Umatilla River Anadromous Fish Habitat Project

2020 Annual Report

(January 1, 2020 – December 31, 2020)

BPA Project Number 1987-100-01
Contract Numbers 73982 REL 96
December 15, 2020

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ACRONYMS

BA	biological assessment
BDSS	beaver dam support structure
BIA	Bureau of Indian Affairs
BPA	Bonneville Power Administration
cfs	cubic feet per second
COR	Contracting Officer 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
USACOE	United States Army Corps of Engineers
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 32-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 2020 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 2020.

Work Element	Stream Name	Description
Conservation Agreements	Wildhorse, Birch, EFK Birch, WFK Birch, Cottonwood, & Umatilla River	Maintain current conservation agreement terms and conditions on 16 agreements, including maintaining fencing.
Conservation Easement	Umatilla River	Continue working on drafting a Conservation Easement on the UmaBirch Property
Weed Treatment	Meacham, Umatilla River	Controlled noxious weeds on 54 acres of conservation agreements and previously implemented habitat projects using chemical and mechanical treatments. Biological control treatments are ongoing.
Planting	Meacham	3,400 plants
	Wildhorse	1,025 plants
Meacham Creek - Bonifer Reach PA 1		Constructed 7,656 linear feet of stream channel and installed 310 pieces of large wood (plus tops) individually and in 35 engineered log structures.

Table 2. Major designs and project planning for the 2020 field season.

Project	Description
East Birch Creek Floodplain Restoration and In-stream Enhancement Project	Continue the design process to produce an engineered design for a floodplain reconnection and in-stream habitat enhancement project on East Birch Creek. Design altered to account for cultural sites and changes due to flooding in the early spring.
Umatilla River Assessment	Began collecting existing data, identifying data gaps, and scoping the assessment within CTUIR. Selected consulting firm to complete the work.
UmaBirch Conservation Easement	Collaborated with the landowner and continued tasks to complete a conservation easement on a part of the UmaBirch property. Conservation Easement anticipated to be completed in 2021.
UmaBirch Design	Selected design firm and completed 60% designs for a piece of the UmaBirch Project. The design for Birch Creek 2.3 will be taken to 100% and construction will begin in 2021. The remainder of the project will be fully designed in 2021-22 with implementation anticipated, beginning in 2022.
UmaBirch NEPA Compliance	An environmental assessment was initiated in 2020 and will be finalized in 2021.

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.

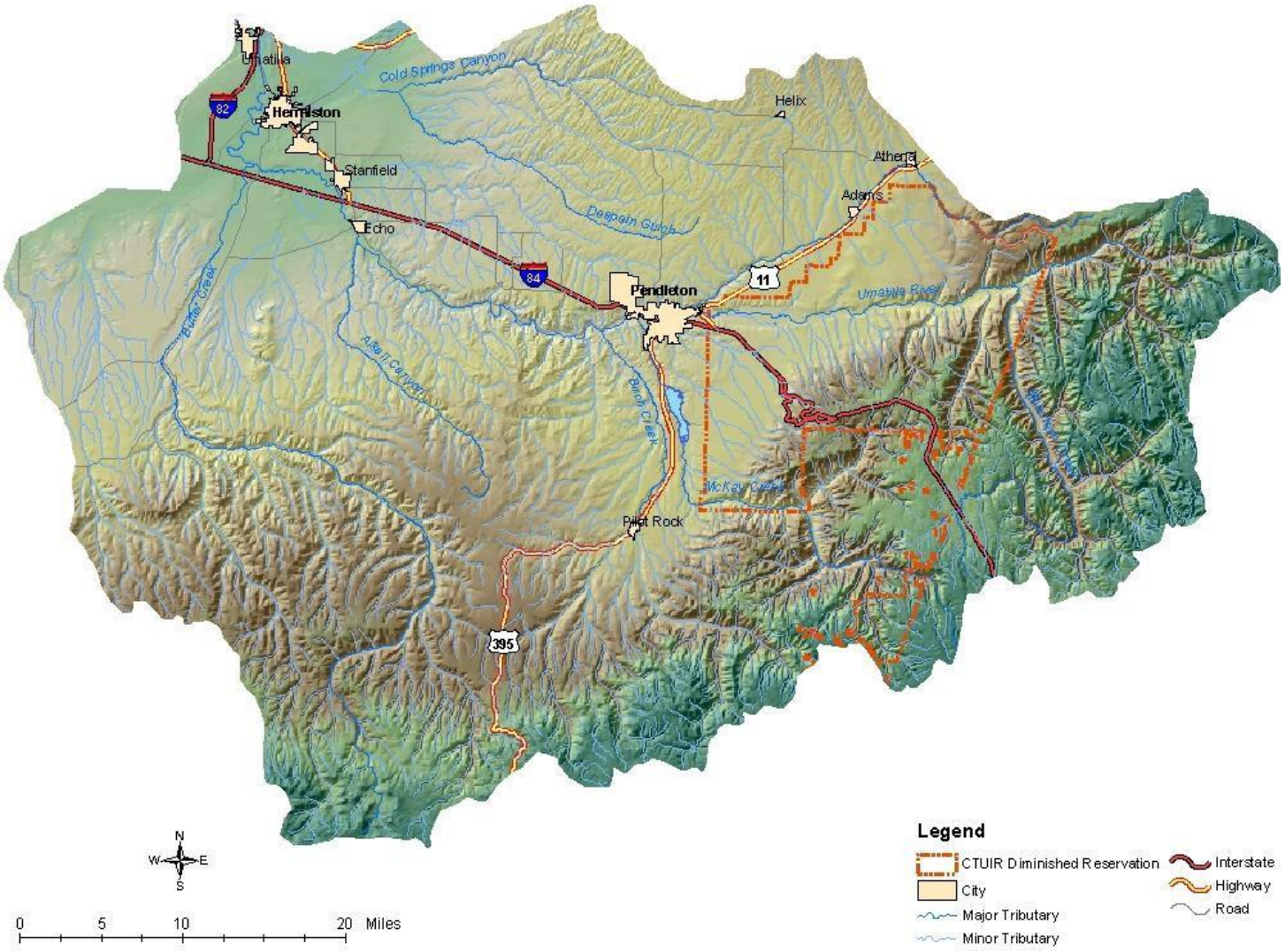


Figure 1. Umatilla River Subbasin

Our primary area of focus for restoration and monitoring work in FY 2020 was Meacham Creek, Wildhorse Creek, Birch Creek and mainstem Umatilla River (Figure 2).

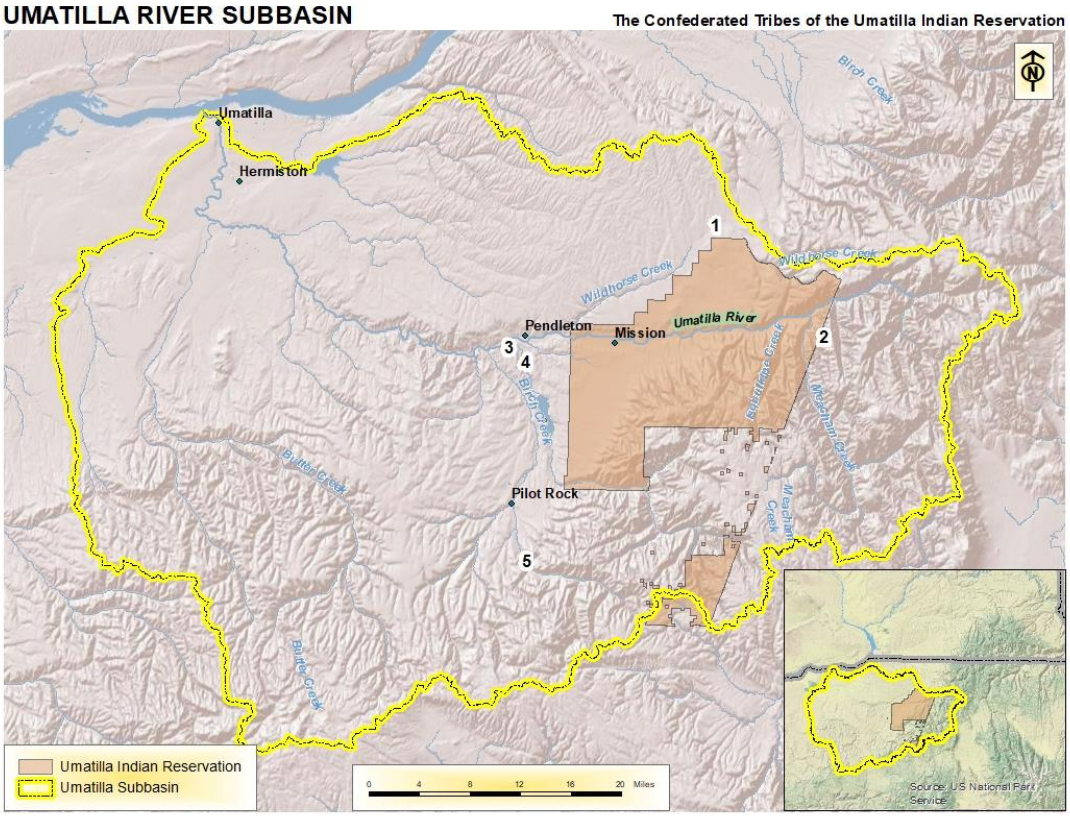


Figure 2. Umatilla River Basin FY 2020 UBAFHP Project Sites

1: Wildhorse Creek Fish Passage Rectification (Athena Bridge): Project maintenance, flood damage mitigation, and site planting.

2: Meacham Creek (Bonifer Reach): Constructed nearly 1 mile of full floodplain restoration on Meacham Creek (Project Area 1).

3: UmaBirch CE/Design: Completed conservation easement to protect over 360 acres of floodplain at the confluence of the Umatilla River and Birch Creek. Concurrently developing a restoration design.

3: UmaBirch PA4 EC & Design: Worked to complete the design and begin implementation of this project area.

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

Umatilla Basin Assessment: Gathered data and selected contractor. This will cover the entire Umatilla Basin, as outlined in yellow above.

COMPLETED WORK BY WORK ELEMENT

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 96 (CY 2020)

Work Element A: 119. Manage and Administer Projects

Work Element Title: Manage and Administer Project
Milestone Deliverable: Effective implementation management and timely contract administration

A. Evaluate current workload and monitor implementation progress.
B. Develop work plan consistent with expected budget availability and potential tasks or projects.
C. Integrate and manage the planning, permitting, environmental compliance, and coordinated implementation of contract actions.

This work element includes general administration of the CTUIR Umatilla Anadromous Fish Habitat Project (UAFHP). CTUIR staff managed and administered project activities in accomplishing work elements and milestones with associated costs.

Work Element B: 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 2020 projects:

- Meacham Creek – Bonifer Reach Floodplain Reconnection
- Mainstem Umatilla River – UmaBirch 60% design submittal, RGP6 Application, EA was written and published
- Wildhorse Creek – Athena Bridge Fish Passage Improvement (renewed permits)

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 FY2020. 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.

1) UBAFHP Environmental Compliance Documentation
2) ESA consultation with NMFS for FY 2020 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 G: 186; WE H: 186): CTUIR monitored and maintained existing easements and habitat improvement sites. Maintenance included vegetation watering and installing bioengineering treatments to stabilize habitat features.
- Maintain Vegetation (WE I: 198): Project activities included maintaining plants on NRCS CREP tracts and treating noxious weeds.
- Plant Vegetation (WE Q: 47): Project activities included planting in the newly constructed Meacham Creek Bonifer Reach project (RM 1.9-3.1) and in the previously constructed Meacham Creek Project Areas 2-4 (RM 3.2-5.7).
- Meacham Creek Construction (WE N: 29; WE O: 30; WE P: 180): CTUIR continued implementation of a nearly 4-mile reach of full floodplain restoration on Meacham Creek. Project activities included side channel construction, off-channel habitat construction, and large wood addition.

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

Cultural Resources protection and preservation compliance was ongoing during this contract period. The CTUIR Cultural Resources Protection Program delivered a final report to BPA in early 2020. As well as the projects listed above, ongoing projects will all require Cultural Resource Protection and Preservation monitoring during construction in 2021. The UmaBirch Floodplain project and West Birch projects will be ongoing into the next CY.

Work Element C: 114. Identify and Select Projects

Work Element Title: CTUIR Umatilla Subbasin Restoration Coordination
Milestone Deliverable: Develop or update prioritized Habitat Project list

CTUIR UBAFHP staff developed and annually updated habitat restoration and enhancement projects through coordination and planning with State, Federal and local partners, and private landowners consistent with the Subbasin Plan. This included participation with the UBWC and the Umatilla County SWCD. CTUIR completed a prioritized list of potential and final developed projects to be implemented contractually with BPA and other funding sources for the upcoming fiscal year and future year planning. Project development and planning were incorporated into this WE to assist in development of future funding packages. The CTUIR also initiated the Umatilla Mainstem Assessment and Action Plan during this contract period. It is anticipated that this document will tier to all of the documents listed below and build on those to focus on the mainstem habitat actions, prioritized by reach and fish species.

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).

Work Element D: 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 the Umatilla County Soil and Water Conservation District
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, 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. 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. This effort was made much more challenging because of the pandemic.

Work Element E: 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 whenever possible. This work was much more limited in scope this year, due to COVID-19. Most of the events that staff normally participate in were canceled after March. It was limited to giving presentations and participating in local and regional workshops, symposia, technical teams and/or conferences (training, project presentation, and memberships), and newspaper articles.

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: July 1 – December 31, 2020

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) Implementation Meacham – Bonifer Project Area 1 ; 2) Athena Bridge permitting and maintenance; 3) Maintain existing project locations and easements; 4) Planting; 5) Work on CE and project development for UmaBirch; 6) Complete quarterly and annual progress reports; and, 7) Monitor implemented projects.

Project Inputs:	Funding	2020 Budget	Permanent Staff	Staff Changes
	BPA	$2,192,097	2 Biologists; 4 Technicians	1 change in staff
	Staff: Richard Christian-Project Leader Bio III, Mikayla Kelly-Bio II, Randy Bonifer & Larry Allen - Technician II, Austin Samuels & Ian Sampson-Tech I			
	Collaborators: BPA, USFS, UBWC, ODFW, ODOT, OWEB, SWCD, NRCS, UPRR, EPA, USFWS, NOAA, Umatilla County, the City of Athena and private landowners.			

Outputs: (specific 6-mo task accomplishments)
- Fall planting (3,400 plants at Meacham & 1,025 at Wildhorse Creek)
- Completed materials and construction contracts for Meacham – Bonifer Project Area 1.
- Developed a 60% design for the UmaBirch Floodplain Reconnection Project Design.
- Continue design on the East Birch Floodplain Reconnection Project.
- Continue working on development of a Conservation Easement, planning and 90% design for the UmaBirch Floodplain Reconnection Project.
- Drafted RFP and selected contractor for Umatilla River Basin Assessment and Action Plan.
- Drafted RFP for Meacham Creek RM 10-11 Project

Outcomes: (broader results/changes from cumulative accomplishments)
- Continue to utilize the Action Plan for restoration of Birch Creek to develop 2 projects.
- Continue to develop partnerships with agencies and landowners for new future projects.
- Enhancement of floodplain and channel connectivity, channel function, fish habitat availability and use, and promoting vegetative recovery approximately 1 mile of Meacham Creek.
- Participated in multi-agency partnerships

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.


Wildhorse Creek Planting


Meacham PA 1 Levee Removal


PA 1 Jam Construction


PA 1 Fish Salvage

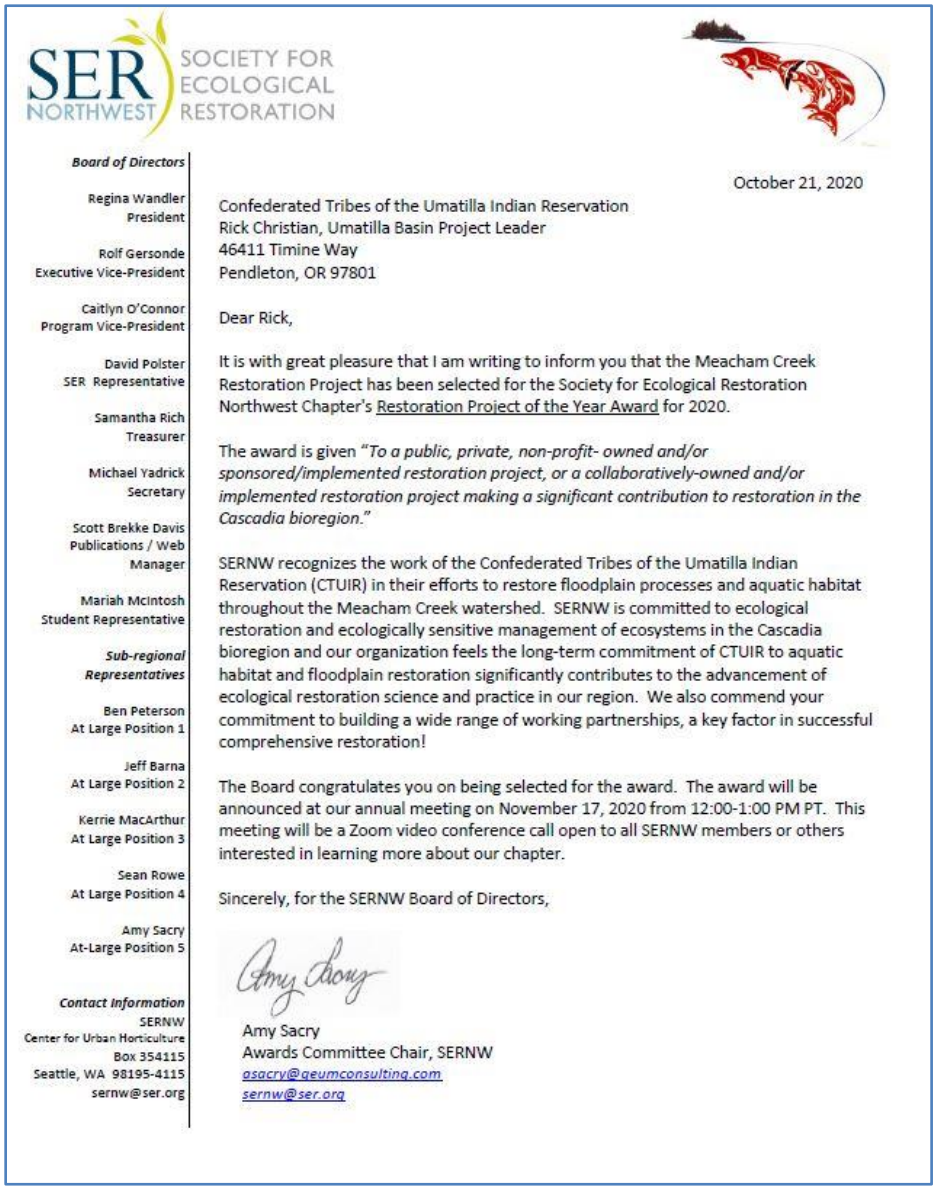
Figure 3. CTUIR semi-annual report for the Umatilla Subbasin Fish Habitat Restoration Project, July 1– December 31, 2020.

Project staff developed and fostered relationships with participating experts in related fields by attending training, professional workshops and working groups. This also helped staff gain professional advancement and improved project success through informative, instructional interactions. CTUIR UBAFHP and DNR Fisheries Habitat Program staff were able to attend a few professional conferences and workshops including:

River Restoration Northwest: The program manager was able to attend this training in February.

Oregon Chapter of the American Fisheries Society: The Project Leader was able to attend this annual meeting and make contact with a variety of different fisheries professionals.

Society for Ecological Restoration Award **2020 Restoration Project of the Year** – The Bonifer Reach Project received this prestigious award for the past work on this project reach. Rick Christian gave a verbal (virtual) presentation at their annual conference on this project. The award letter is contained to the right.



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October 21, 2020

Confederated Tribes of the Umatilla Indian Reservation
Rick Christian, Umatilla Basin Project Leader
46411 Timine Way
Pendleton, OR 97801

Dear Rick,

It is with great pleasure that I am writing to inform you that the Meacham Creek Restoration Project has been selected for the Society for Ecological Restoration Northwest Chapter's Restoration Project of the Year Award for 2020.

The award is given "*To a public, private, non-profit- owned and/or sponsored/implemented restoration project, or a collaboratively-owned and/or implemented restoration project making a significant contribution to restoration in the Cascadia bioregion.*"

SERNW recognizes the work of the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) in their efforts to restore floodplain processes and aquatic habitat throughout the Meacham Creek watershed. SERNW is committed to ecological restoration and ecologically sensitive management of ecosystems in the Cascadia bioregion and our organization feels the long-term commitment of CTUIR to aquatic habitat and floodplain restoration significantly contributes to the advancement of ecological restoration science and practice in our region. We also commend your commitment to building a wide range of working partnerships, a key factor in successful comprehensive restoration!

The Board congratulates you on being selected for the award. The award will be announced at our annual meeting on November 17, 2020 from 12:00-1:00 PM PT. This meeting will be a Zoom video conference call open to all SERNW members or others interested in learning more about our chapter.

Sincerely, for the SERNW Board of Directors,

Amy Sacry
Awards Committee Chair, SERNW
asacry@geumconsulting.com
sernw@ser.org

Work Element F: 122. Provide Technical Review and Recommendation

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. Other projects that were reviewed included relevant public project planning, 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.

Of special note this year was the amount of review that was provided for the UPRR projects that occurred in Meacham canyon this spring/summer. An enormous amount of work was completed by UPRR, following the floods in February. CTUIR staff reviewed all projects that were proposed on tribal land, as well as providing construction oversight during implementation.

Work Element G: 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 4). 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.

This spring, the Umatilla Basin went through two historical flood events. These events caused severe damage to stream banks throughout Eastern Oregon. The recently constructed bank on Wildhorse Creek below the new 3rd Street dam lost significant material due to the close timing of the flood from construction and lack of well rooted vegetation and erosion control. CTUIR added material and fill, constructing the bank to the original design. Over 1,000 plants were planted in the bank along with grass seed to assist with any future erosion control.

Table 3. 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)
2019	Umatilla River	RM 48.2	Partial dam removed (juvenile and adult passage)
2019	Wildhorse Creek	RM 18.8	Passage rectified by removing concrete grade control structure and replacing bridge (Juvenile and adult passage)

Figure 4. Athena Bridge Fish passage project before and after construction

Work Element H: 186. Operate and Maintain Habitat/Passage/Structure

Work Element Title: Maintenance of Habitat Features Associated with Project Conservation Agreements
Milestone Deliverable: Maintenance of Land or Structures Associated with Conservation Agreements

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

The purpose of these Conservation Agreements 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.

Of special note here is the repair of the Wildhorse Fish Passage Project that was completed last year. Three months after the project was completed, Wildhorse Creek sustained about a 200-year flow event, followed three months later by a 100-year event. These two events washed out the bankfull bench that was previously constructed. This was rebuilt during the current contract year and the bank was reseeded and planted. The project planted about 325 rooted plants and 600 sedge/rush plugs.

Work Element I: 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 2020 included the monitoring and maintenance of 16 conservation agreements on numerous individual landowner properties. Watering, weeding and maintenance methods for each Conservation Agreement 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 partnered with Umatilla County and the Forest service to spray/control noxious weeds on sites where chemical application is necessary. The team identified problem weeds, determined the appropriate herbicide and selected 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.

Due to COVID restrictions the UBAFHP were only able to complete 54 acres of mechanical and chemical weed treatment on current and completed project areas (Table 3), during the 2020 CY.

Table 4. Noxious weed treatments completed by location within the Umatilla River Basin, 2020

Stream Name	Latitude	Longitude	Acres Treated	Method	Species Targeted
Meacham Creek	45.63673	-118.35686	12	Mechanical, Chemical	*Potentilla recta, Centaurea* spp., *Echium vulgare, Rubus spp.*
Wildhorse Creek	45.80863	-118.49055	1	Mechanical	*Conium maculatum*
Umatilla River	45.66254	-118.99011	37.5	Mechanical	*Lepidium* spp., *Centaurea* spp.
	Total Acres Treated		**54.5**		

Work Element J: 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 led to the collection of new LiDAR data during the 2020 CY. This information was rolled into contract year 2020. We awarded a contract for the Assessment and Action Plan to Tetra Tech Inc. In contract year 2020 the UBAFHP also continued 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 K: 184. Install Fish Passage Structure

Work Element Title: West Birch Creek Fish Passage Project Implementation
Milestone Deliverable: The CTUIR will work collaboratively with the ODFW, UBWC and Umatilla County to design and replace an undersized culvert on Stanley Creek and an irrigation diversion dam on West Birch Creek.

The CTUIR tried to work with the UBWC to develop these projects. The UBWC was going to take the lead as the project manager on these projects. The projects never developed in large part due to the uncertainties associated with the COVID-19 pandemic. Therefore, the project was descoped.

Work Element L: 175. Produce Design and/or Specifications

Work Element Title: Meacham RM 10 Habitat Enhancement Project Design
Milestone Deliverable: Complete a design and implementation schedule for a floodplain reconnection project in Meacham Creek.

CTUIR continued to work collaboratively with the USAD-FS to develop the RFP for final designs. The RFP was advertised and a contractor selected to initiate the design during the next CY. The design will include, EC compliance and construction oversight. Part of the delay in being able to implement this project was a result of COVID-19.

Work Element M: 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 2020, UAFHP staff continued to create a design and develop a formal conservation easement for restoration work on the UmaBirch property project established in 2017. The 60% design completed in March of 2020 identified actions taken to increase habitat and floodplain function and design them to a constructible implementation plan. The design will continue to be developed in close collaboration with the landowner, who has shown great interest in conservation and restoration on their property. Given the large scale of the project site, the designs were designed for implementation in phases, with each phase consisting of work feasible to complete in a single year. Phasing designs allows the CTUIR to be flexible in its restoration strategy at the site and plan projects for out years more easily.

The project was subsequently broken into 4 distinct project areas. The decision was made to carry Project Area 4 (PA4) forward first, as it was deemed to be the least complex. Due in part to COVID-19 causing a huge increase in time needed for each review, and in part to difficulties in coming to a consensus on the philosophical approach to the restoration strategy, the designs for PA4 have not progressed beyond 60%.

Work Element N: 29. Increase Aquatic and/or Floodplain Complexity

Work Element Title: Construction – Bonifer Floodplain Restoration and In-stream Enhancement – PA 1
Milestone Deliverable: Complete installation of 301 pieces of large wood, placement of 133 individual boulders, and install 29 engineered log jams.

CTUIR subcontracted construction services to complete installation of large wood structures in the Meacham Creek Bonifer Reach Project Areas. This project area involved 0.80 linear miles of Meacham Creek. A total of 301 logs were used in the project, including the construction of 35 log structures. The log jams required an additional 78 large boulders as ballast. The proposed implementation schedule is outlined in Table 5, below.

Table 5. 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

Work Element O: 30. Realign, Connect, and/or Create Channel

Work Element Title: Construction – Bonifer Floodplain Restoration and In-stream Enhancement – PA 1
Milestone Deliverable: Complete construction of secondary channel

CTUIR subcontracted construction services to complete construction of secondary pilot channels in the Meacham Creek

Bonifer Reach Project Area 1 as part of the Bonifer Reach Floodplain Reconnection and In-Stream Enhancement Project. By treating 1,320 feet of new side channel, the project was able to reconnect 7,656 feet of channel, with the balance being abandoned floodplain channels that were reconnected.

Work Element P: 180. Enhance Floodplain/Remove, Modify, Breach Dike

Work Element Title: Construction - Bonifer Floodplain Restoration and In-stream Enhancement: PA-1
Milestone Deliverable: Remove Confining Features to re-establish floodplain connection and historic flow paths and channel function.

CTUIR subcontracted construction services to complete the construction of floodplain reconnection in the Meacham Creek Bonifer Reach Project Area 1 as part of the Bonifer Reach Floodplain Reconnection and In-Stream Enhancement Project. By removing 8 confining features, the project was able to move 9,100 cubic yards of material to allow historic flow paths and channel function.

Work Element Q: 47. Plant Vegetation

Work Element Title: Meacham Creek Floodplain Restoration and In-Stream Enhancement, RM's 1.9-6.1 Planting
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 Agreement areas. In 2020, the UBAFHP completed a fall planting effort within the previously implemented Meacham Creek Floodplain Restoration and In-stream Enhancement Project. The fall 2020 planting effort included installing 3,400 containerized, native plants in Meacham Creek.

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.

Figure 5. CTUIR planting native vegetation at the Meacham Creek Project Site (Left) and the Athena Bridge Passage Project at Wildhorse Creek (Right).

Work Element R: 29. Increase Aquatic and/or Floodplain Complexity

Work Element Title: Construction – East Birch Creek Floodplain Reconnection
Milestone Deliverable: Complete installation of 15 logjam structures and 85 boulder structures to increase floodplain complexity.

Under the previous contract, a design was initiated to reconnect the floodplain through this 0.8 mile reach. As mentioned in Work Element U, this project is still in the design stage. A completely new RRT in 2019 required increased engagement and slower progress to ensure that all parties were properly informed on the project and comfortable moving forward. Implementation is expected to begin in contract year 2020, with the design and implementation plan anticipated to be completed in early 2020. There were some discussions about potentially buying the property from the current owner. This will be fully explored during the next contract period, as it would change the project parameters. Due to COVID-19 and the flooding events of this spring, the project was descoped.

Work Element S: 30. Realign, Connect, and/or Create Channel

Work Element Title: Construction – East Birch Creek Floodplain Reconnection
Milestone Deliverable: Completed channel construction.

Under the previous contract, a design was initiated to reconnect the floodplain through this 0.8 mile reach. As mentioned in Work Element U, this project is still in the design stage. A completely new RRT in 2019 required increased engagement and slower progress to ensure that all parties were properly informed on the project and comfortable moving forward. Due to COVID-19 and the flooding events of this spring, the project was descoped.

Work Element T: 180. Enhance Floodplain/Remove, Modify, Breach Dike

Work Element Title: Construction – East Birch Creek Floodplain Reconnection
Milestone Deliverable: Remove Confining Features to re-establish floodplain connection and historic flow paths and channel function.

Due to COVID-19 and the flooding events of this spring, the project was descoped.

Work Element U: 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 2020 contract year to advance this project to the potential purchase of most of the floodplain property and the execution of a conservation easement on the remaining floodplain portion of the property. The UBAFHP has been working closely with the landowner, other CTUIR projects, the UBWC, and Western Rivers Conservancy to determine the scope and terms of the purchase and easement. Over the course of this contract year, the CTUIR held several coordination meetings to discuss next steps and coordination with all parties. An appraisal was completed during this CY. While progress was made, the deliverable for the Work Element was not fully met in this contract year. However, the landowner and the CTUIR remain very motivated to complete the purchase and easement.

Work Element J: 115. Produce Inventory or Assessment
Work Element Title: New CCR 44552 Upper Umatilla River LiDAR Acquisition
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 2020. Data collected included vegetation surveys from 15 previously 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.

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 6**). This list is still being utilized for weed treatment and prioritization. It is anticipated that this will need to be updated during the 2021 CY.

Table 6. 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 2020 contract year. Photo points were conducted in the spring and fall of 2020 and uploaded to the UBAFHP internal photo point data depository (Figure 6).

Figure 6. Before (Spring 2020) and after (Fall 2020) photos of the Meacham Creek Floodplain Restoration and In-stream Enhancement Project Area 1 taken at photo point monitoring locations.

Work Element U: 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 2020 contract year to advance this project to the potential purchase of most of the floodplain property and the execution of a conservation easement on the remaining floodplain portion of the property. The UBAFHP has been working closely with the landowner, other CTUIR projects, the UBWC, and Western Rivers Conservancy to determine the scope and terms of the purchase and easement. Over the

course of this contract year, the CTUIR held several coordination meetings to discuss next steps and coordination with all parties. An appraisal was completed during this CY. While progress was made, the deliverable for the Work Element was not fully met in this contract year. However, the landowner and the CTUIR remain very motivated to complete the purchase and easement.

Work Element V: 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 (2/1/2020 - 6/30/2020)
July-September (7/1/2020 - 9/30/2020)
October-December (10/1/2020 - 12/31/2020)
Final January (1/1/2021 - 1/31/2021)

The BPA Contracting Officer Representative (COR) 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 W: 132. Produce (Annual) Progress Report

Work Element Title: Produce Annual Progress Report CY20 (Jan. 1, 2020, thru Dec. 31, 2020)
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 CY2020 technical report
G. Interagency/tribal review
H. Confirm BPA posted received

The CY2020 BPA Annual Progress Report was completed and was uploaded to BPA through Pisces in the winter of 2020.

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 7. 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.

OBSTACLES AND LESSONS LEARNED

One of the largest obstacles to implementation during almost this reporting period was the worldwide pandemic. This pandemic created multiple challenges to communication, implementation and staff daily activities. Throughout this period, project staff have adapted and become much more adept at communicating via virtual means (e.g. Microsoft Teams, Zoom, and etc.). This has resulted in increased efficiencies in some cases and a decrease in other cases.

Overcoming the COVID-19 issues as best as possible, 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.

There were some issues during the implementation of the West Birch Fish Passage Projects this year. The UBAFHP did implement the lessons learned from last year by outlining the roles of each organization at the onset of the project. The project also clearly identified the project goals, timelines and partner responsibilities at the beginning of the project. Due to partner communications and COVID-19 obstacles, communications were not maintained throughout the summer. Therefore, the partnering organization wasn't able to fulfill their obligations to complete the project during this reporting period

Another issue that was unable to be overcome during this contract year related to navigating through the HIP process for the UmaBirch Project. The UBAFHP completed the 60% design for the project by March, 2020. To date the UBAFHP staff have accommodated the Restoration Review Team's (RRT) additional requests and needs in order to reach a group consensus to move the project forward. At this time it isn't clear how to move this project forward, if it will move forward at all, or how this can be overcome in the future. BPA has also assumed more of a project sponsor role than ever before, which has created major issues in developing designs. In this CY this led the UmaBirch Project reaching this impasse, as BPA staff simply disagreed with the Project Sponsor's approach to the project, even though the proposed approach exceeds all stated project objectives. The Project Sponsor has documented that they have met all HIP IV Conservation Measures, as well as providing all of the design analysis results to support this approach.

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 differences in stakeholder priorities since the design began in CY2018. The design firm and UBAFHP staff have been attempting to balance floodplain connection, fisheries benefit, and the concerns of the landowner. The increased time and effort put into landowner engagement and negotiation has led to the design being delayed. At present, the design is at the 60% design phase. However, this system sustained a major flow event in May (over 100-years in magnitude), which completely changed the upstream portions of the project reach. This change led to the UBAFHP staff deciding to stop the design and resurvey the entire project area. An additional reason for not proceeding further with the design is that the CTUIR in partnership with Western Rivers Conservancy are working with the landowner to purchase the property in title fee status.

Increased engagement with a completely new staffed RRT also played a role in the delay of project designs for East Birch and Umabirch. Due to everyone on the team being new to the project, they required significant involvement to become familiar with the design. In 2021, UBAFHP hopes to create a manageable and efficient communication plan with the RRT to ensure effective design processes in the future. In combination with the newly defined, written process discussed above, this would go a long way to preventing future miscommunications.

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. This was discussed in more detail in the 2019 Annual Report. However, in this reporting period the UBAFHP has continued to incorporate those recommendations into the annual planting plan. The species list 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. During this CY that has led to working on an aquatic obligate species list of First Foods plants to incorporate into the UmaBirch wetlands that will be constructed.

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 greater and more aggressive floodplain topography creation to help increase plating survival and natural vegetative regeneration. The benefits of this methodology were described in the 2019 Annual Report.

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. 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, whenever possible. Monitoring of out-migrating 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 of out-migrating steelhead 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 out-migrating smolts habitat to rear over summer and winter, refuge from high flow events, cover from predators, and increased water quality.

In order to address the HIP and RRT issue outlined above in the Lessons Learned Section, the UBAFHP staff have several suggestions. The UBAFHP encourages more open, honest and direct communications from the RRT group to avoid additional misunderstandings in the future. The RRT also should to adhere more directly with the outlined process in HIP IV. Deviations from this only lead to frustration and confusion. If there is only one technical approach to new channel construction in incised systems ("plug and pond"), BPA needs to clearly articulate that in writing to all sponsors within the Columbia Basin. A new process should be clearly articulated in writing about what the RRT's actual defined role is and how project sponsors should interact within that framework in order to navigate this process more

seamlessly. For example, the HIP IV document was officially signed by all parties during this contract period, but BPA did not inform project sponsors of this.

Other alternatives include avoiding new channel construction in floodplain reconnection projects, which would avoid the "plug and pond" issue entirely. It is likely that this would not yield as great of an ecological/biological benefit, at least initially. Another option is to use Aquatic Restoration Biological Opinion II (ARBO II) whenever possible on projects as the programmatic consultation mechanism. Project sponsors could also simply write a project Biological Assessment for each of these projects, rather than utilizing the very arduous HIP/RRT process altogether to obtain ESA concurrence.

Utilizing a River Vision (Jones et al 2008) approach, the staff have developed an implementation approach to allow the water to do as much work for us as possible. Not only does this align perfectly with a process-based approach, it also minimizes impacts to the resources in the short term. This approach, specific to constructing new side channels or main channels, relies on the premise that they are constructed in the fall and allowed to overwinter. These channels are roughly excavated, to allow the water to activate the newly constructed section at a designed flow elevation (e.g. typically about 1.2 year flow return interval). Channel dimensions are not constructed to exact widths or depths, as the water will be allowed to scour the channel to the appropriate dimensions. Also the project strives to only excavate the minimum amount necessary to reconnect relic channels. This accomplishes the following ecological/biological benefits:

- There is less excavation, as the water is allowed to more clearly define its own channel geomorphology, which reduces overall project costs;
- Allowing the water to define its own course more directly also likely contributes to longer term stability, as the water is creating its own channel;
- This allows the newly disturbed soil to gain weathering, which reduces the amount of turbidity produced;
- The newly disturbed soil is washed into place by hand. This turbid water is pumped into the floodplain and allowed to slowly re-infiltrate slowly, which further reduces future turbidity;
- When the turbidity is realized in the system, it is at a time of the year when there is substantially less stress to the fish that are present:
    - Water temperatures are lower (i.e. there's less oxygen requirements on the fish);
    - The turbidity presumably settles out along the length of newly reconnected channel prior to reaching areas occupied by fish;
    - This occurs at a time of the year when there's more water, which allows fish more refugia areas to avoid any potential turbidity stressors; and,
- This approach minimizes the need for fish salvage, and thus, reduces the incidental take of listed and resident fish.

Of course, COVID-19 created a situation that forced project staff to adapt to a changed work environment. Staff that were able embraced technology and began working from home, had all meetings virtually and gave pre-bid tours virtually. This created several logistical challenges, as well as increased efficiencies in some instances. CTUIR staff have adapted to this via new software, added flexibility in utilizing work computers at home and more flexible work schedules. COVID-19 continues to present challenges that staff will continue to overcome.

SUMMARY AND CONCLUSIONS

The CTUIR Habitat Program utilizes a process based approach to restoration activities, following the CTUIR River Vision (Jones et al 2008, Upland Vision (Endress et al 2019) and First Foods policies (Quaempts et al 2018). These guiding documents provide the framework in which our program develops, designs, implements and monitors restoration activities and projects. Following this approach, project staff have developed a more holistic way to meet project

objectives, provide the system with tools to place it on a recovery trajectory and allow the water to do some to the work for us.

In accordance with the 2006 NPCC solicitation outline, the CTUIR UBAFHP has 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. Table 8 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 include levee removal and or modification, floodplain and channel construction, in-stream and floodplain large wood 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, or conservation easements/land acquisition, on private properties for protection and enhancement of floodplain and riparian habitat investments. 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 through a debilitating pandemic. The CTUIR UBAFHP completed the final 0.8 miles of floodplain reconnection and in-stream enhancement in the Meacham Creek Bonifer Reach. The project included levee removal, relic channel reconnection, and large wood additions that will “jumpstart” natural floodplain processes and set the reach on a recovery trajectory. UBAFHP also rectified post-flood damage at the Athena Bridge passage project from 2019. This included replacing fill material lost in the flood and riparian planting to stabilize the bank. 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 riparian planting.

The CTUIR UBAFHP made progress on several design documents that will serve to inform projects in the long and near term future of the UBAFHP. The UBAFHP began the design process for a floodplain reconnection and in- stream enhancement project on Meacham Creek RM 10-11. UBAFHP made great strides on the Umatilla Basin Assessment and Action Plan, with the hope of beginning implementation early 2021. Design of the UmaBirch Project was met with setbacks in 2020, and the UBAFHP hopes to continue in a more efficient manner.

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 8. 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; 2007-2019.

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 Agreement 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 Agreements 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.
Meacham Creek Bonifer Reach Floodplain Reconnection and In-stream Enhancement –	Floodplain and channel improvement with channel creation and reconnection,	STS, CHS, BT, Pacific Lamprey		x	x	x	x	x	x	x	Treated 0.95 miles of Meacham Creek by creating and reconnecting 7,656 feet of primary and secondary channel

Project Area 2 (2019)	large wood placement, and riparian plantings										habitat, and installing 14 engineered logjams, 45 individual log structures, and 130 boulders
Reith Dam Removal (2019)	Fish passage rectification	STS, CHS, CHF, Coho, BT, Pacific Lamprey	**X**	**X**							Removed a longstanding partial barrier to upstream migration and opened miles of river to unimpeded travel for anadromous salmonids.
Athena Bridge Fish Passage Project (2019)	Fish passage rectification	STS, BT, Pacific Lamprey	**X**	**X**						**X**	Removed fish passage barrier, replaced bridge, placed rock structures and planted native riparian vegetation.
Meacham Creek Bonifer Reach Floodplain Reconnection and In-stream Enhancement – Project Area 1 (2020)	Floodplain and channel improvement with channel creation and reconnection, large wood placement, and riparian plantings	STS, CHS, BT, Pacific Lamprey		**X**	**X**	**X**	**X**	**X**	**X**	**X**	Treated 0.8 miles of Meacham Creek by creating and reconnecting 7,656 feet of primary and secondary channel habitat, and installing 13 engineered logjams, and 22 additional log structures

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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