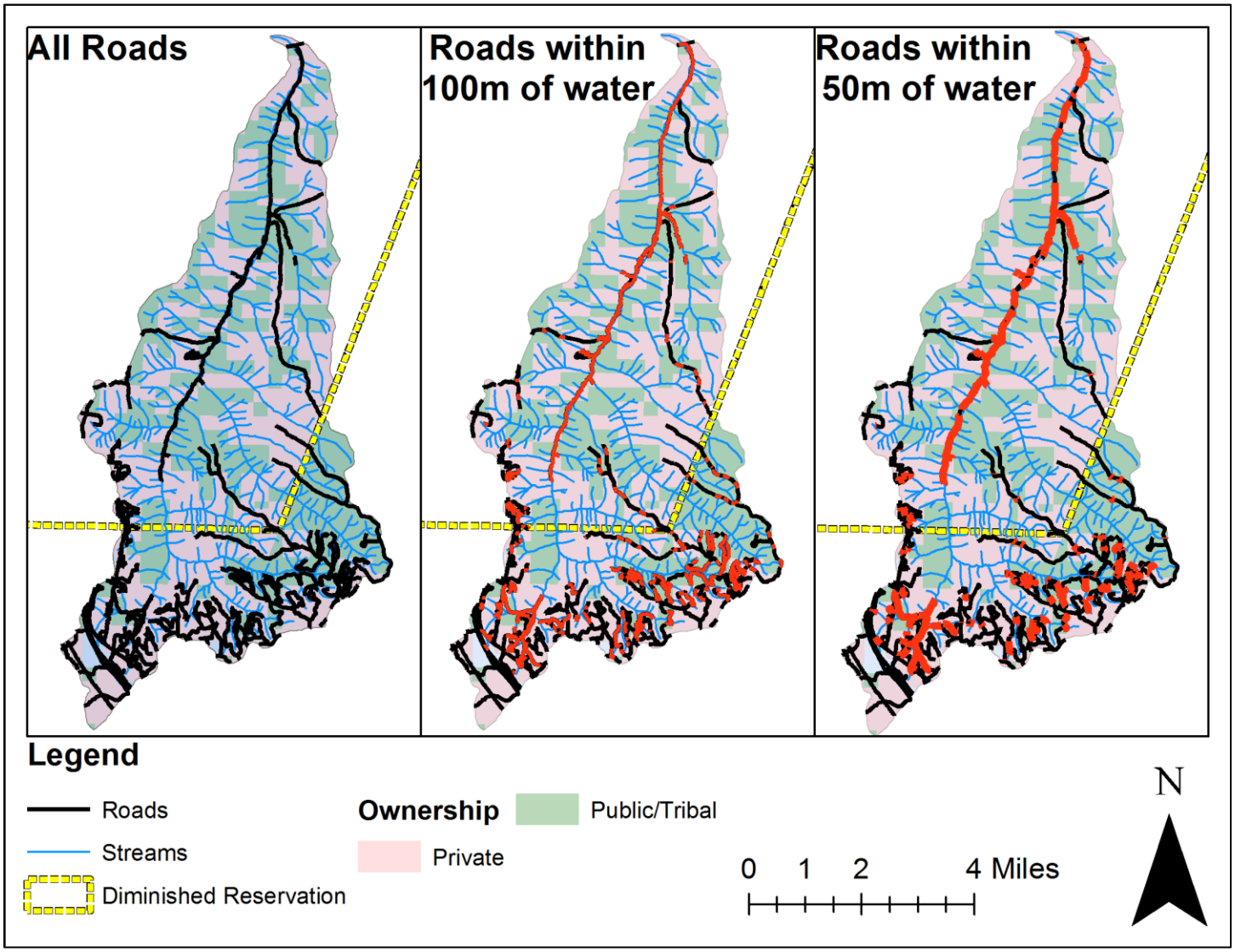


Figure 7. Maps of the Isquúlktpe Creek watershed, property ownership, and surveyed roads.

Discussion

The road densities observed in the Isquúlktpe Creek Watershed are higher than originally anticipated at the onset of this study. Guidelines from the National Marine Fisheries Service (1996) indicate that the watershed conditions of Isquúlktpe Creek are "not properly functioning" at the current road densities and locations. A "properly functioning" watershed should have a road density of less than 2 mi/mi^2 and have no roads confining the stream on the valley bottom.

Much of the road network in Isquúlktpe Creek is located in close proximity to perennial or ephemeral stream channels. The potential for these roads to contribute sediment to stream network is a question that merits further study. The results from this survey may be useful in a small modelling exercise to determine potential sediment contribution from the road network in the Isquúlktpe Creek watershed. Additionally, a road network in such close proximity to the stream likely confines the stream to some degree, limiting floodplain connection and impeding watershed function.

Road Relocation Design

As a part of the effort to inventory the road network in Isquúlktpe Creek watershed, a priority location for work was identified on the Isquúlktpe Creek Road. The creek approaches the road prism and has consistently caused erosion issues. The UBAFHP produced a small design to relocate the road prism away from the creek toward the toe slope of the valley and incorporate some large wood habitat features to increase in-stream habitat complexity while maintaining protection of the newly constructed road. This design was provided to CTUIR Public Works for implementation at a later date.

Work Element O: 184. Install Fish Passage Structure (Cancelled in CCR 39065)
Work Element Title: Wildhorse Creek – Athena Fish Passage Project Implementation
Milestone Deliverable: The CTUIR will work collaboratively with the ODFW, UBWC, City of Athena and Umatilla County to replace an aging bridge on 3rd Street in Athena, OR, to restore upstream fish passage through the project reach.

CTUIR selected a contractor to produce an engineered design for this project in the previous contract year. Due to unanticipated delays in the design process, this project was unable to be completed in the 2017 contract year. Construction was rescheduled for the 2018 contract year.

Work Element P: 184. Install Fish Passage Structure
Work Element Title: Dillon Dam Irrigation Diversion Passage Project
Milestone Deliverable: The CTUIR will work collaboratively with the ODFW, UBWC, and water users to remove an aging diversion dam at RM 25.2 on the Umatilla River to restore full fish passage through the project reach.

The CTUIR UBAFHP collaborated with ODFW and UBWC to fund and implement the removal of the defunct Dillon irrigation diversion dam at River Mile 25.2 on the mainstem Umatilla River. CTUIR provided project funding, in-kind contributions for cultural resources surveying, technical design review, and fish salvage assistance. ODFW provided partial project funding and labor and equipment necessary for removal of the structure. The UBWC provided funding and design for the replacement water delivery system to ensure uninterrupted service to the water users that previously relied on the Dillon diversion dam. Water users also contributed funding for the replacement water delivery system. The dam was fully removed in the 2017 in-water work window (Figure 8).

Figure 8. Drone imagery of the Dillon Dam Removal Project before (A), during (B), and after implementation (C).

Work Element Q: 180. Enhance Floodplain/Remove, Modify, Breach Dike
Work Element Title: Pre-construction – Bonifer Floodplain Restoration and In-stream Enhancement
Milestone Deliverable: Complete revised design for Project Areas 3 and 4, finalized permits, and completed construction staking.

All pre construction activities were completed in summer of 2017 including finalizing all permits and permissions, construction staking, and all design changes.

Work Element R: 175. Produce Design and/or Specifications
Work Element Title: Wildhorse Creek – Athena Fish Passage Project Design
Milestone Deliverable: Complete a design and implementation schedule for one fish passage project on Wildhorse Creek in the city of Athena, OR.

CTUIR solicited proposals for an engineering firm to design the preferred alternative proposed in the Athena Bridge feasibility report. The selected design firm began producing the design in the 2017 contract year and will complete the design early in the 2018 contract year.

Work Element S: 180. Enhance Floodplain/Remove, Modify, Breach Dike
Work Element Title: Construction – Bonifer Floodplain Reconnection and In-stream Enhancement – PA 3 & 4
Milestone Deliverable: Complete removal of 3,385 linear feet of levees and dikes in the Meacham Creek Bonifer Reach Project Areas 3 and 4.

CTUIR subcontracted construction services to complete removal of levees and dikes in the Meacham Creek Bonifer Reach Project Areas 3 and 4 as part of the Bonifer Reach Floodplain Reconnection and In-Stream Enhancement Project. Due to a later than anticipated start to construction, no levees below ordinary high water were able to be removed in 2017. Partial implementation did occur in 2017 and CTUIR was able to remove 2,535 linear feet of levees and dikes. The remainder of the levee removals in Bonifer Reach Project Areas 3 and 4 will be completed in contract year 2018.

Work Element T: 29. Increase Aquatic and/or Floodplain Complexity
Work Element Title: Construction – Bonifer Floodplain Restoration and In-stream Enhancement – PA 3 & 4
Milestone Deliverable: Complete installation of 550 pieces of large wood and install 69 engineered log jams.

CTUIR subcontracted construction services to complete installation of large wood structures in the Meacham Creek Bonifer Reach Project Areas 3 and 4 as part of the Bonifer Reach Floodplain Reconnection and In-Stream Enhancement Project. Due to a later than anticipated start to construction, no large wood below ordinary high water was able to be installed in 2017. Partial implementation did occur in 2017 and CTUIR was able to install 38 pieces of large wood including 10 engineered log jams. The remainder of the large wood in Bonifer Reach Project Areas 3 and 4 will be installed in contract year 2018.

Work Element U: 30. Realign, Connect, and/or Create Channel
Work Element Title: Construction – Bonifer Floodplain Restoration and In-stream Enhancement – PA 3 & 4
Milestone Deliverable: Complete construction of 2,770 linear feet of primary and secondary channel.

CTUIR subcontracted construction services to complete construction of primary and secondary pilot channels in the Meacham Creek Bonifer Reach Project Areas 3 and 4 as part of the Bonifer Reach Floodplain Reconnection and In-Stream Enhancement Project. Due to a later than anticipated start to construction, only a small segment of side channel below ordinary high water was able to be installed in 2017. Partial implementation did occur in 2017 and CTUIR was able to construct 500 feet of side channel to reconnect an additional 996 feet of relic side channel habitat. The remainder of the designed channel construction in Bonifer Reach Project Areas 3 and 4 will be installed in contract year 2018.

Work Element V: 92. Lease Land (added in CCR 39580)
Work Element Title: Grazing lease Bonifer Floodplain Restoration PA 3&4
Milestone Deliverable: 10-year lease of grazing rights on private property within the Bonifer Project boundary.

CTUIR worked with the Bureau of Indian Affairs (BIA) Realty program to secure business leases on several individual allotments within the boundary of the Meacham Creek Bonifer Reach Floodplain Reconnection and In-stream Enhancement Project. As a result of these leases, the grazing rights within the project boundary were leased. The leases preclude grazing on approximately 65.2 acres of floodplain within the project boundary for a period of 10 years.

Contract 73982 REL 33 (CY 2018)

Work Element A: 185. Produce Pisces Status Report
Work Element Title: Periodic Status Reports for BPA
Milestone Deliverable: Complete Periodic Pisces Status Reports

CTUIR reported to BPA periodically during the contract period on the status of each statement of work element, and milestones and deliverables using the computer program Pisces:
February-June (2/1/2018 - 6/30/2018)
July-September (7/1/2018 - 9/30/2018)
October-December (10/1/2018 - 12/31/2018)
Final January (1/1/2019 - 1/31/2019)

The BPA Contracting Officer Technical Representative (COTR) reviewed the Pisces status reports, recommended changes as necessary and accepted them electronically upon approval. Additionally, upon completion of each deliverable milestone, we provided metrics and final project location (latitude and longitude) when required. These Pisces status reports provide a tool for the BPA COTR and administrative staff to track project progress in meeting contract requirements.

Work Element B: 132. Produce (Annual) Progress Report
Work Element Title: Produce Annual Progress Report CY17 and CY18 (Jan. 1, 2017, thru Dec. 31, 2018)
Milestone Deliverable: Completed annual report

A. Review progress report format requirements
B. Write non-technical progress report
C. Upload non-technical progress report to Pisces
D. Confirm BPA posted received

The CY2017-18 BPA Annual Progress Report was completed and was uploaded to BPA through Pisces in the winter of 2018.

Work Element C: 119. Manage and Administer Projects
Work Element Title: Manage and Administer Project
Milestone Deliverable: Upload Statement of Work, Budget, Property Inventory for Upcoming Contract Period to Pisces

A. Per COTR, revise/finalize the new contract package (statement of work, environmental compliance documentation, budget, and property inventory).
B. Accrual – submit September estimate to BPA.
C. Funding package – conduct internal review (e.g., supervisor or interagency).

This work element includes a suite of management actions required to administer the project, including preparation of annual operations and maintenance budgets, managing and preparing statements of work and budgets, and property inventory to the assigned BPA COTR for the following contract period. The project leader reports quarterly or as necessary on milestones and metrics to BPA using the BPA Pisces Program, supervises, trains, and directs staff activities, conducts vehicle and equipment maintenance and management, performs payroll, purchasing, obtains quotes and subcontracting for services, and administers habitat enhancement activities.

Work Element D: 114. Identify and Select Projects
Work Element Title: CTUIR Umatilla Subbasin Restoration Coordination
Milestone Deliverable: List of Final Projects

A. Coordinate regularly with project partners and landowners
B. List projects

CTUIR UBAFHP staff annually coordinated and planned projects with State, Federal, and local partners, and private landowners to develop habitat restoration and enhancement projects consistent with local planning documents. CTUIR project development is guided and prioritized by project activities that are supported by the Umatilla River Vision and CTUIR Department of Natural Resources First Foods mission statements to enhance or protect ecological and physical processes thus sustaining biota production (Jones et al. 2008). The CTUIR is guided in its habitat restoration activities by multiple planning documents:

Final Umatilla Willow Subbasin Plan (NPCC 2005),
Middle Columbia River Steelhead Recovery Plan (NMFS 2009),
Recovery Plan for the Coterminous United States Population of Bull Trout (*Salvelinus confluentus*) (USFWS 2015),
Meacham Creek Watershed Analysis and Action Plan (Andrus & Middel, 2003), and
Birch Creek Watershed Action Plan (CTUIR 2016).

Projects were identified, prioritized and developed with project partners (ODFW, UBWC, and SWCD) who implement restoration projects within the Umatilla River Basin. Projects that were ranked by priority, CTUIR identified funding sources and projects were prepared for planning, engineering design, permitting and implementation and included in the FY 2017 BPA statement of work and budget.

Work Element E: 191. Watershed Coordination
Work Element Title: Umatilla River Watershed Coordination Duties
Milestone Deliverable: Coordinate Watershed Association Activities

A. Coordinate with Umatilla Basin Watershed Council
B. Coordinate with NRCS and local conservation districts
C. Network with professionals in the field of habitat restoration
D. Coordinate with co-manager ODFW and other Federal agencies

CTUIR UBAFHP staff participated and coordinated with multiple agencies and stakeholders in the Umatilla River Subbasin through the Umatilla Subbasin Restoration Team (Restoration Team) including ODFW, USDA-FS, NRCS, conservation districts, USFWS, Umatilla Basin Watershed Council and local stakeholders to enhance natural resources, identify problems and solutions, coordinate efforts to prevent duplication, enhance communication and cooperation and identify funding and cost share opportunities within the Umatilla River Subbasin. Staff further coordinated with other agencies in planning and implementing partner habitat restoration and enhancement projects, ESA planning processes, and project prioritization and selection processes. The Restoration Team was established in 2010 and is an informal group formed of agency or entity representatives that do restoration work within the Umatilla River /Willow Creek Basin floodplain and riverine system. The Restoration Team coordinated several passage projects in Birch Creek, and upcoming project activities in the lower Umatilla River. CTUIR staff prepared agreements, if necessary, to assign duties and responsibilities to the appropriate entities. We also developed documents, press releases, web sites, and other communications to impart information to participating stakeholders and the public. Furthermore, CTUIR UBAFHP staff updated the Restoration Team, UBWC, CTUIR Committees and Commissions, and permitting agencies on project activities by presentation and in writing on project activities.

Work Element F: 122. Provide Technical Review
Work Element Title: Review and Provide Technical Input on Issues and Topics that Affect the Areas Natural Resources
Milestone Deliverable: Provide Technical Input and Summaries to Enhance or Protect Natural Resources in the Subbasin

A. Conduct review and provide input as necessary on natural resource preservation issues.
B. Review and provide technical input on issues that may adversely affect natural resources.

CTUIR UBAFHP staff reviewed and provided technical input as applicable on plans and proposals by entities within the Umatilla River Basin that may adversely impact floodplain or riverine processes and biota productivity, public project planning relevant to floodplain, river and wetland restoration or impacts, development and review of grant funding proposals, and proposed landowner projects. Project staff provided input to multiple CTUIR departments on annual activities relevant to work within the floodplain, rivers, and wetlands, US Army Corps of Engineers/Oregon Division of State Lands removal-fill permit applications, and CTUIR Stream Zone Alteration (SZA) Permit applications on work proposed within the floodplain on Reservation land.

Work Element G: 165. Produce Environmental Compliance Documentation
Work Element Title: Produce Environmental Compliance Documentation
Milestone Deliverable: Receipt of Environmental Compliance Clearance from BPA

The following milestones were completed for CY 2018 projects:
Meacham Creek – Bonifer Reach Floodplain Reconnection
Wildhorse Creek – Athena Bridge Fish Passage Improvement

CTUIR successfully submitted many applicable documents to the appropriate federal, tribal, state, county entities for select implementation projects in a timely manner required under work elements related to producing environmental compliance documentation in CY2018. Secondary environmental compliance accomplishments during the reporting period included coordination with various compliance personnel to prepare supplemental documentation and reporting for ongoing and planned management actions. Environmental compliance methods include development of appropriate documentation under various federal, Tribal, state and county laws and regulations governing federally funded project work. Methods involve coordination with various federal and state entities agencies and development and submittal of permit applications, cultural clearances, biological assessments, National Environmental Policy Act checklists, etc., as necessary. Part of the environmental compliance work element includes planning and developing site-specific proposals tailored to accomplish fisheries goals and meet compliance standards. The details concerning the implementation of treatments and preparations for putting efforts on the ground, including preparations for subcontracting, and specifics in regarding the safeguarding of ESA-Listed species during the implementation process are outlined in the proposals.

Cultural Resource Protection and Preservation
CTUIR submitted a letter and attachments with necessary project descriptions and geo-referenced maps for assisting BPA with section 106 National Historic Protection Act consultations and environmental compliance. The following projects were submitted for compliance:

1) UmaBirch Floodplain Restoration and In-stream Enhancement
2) East Birch Creek RM 5.3-5.8 Habitat Enhancement Project
3) Taylor Dam Removal – Dam Removal
4) Wildhorse Creek Beaver Dam Support Structure Pilot Project
5) USDA-FS Hazard Tree Harvesting for Large Wood Addition

Cultural Resources protection and preservation compliance was ongoing during this contract period. The CTUIR Cultural Resources Protection Program is anticipated to deliver a final report to BPA in early 2019.

UBAFHP Environmental Compliance Documentation

ESA consultation with NMFS for CY 2018 project activities was covered under the Terms and Conditions of the HIP III Programmatic Biological Opinion (HIP III BO). Project activities covered under the HIP III BO included:

- Operate and Maintain Habitat/Passage/Structure (WE I: 186; WE J: 186): CTUIR monitored and maintained existing easements and habitat improvement sites. Maintenance included vegetation watering and installing bioengineering treatments to stabilize habitat features.
- Maintain/Remove Vegetation (WE L: 198): Project activities included watering and maintaining plants on NRCS CREP tracts and treating noxious weeds.
- Plant Vegetation (WE O: 47): Project activities included planting in the newly constructed Meacham Creek Bonifer Reach project.
- Install Fish Passage Structure (WE N: 184): CTUIR assisted in completing environmental compliance for the replacement of the Athena, OR, 3rd Street Bridge on Wildhorse Creek (RM 18.8).
- Meacham Creek Construction (WE P: 180; WE Q: 29; WE R: 30): CTUIR continued implementation of a nearly 4-mile reach of full floodplain restoration on Meacham Creek. Project activities included levee removal, side channel construction, off-channel habitat construction, and large wood addition.
- Wildhorse Creek Beaver Dam Support Structure Pilot Project (WE W: 29): CTUIR designed and planned implementation of a small BDSS pilot project in coordination with the Umatilla County SWCD.

Work Element H: 99. Outreach and Education
Work Element Title: Public Outreach and Education
Milestone Deliverable: Complete Outreach and Education Activities

CTUIR UBAFHP staff educated the public on natural resource protection and restoration principles, and communicated on project activities throughout the year. This work included giving project tours and presentations (field, written, and verbal) and participating in local and regional workshops, symposia, technical teams and/or conferences (training, project presentation, and memberships), newspaper articles and public education (local school districts or college programs).

CTUIR UBAFHP staff completed CTUIR semi-annual reports summarizing project objectives and outputs, expected outcomes, and resulting impacts of project restoration activities (Figure 9). These reports are used by the CTUIR Department of Natural Resources to inform CTUIR staff and government officials, other agencies and entities, and the public of project activities.

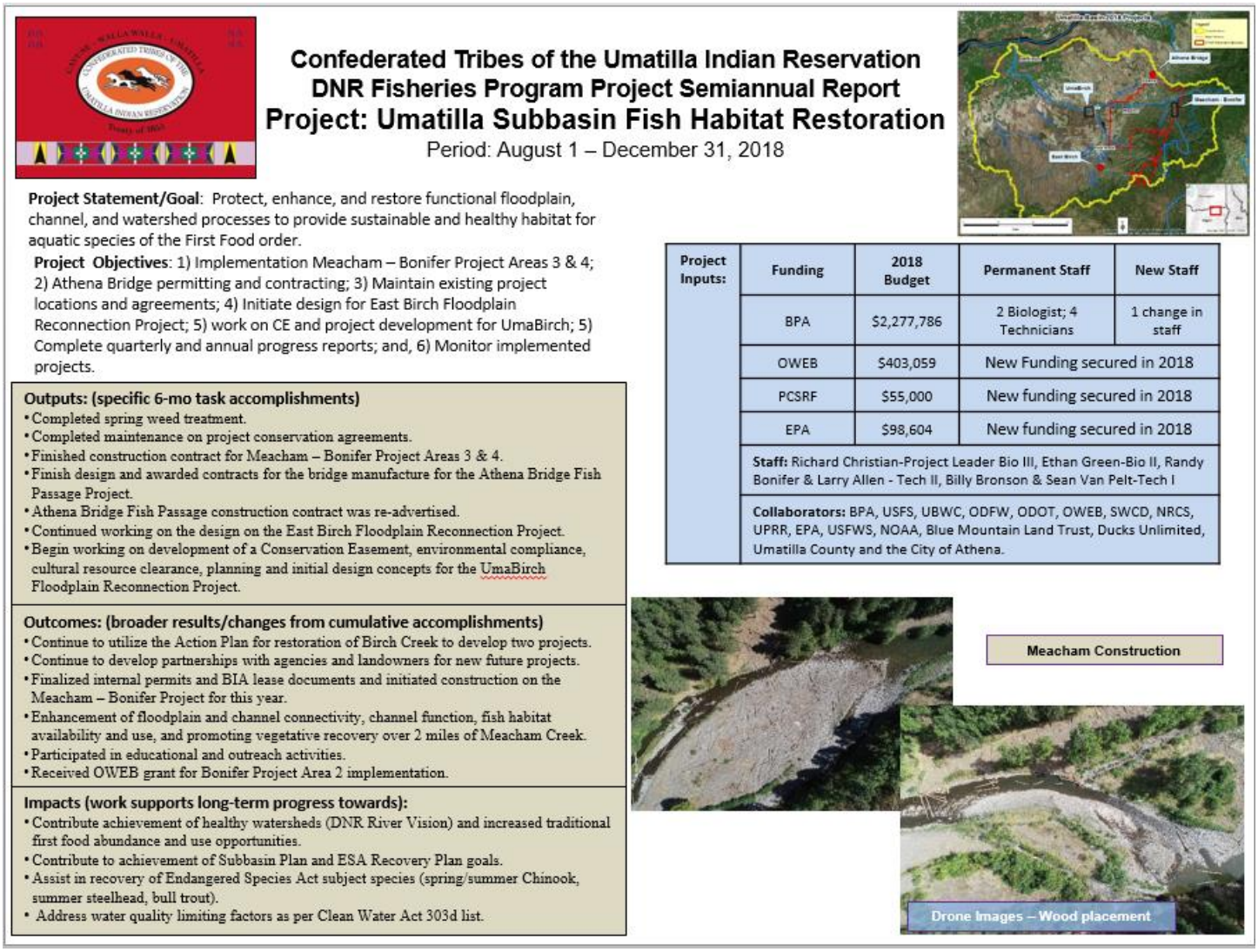


Figure 9. CTUIR semi-annual report for the Umatilla Subbasin Fish Habitat Restoration Project, August – December, 2018.

The UBAFHP participated in a number of community outreach and education opportunities in 2018. In March, 2018, the UBAFHP hosted a group of students from Whitman College on a service learning trip. The UBAFHP provided the group with a tour of the Meacham Creek floodplain restoration projects, educated them about the project and floodplain processes, and the group got hands-on restoration experience pulling noxious weeds in the Meacham Creek floodplain. The UBAFHP again participated in the Watershed Field Days program to educate local elementary school children about the importance of stream and watershed health. UBAFHP staff also participated in the annual Outdoor School program where local students learn about the Blue Mountains ecosystem. Finally, the UBAFHP participated in a media outreach program through the Oregon Lottery highlighting the salmonid habitat restoration work that the CTUIR has completed with OWEB funding.

Numerous tours were also conducted of the previous work that has been completed on Meacham throughout the 2018 contract year. Some of these tours were for other resource professionals, while some of them were for educational purposes. A notable tour included presenting on floodplain reconnection and hyporheic response to restoration to a group of visiting scientists from the Geological Survey of Japan (Figure 10).




Figure 10. UBAFHP outreach and education activities. Clockwise from top left: UBAFHP staff presenting to visiting scientists from the Geological Survey of Japan; CTUIR staff participating in the Outdoor School program; UBAFHP staff participating in an Oregon Lottery media shoot; UBAFHP staff assisting local elementary school students plant native plants at the annual Watershed Field Days.

Project staff also developed and fostered relationships with participating experts in related fields by attending training, professional workshops and working groups, and gained professional advancement and improved project success through informative, instructional interactions. The CTUIR participated in the 2018 USDA-FS Ranger Summit where UBAFHP staff presented to District Rangers from across the Western United States on floodplain restoration efforts and interagency coordination.

CTUIR UBAFHP and DNR Fisheries Habitat Program staff attended multiple professional conferences and workshops in this review period. Staff from the UBAFHP attended the Western Division American Fisheries Society annual meeting to receive the Riparian Challenge Award for the Meacham Creek Floodplain Restoration and In-stream Enhancement Project – Phase I. The UBAFHP also participated in presentations of project activities including:

River Restoration Northwest (2018)
Designing Restoration for Climate Change Resiliency: Strategies for Meacham Creek – Richard Christian, Mike Lambert, and Chris James (Tetra Tech)

River Restoration Northwest (2018 – Poster)
Giving a Dam: An Implementation of the Beaver Restoration Assessment Tool in the Middle Columbia River Basin – Ethan Green

Work Element I: 186. Operate and Maintain Habitat/Passage/Structure
Work Element Title: Inspect and Maintain Function of In-stream Improvement Structures
Milestone Deliverable: Maintain Proper Operation of In-stream Habitat Structures

A. Environmental compliance requirements complete.
B. The inspection, replacement and/or maintenance of passage and habitat structures.
C. Hire contractor to perform work.

CTUIR monitors 6 passage rectification projects to assure that treatments are effectively working and to insure that intrusive objects are not interfering with the designed function of the passage structures (Table 7). Routine quarterly scheduled site visits of individual projects are conducted either independently by the CTUIR or jointly with project partners such as ODFW. Site visits typically follow significant flow events or responses to landowner requests at project sites. Project maintenance included, but was not limited to, meeting specified conditional language in state and Federal permits, maintaining debris that is routinely captured or caught on in-stream structures, responses to landowner requests and concerns, and completion of post-treatment surveys to monitor and quantify changes to physical and ecological responses.

Work Element J: 186. Operate and Maintain Habitat/Passage/Structure
Work Element Title: Maintenance of Habitat Features Associated with Project Conservation Easements
Milestone Deliverable: Maintenance of Land or Structures Associated with Conservation Easements

A. Environmental compliance requirements complete.
B. Adhere to details of existing easements and/or initiate additional agreements as feasible.

The purpose of these conservation easements is to protect, enhance, and restore functional floodplain, channel, and watershed processes to provide sustainable and healthy habitat for aquatic species in the Umatilla River subbasin. The UBAFHP have and will continue to maintain the individual projects to ensure that project structures and fencing are functioning and habitat recovery is progressing towards meeting projects goals and objectives. The CTUIR currently maintains 16 conservation agreements. Current agreements provide secured access and protection of resources for functional floodplain, channel watershed processes to provide sustainable and healthy habitat for aquatic specifies 26 miles of stream. CTUIR routinely conducts custodial maintenance on individual projects to ensure that project structures and fencing are functioning and habitat recovery is progressing towards meeting projects goals and objectives. Activities include, but are not limited to, installing and repairing riparian cattle exclusion fences, maintaining or installing water gaps, riparian and floodplain plantings and maintenance, noxious weed control, maintenance of fish habitat improvement structures, and landowner coordination and education.

Work Element K: 115. Produce Inventory or Assessment
Work Element Title: Field Data Collection
Milestone Deliverable: Summarized aquatic, physical habitat, and water quality data.

A. Environmental compliance requirements complete.
B. Environmental conditions
C. Interpretation and synthesis
D. Incorporate project effectiveness and regional data into project activities and annual BPA report

UBAFHP staff collected and maintained field data necessary to inform project tasks and habitat site management in 2018. Data collected included vegetation surveys from 34 previously and newly established transects in past planting sites to determine site survival, natural regeneration, as well as to survey for any noxious weeds that may require control.

In 2018, mean stem density in planting locations was approximately 0.13 stems per m^2 (Figure 11A). Mean Shannon-Weiner diversity index value of woody plants was 1.05 and mean woody plant species richness was 4.6 (Figure 11B and 11C). Mean species evenness was approximately 0.77 (Figure 11D). Additionally, naturally recruited plants made up approximately 29% ± 4.4% (mean ± SE) of the woody vegetation surveyed in 2018.

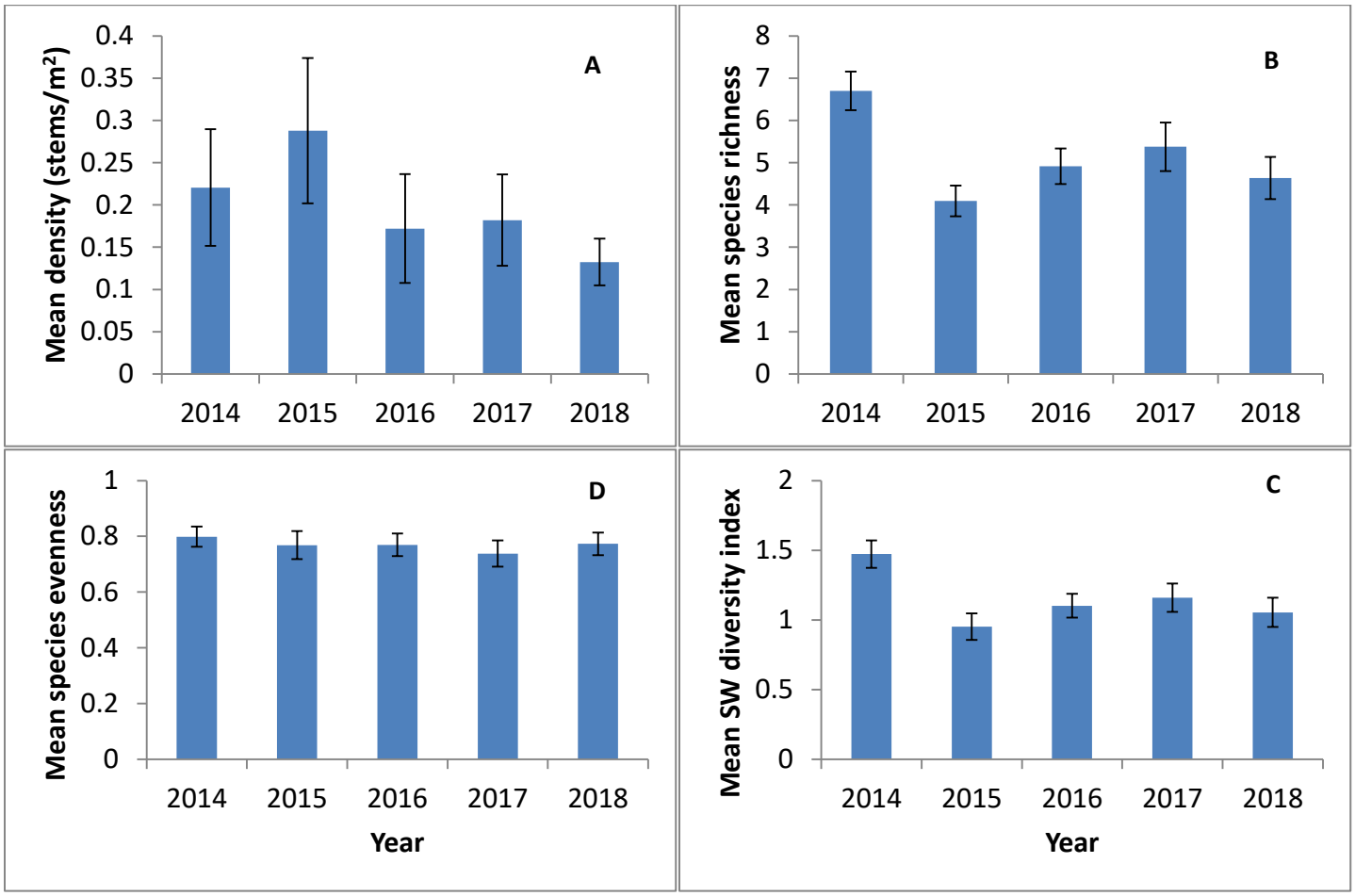


Figure 11. Summary of vegetation statistics across the period of record from 2014 to 2018 within the Meacham Creek Floodplain Restoration and In-stream Enhancement project phases I & II. Clockwise from top left: A) Mean stem density per m^2 by year; B) mean species richness by year; C) mean Shannon-Wiener diversity index value by year; D) mean species evenness by year. Error bars represent standard error.

Concurrently with vegetation transects, previously planted areas were surveyed for invasive weed species. Eleven major weed species were identified in the Meacham Creek Floodplain Restoration and In-stream Enhancement project area in 2018. The most abundant weed species found was Viper's bugloss (*Echinum vulgare*) and the highest priority species for control identified was invasive blackberry (*Rubus* spp.; Table 3).

Table 3. Invasive weed species detected in Meacham Creek Floodplain Restoration and In-stream Enhancement Phase I and II planting areas in 2016 and relative priority for control efforts.

Species Common Name	**Species Scientific Name**	**Priority**	**Frequency (# of sites present**
Diffuse knapweed	*Centaurea diffusa*	High	6
Spotted knapweed	*Centaurea stoebe*	High	7
Eurasian blackberries	*Rubus* spp.	High	12
Sulfur cinquefoil	*Potentilla recta*	High	3
Yellow starthistle	*Centaurea solstitialis*	High	1
Bull thistle	*Cirsium vulgare*	Moderate	2
Multiflora rose	*Rosa multiflora*	Moderate	2
St. John's wart	*Hypericum perforatum*	Moderate	3
Viper's bugloss	*Echinum vulgare*	Moderate	13
Wild carrot	*Daucus carota*	Moderate	1
Curly dock	*Rumex crispus*	Low	3

The CTUIR UBAFHP also continued its intensive photo point monitoring in the 2018 contract year. Photo points captures were conducted in the spring of 2018 and uploaded to the UBAFHP internal photo point data depository (Figure 12).

2011	2018
	
	
	

Figure 12. Before (2011) and after (2018) photos of the Meacham Creek Floodplain Restoration and In-stream Enhancement Project RM 6-7 taken at photo point monitoring locations.

Grid-intersect analysis of photo point data from 2011 to 2018 revealed that the proportion of the bankfull channel that supports perennial woody vegetation has been steadily increasing since the completion of the Meacham Creek Floodplain Restoration and In-stream Enhancement Phase I project in 2011. Immediately after construction, approximately 36.6% ± 4.9% (mean ± SE) of the bankfull channel supported perennial woody vegetation, whereas in 2018, 89% ± 1.5% was vegetated (Figure 13).

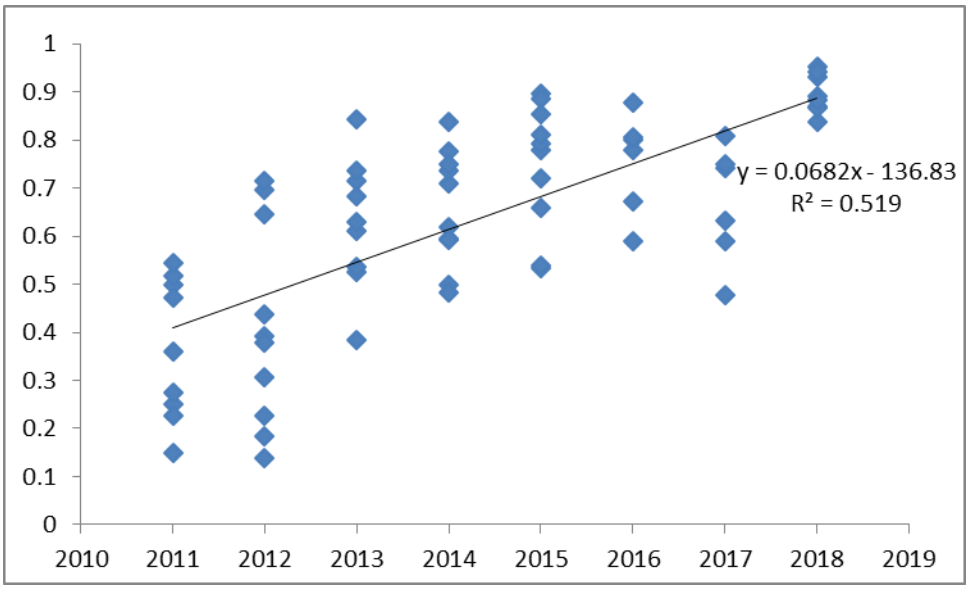


Figure 13. Proportion of vegetated bankfull channel length within the Meacham Creek Floodplain Restoration and In-stream Enhancement Phase I project area by year based on grid-intersect analysis of photo point data.

Work Element L: 198. Maintain Vegetation
Work Element Title: Maintain Vegetation and Control Noxious Weeds in Project Areas within the Umatilla River Subbasin
Milestone Deliverable: Maximize Survival of Native Vegetation in Enhancement Project Areas

A. Environmental compliance requirements complete.
B. Physical removal of non-preferred species of vegetative growth from project area.
C. Weed control in project areas by chemical means.
D. Water vegetation and reduce weed competition to improve survival at CTUIR project areas.
E. Till established weed areas as necessary for noxious weed control.

Project activities conducted in 2018 included the monitoring and maintenance of 16 conservation agreements on numerous individual landowner properties. Watering, weeding and maintenance methods for each conservation easement and project area is important for enhanced native vegetation and project site but maintenance varies by site conditions. Strategies to address weeds are included in agreements that are either completed by the landowner, CTUIR, subcontractor, and/or through the County Weed Control Board. CTUIR staff provides assistance to landowners by coordinating and managing herbicide application, providing funding, and developing treatment strategies. Manual, biological and chemical treatment options are utilized by CTUIR and may be employed when consistent with existing standards. Weed control is essential in establishing native grass and plant species. The UBAFHP maintains a licensed pesticide applicator on staff to spray/control noxious weeds on sites where chemical application is necessary. This staff member identifies problem weeds, determines the appropriate herbicide and selects the most effective application methods and rates in accordance with the National Oceanic and Atmospheric Administration's (NOAA) Biological Opinion under BPA's Habitat Improvement Program. The UBAFHP utilizes backpack spraying applications to treat perennial, annual and biennial weed species. All herbicide applications are consistent with Oregon Revised Statue (ORS).570.505 and Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) Regulations. CTUIR complies with BPA standards and supplies a report to BPA detailing the types and quantities of herbicides applied to specified locations.

In 2018 the UBAFHP completed 237 acres of mechanical and chemical weed treatment on current and completed project areas (Table 5).

Work Element M: 175. Produce Design and/or Specifications
Work Element Title: Wildhorse Creek – Athena Fish Passage Project Design
Milestone Deliverable: Complete a design and implementation schedule for one fish passage project on Wildhorse Creek in the city of Athena, OR.

In 2017, the CTUIR selected an engineering firm to design the preferred alternative proposed in the Athena Bridge feasibility report. The selected design firm began producing the design in the 2017 contract year. The 100% final design was delivered to the CTUIR in May 2018.

Work Element N: 184. Install Fish Passage Structure
Work Element Title: Wildhorse Creek – Athena Fish Passage Project Implementation
Milestone Deliverable: The CTUIR will work collaboratively with the ODFW, UBWC, City of Athena and Umatilla County to replace an aging bridge on 3rd Street in Athena, OR, to restore upstream fish passage through the project reach.

In 2018, the CTUIR collaboratively worked with project partners to completed permitting, intergovernmental agreements, and secured funding to enable the completion of the Wildhorse Creek Athena Fish Passage Project. The CTUIR worked closely with the UBWC to purchase the prefabricated concrete bridge necessary to replace the current concrete box culvert. The CTUIR also solicited and issued a tentative award for construction of the project. Due to circumstances out of the control of the CTUIR, the selected contractor opted not to sign the contract to construct the project. The second contractor that responded to the Request for Proposals was not deemed responsible and a contract for construction was unable to be awarded in the 2018 contract year. The prefabricated modular concrete bride was able to be purchased and was delivered to a holding location in Mission, OR, in November-December 2018 (Figure 14).

Figure 14. Precast, prestressed concrete bridge deck planks delivered to Mission, OR, in December 2018.

Work Element O: 47. Plant Vegetation
Work Element Title: Meacham Creek Floodplain Restoration and In-Stream Enhancement, RM's 3.8-6.1
Milestone Deliverable: Complete Scheduled Tree and Shrub Plantings in Project Areas

A. Environmental compliance requirements complete.
B. Agreement with the Native Plant Nursery for Growing Plants and Developing Plant Protocol.
C. Establish Planting Locations in Existing Project Areas for Increased Recovery.

UBAFHP staff annually plant vegetation and distribute native grass seed in areas we have implemented existing or new habitat enhancement projects or have identified a need in maintained riparian conservation easement areas. In 2018, UBAFHP staff revegetated sensitive areas within Project Areas 3 and 4 of the Meacham Creek Bonifer Reach Floodplain Reconnection and In-steam Enhancement Project. Planted areas included wetland and riparian areas where immediate erosive potential is high and where immediate vegetative cover would be most beneficial for riparian shading and fish habitat. Overall, 8,225 containerized plants and 1,000 willow cuttings were planted over 4.7 acres in the fall 2018 planting effort. Native grass seed was spread on all disturbed areas, including all acres that were planted with containerized plants. The total acreage seeded in 2018 exceeded 15.8 acres (Figure 15).

Figure 15. Areas within the Meacham Creek Bonifer Reach Floodplain Reconnection and In-stream Enhancement Project where native vegetation was planted by UBAFHP staff. Background is drone orthography captured by the CTUIR post-implementation in September 2018.

Planting tasks include site planning and development of planting strategies, collection and preparation of materials (pruning and conditioning of live willow material), pre-order coordination with the CTUIR Tribal Native Plant Nursery, and installation. Planting techniques are customized for conditions within each project area. Planting location, species, age, form (cuttings, saplings, bare-roots, potted, plugs), and soil/substrate conditions were considered and addressed during the implementation planning phase (Figure 16). The CTUIR UBAFHP staff work closely with the Tribal Native Plant Nursery to collect local seed and plant stock to provide native plants for particular project areas by elevation and planting zones.

Figure 16. UBAFHP staff planting wetland plants in the riparian area of the Meacham Creek Bonifer Reach Floodplain Reconnection and In-stream Enhancement Project.

Work Element P: 180. Enhance Floodplain/Remove, Modify, Breach Dike
Work Element Title: Construction – Bonifer Floodplain Reconnection and In-stream Enhancement – PA 3 & 4
Milestone Deliverable: Complete removal of 2,130 linear feet of levees and dikes in the Meacham Creek Bonifer Reach Project Areas 3 and 4.

CTUIR subcontracted construction services to complete removal of levees and dikes in the Meacham Creek Bonifer Reach Project Areas 3 and 4 as part of the Bonifer Reach Floodplain Reconnection and In-Stream Enhancement Project. Partial implementation of Project Areas 3 and 4 occurred in 2017. The remainder of the levee removals in Bonifer Reach Project Areas 3 and 4 were completed in this contract year including approximately 2,130 linear feet of levees and dikes.

Work Element Q: 29. Increase Aquatic and/or Floodplain Complexity
Work Element Title: Construction – Bonifer Floodplain Restoration and In-stream Enhancement – PA 3 & 4
Milestone Deliverable: Complete installation of 499 pieces of large wood and install 59 engineered log jams.

CTUIR subcontracted construction services to complete installation of large wood structures in the Meacham Creek Bonifer Reach Project Areas 3 and 4 as part of the Bonifer Reach Floodplain Reconnection and In-Stream Enhancement Project. Partial implementation of Project Areas3 and 4 occurred in 2017. The remainder of the large wood in Bonifer Reach Project Areas 3 and 4 was installed in this contract year including 1049 pieces of large wood (499 logs with rootwads and 550 tops) and 59 engineered log jams.

Work Element R: 30. Realign, Connect, and/or Create Channel
Work Element Title: Construction – Bonifer Floodplain Restoration and In-stream Enhancement – PA 3 & 4
Milestone Deliverable: Complete construction of 1,810 linear feet of primary and secondary channel.

CTUIR subcontracted construction services to complete construction of primary and secondary pilot channels in the Meacham Creek Bonifer Reach Project Areas 3 and 4 as part of the Bonifer Reach Floodplain Reconnection and In-Stream Enhancement Project. Partial implementation of Project Areas 3 and 4 occurred in 2017. The remainder of the designed channel construction in Bonifer Reach Project Areas 3 and 4 was constructed in this contract year. Channel construction in 2018 included 560 feet of primary channel construction and 1,280 feet of side channel construction which functioned to reconnect an additional 2,210 feet of relic primary channel.

Work Element S: 172. Conduct Pre-Acquisition Activities
Work Element Title: Conduct pre-acquisition activities for Birch Creek-Umatilla River confluence, UmaBirch LLC Properties
Milestone Deliverable: Produce the necessary documents and conduct surveys necessary to move forward with purchasing a conservation easement on the UmaBirch properties.

Significant coordination and planning efforts were accomplished in the 2018 contract year to advance this project to the execution of a conservation easement. The UBAFHP has been working closely with the landowner, other CTUIR projects, the UBWC, and the Blue Mountain Land Trust to determine the scope and terms of the easement, as well as the steps necessary to complete a conservation easement. Over the course of this contract year, the CTUIR held several coordination meetings to discuss next steps, coordinated with the landowner to consolidate ownership of several taxlots into a more manageable format for the easement, and initiated the process to produce a preliminary title report for the taxlots subject to the conservation easement. While progress was made, the deliverable for the Work Element was not fully met in this contract year. However, the landowner and the CTUIR are very motivated to complete the easement and the consolidation of ownership should facilitate further steps to be taken in contract year 2019. The conservation easement is anticipated to be completed in 2019.

Work Element T: 175. Produce Design and/or Specifications
Work Element Title: UmaBirch Properties – Floodplain Restoration and Habitat Enhancement Design
Milestone Deliverable: Produce designs and constructible implementation plans for several phases of restoration work on the UmaBirch easement property.

In contract year 2018, due to the uncertainties with the timeline and ultimate scope of the UmaBirch conservation easement, a full design process was not initiated for the UmaBirch floodplain restoration and habitat enhancement project. Instead, the CTUIR coordinated with BPA engineering staff to begin designing a discrete portion of the UmaBirch project that could be completed independent of the rest of the larger project (Figure 17). The Taylor Dam (formerly referred to as the Brown's Dairy Dam) is a defunct diversion dam that presents a partial barrier to some life stages of migrating fish at some life stages. The UmaBirch landowner and adjacent landowner were willing to remove the dam and the only remaining water right with the dam as the point-of-diversion irrigates the UmaBirch property. The last

remaining water right is currently in the process of having the point-of-diversion moved. The CTUIR provided BPA engineering staff with LiDAR and physical survey data to support the design effort. The removal design is anticipated to be completed in spring 2019.

Figure 17. CTUIR staff conducting total station surveys of the Taylor Diversion Dam to support BPA engineering staff in designing the removal of the dam.

Work Element U: 115. Produce Inventory or Assessment
Work Element Title: Produce Umatilla River Subbasin Assessment
Milestone Deliverable: Deliver a partial assessment including draft vision statement, draft objectives, data gaps, outline, and approach.

In this contract year, the CTUIR focused on identifying data gaps, developing an internal technical team, scoping the assessment, and weighing different approaches to the Umatilla River assessment. The UBAFHP worked closely with the CTUIR GIS department to identify existing data in the CTUIR repositories and in public databases as well as determining where critical data gaps exist. This information will be rolled into contract year 2019 where the UBAFHP will solicit proposals to begin composing the assessment document. In contract year 2018 the UBAFHP also began coordinating with stakeholders including various tribal government departments, federal and state agencies, local governments, and

local nonprofits to begin assembling a core technical team and several smaller teams to work on specific components of the assessment (e.g. Fisheries Committee).

Work Element V: 175. Produce Design and/or Specifications
Work Element Title: East Birch Creek RM 5.3 – 5.8 Habitat Enhancement Project Design
Milestone Deliverable: Complete a design and implementation plan for a floodplain reconnection and habitat enhancement project.

In this contract year, the UBAFHP solicited proposals for engineering firms to create the design and implementation plan. A firm was selected and the design process began in this contract year. The UBAFHP worked closely with the selected engineering firm and the landowner to determine project elements and a more detailed footprint that would both satisfy the needs of the landowner and provide the fisheries uplift required for the UBAFHP. A 15% design was produced in contract year 2018, which led to additional concerns from the landowner and further discussions. The UBAFHP consulted with the BPA RRT for guidance on what quantity of fisheries benefit would be required for continued funding and consideration. After going through several rounds of comments with RRT, the UBAFHP and the landowner decided to move forward to a 30% design and revisit the recommendations from RRT and determine if it is acceptable for the landowner to feel comfortable moving forward with the project. The design and implementation plan is anticipated to be completed in contract year 2019 with implementation anticipated in 2020.

Work Element W: 29. Increase Aquatic and/or Floodplain Complexity
Work Element Title: Install Wildhorse Creek Beaver Dam Support Structures
Milestone Deliverable: Work cooperatively with the SWCD to install 8 beaver dam support structures.

The CTUIR entered into a partnership with the Umatilla County SWCD to design and install a pilot project for BDS structures. The CTUIR was responsible for providing a design and completing cultural resources surveys (if necessary) and ESA consultation through the BPA HIP III programmatic. The Umatilla County SWCD was responsible for securing OWEB small grant funding and completing any state and local permits. The UBAFHP completed a design and consulted with the RRT to develop a low-risk beaver dam support structure project. The UBAFHP also requested cultural resource surveys and was provided a report from a survey that was previously completed in the area. The SWCD did secure funding for installation in this contract period, but was unsuccessful in obtaining permits to implement the project in contract year 2018. Due to permitting uncertainties with the Oregon Department of State Lands, ODFW, and USACE, it was decided to permit the project through a full Joint Permit Application and abandon attempting to permit the project at a lower level. A JPA will be developed in early 2019 and implementation is anticipated in summer of 2019

Table 4. Noxious weed treatments completed by location within the Umatilla River Basin, 2017.

Stream Name	Latitude	Longitude	Acres Treated	Method	Species Targeted
Meacham Creek	45.6222	-118.35	35.9	Chemical	*Potentilla recta, Centaurea* spp.
Wildhorse Creek	45.7483	-118.58	2	Mowing	*Conium maculatum*
Umatilla River	45.661	-118.99	56.7	Chemical	*Lepidium* spp., *Centaurea* spp.
	Total Acres Treated		94.6		

Table 5. Noxious weed treatments completed by location within the Umatilla River Basin, 2018.

Stream Name	Latitude	Longitude	Acres Treated	Method	Species Targeted
Meacham Creek	45.6222	-118.35	136	Chemical	*Potentilla recta, Centaurea* spp.
East Birch Creek	45.7483	-118.58	1	Mowing	*Rosa multiflora, Rubus* spp.
Umatilla River	45.661	-118.99	99	Chemical	*Lepidium* spp., *Centaurea* spp.
	Total Acres Treated		236.0		

Table 6. Planting materials and grass seed by species, quantity, and size, planted and established at Umatilla River Basin existing and new project sites, 2017-18.

Stream	Date Planted	Project Site Location	Species (Common Name)	Quantity
Meacham Creek	May 2017	Meacham Creek Floodplain Reconnection Phase I	Mountain Alder	99
Meacham Creek	May 2017	Meacham Creek Floodplain Reconnection Phase I	Serviceberry	54
Meacham Creek	May 2017	Meacham Creek Floodplain Reconnection Phase I	Red Osier Dogwood	99
Meacham Creek	May 2017	Meacham Creek Floodplain Reconnection Phase I	Douglas' Hawthorn	50
Meacham Creek	May 2017	Meacham Creek Floodplain Reconnection Phase I	Baltic Rush	31
Meacham Creek	May 2017	Meacham Creek Floodplain Reconnection Phase I	Mock Orange	45
Meacham Creek	May 2017	Meacham Creek Floodplain Reconnection Phase I	Mallow Ninebark	54
Meacham Creek	October 2017	Meacham Creek Bonifer Project Area 3 & 4	Thinleaf Alder	75
Meacham Creek	October 2017	Meacham Creek Bonifer Project Area 3 & 4	Red Osier Dogwood	96
Meacham Creek	October 2017	Meacham Creek Bonifer Project Area 3 & 4	Oceanspray	38
Meacham Creek	October 2017	Meacham Creek Bonifer Project Area 3 & 4	Mallow Ninebark	39
Meacham Creek	October 2017	Meacham Creek Bonifer Project Area 3 & 4	Douglas' Hawthorn	51
Meacham Creek	October 2017	Meacham Creek Bonifer Project Area 3 & 4	*Juncus* spp.	411
Meacham Creek	October 2017	Meacham Creek Bonifer Project Area 3 & 4	Bigleaf Sedge	103
Meacham Creek	October 2017	Meacham Creek Bonifer Project Area 3 & 4	Water Sedge	103
Meacham Creek	October 2017	Meacham Creek Bonifer Project Area 3 & 4	Seep Monkeyflower	68
Meacham Creek	November 2018	Meacham Creek Bonifer Project Area 3 & 4	Mountain Alder	210
Meacham Creek	November 2018	Meacham Creek Bonifer Project Area 3 & 4	White Alder	54
Meacham Creek	November 2018	Meacham Creek Bonifer Project Area 3 & 4	Red Osier Dogwood	848
Meacham Creek	November 2018	Meacham Creek Bonifer Project Area 3 & 4	Black Cottonwood	88

Stream	Date Planted	Project Site Location	Species (Common Name)	Quantity
Meacham Creek	November 2018	Meacham Creek Bonifer Project Area 3 & 4	Bigleaf Sedge	1531
Meacham Creek	November 2018	Meacham Creek Bonifer Project Area 3 & 4	Water Sedge	365
Meacham Creek	November 2018	Meacham Creek Bonifer Project Area 3 & 4	*Juncus* spp.	3034
Meacham Creek	November 2018	Meacham Creek Bonifer Project Area 3 & 4	Seep Monkeyflower	400
Meacham Creek	November 2018	Meacham Creek Bonifer Project Area 3 & 4	Common Tule	535
Meacham Creek	November 2018	Meacham Creek Bonifer Project Area 3 & 4	Douglas' Spirea	300
Meacham Creek	November 2018	Meacham Creek Bonifer Project Area 3 & 4	Douglas' Hawthorn	98
Meacham Creek	November 2018	Meacham Creek Bonifer Project Area 3 & 4	Mallow Ninebark	577
Meacham Creek	November 2018	Meacham Creek Bonifer Project Area 3 & 4	Oceanspray	111
Meacham Creek	November 2018	Meacham Creek Bonifer Project Area 3 & 4	Common Snowberry	74
Meacham Creek	November 2018	Meacham Creek Bonifer Project Area 3 & 4	Willow spp.	1000
			TOTAL POTTED PLANTS	**9,641**
			TOTAL WILLOW CUTTINGS	**1,000**
			TOTAL PLANTS	**10,641**

Table 7. Habitat passage structures monitored and maintained by CTUIR to meet design specifications.

Year	Stream	Stream Location	Project Description
2007	Meacham Creek	RM 1.7	Passage rectified by removing large cabled boulders (improved adult passage)
2007	Meacham Creek	RM 20.2	Partial dam removed (juvenile and adult passage)
2007	Camp Creek	RM 0.3	Partial dam removal (juvenile and adult passage)
2007	Greasewood Creek	RM 0.4	Partial dam removal (juvenile and adult passage)
2007	West Birch Creek	RM 3.2	Roughened channel to restore proper gradient and reduce step height at road bridge crossing for adult passage
2008	West Birch Creek	RM 2.7	Hoeft Dam fish passage rectification (juvenile and adult passage)

Table 8. Meacham Creek Bonifer Reach implementation schedule.

Implementation Year	Project Areas	Stream Location	Project Description
2017-18	3 & 4	RM 4.05 – 5.7	Remove levees/dikes, create primary and secondary channel, enhance pool/alcove habitat, construct large woody jams, add large wood, construct embankments
2019	2	RM 3.25 – 4.05	Create primary and secondary channel, add large wood
2020	1 & 5	RM 1.9 – 3.25, Bonifer Pond	Reconnect Bonifer Pond to Boston Canyon Creek, remove levees/dikes, create side channel, add large wood, construct embankments

Discussion

The projects implemented in this reporting period were carefully designed in previous years to mitigate for the identified ecological concerns and align with local assessments. The CTUIR approaches restoration utilizing the Umatilla River Vision, previously described (Jones et al. 2008). The process-based philosophy of the River Vision encourages development of projects that address multiple River Vision Touchstones, limiting factors, and ecological concerns (Table 9).

Table 9. The Umatilla Anadromous Fish Habitat Project objectives relative to the Umatilla River Vision touchstones (Jones et al. 2008), BPA 2008 Fish Accords primary limiting factors (Fish Accords 2008) and NOAA's ecological concerns (NMFS 2009).

Umatilla Habitat Program Objectives	Umatilla River Vision 2008 Touchstones Addressed	BPA 2008 Fish Accords Primary Limiting Factor's Addressed	NOAA Ecological Concerns	NOAA Ecological Concerns Subcategories
Protect and conserve natural ecological processes that support the viability of fish populations and their primary life history strategies	Biota Connectivity Geomorphology Hydrology Riparian Vegetation	In-channel Characteristics Floodplain/Riparian Sediment	Multiple(Habitat Quantity, Injury and Mortality, Peripheral and Transitional Habitats, Channel Structure and Form, Sediment Conditions, Water Quality, Water Quantity, Population Level Effects)	Multiple
Restore passage and connectivity to habitats blocked or impaired by artificial barriers and maintain properly function passage and connectivity	Geomorphology Connectivity	Passage/Entrainment	Habitat Quantity	Anthropogenic Barriers
Maintain and restore floodplain connectivity and function	Aquatic Biota, Connectivity, Riparian Vegetation, Geomorphology, Hydrology	Water Quality-Temperature Riparian/Floodplain	Food, Peripheral and Transitional habitats, Riparian Condition, Channel Structure and Form, Water Quantity	Altered Primary Productivity, Altered Prey Species Composition and Diversity, Riparian Condition, LWD Recruitment, Floodplain Condition, Bed and Channel Form, Instream Complexity, Decreased Water Quantity, Altered Flow Timing
Restore degraded and maintain properly function channel structure and complexity	Connectivity, Riparian Vegetation, Geomorphology	In-channel Characteristics	Riparian Condition, Peripheral and Transitional Habitats, Channel Structure and Form	Riparian Condition, LWD Recruitment, Side Channel Conditions, Floodplain Condition, Bed and Channel Form, Instream Structural Complexity
Restore riparian condition and LWD recruitment and maintain properly functioning conditions	Aquatic Biota, Riparian Vegetation, Hydrology	In-channel Characteristics Riparain/Floodplain	Food, Riparian Condition	Riparian Condition, LWD Recruitment, Altered Primary Productivity, Food-Competition, Altered Prey Species Composition and Diversity
Restore natural hydrograph to provide sufficient flow during critical periods	Connectivity, Aquatic Biota, Hydrology,	Floodplain/Riparian Water Quality-Temperature	Habitat Quantity, Water Quality, Water Quantity	HQ-Competition, Oxygen, Increased Water , Alter Flow Timing
Improve degraded water quality and maintain unimpaired water quality	Hydrology, Aquatic Biota	Floodplain/Riparian Water Quality-Temperature	Riparian Condition, Sediment Conditions, Water Quality	Riparian Condition, Decreased Sediment Quantity, Temperature, Oxygen Turbidity, Toxic Contaminants

Habitat protection and restoration actions, like those completed during this review period, were identified in numerous local assessments and planning documents. The Umatilla River Basin TMDL and WQMP (ODEQ and CTUIR 2001), Umatilla/Willow Subbasin Plan (NPCC 2005), Middle Columbia Steelhead DPS ESA Recovery Plan (2009), and the Recovery Plan for the Coterminous United States Population of Bull Trout (USFWS 2015) all identify one or more habitat restoration or protection actions implemented by the UBAFHP in this reporting period as a way to address issues facing ESA-listed fish species and/or water quality concerns. In addition to the subbasin-scale planning documents, the restoration activities completed by the UBAFHP in this reporting period are also supported by several smaller scale watershed assessments. The Meacham Creek Watershed Analysis and Action Plan (Andrus and Middel 2003) and the Birch Creek Watershed Action Plan (CTUIR 2016) both specifically support the restoration actions completed in those watersheds.

LESSONS LEARNED AND ADAPTIVE MANAGEMENT

Lessons Learned

During this reporting period, the UBAFHP completed work in areas with multiple jurisdictions, subcontracted several large design and construction contracts, and maintained complex partnerships with landowners and local action agencies. The wide variety of work presented a number of unique challenges. As a result of working through these challenges, the UBAFHP has learned several lessons that will inform future project work.

During the planning and permitting stage of the Meacham Creek Bonifer Reach Floodplain Reconnection and In-stream Enhancement Project in CY2017, the UBAFHP had to work through a novel scenario. At no time in the past has the CTUIR completed a large-scale floodplain restoration project within the boundaries of the Umatilla Indian Reservation. The project also incorporated several different land ownerships including tribally-owned simple fee and tribal trust and individual trust allotments with fractionated ownership that are administered by the BIA. Permitting the project required the UBAFHP to "blaze a trail" through the regulatory processes of the various jurisdictions of Tribal, Federal, State, and local governments. The uncertainty of how to move forward with landowner permissions did ultimately delay implementation of the Bonifer Reach project in CY2107 and lead to a two-year implementation of Project Areas 3 & 4. However, UBAFHP projects will benefit from the process outlined for permitting and gaining landowner permissions through the BIA and future project delays may be avoided more easily.

Several of the projects in this reporting period included working closely with agency partners and participating landowners. Cultivating these partnerships has led to rewarding outcomes as well as occasionally limiting progress on project work. One of the successes in this project period that required close coordination with agency and landowner stakeholders in the basin was the completed removal of the Dillon Diversion Dam in CY2017. The UBAFHP worked with the subbasin co-managers at ODFW, the UBWC, water users at the Dillon Irrigation Company, and surrounding landowners to complete the project. This complex project required leveraging the strengths of the different stakeholders and strategically targeting funding sources for different components of the project as a whole. By collaborating and working as a restoration team, a longstanding barrier was removed from the Umatilla River.

Conversely, not all of the collaborative projects proposed in this reporting period have gone exactly as planned. The UBAFHP also partnered with partner agencies to implement a beaver dam support structure pilot project. The UBAFHP completed ESA consultation and designed the project, whereas partners were responsible for permitting and securing funding. While the roles of each organization were identified at the outset of the partnership, UBAFHP staff failed to maintain close coordination and follow-up with project partners during the height of the field season and as a result, permitting began too late for implementation in this reporting period. In the future, the UBAFHP will clearly identify project goals and timelines to potential partner organizations at the beginning of projects and maintain coordination throughout to ensure all parties complete their assigned tasks. In a similar vein, the UBAFHP also faced some challenges with landowner partnerships on some projects. The UBAFHP has been developing and designing a floodplain reconnection project on East Birch Creek on a private landowner's property. The CTUIR and the landowner entered into an agreement to pursue a mutually-beneficial project, but there have been significant differences in stakeholder priorities since the design began in CY2018. Design firm and UBAFHP staff have been attempting to balance floodplain connection, fisheries benefit, and the concerns of the landowner and the time and effort put into landowner engagement and negotiation has led to the design being delayed. At present, the design is proceeding to a 30% design of the preferred alternative with the understanding that the landowner and CTUIR will agree to the project footprint and general project elements at that stage and continue with the design. In the future, the UBAFHP will make an effort to complete more landowner education when entering into a partnership, as well as clearly define the goals of all groups as well as the timeline for the project and relevant deadlines.

Finally, one project during the reporting period was delayed as a result of the selected contractor rescinding their proposal before the project initiation, leaving little time to get a contract in place with another firm. Part of the issue

was that the one other firm that submitted a proposal did not submit a technically adequate proposal and was disqualified from further consideration. In order to maximize the number of responses to solicitations in the future, the UBAFHP is attempting to advertise IFBs and RFPs as early as possible before implementation. The hope is that if the UBAFHP encounters the situation again, there will be a second responsible contractor able to complete the work without incurring any undue delays to the project.

Adaptive Management

The UBAFHP places a heavy weight on adaptive management, applying lessons learned in past years, and using research and action effectiveness monitoring data to support project decision making.

Lessons learned identified in previous year's annual reports play a large part in the management of habitat restoration site and the development of future projects. For example, in the CY2016 annual report, we identified recommendations for increasing planting survival and increasing revegetation success following restoration projects. In this reporting period, the UBAFHP has incorporated those recommendations into the annual planting plan. For example, the CTUIR has adopted a planting methodology that prioritizes immediate planting of wetland and riparian areas and letting heavily disturbed upland/floodplain areas settle for two years prior to planting containerized plants. The plant mix that UBAFHP staff planted was also much more targeted to the microsites available in the planting locations, ensuring that more hydrophilic species are planted in the most sensitive sites. The UBAFHP continues to improve the species mix based on ecological suitability and enhancement of First Foods species. Similarly, all plantings were completed in fall, taking advantage of a longer dormancy window in the plants and allowing containerized plant's roots to infiltrate the soil early and quickly in the spring and take advantage of seasonally high groundwater elevations.

The UBAFHP also kept revegetation in mind during implementation. Based on observed conditions in previous year's projects, projects completed in this reporting period included enhanced floodplain topography creation to help increase plating survival and natural vegetative regeneration. In any area of disturbed floodplain encountered in UBAFHP project areas (e.g. the floodplain surface following a levee removal), 2-5 foot deep depressions were excavated to mimic natural floodplain features such as relic channels. Excavating these depressions allows groundwater to be nearer to the ground surface, becoming more available to young plants. Additionally, the floodplain topography creates microsites that collect floodwaters and precipitation and provide cover from insolation and wind that may help plants naturally establish and become a seed source and additional cover for other plants.

The UBAFHP also incorporated lessons learned in past years into project development and implementation methodology. During the design process for the Meacham Creek Bonifer Reach Floodplain Reconnection and In-stream Enhancement project, the UBAFHP and the design firm engaged in a lessons learned exercise to improve the design process from the Meacham Creek Phase I and Phase II projects. One of the recommendations of this exercise was to make more efficient and judicious use of large woody material. This recommendation was also supported by CTUIR biomonitoring reporting that concluded that most of the large wood installed in previous project was not in contact with the water during summer baseflow. During this reporting period, staff made a concerted effort to place individual pieces of large wood directly in contact with baseflow and "seed" the upper end of the project area with unanchored pieces of wood in the anticipation of the creek self-sorting wood into more natural aggregations.

In addition to the lessons learned from previous project years, project staff also incorporate data collected by other CTUIR projects and from annual project data inventories of previously implemented projects. The UBAFHP annually inventories plant survival and revegetation progress, as well as noxious weed presence and extent of infestations. The UBAFHP is responsible for treating noxious weeds on several hundred acres of project areas and staffing and time constraints mean that treatment areas and species must be prioritized in order to achieve project objectives of promoting native plant growth in project areas. The UBAFHP sets priorities and manages conservation agreement properties using a rich dataset collected by project staff as well as incorporating data from the Oregon Department of Agriculture, USDA-FS, and Umatilla County Public Works. Using this dataset, the UBAFHP is able to identify the highest

priority weeds in priority areas, direct staff time to the most important areas, and apply the least invasive and most ecologically benign treatment while remaining effective.

The UBAFHP also integrates data collected from research, monitoring, and evaluation efforts by the CTUIR and ODFW to inform future project development. Monitoring of outmigrating steelhead smolt survival from the Meacham Creek and Birch Creek screw traps to Three Mile Dam suggest that the mainstem Umatilla River is a source of significant mortality. Survival rates between Meacham Creek and Three Mile Dam have been recorded as low as 22% (Contor et al. 2016). Recognizing that many of the juvenile salmonids currently being produced in the system are not successfully migrating to the mainstem Columbia River and the Pacific Ocean beyond, the UBAFHP has begun planning more habitat improvements in the mainstem Umatilla River. The objective is to improve habitat conditions in the mainstem Umatilla River to provide outmigrating smolts habitat to rear over winter, refuge from high flow events, cover from predators, and increased water quality.

SUMMARY AND CONCLUSIONS

In accordance with the 2006 NPCC solicitation outline, the CTUIR UBAFHP since 2007 focused its restoration activities primarily on Meacham Creek, Birch Creek, and mainstem Umatilla River. However, project restoration activities occur in other areas of the basin where floodplain and riverine processes are treated with outcomes that are beneficial to ecological processes, water quality and fish production. The Meacham Creek Watershed has long been a primary focal point of the CTUIR effort to improve habitat conditions in the Umatilla Basin because of its location, size, historical significance, and recovery potential. **Error! Reference source not found.** highlights the CTUIR Umatilla Anadromous Fish Habitat Project restoration accomplishments since 2007.

Proposed restoration actions have focused on protection, enhancement, and restoration of functional floodplain, channel and watershed processes at multiple scales using passive and active restoration techniques. Over the past decade, the CTUIR Department of Natural Resources and UBAFHP have transitioned from restoration toward a fixed endpoint to address symptoms to a restoration of processes. Restoration of process is more likely to address causes of river ecosystem degradation, whereas restoration toward a fixed endpoint addresses only symptoms. Specific restoration actions proposed for completion by CTUIR, partnering agencies and hired independent contractors include levee and dike removal and or modification, floodplain and channel construction, in-stream and floodplain large wood debris additions, in-stream structure placement, wetland enhancement, floodplain and riparian plantings, noxious weed removal, riparian management through fencing, and removal of physical migration barriers. The UBAFHP have and will continue to maintain project areas under secured conservation agreements with landowners on private properties for protection and enhancement of floodplain and riparian habitat and investments from past passage and in-stream structure projects. Completed project activities are described below in more detail in the context of the watershed with reference to annual progress reports.

During this reporting period, the UBAFHP continued to implement habitat improvement projects at a high level. The Dillon Dam Removal was a long-discussed project in the subbasin that had never been implemented in the past. The CTUIR UBAFHP was able to work with agency partners and private stakeholders to implement the removal and rectify a partial barrier to upstream salmonid migration that had been recognized as a significant issue in the subbasin. The UBAFHP was also able to complete over 1.6 miles of floodplain reconnection and in-stream enhancement in the Meacham Creek Bonifer Reach. The project included levee removals, relic channel reconnection, and large wood addition that will “jumpstart” natural floodplain processes and set the reach on a recovery trajectory. In addition to project implementation, UBAFHP staff completed maintenance of ongoing riparian enhancement and passage projects at properties where the CTUIR has pre-existing riparian conservation agreements. This maintenance included noxious weed treatment, maintenance of built structures, and additional riparian plantings as needed.

The CTUIR UBAFHP completed several design documents that will serve to inform projects in the long and near term future of the UBAFHP. First, the UBAFHP also completed a full design and implementation plan to rectify a fish passage barrier at the 3rd Street Bridge in Athena, Oregon. This project is crucial to reconnect over 24 kilometers of potential spawning habitat for Middle Columbia River Steelhead. The UBAFHP also completed an in-house design for a BDSS pilot project. While the project itself is small, it is an important step in determining the feasibility and usability of beaver restoration strategies in the Umatilla River subbasin and will help determine if a larger-scale beaver restoration program is an effort worth undertaking. Lastly, the UBAFHP produced a preliminary design for a floodplain reconnection and in-stream enhancement project on East Birch Creek. This project is a direct result of the Birch Creek Watershed Action Plan process and is an important first step in the watershed.

A principal strength and focus of the CTUIR UBAFHP project is the ability to work cooperatively with the various entities throughout the restoration process. Staff participated and cooperated with multiple agencies and stakeholders in the Umatilla Basin Watershed including ODFW, USDA-FS, Natural Resource Conservation Service, Umatilla Basin Watershed Council, Umatilla County Soil and Water Conservation District, and local stakeholders to enhance or protect natural

resources, identify problems and solutions, coordinate efforts to prevent duplication, enhance communication and cooperation and identify funding and cost share opportunities within the Umatilla River Subbasin.

The Umatilla Basin Anadromous Fisheries Habitat Project is an ongoing effort to protect, enhance and restore functional floodplain, channel and watershed processes to provide sustainable and healthy habitat for aquatic species in the Umatilla River Basin, including Threatened Middle Columbia River Steelhead. Project work further supports the CTUIR Department of Natural Resource River Vision and First Foods mission statements to sustain production. The River Vision principles have been successfully applied in effort to reestablish the salmonids to self-sustaining levels. We expect a substantial positive response of salmonid populations once habitat floodplain and channel function is addressed and improved. We believe a positive correlation between habitat improvement, salmonid density, and fitness levels will shift the status of ESA-Listed species towards a safer level of sustainability in the Umatilla River Basin

Table 10. The CTUIR UBAFHP restoration project descriptions by location, treated primary limiting factors (NMFS 2009) by CTUIR River Vision touchstones (Jones et al. 2008) and accomplishments; 2007-2016.

Subbasin, Stream and Years	Project Description	Species	CTUIR River Vision Touchstones/ Habitat Limiting Factors (PLF's shaded in yellow-NOAA BiOP)								Comment/ Accomplishments
			Biota-Connectivity	Geomorphology	Connectivity		Hydrology			Riparian Vegetation	
			Passage Barriers/ Entrainment	In-channel Characteristics	Habitat Diversity (LWD)	Floodplain Confinement	High Temps	High Turbidity	Low Flows	Riparian/ Floodplain	
Meacham Creek and Camp Creek, Tributary of Meacham Creek (2007)	Fish passage rectifications, pool development with rock structures, and plantings	STS	**X**				**X**			**X**	Rectified two diversion dams and one in-stream structure providing unimpeded access to the entire watershed, development of pools with boulder cross vanes, 335 ft of streambank stabilization with added wood complexity, 0.3 miles livestock exclusion fence, and 500 riparian plantings.
West Birch Creek (2007-2008)	Fish passage rectification, riparian protection fencing and plantings	STS	**X**		**X**		**X**			**X**	Rectification of the Cunningham and Hoeft Dams providing 2.4 miles unimpeded habitat, 335 ft of streambank stabilization with added wood complexity, 0.3 miles livestock exclusion fence, and 5,000 riparian plants.

Mainstem Umatilla River (Initiated 2008-2012)	Treated and maintained 3.5 miles of floodplain and channel; riparian and uplands	CHS, CHF, STS, Coho			X		X	X	X	X	Conservation easement on B&G Property to maintain 355 (61 riparian and 294 upland acres; installation of 60.7 acres of CREP tract's), 2 off-channel water wells, 13,400 seedling trees planted, 1,335 lbs of native grass seed and noxious weed control; Installation of an access restriction fence (3 additional riparian acres protected).
Meacham Creek (2009)	Floodplain improvement with levee setback, initiation of off-channel rearing habitat, large wood placement, and riparian plantings	CHS, STS,BT, Pacific Lamprey	X	X	X	X	X		X	X	Restored 40 acres of floodplain connectivity over 1-mile of stream by removal or modification of 3 levees and 1 dike (3,200 linear ft, 24,000 cubic yards); distribution of large wood on floodplain; 15,000 planted hardwood and conifer seedlings (30acres).
Meacham Creek (Initiated 2008-2012)	Riparian protection fencing and plantings	CHS, STS,BT, Pacific Lamprey		X	X		X		X	X	Built 9.8 miles of livestock exclusion fence between RM 2.0-8.5 (~350 acres protected).
Birch Creek (2010-2016)	Bank stabilization and large wood habitat complexity and riparian plantings	STS		X	X	X	X	X		X	Restoration of 335 ft of streambank stabilization with large wood and boulders over 0.1 miles of stream, 2 large wood in-channel habitat structures, and planted 5,000 riparian plantings over the 1-mile property.

Meacham Creek Floodplain Restoration and In-Stream Enhancement Phase I Project RM 6-7.1 (2011-2012)	Floodplain and channel improvement with levee setback, large wood placement, side-channel connectivity, wetland enhancement, and riparian plantings.	STS, CHS, BT, Pacific Lamprey		X	X	X	X	X	X	X	Reconnected 67 acres of floodplain over 1-mile of stream by removing a 2,800 foot levee and modification of two spur dikes (600 ft removed), realigned historic channel with meanders in the floodplain, developed 3 secondary channels and 3,568 ft of off-channel habitat, 12 large pool structures, 10 major and 286 medium rock and log features, and installed 38,290 plantings.
Birch Creek (2012)	Fish passage rectification and habitat restoration project.	STS, Coho	X	X		X	X	X		X	Removed two abandoned irrigation diversions (Taylor Property-ODFW lead agency) providing unimpeded access to 2.7 river miles of stream. Included channel reshaping, setback of leveed road adjacent to the channel; and reshaping of the channel and banks, two j-hook rock structure placements and riparian plantings over 0.6 miles of stream.
West Birch Creek (2012)	Fish passage rectification and habitat	STS	X	X	X		X	X		X	Removed one abandoned irrigation diversion (Low Property-ODFW lead

	restoration project.										agency) providing unimpeded access to 5.0 river miles of stream, installation of rock and large wood structures, channel re-shaping and plantings over 1-mile of stream.
Dillon Diversion Dam Removal (2017)	Fish passage rectification	STS, CHS, CHF, Coho, BT, Pacific Lamprey	X	X							Removed a longstanding partial barrier to upstream migration and opened an additional 3.65 miles of river to unimpeded travel for anadromous salmonids.
Meacham Creek Bonifer Reach Floodplain Reconnection and In-stream Enhancement – Project Areas 3 & 4 (2017-2018)	Floodplain and channel improvement with levee removal, channel reconnection, large wood placement, and riparian plantings	STS, CHS, BT, Pacific Lamprey		X	X	X	X	X	X	X	Treated over 1.6 miles of Meacham Creek by removing 3,385 linear feet of levees and dikes, reconnecting 3,766 linear feet of primary and secondary channel habitat, and installing 69 engineered log jams with more than 537 logs with rootwads attached.
Basin-wide easements O&M (2008-2018)	Ongoing maintenance of 17 riparian conservation agreements including livestock exclusion fencing, tree planting and weed control	CHS, CHF, STS, Coho, BT, Pacific Lamprey	X	X	X	X	X	X	X	X	552 acres protected and maintained, 15.15 miles of riparian fence protection (184 ac.), 7,300 planted hardwood seedling trees.

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APPENDIX A: USE OF DATA AND PRODUCTS

Umatilla Projects Review

http://pisces.bpa.gov/release/documents/documentviewer.aspx?doc=P130848

APPENDIX B: LIST OF METRICS AND INDICATORS

Category	Subcategory	Subcategory Focus 1	Subcategory Focus 2	Specific Metric Title
Classification of Ecological or Geological Attribute	Form/Morphology	Habitat Type: Channels		Channel Complexity
Classification of Ecological or Geological Attribute	Form/Morphology	Habitat Type: Channels		Channel Score
Classification of Ecological or Geological Attribute	Form/Morphology	Habitat Type: Channels		Channel Unit Volume
Classification of Ecological or Geological Attribute	Form/Morphology	Habitat Type: Channels		Residual Pool Volume
Fish	Prey Availability for Fish Species			Growth Potential
Hydrology/Water Quantity	Flow			Discharge
Hydrology/Water Quantity	Flow			Velocity Heterogeneity
Landscape Form & Geomorphology	Composition/Structure of Habitat Types	Habitat Type: Channels		Channel Unit Complexity
Landscape Form & Geomorphology	Composition/Structure of Habitat Types	Habitat Type: Channels		Channel Unit Volumes
Landscape Form & Geomorphology	Composition/Structure of Habitat Types	Habitat Type: Channels		Channel Unit Complexity
Landscape Form & Geomorphology	Cover	Habitat Type: Channels		Percent fish cover
Landscape Form & Geomorphology	Cover	Habitat Type: Channels		Fish Cover
Landscape Form & Geomorphology	Density of Habitat Type	Habitat Type: Channels		Pool Frequency
Landscape Form & Geomorphology	Density of Instream Wood			Channel unit large wood volume
Landscape Form & Geomorphology	Density of Instream Wood			Channel unit large wood

				volume/count in log jams
Landscape Form & Geomorphology	Density of Instream Wood			Site large wood volume
Landscape Form & Geomorphology	Depth: Bathymetry			Thalweg Profile
Landscape Form & Geomorphology	Depth: Pool			Residual Pool Depth
Landscape Form & Geomorphology	Distribution of Habitat Type	Habitat Type: Channel: Pools		Percent Pools
Landscape Form & Geomorphology	Distribution of Habitat Type	Habitat Type: Channel: Pools		Pool Frequency
Landscape Form & Geomorphology	Distribution of Instream Wood			LWD Volume
Landscape Form & Geomorphology	Edge/Density/Sinuosity	Habitat Type: Channels		Sinuosity
Landscape Form & Geomorphology	Gradient			Gradient
Landscape Form & Geomorphology	Size: Wood Structure			Residual Pool Volume
Landscape Form & Geomorphology	Width to Depth Ratio			Bankfull width-to-depth ratio
Landscape Form & Geomorphology	Width to Depth Ratio			Wetted width-to-depth ratio
Landscape Form & Geomorphology	Width: Bankfull			Bankfull Width
Light	Light Concentration			Riparian cover
Light	Light Concentration			Solar Input
Macroinvertebrates	Drift Density	Habitat Type: Channels		Drift biomass
Macroinvertebrates	Drift Density	Habitat Type: Channels		Total Drift Biomass
Sediment/Substrate/Soils	Composition: Substrate/Soil-Dominant Size			Percentage substrate composition

Sediment/Substrate/Soils	Composition: Substrate/Soil-Dominant Size			Riffle Particle Size (D16, D50, D84)
Sediment/Substrate/Soils	Composition: Substrate/Soil-Dominant Type			Percent Fines
Sediment/Substrate/Soils	Depth-Fines			Subsurface Fines
Sediment/Substrate/Soils	Distribution of Sediment			Riffle Particle Size (D16, D50, D84)
Sediment/Substrate/Soils	Embeddedness			Percent cobble embedded
Sediment/Substrate/Soils	Embeddedness			Embeddedness of Fast water Cobble
Vegetation/Plants	Composition: Vegetative Species Assemblage			Riparian Structure
Vegetation/Plants	Density of Vegetation			Riparian Structure
Water Quality	Alkalinity	Habitat Type: Channels		Alkalinity
Water Quality	Alkalinity	Habitat Type: Channels		Average Alkalinity
Water Quality	Conductivity			Conductivity
Water Quality	Conductivity			Average Conductivity
Hydrology/Water Quantity	Flow			Radon 222 Geochemistry
Hydrology/Water Quantity	Ground Water Level Change			Groundwater Surface Elevation
Hydrology/Water Quantity	Hyporheic Flow			Groundwater Budget Model
Water Quality	Water Temperature			Groundwater Temperature
Water Quality	Water Temperature			Surface Water Temperature