UMATILLA RIVER BASIN ANADROMOUS FISH HABITAT

ENHANCEMENT PROJECT

1998 ANNUAL REPORT

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Project No. 87-100-01
Contract Number DE-BI79-87BP35768

November, 1999

ABSTRACT

The Umatilla River Basin Anadromous Fish Habitat Enhancement Project continued to identify impacted stream reaches in the upper Umatilla River Basin for habitat improvements during the 1998 project period. Public outreach efforts, biological and physical monitoring, and Geographic Information System databases assisted the project in fostering public cooperation, targeting habitat deficiencies and determining habitat recovery measures.

Habitat enhancement projects continued to be maintained on 33 private properties and two new projects implemented to improve anadromous fish habitat and natural fisheries production capabilities in the upper Umatilla River Basin. New project locations included lower Squaw Creek and a site on the upper Umatilla River. A total of 1,855 yards of fencing was constructed in the Squaw Creek Drainage to restrict vehicle access and better manage livestock distribution in flood plain and riparian areas. A 25 year Access, Implementation and Maintenance Agreement was secured to construct 142 yards of fencing adjacent to the upper Umatilla River to limit public access to a previously constructed chinook salmon holding pool. Approximately 13,000 native trees and shrubs were planted in existing Umatilla River, Meacham Creek, Wildhorse Creek, Greasewood Creek, West Fork of Greasewood Creek, Spring Hollow Creek and Buckaroo Creek project areas. Approximately 350 pounds of native bunch grasses and native grass/legume equivalents were seeded in existing Wildhorse Creek and Meacham Creek project areas. Four low-profile rock barbs were constructed and three existing barbs reconstructed in the lower Meacham Creek Project Area to prevent reoccurring stream bank erosion.

Monitoring continued to quantify short and long-term effects of habitat enhancements in the upper basin. Maximum, minimum and average daily stream temperatures were collected from June through September at 16 sites. Suspended sediment samples were obtained at three gage stations to arrive at daily sediment load estimates. A total of 18 aquatic macroinvertebrate samples were collected upstream, downstream and within the Mission Creek and Spring Hollow Creek project areas. Alkalinity, conductivity, sulfate, nitrate, ortho phosphate and pH parameters were tested in conjunction with aquatic macroinvertebrate sampling. Photographs were taken at 81 established photo points in all existing project areas to document habitat recovery.

A subcontract was developed with Washington State University to develop a Umatilla Basin Watershed Assessment. This endeavor will compile existing information, identify data gaps, determine habitat limiting factors and recommend actions to improve anadromous fisheries habitat. This watershed assessment document and working databases will be completed by fiscal year 2000 and made available to assist project personnel with sub-watershed prioritization of habitat needs.

ACKNOWLEDGMENTS

This project was funded by the Bonneville Power Administration. The Confederated Tribes of the Umatilla Indian Reservation wish to thank Charlie Craig and other Bonneville Power Administration personnel for their assistance. Thanks also to Kevin Jordan of the Umatilla County Farm Services Agency for assistance in attempting to merge U.S. Department of Agriculture conservation program efforts with proposed habitat enhancement projects, Hal Phillips, Umatilla County Public Works Director, for assistance in receiving clearances to construct fencing in the Squaw Creek County Road right-of-way, Darin Saul of Washington State University's Center for Environmental Education for coordinating watershed assessment efforts and assisting with native tree planting in the Wildhorse Creek Project Area, local Boyscout Troop 740 for planting native trees in the lower Meacham Creek Project Area, and Washington School fifth grade students for planting willow cuttings in the Spring Hollow Creek Project Area.

We would like to acknowledge cooperating landowners, Myrna Tovey, Fawn Williams and Nina Williams, who supported our efforts by providing their property for habitat enhancements during the project period.

Thanks also to Confederated Tribes of the Umatilla Indian Reservation staff, whose cooperation and contributions are evident in this report. Special thanks to Jed Volkman, Ken Hall, Randy Bonifer, Rob Quaempts, Bryson Bronson and Joe Berumen for long hours performing office duties, monitoring habitat enhancements, and implementing and maintaining improvements in project areas, to Scott O'Daniel for development of Geographic Information System stream habitat overlays, to Bill Quaempts for assistance with property corner searches and project area mapping, to Eric Quaempts for obtaining right-of-way clearances and assisting with fence contract specifications for Squaw Creek enhancements, to Julie Burke and Celeste Reeves for secretarial services and public relations preparations, to Gary James for support and guidance, and to Michelle Thompson for administration of this agreement.

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INTRODUCTION

The Umatilla River Basin Anadromous Fish Habitat Enhancement Project is funded under the Northwest Power Planning Council's Columbia River Basin Fish and Wildlife Program, Section 7.6 - 7.8 and targets the improvement of water quality and restoration of riparian areas, and specifically the holding, spawning and rearing habitats of anadromous salmonids. Funding of this project provides partial mitigation for losses of salmon and steelhead (*Oncorhynchus spp.*) populations in the Columbia River Basin from the construction and operation of hydroelectric dams. This Umatilla River Basin Anadromous Fish Habitat Enhancement Project Annual Report covers work accomplished by the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) from February 1, 1998 through January 31, 1999 as part of the Umatilla Basin Fisheries Restoration Program.

Significant effort and funds have been directed at restoration of anadromous fish in the Umatilla River Basin. This habitat project is one element in the comprehensive Umatilla Basin Fisheries Restoration Program which also includes artificial production, adult and juvenile passage improvements (ladders, screens, and trap and haul), instream flow enhancement, and monitoring and evaluation. Emphasis on watershed-wide habitat is needed for protection and enhancement of the natural production capabilities in the basin.

The primary problems continuing to impact water quality and limit available habitat and natural fisheries production capabilities in the Umatilla River Basin include: non-point source pollution due to poor cropland tillage and rotation practices, livestock overgrazing riparian and upland areas, over-appropriation of instream flows to irrigators, and stream channelization, constriction, and floodplain modification from agricultural and road/railroad building and maintenance activities.

The project focused on implementing cooperative instream and riparian habitat

improvements on private lands on the Umatilla Indian Reservation (hereafter referred to as Reservation) from April 1, 1988 to March 31, 1992. These efforts resulted in enhancement of 7.45 river miles on lower Boston Canyon Creek, lower Meacham Creek and the upper Umatilla River in the vicinity of Gibbon, Oregon. In 1993, the project shifted emphasis and began to identify upland and riparian watershed-wide causative factors limiting anadromous fisheries habitat and natural fisheries production capabilities throughout the Umatilla River Basin. Riparian and instream enhancement projects continued and were expanded to include tributaries outside of Reservation Boundaries. An additional 6.75 river miles of fisheries habitat improvement projects have been implemented on private properties, both on and off the Reservation, since shifting to a more comprehensive approach. Additional projects have included habitat enhancements in the upper Umatilla River, Meacham Creek, Mission Creek, Wildhorse Creek, Greasewood Creek, West Fork of Greasewood Creek, Spring Hollow Creek, Buckaroo Creek and Squaw Creek drainages. A total of 34 easements have been secured with private landowners since initial 1988 implementation efforts.

The project represents a continuation and evolution of existing efforts to improve natural production in the Umatilla River Basin. A watershed analysis is currently being developed to assist the project with prioritization of fisheries habitat needs and streamlining of project funds. Geographic Information System (GIS) data layers continue to assist the project in identification of habitat impacts and proposed management/restoration actions. The project complements fish passage and artificial production projects in the basin by integrating existing on-the-ground management programs on private and public lands with restoration activities to better justify expenditure of funds and time. Biological and physical surveys, summaries of existing survey information and follow up surveys are coordinated with CTUIR's Umatilla Basin Natural Production Monitoring and Evaluation (UBNPME) Project. Remedial measures will be implemented to reduce or eliminate detrimental land use activities where possible. Continued operations and maintenance of existing enhancement projects are included under this integrated approach.

The restoration of anadromous fisheries resources in the Umatilla River Basin has been a coordinated effort between CTUIR, state and federal agencies, and the local community. Examples include the Umatilla River Basin Anadromous Fish Habitat Enhancement Project, the Umatilla River Subbasin Fish Habitat Improvement Project, the Umatilla Basin Project, the Umatilla Basin Watershed Council, the Umatilla River Subbasin Salmon and Steelhead Production Plan and development of the Umatilla Hatchery and associated artificial production plans. This coordination has continued and expanded through scoping groups, comprised of local land owners, sportsman clubs, special interest groups and resource agencies, formed to identify issues and develop creative solutions to land use problems in the basin.

DESCRIPTION OF PROJECT AREAS

Project areas include portions of the Umatilla River between River Mile (RM) 78.5 and RM 82.7, the lower 4.5 miles of Meacham Creek, the lower 0.25 miles of Boston Canyon Creek, Wildhorse Creek between RM 9.5 to RM 10.5 and RM 11.5 to RM 12.5, the lower 1.5 miles of Greasewood Creek, the lower 0.25 miles of the West Fork of Greasewood Creek, Spring Hollow Creek between RM 3.4 and RM 4.0, Mission Creek between RM 2.9 and RM 3.3, Buckaroo Creek between RM 1.5 and RM 1.8, and Squaw Creek between RM 2.0 to 2.9 and RM 9.8 to 10.1. The CTUIR Habitat Enhancement Project Table on page 8 illustrates enhancement project locations, number of stream miles enhanced and number of landowner agreements secured in each drainage.

The Umatilla River has a drainage basin of 2,290 square miles and is a tributary to the Columbia River at RM 289. The principle aquifer is quaternary alluvium composed of unconsolidated sand and gravel, and some silt. Alluvium may reach a depth of up to 12 feet (Gonthier and Harris, 1977).

Meacham Creek is a major tributary to the Umatilla River, entering at RM 79. It drains approximately 165 square miles and produces 145,000 acre-feet annually at RM 5 near the top of the project area.

Boston Canyon Creek, entering Meacham Creek at RM 2.1, is the largest tributary to Meacham Creek within Reservation Boundaries. It contributes over 4,000 acre-feet annually to Meacham Creek from a drainage basin of approximately 5.5 square miles. It runs over and through large alluvial deposits as it enters the Meacham Creek floodplain.

Elevations in the Umatilla River, Meacham Creek and Boston Canyon Creek project areas

range from 1,760 to 2,000 feet above sea level, giving the area an unusually long growing season. Stream gradients average less than two percent. Flooding in project areas usually occurs in late winter and spring as a result of a rain on snow event. The flood peaks tend to be high and the volumes large, but the duration of damaging stages seldom last more than a day or two (U.S. Army Corps of Engineers, 1975).

The Umatilla River, Meacham Creek and Boston Canyon Creek project areas lie in a big game winter grazing zone as outlined by the CTUIR Land Development Code (1983). The primary land use is livestock grazing from May to November. Timber harvest is permissible under a conditional use permit. Major portions of these areas have been disconnected from their floodplains. Intensive land uses within floodplains have resulted in dramatic changes in waterway characteristics. Current and historical land use practices, including road and railroad construction and maintenance activities, overgrazing of riparian and upland areas and extensive timber harvests, have led to stream channelization, diking within floodplains, streambank riprapping and elimination of riparian vegetation. These practices have impacted fish habitat by altering natural channel form and function. Loss of stream channel meander from channelization and diking has accelerated runoff velocity due to an increase in surface gradient.

Wildhorse Creek is a 34 mile intermittent tributary to the Umatilla River, entering at RM 55 in the city of Pendleton, Oregon. It drains approximately 190 square miles and produces 14,000 acre-feet annually at the mouth. The highest point on the drainage divide of the basin is at an altitude of about 3,800 feet (Gonthier and Harris, 1977). A steep headwater topography of 15 to 35 percent contributes to rapid runoff rates. The slope in the lower and mid reaches varies from 0 to 3 percent (USDA, Soil Conservation Service, 1988).

Riparian and water storage capabilities in the upper Wildhorse Creek Watershed have been impacted from past timber harvest practices. Mid and low elevation lands are characterized by dryland crop farming, livestock grazing and residential use. Poor land use practices have significantly impacted upland vegetation communities, reduced riparian vegetation, degraded water quality, and diminished water table elevations and instream flows. Lack of conservation farming practices, such as strip cropping, terrace systems and grass waterways, are common problems in mid and lower watershed areas. Overgrazing of livestock and absence of pasture rotation plans have contributed to poor water quality and loss of flood plain function. The communities of Athena and Adams, county and state highway departments and the Union Pacific Railroad have constrained the mainstem stream channel, resulting in downcutting, loss of flood plain function and water quality impacts.

Greasewood Creek originates approximately 3.25 miles northwest of the town of Helix and flows southeast to enter Wildhorse Creek at RM 9.3, 0.5 miles downstream of

Rothrock Road. The West Fork of Greasewood Creek originates 1.75 miles southwest of Helix and enters mainstem Greasewood Creek 1.5 miles upstream of the Wildhorse Creek confluence. The Greasewood Creek Watershed drains approximately 20,452 acres over a 33 square mile area. Annual precipitation ranges from 12 to 15 inches per year with 70% of this moisture being obtained during October through April. Stream flows in mid and upper watershed areas are intermittent during summer and early fall months. However, in the lower watershed, springs provide year-round flows to the Greasewood Creek and West Fork Greasewood Creek project areas. A study conducted by the Natural Resource Conservation Service (NRCS) estimated the ten year peak flow in the upper 9,650 acres of the watershed (upstream of State Highway 334) at 143 cfs (Ray Wilson, personal communication). Elevations in the watershed range from 1,800 feet above sea level in the headwaters to 1,400 feet above sea level at the confluence with Wildhorse Creek. Soils throughout the drainage are predominantly Walla Walla Series, consisting of deep, well-drained silt loams on 1 to 40 percent slopes.

NRCS personnel estimate that 98% of landuse in the Greasewood Creek Watershed is comprised of cropland practices, primarily winter wheat/summer fallow operations (Ray Wilson, personal communication). The deep soils in this drainage are considered to be some of the most productive agricultural soils in the Umatilla River Basin. However, lack of terraces, grass waterways and contour farming practices, failure to return crop residue to the soil and farming in highway right-of-way areas results in extensive erosion of top soils from steep slopes into roadside ditches and waterways. NRCS staff estimate as much as 130 tons/acre of top soil erodes annually from cropland fields in the Greasewood Creek Watershed (Bob Adelman, personal communication).

Spring Hollow Creek originates in sections 29, 26 and 23, T.3N., R.35E. in the northeast corner of the Reservation at elevations ranging from 2,166 feet (West Fork headwaters) to approximately 2,755 feet (East Fork headwaters) and flows northwest to empty into Wildhorse Creek at RM 13.7 at a 1,560 foot elevation upstream of Adams. The Spring Hollow Creek Watershed has a drainage basin of 18 square miles and supplies 1,500 acre-feet annually at its confluence with Wildhorse Creek (Gonthier and Harris, 1977). This system is one of the few streams originating on the Reservation which deliver year-round stream flows. Due to significant spring seepage throughout the drainage, stream temperatures commonly average between 60 and 68 degrees fahrenheit in lower stream reaches during late summer (see stream temperature graph B-7. in Appendix B of this report). Annual precipitation in the upper watershed varies from 18 to 25 inches, while precipitation at lower elevations ranges between 5 and 20 inches annually (USDA, Soil Conservation Service, 1988).

Non-irrigated annual crop farming, typically small grain-pea rotations, is the primary land use in the Spring Hollow Creek Watershed. According to the Soil Survey of Umatilla County Area, Oregon, many of the properties located within this drainage classify as

"prime farmlands" because the silt loam soils present have the ability to sustain high crop yields with minimal inputs of energy and economic resources, and farming such soils results in the least damage to the environment (USDA, Soil Conservation Service, 1988). However, failure to leave crop residue, maintain tilth, chisel stubble, contour farm, and construct terraces, diversions and grass waterways in this drainage continue to result in extensive erosion of top soils during wet winter months. Grazing is the second most prevalent land use occurring in the watershed. The majority of grazing occurs within flood plain areas in lower stream reaches. High stocking rates, absence of pasture rotation plans and failure to restrict grazing during wet periods results in compaction of soils, poor tilth and excessive runoff.

Mission Creek originates in the western slope foothills of the Blue Mountain Range at an elevation of about 3,560 feet and flows northwesterly to empty into the Umatilla River at approximately RM 61.5 at an elevation of about 1,270 feet. The watershed is located entirely within Reservation Boundaries and has a total acreage of approximately 3,100 acres. The watershed is comprised of the following landuse practices: 1) 2,100 acres of rangeland, 2) 670 acres of winter wheat/summer fallow cropland, 3) 180 acres of Conservation Reserve Program (CRP) land, 4) 140 acres of abandoned cropland and 5) 10 acres of residential property. Average annual precipitation ranges from 16 to 24 inches with most of it falling between October and March as rain. Mission Creek is an intermittent stream with stream flows in the lower reaches and portions of the upper watershed going subsurface by mid-summer.

Conversion of historical, native plant communities to cropland and rangeland combined with realignment and shortening of lower stream channel reaches have altered the hydrologic capabilities of the Mission Creek Watershed, resulting in higher peak runoff rates during storm events, increased channel/streambank erosion and loss of fish and wildlife habitat. Limited portions of the mid watershed sustain year-round stream flows and provide excellent salmonid habitat. Lack of perennial stream flows and insufficient riparian cover are the primary factors limiting anadromous fisheries production in this system.

Buckaroo Creek is an intermittent stream, originating in the vicinity of Deadmans Pass in the Blue Mountains at an elevation of approximately 3,600 feet. This 15 square mile drainage area is located entirely within Reservation Boundaries and flows northeasterly to enter the Umatilla River at Thorn Hollow (approximately RM 73.2) at an elevation of about 1,600 feet. This tributary has an annual stream discharge of 4,000 acre-feet and an average daily discharge of 10 cfs at the mouth (Gonthier and Harris, 1977). Soils within the watershed tend to be a mixture of moderately deep, well drained silt loams and shallow, well drained Gwin cobbly silt loams. Forage tends to be limited by the high content of rock fragments and shallow depth to bedrock in the Gwin soils (USDA, Soil Conservation Service, 1988).

Livestock grazing is the primary land use in the Buckaroo Creek Watershed. This drainage is located within Bureau of Indian Affairs (BIA) Range Unit Six. This system continues to be overgrazed due to high stocking rates and extended grazing seasons. The CTUIR is currently coordinating with the BIA in development of a long-term range management plan to address these concerns. Historical land uses in the watershed included timber harvest and sheep grazing. Impacts from these long ago and current events include increased runoff rates, elevated stream temperatures (see stream temperature graphs B-14. and B-15. in Appendix B of this report), and diminished riparian and upland native vegetation communities.

The Squaw Creek Watershed is located approximately 18 miles east of Pendleton, Oregon. Squaw Creek originates in the western flank of the Blue Mountains in the vicinity of Emigrant Springs and flows approximately 12 miles northward to empty into the Umatilla River at approximately RM 76.7. Elevations range from approximately 4,200 feet in the headwaters to 1,670 feet at the mouth (U.S. Soil Conservation Service, 1991). This drainage has a total area of 24,198 acres with 18,398 acres (including approximately 608 acres owned by the Boise Cascade Corporation) lying within Reservation Boundaries. Approximately 1,800 acres lie within Umatilla National Forest Boundaries and an additional 4,000 acres lies on private property outside of Reservation Boundaries (including approximately 2,628 acres owned by the Boise Cascade Corporation).

Squaw Creek is an intermittent tributary with an annual stream discharge of 2,000 acre-feet (Gonthier and Harris, 1977). Average precipitation ranges from about 24 inches near the village of Meacham to 13 inches at the confluence with the Umatilla River (U.S. Soil Conservation Service, 1991). Stream gradient ranges from eight percent in the upper watershed to one percent at the mouth.

The riparian area has distinct storage and transport zones, but no well defined depositional zone, and presence of young, shrub seedlings is sparse. Soils within the watershed are highly variable. The stream bed on the lower five to six miles of Squaw Creek is transporting materials up to six inches in diameter, and the channel and stream banks are extremely unstable. Extensive areas of bed load and scour are apparent (U.S. Soil Conservation Service, 1991).

Land use practices in the Squaw Creek Watershed have primarily consisted of seasonal (May 1 through October 1) livestock grazing and timber harvest. This drainage is popular for recreational and subsistence hunting, and emphasis of these activities will likely increase with recent tribal land acquisitions.

A map of the Umatilla River, Meacham Creek, Boston Canyon Creek, Wildhorse Creek, Greasewood Creek, West Fork of Greasewood Creek, Spring Hollow Creek, Mission Creek,

Buckaroo Creek and Squaw Creek project areas is illustrated in Figure 1 on page 7.

METHODS AND MATERIALS

Objective I. <u>Maintain and Continue Implementation of Habitat Enhancement Projects throughout the Umatilla River Watershed.</u>

1. ..... Pre-construction Preparation:

a.....<u>Assess Maintenance Needs</u>

The physical condition of habitat improvements are annually evaluated in existing project areas, following spring high flow events, to determine effectiveness and prescribe any maintenance to occur during the project funding period.

b.....<u>Project Cost Share</u>

Cost share funds are obtained and combined with Bonneville Power Administration (BPA) funds for financial assistance. These efforts effectively forge partnerships between resource agencies and the public and allow BPA funds to go further.

c. .....Clearances and Land Owner Agreements

Various clearances and land owner agreements must be obtained before CTUIR can initiate habitat improvements on private properties.

The BIA requires a land survey of designated project area boundaries and the acquisition of right-of-way agreements on private-owned, Indian Allotments (trust lands), prior to pursual of riparian easements.

Riparian easements restrict landowners from certain land use activities, such as grazing, removal of vegetation and use of weed or insect control measures, within enhanced riparian corridor areas. The term of the agreements is generally 15 years, and the landowner accepts the costs of all habitat improvements and CTUIR's maintenance of these improvements as consideration for participating in project recovery efforts. An attempt is made to address landowner needs (such as livestock water gaps, stream crossing sites, etc.) and incorporate these needs into the final agreement. Riparian easements protect habitat improvements and ensure an early recovery period within project areas.

Other necessary clearances may include obtainment of permits from Umatilla County to construct habitat improvements within county road right-of-way areas or burning permits to burn noxious weeds within existing project areas. Considerable effort and coordination is required to secure clearances and land owner agreements.

d. .....Fill and Removal Permits

Instream work activities on the Reservation require a CTUIR Tribal Stream Zone Alteration Permit and a U.S. Army Corps of Engineer's (COE) 404 Fill/Removal Permit. Instream work activities off of the Reservation generally require a General Authorization for Fish Habitat Enhancement Permit from the Oregon Division of State Lands (ODSL) in conjunction with a COE 404 Fill/Removal Permit. Applications for these permits should be completed and returned to the respective agencies a minimum of 90 days prior to anticipated instream work. Permitted instream work activities in the Umatilla River Basin are restricted to specific instream work periods. These instream work periods are based upon when migrating and spawning salmonids are least likely to be impacted by fill and removal activities. Work windows vary throughout the basin.

The Columbia River population of bull trout (*Salvelinus confluentus*) are listed as threatened species under the federal Endangered Species Act (ESA). Any proposed instream work activities in areas within the Columbia Basin (including the Umatilla Basin), currently supporting bull trout or providing critical habitat for bull trout,

require ESA, Section 7 consultation. Upon receiving a completed 404 Fill/Removal permit application, COE initiates Section 7 consultation proceedings with the appropriate federal agency. The U.S. Fish and Wildlife Service (USFWS) is the agency COE consults for potential resident species (such as bull trout) impacts. Instream work in critical bull trout habitat areas generally requires the project proponent to develop a Biological Assessment (BA) to determine the extent of impact, if any, from proposed habitat enhancements. The BA is reviewed by the USFWS during consultation proceedings and assists in determining if an instream project will occur, as proposed, or if modification is necessary to limit potential impacts. Consultation proceedings can considerably delay obtainment of instream permits.

e.....Cultural/Archeological Monitoring

The project coordinates with CTUIR's Cultural Resource Staff at proposed habitat enhancement sites involving ground disturbance (high tensile fence construction, structures keyed into streambanks, etc.), prior to project implementation to obtain cultural clearances. CTUIR's Cultural Resource Staff conduct file and literature searches, pedestrian surveys and/or archeological excavations to determine if cultural resources potentially eligible for inclusion to the National Register of Historic Places are present at proposed enhancement sites. Final reports, documenting their findings, are prepared and submitted to the BIA Umatilla Agency Real Property Management Office (for implementation efforts on the Reservation) and to the State Historic Preservation Office (for implementation efforts, both on and off the Reservation). All cultural clearances are obtained in compliance with Section 106 of the National Historic Preservation Act.

f. .....Design and Layout

Design and layout of proposed projects consists of determining the quantity and type of materials required to build or repair fence and instream structures, and develop heavy equipment access sites, haul roads and boulder storage sites. Proposed fence lines, instream structure sites and stream bank areas are staked and flagged to provide assistance to subcontractors.

g.....Contracts

Proposed implementation activities, requiring rental of operated heavy construction equipment or construction of high tensile smooth-wire fencing, are advertised and pre-bid tours provided to potential subcontractors. Subcontracts are awarded to the lowest bidder.

Prior to commencement of a subcontract, the subcontractor meets with CTUIR

Habitat Enhancement Project Personnel to discuss subcontract terms and work performance requirements, a work progress schedule, petroleum spill plans, and fire prevention and suppression plans. Notices to proceed are issued in writing to the subcontractor.

The subcontractor provides and maintains an inspection system acceptable to the CTUIR, covering the services under the subcontract. Complete records of all inspection work performed by the subcontractor are maintained and made available to the CTUIR during subcontract performance and for as long afterwards as the subcontract requires.

Equipment is inspected at the work site at the time of delivery. All equipment must be in good working condition, free from excessive leaks in hydraulic, fuel and power systems and clean enough to allow close inspection of these systems. Any equipment that does not meet subcontract specifications and requirements is rejected.

CTUIR Habitat Enhancement Project Personnel monitor the subcontractor's progress and photo document various stages of project implementation.

h.....Transect and Photo Point Establishment

Permanent transects are established at channel cross sections, prior to project implementation, to obtain baseline data regarding channel morphology and riparian vegetation. These measurements are repeated at three to five year intervals.

Permanent photo points are established prior to project implementation in conjunction with permanent transects. Standardized photos are taken each spring and autumn to provide a visual record of changes in channel morphology and riparian recovery.

2. ..... Maintain and Implement Habitat Enhancements:

a.....Structural Maintenance and Large Woody Debris Placement

Stream bank revetments, log and boulder weirs, log and boulder deflectors and sediment retention structures previously placed into the Umatilla River, Meacham Creek, Wildhorse Creek, Greasewood Creek, the West Fork of Greasewood Creek and Spring Hollow Creek project areas are repaired annually as needed. These structures are designed to increase instream habitat diversity, increase pool frequency, stabilize stream banks, and recruit and deposit sediments onto stream

banks to provide substrate for revegetation.

CTUIR Habitat Enhancement Project Personnel hilti-cable large woody debris to boulders and structures in project areas as needed. Placement of large woody debris in habitat enhancement project areas provides additional instream cover for salmonids and organic material for aquatic organisms to feed upon, and assists in rebuilding streambanks by slowing water velocities and capturing sediments.

b. .....Livestock Exclusion and Riparian Corridor Fencing

Fencing is constructed to exclude livestock from floodplain and riparian areas. Livestock exclusion provides stream bank protection and vegetative recovery in project areas.

Fencing, gates and cross section fences in existing project areas are repaired by project personnel as needed. Frequent fence inspections are conducted to ensure continued exclusion of livestock and to allow for continued riparian recovery inside of project areas.

c. .....Revegetation

The CTUIR Habitat Enhancement Project plants native riparian tree and shrub species along bank revetment structures, sediment retention structures and stream margins to improve bank stability, provide insect drop, shade streams and provide future recruitable large woody debris. Streambanks, terraces and disturbed sites within project areas are seeded with native grasses and/or close equivalents of native grasses to improve bank stability and to provide vertical surfaces to capture and retain sediments during high flow events.

Native plants are acclimated to the local climate, provide natural forage for wildlife and are much more resistant to the area's disease and insect problems. Studies have found that exotic species may out-compete and displace native riparian vegetation (Gordon et al., 1993). In addition to historical and present impacts of disturbance on riparian vegetation connectivity and diversity, plantings of exotic riparian vegetation (e.g. Russian olive) and the potential of hybrid poplar monocultures could disrupt riparian processes (Li, 1998). In Europe, plantations of exotic monocultures have replaced the natural diversity of riparian vegetation along stream banks of various watersheds (Cortes et al., 1994). This has changed the trophic structure of affected streams and influenced the input of terrestrial invertebrates that form the bulk of drifting prey for surface feeding fishes in headwater streams. The timing and quality of litter inputs from single species plantings or exotic species may differ greatly from diverse systems and lead to

reduced food resources for aquatic species (Li, 1998). There may also be concerns about pollution of the gene pool of existing plant populations when non-local plants are introduced to a site (Lambert et al., 1995).

Trees and shrubs planted in CTUIR Habitat Enhancement Project Areas are locally obtained, indigenous species grown out as bareroot stock or tublings at the CTUIR Native Plant Nursery. Native grass seed and close replicates of native grass seed are currently unavailable locally and continue to be purchased from Grassland West Seed Company in Clarkston, Washington.

d.....Noxious Weed Control

The CTUIR subcontracts Umatilla County Weed Control to chemically treat noxious weeds three times per year in existing project areas. Only the most invasive noxious weeds, identified as "A" Pest Weeds on Umatilla County's Noxious Weed List, are treated. All chemical applications are consistent with Oregon Revised Statute (ORS).570.505 and Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) Regulations.

When other noxious weed species are identified as detrimental to project success or are of special concern to the landowner, CTUIR Habitat Enhancement Project Personnel treat these weeds as needed.

3. ..... Post-implementation Final Review:

CTUIR Habitat Enhancement Project Personnel visit implementation sites immediately following final construction as indicated by the subcontractor. Subcontracted services are inspected to determine whether they conform with subcontract requirements. If subcontract services are not acceptable, CTUIR may (1) require the subcontractor to perform the services again in conformity with contract requirements, (2) reduce the contract price to reflect the reduced value of services performed, (3) hire another subcontractor to perform the services and charge the original subcontractor any cost incurred by the CTUIR, or (4) terminate the contract for default.

Objective II.....Continue Post-project Monitoring and Collect Baseline Data to Identify Habitat Limiting Factors and to Quantify Short and Long-Term Effects of Habitat Enhancement Activities in the Umatilla River Basin.

1. .....**Transect Measurements and Photo Point Monitoring:**

Transects and photo points established in the Umatilla River, Meacham Creek, Boston Canyon Creek, Wildhorse Creek, Greasewood Creek, West Fork of Greasewood Creek, Mission Creek, Spring Hollow Creek and Buckaroo Creek project areas during previous project periods continue to be monitored. Transect measurements are repeated at three to five year intervals following project implementation to measure changes in channel morphology and vegetative response to habitat enhancements.

Standardized photos are taken in spring and autumn to provide a visual record of changes in channel morphology and riparian recovery. A photo point notebook, containing 35 mm slides of annual changes, is maintained by the CTUIR Fisheries Habitat Enhancement Project.

2. ….. Fish Habitat Surveys:

The CTUIR UBNPME Staff conduct habitat surveys in conjunction with biological inventories in Umatilla River Basin Subwatersheds. These surveys assist in determining relations of anadromous fish habitat and abundance in different types of stream channels from a total basin perspective. CTUIR Habitat Enhancement Project Personnel utilize the summarized data to identify habitat deficient stream reaches within subwatersheds and attempt to focus habitat restoration efforts in these areas. When a recent habitat survey has not been conducted at a proposed enhancement site, project personnel physically survey the site prior to project implementation. All habitat surveys conducted by CTUIR are consistent with survey methodology developed by the Oregon Department of Fish and Wildlife (ODFW) Aquatic Inventory Program.

3. ….. Aquatic Macroinvertebrate Sampling:

Aquatic macroinvertebrate communities can reveal the quality of habitat components essential to aquatic fauna, such as water quality, substrate composition, riparian habitat quality, ecosystem stability, and past history (U.S. Bureau of Land Management, 1988). Aquatic macroinvertebrate communities are useful for monitoring biological integrity of streams since they function as integrators of pollution over time and are a direct measure of beneficial uses (aquatic life support) (Meyers, 1987). According to Schoen (1991), macroinvertebrates cover the whole range of pollution sensitivity, from highly sensitive stoneflies and mayflies down to very tolerant aquatic worms, so the presence or absence of particular taxonomic groups provides a good yardstick of pollution. Unlike fish, macroinvertebrates are relatively immobile. So, if macroinvertebrates are absent from their normal habitat, it is likely that pollution

drove them out. In a healthy stream, one should find a balanced population consisting of many different kinds of organisms. Adverse chemical or physical changes that disrupt any part of the stream ecosystem often decrease community diversity.

CTUIR Habitat Enhancement Project Personnel annually sample aquatic macroinvertebrate populations in the Mission Creek and Spring Hollow Creek drainages. Three 100 ft (30 m) stations were previously established in both drainages. Stations are located in stream reaches upstream (a control), within and downstream of habitat enhancement project areas. Three stratified, random macroinvertebrate samples are collected from riffles within each station with a Winget-Modified Surber Net to provide a measure of community representation and data for statistical analysis. The Winget-Modified Surber Net has been used as standard quantitative aquatic macroinvertebrate sampling equipment by the U.S. Forest Service (USFS), U.S. Bureau of Land Management (BLM) and other agencies since 1977. Compared to other sampling devices, used for collecting aquatic macroinvertebrates, the Winget-Modified Surber Net is one of the most versatile and reliable for sampling and the benthic communities collected can be used to assess existing current conditions in aquatic ecosystems (USFS Aquatic Ecosystem Lab, 1995).

Various physical habitat characteristics and water chemistry parameters are measured at all stations in conjunction with macroinvertebrate sampling. Physical habitat and water chemistry data are integrated with macroinvertebrate data to evaluate and bring the total biological analysis into perspective. Aquatic macroinvertebrate samples and field support data are sent to the BLM Aquatic Ecosystem Lab in Logan, Utah for analysis.

Macroinvertebrate data provides an additional element in comparatively detecting trends over time to assist in determining habitat enhancement effectiveness.

4. ….. Water Temperature Monitoring:

…….

Ryan Tempmentor and Ryan RTM 2000 thermographs are deployed within selected stream reaches (see Figure 3 on following page) in the upper Umatilla River Watershed. Several of these instruments are installed upstream, downstream and/or within project areas in the upper Umatilla River, Meacham Creek, Wildhorse Creek, Greasewood Creek, Spring Hollow Creek, Mission Creek, Buckaroo Creek and Squaw Creek to monitor the effectiveness of habitat improvements on water temperature cooling. The remaining thermographs are installed in Moonshine Creek, Coonskin Creek, Eagle Creek and at additional Umatilla River sites to obtain data on potential habitat limiting factors and existing

water quality conditions.

Thermographs are deployed in May. All instruments are recovered and downloaded into a computer program in October. The thermographs collect one temperature reading per hour. Maximum, minimum and average daily water temperatures are compiled in tabular form. Water temperatures are graphed during warmer months (June, July, August and September) to determine if temperatures are reached which could prove detrimental to salmonids.

Figure 3. Thermograph Locations 1998 Project Period
Location
1. .....Umatilla River - RM 56 (West Reservation Boundary)
2. .....Umatilla River - RM 76.5 (downstream from mouth of Squaw Creek)
3. .....Umatilla River - RM 81.7 (USGS Gage Station No. 14020000)
4. .....Wildhorse Creek - RM 0 (upstream from confluence with Umatilla River)
5. .....Wildhorse Creek - RM 9.5 (upstream from mouth of Greasewood Creek)
6. .....Wildhorse Creek - RM 26
7. .....Greasewood Creek - RM 0.1 (upstream of confluence with Wildhorse Creek)
8. .....Spring Hollow Creek - RM 3.5
9. .....Eagle Creek - RM 0.20 (at Umatilla County Road 685 Bridge)
10.....Mission Creek - RM 1.25 (upstream of Umatilla County Road 900 Bridge)
11.....Mission Creek - RM 3.7 (upstream of St. Andrew's Church)
12.....Mission Creek - RM 3.8 (downstream of stream forks)
13.....Moonshine Creek - RM 1.1 (upstream of Umatilla County Road 900 Bridge)
14.....Coonskin Creek - RM 0.20 (upstream of Umatilla County Road 900 Bridge)
15.....Buckaroo Creek - RM 2

16.....Little Buckaroo Creek - RM 0.04 (upstream from confluence with Buckaroo Creek)
17.....Squaw Creek - RM 2..
18.....Squaw Creek - RM 9 (at confluence with Little Squaw Creek)
19.....Meacham Creek - RM 2 (USGS Gage Station No. 14020300)
20.....Meacham Creek - RM 5.25 (East Reservation Boundary)

5. ..... Suspended Sediment Monitoring:

Three Isco Model 2700 Wastewater Samplers are deployed to obtain estimates of suspended sediments. These sampling sites include RM 81.7 Umatilla River, RM 56 Umatilla River and RM 2 Meacham Creek. Sampling sites are located at U.S. Geological Survey Gage Stations (see Figure 4 for gage station identification numbers) and near CTUIR thermographs.

Samples are taken year round at 6 hour intervals to create a composite daily sample. The samples are processed monthly by Umatilla National Forest Service Personnel at the USFS Lab in Pendleton, Oregon to determine Jackson Turbidity Units, conductivity, total suspended solids and total dissolved solids. CTUIR staff correlate suspended sediment data with stream flow data collected from the adjacent gage stations to arrive at daily sediment loads (tons/day) estimates.

Figure 4. .....Suspended Sediment Monitoring Sites 1998
Location
Umatilla River - RM 56 @ USGS Gage Station No. 14020850 (West Reservation Boundary)
Umatilla River - RM 81.7 @ USGS Gage Station No. 14020000 (East Reservation Boundary)
Meacham Creek - RM 2 @ USGS Gage Station No. 14020300

Objective III: ..... <u>Continue Watershed Planning, Scoping and Education Process by Identifying Problems and Developing Creative Solutions to Land Use Problems Impacting Fisheries Habitat in the Umatilla River Basin.</u>

1. ..... Watershed Analysis:

The CTUIR has subcontracted Washington State University (WSU) to conduct and complete a watershed analysis of the Umatilla River Basin by fiscal year 2000. A guiding document and upgradable, working databases are being developed to assist in subwatershed prioritization of anadromous fisheries habitat needs, recommendation of future habitat improvements and determination of cost effective treatments. A prioritization schedule for BPA funded fisheries habitat projects in the Umatilla Basin has not been developed since the Umatilla Drainage Fish Habitat Improvement Implementation Plan (ODFW, CTUIR and USFS, 1988) was produced in 1988. Many of the habitat enhancements recommended in that document are no longer biologically valid (instream hard structures, rip-rapping, etc). Furthermore, most of the habitat deficient areas, identified in the plan, have been addressed. Therefore, an updated watershed analysis is necessary to guide future project activities. The current watershed analysis will include historical watershed conditions, present-day watershed conditions, on-going land use practices, biological data, anadromous fish habitat limiting factors and identified data gaps.

2. ..... Community Outreach Efforts:

The project conducts local outreach efforts. Outreach activities are coordinated with land owners, special interest groups and resource agency personnel. These activities assist the project in obtaining public input and support, identifying detrimental land use practices, and developing site-specific habitat restoration and mitigation measures. Watershed improvement workshops, tours and presentations are provided to area residents, students, agency personnel and other interested individuals. Project personnel also attend training sessions to obtain information relevant to promoting public outreach efforts and associated habitat restoration projects.

RESULTS AND DISCUSSION

Objective I. Maintain and Continue Implementation of Habitat Enhancement

Projects throughout the Umatilla River Watershed.

1. ..... Pre-construction Preparation:

a.....Assess Maintenance Needs

The physical condition and structural integrity of improvements within the Umatilla River, Meacham Creek, Boston Canyon Creek, Wildhorse Creek, Greasewood Creek, West Fork of Greasewood Creek, Spring Hollow Creek, Mission Creek and Buckaroo Creek project areas were evaluated following spring 1998 high flow events. It was determined that rock would be purchased and an operated heavy equipment rental subcontract developed to construct four low-profile rock barbs and repair three existing rock barbs in the lower Meacham Creek Project Area. These structures were needed to prevent further stream bank erosion and loss of livestock exclusion fencing.

A landowner agreement was secured to construct 142 yards of barbed-wire fencing adjacent to the upper Umatilla River. The purpose of this fencing was to restrict public access from a previously constructed chinook salmon (*Oncorhynchus tshawytscha*) holding pool. Minor fence maintenance in project areas was accomplished by CTUIR Habitat Enhancement Project Personnel.

b.....Project Cost Share

A total of $39,523 in CTUIR funds was secured to cover personnel salary, fringe benefits and associated overhead expenses. BPA monies funded an additional $125,592 in salary, fringe benefits and overhead expense needs.

WSU provided approximately $30,000 in funds and in-kind services to conduct a Umatilla Basin Watershed Analysis throughout fiscal year 1998. These dollars were cost shared with $10,000 in BPA monies.

U.S. Environmental Protection Agency (EPA) 319 Grant Funding covered approximately $1335 in hydrological services for design and repair of low-profile rock barb structures in the lower Meacham Creek Project Area. BPA provided approximately $28,634 in additional funding for personnel services, rock and an operated equipment subcontract to implement this project.

BIA funds were cost shared with BPA project dollars to assist with noxious weed treatments on Reservation Indian Allotments in the Meacham Creek, Squaw Creek, Buckaroo Creek and Mission Creek project areas and to provide more comprehensive watershed-wide noxious weed eradication.

The WSU Environmental Learning Center, local Boy Scout Troop 740 and Washington School fifth grade students provided in-kind, tree planting services in the Wildhorse Creek, Spring Hollow Creek and Meacham Creek project areas. Native tree purchases were funded with BPA project monies.

A 1.8 million dollar mitigation trust fund is being finalized between the Union Pacific Railroad, ODFW and CTUIR. Once in place, this fund will provide future habitat enhancement cost share opportunities within the Meacham Creek Watershed. ....

c. .....Clearances and Land Owner Agreements

A BIA clearance was required to construct 142 yards of barbed-wire fencing adjacent to the upper Umatilla River on an Indian allotment owned by Mrs. Nina Williams, Mrs. Myrna Tovey and Ms. Fawn Williams. This property, located at RM 81.7 Umatilla River, was previously under a five year Riparian Lease with the CTUIR. The fencing was constructed to restrict public access from a previously constructed chinook salmon holding pool. A 25 year Access, Implementation and Maintenance Agreement was secured to protect this investment.

An Installation of Utilities on County and Public Roads Permit was obtained from the Umatilla County Board of Commissioners to construct 1,555 yards of high tensile smooth-wire fencing within the right-of-way of Umatilla County Road 917. This fencing was constructed to restrict vehicle access and manage livestock distribution in Squaw Creek flood plain and riparian areas, recently acquired with BPA funding.

A Umatilla County Burning Permit was acquired to implement a controlled burn within the Wildhorse Creek Project Area to remove extensive areas of noxious weeds.

d. .....Fill and Removal Permits

The CTUIR Habitat Enhancement Project Leader coordinated with the CTUIR Water Resources Program to renew a Tribal Stream Zone Alteration Permit for construction of four low-profile rock barbs and repair of three existing rock barbs in the lower Meacham Creek Project Area. The COE indicated that the proposed activities did not require permit renewal because the former permits (authorizing initial construction activities in Meacham Creek) had been previously permitted under a Nationwide Permit (NWP) 03, which covered maintenance activities.
No fill and removal permits were required from ODSL during the project period.

e.....Cultural/Archaeological Monitoring

No cultural resource clearances were required during the 1998 project period. The CTUIR Cultural Resources Staff had previously conducted pedestrian surveys in the Squaw Drainage and at the Williams/Tovey Property on the upper Umatilla River. It was determined that fence construction activities would not impact potential cultural resources at these sites.

f. .....Design and Layout

Riparian corridor fence lines and fence structure sites were staked in the Squaw Creek Drainage and at the Williams/Tovey Property on the upper Umatilla River to assist fence subcontractors in determining construction locations.

Rock barb locations were staked at new and existing structure sites within the lower Meacham Creek Project Area to provide site assistance to heavy equipment operators. A total of 790 yards of 18 to 36 inch diameter rock was delivered to the lower Meacham Creek Project Area to construct and repair instream rock barbs.

g.....Contracts

CTUIR Habitat Enhancement Project Personnel met with subcontractors, prior to proposed project implementations, to discuss subcontract terms and work performance requirements, work progress schedules, petroleum spill plans, and fire prevention and suppression plans.

A seven day operated heavy equipment rental subcontract was awarded to A. Key Excavating on September 5, 1998 to construct four low-profile rock barbs and repair three existing rock barbs in the lower Meacham Creek Project Area. The excavator was inspected at the project site by CTUIR Habitat Enhancement Project Personnel and determined to be in good working order, free from excessive leaks in hydraulic, fuel and power systems.

A fence construction subcontract was awarded to Borgerding Construction to construct: (1) 1,555 yards of five-strand, high tensile smooth-wire fenceline in the lower Squaw Creek Drainage, (2) 300 yards of four-strand, barbed-wire fenceline in the mid Squaw Creek Drainage, and (3) 142 yards of four-strand, barbed-wire fenceline at RM 81.7 Umatilla River.

Earth Conservation Corps - Salmon Corps at Umatilla were awarded a subcontract to plant 10,000 native shrubs and trees, place 2,000 tree mats and install 5,000 tree shelters in existing project areas.

Umatilla County Weed Control was subcontracted to eradicate noxious weeds within 13 stream miles of existing project areas (project funds were cost shared with BIA dollars).

h.....Transect and Photo Point Establishment

Prior to project implementation, photo points were established by CTUIR Wildlife Program Personnel at proposed Squaw Creek fencing sites. Slides were taken at these sites to document pre-project conditions. Slides will continue to be taken to provide a visual record of changes in riparian vegetative recovery.

Transects and photo points had been previously established at the Williams/Tovey Property on the upper Umatilla River in 1991 when a chinook salmon holding pool was created at this site. Physical measurements and photo documentation will continue to be monitored on this property.

2. ..... Maintain and Implement Habitat Enhancements:

a.....Structural Maintenance and Large Woody Debris Placement

Four low-profile rock barbs were constructed and three existing rock barbs repaired to prevent reoccurring stream bank erosion in the lower Meacham Creek Project Area. Four ponderosa pine trees with attached root wads were incorporated into this project to provide additional instream cover for juvenile and adult salmonids. CTUIR Habitat Enhancement Project Personnel hilti-cabled the trees to the barbs to ensure increased stability and long-term structural integrity. Continued migration of the stream channel at this site would have resulted in loss of riparian corridor fencing and an electrical power line.

Sediment retention structures in the Wildhorse Creek, Greasewood Creek, West Fork of Greasewood Creek and Spring Hollow Creek project areas were not impacted by 1997 - 1998 high flow events, and therefore, no annual maintenance was required. Sediments, deposited on streambanks upstream of the structures, will continue to be seeded with native grasses and planted with trees and shrubs as needed.

b.....Livestock Exclusion and Riparian Corridor Fencing

A 1,555 yard five-strand, high tensile smooth-wire fence was constructed between approximately RM 2.0 and RM 2.9 Squaw Creek, and a 300 yard four strand, barbed wire fence was built between approximately RM 9.8 and 10.1 Squaw

Creek. The purpose of these fences is to restrict vehicle and livestock access from flood plain and riparian corridor areas.

A 142 yard four-strand, barbed-wire fence was constructed at RM 81.7 Umatilla River to prevent public access to a previously constructed chinook salmon holding pool.

Minor fence repairs and water gap maintenance were performed by CTUIR Habitat Enhancement Project Personnel in the Umatilla River, Meacham Creek, Boston Canyon Creek, Mission Creek, Wildhorse Creek, Greasewood Creek, West Fork of Greasewood Creek, Spring Hollow Creek and Buckaroo Creek project areas.

c. .....Revegetation

The CTUIR subcontracted Earth Conservation Corps - Salmon Corps at Umatilla to plant 10,000 native bare root and tubling shrubs and trees in the Umatilla River, Meacham Creek, Wildhorse Creek, Greasewood Creek, West Fork of Greasewood Creek, Spring Hollow Creek and Buckaroo Creek project areas. The WSU Environmental Learning Center, local Boy Scout Troop 740, Washington School fifth grade students and CTUIR Habitat Enhancement Project Personnel planted an additional 3,000 native shrub and tree cuttings and bare root stock in the Meacham Creek, Wildhorse Creek, Greasewood Creek, West Fork of Greasewood Creek and Spring Hollow Creek project areas. Species planted included black cottonwood (*Populus trichocarpa*), redosier dogwood (*Cornus sericea*), woods rose (*Rosa woodsii*), black hawthorn (*Crataegus douglasii*), western serviceberry (*Amelanchier alnifolia*), common chokecherry (*Prunus virginiana*), ponderosa pine (*Pinus ponderosa*) and various willow species (*Salix spp.*).

Stream banks and terraces, disturbed by a controlled burn in the Wildhorse Creek Project Area and from stream bank stabilization activities in the lower Meacham Creek Project Area, were seeded with approximately 350 pounds of native bunch grasses or native grass/legume equivalents. The grass seed mixture used to seed riparian corridors and channel margins in the Wildhorse Creek Project Area was comprised of 40% western wheatgrass (*Agropyron smithii*), 25% sand dropseed (*Sporobolus cryptandrus*), 18% great basin wild rye (*Elymus cinereus*) and 17% sherman big bluegrass (*Poa ampla*). The grass seed mixture used to seed terraces and dry sites in the Wildhorse Creek Project Area included 36% Indian ricegrass (*Oryzopsis hymenoides*), 36% western wheatgrass, 12% great basin wild rye, 9% sand dropseed and 6% sherman big bluegrass. The grass/legume seed mixture used to seed riparian corridors and channel margins in the Meacham Creek Project Area contained 33% alsike clover (*Trifolium hybridum*), 17% sodar streambank wheatgrass (*Agropyrun riparium*), 17% sheep fescue (*Festuca ovina*), 17% cicer

milkvetch (*Astragalus cicer*) and 16% mountain brome (*Bromus marginatus*). The grass/legume seed mixture used to seed terraces and dry sites in the Meacham Creek Project Area included 23% yellow sweetclover (*Melilotus officinalis*), 16% bluebunch wheatgrass (*Agropyron spicatum*), 16% western wheatgrass, 15% mountain brome, 15% sheep fescue and 15% canby bluegrass (*Poa canbyi*). Seeding of native grasses and native grass equivalents assists with stream channel stabilization and sediment filtering during high flow periods.

d.....Noxious Weed Control

Umatilla County Weed Control chemically treated "A" Pest Weeds, as identified on Umatilla County's Noxious Weed List, once in the Meacham Creek Project Area and three times in all other existing project areas. Umatilla County Weed Control chemically treated a total of 13 stream miles of noxious weeds in project areas in 1998.

Project personnel implemented a controlled burn in the Wildhorse Creek Project Area in November 1998 in an attempt to eradicate noxious weeds, primarily Kochia (*Kochia scoparia*).

BIA - Umatilla Agency Range Management Staff coordinated with the project to address noxious weeds in upland watershed areas on the Reservation, including Meacham Creek, Squaw Creek, Buckar

oo Creek and Missio n Creek.

All chemical applications were consistent with ORS.570.505 and FIFRA Regulations.

3. ….. Post-implementation Final Review:

All subcontractors maintained a daily log and work progress schedule.

CTUIR Habitat Enhancement Project Personnel inspected rock barbs in the Meacham Creek Project Area immediately following construction and repair of these structures.

High tensile smooth-wire fences in the Squaw Creek and upper Umatilla River project areas were inspected to ensure that constructed fences were consistent with CTUIR specifications.

Umatilla County Weed Control provided an annual description and summary of all noxious weeds identified and treated in project areas. Project personnel coordinated closely with Umatilla County Weed Control and individual landowners to assure that nuisance weeds were adequately identified and eradicated.

Project personnel inspected native shrub and tree planting services contracted to Earth Conservation Corps - Salmon Corps at Umatilla.

All subcontract services implemented during the project period met subcontract requirements and were completed in a satisfactory and timely manner. CTUIR Habitat Enhancement Project Personnel photo documented various stages of project implementations.

Objective II……. <u>Continue Post-project Monitoring and Collect Baseline Data to Identify Habitat Limiting Factors and to Quantify Short and Long-Term Effects of Habitat Enhancement Activities in the Umatilla River Basin.</u>

1……. Transect Measurements and Photo Point Monitoring:

Stream channel cross sections were not scheduled to be measured at established transect sites in existing project areas. These cross sections will continue to be measured at three to five year intervals.

Slides were taken during spring and fall of 1998 at 81 existing photo point locations. Photo points are located within the Umatilla River, Meacham Creek, Boston Canyon Creek, Wildhorse Creek, Greasewood Creek, West Fork of Greasewood Creek, Spring Hollow Creek, Mission Creek and Buckaroo Creek project areas. Slides obtained, document project recovery and provide a visual record of annual changes within riparian and floodplain areas. Photographs indicate an upward, downward, or static trend in woody vegetation, streambank stability and cover (Meyers, 1987). However, initial vegetation "expression", obvious in photographs, should not be confused with vegetation "succession" required for stream ecosystem health (Elmore and Beschta, 1987).

2. ..... Fish Habitat Surveys:

No habitat surveys were conducted during the 1998 project period. Habitat surveys, which included the newly acquired Squaw Creek Project Area, were previously conducted by CTUIR Fisheries Staff in 1991 (CTUIR, 1993) and 1994 (CTUIR, 1995). A habitat survey of the upper Umatilla River, which encompassed the Williams/Tovey Property, was conducted by CTUIR UBNPME Staff during the summers of 1994 and 1995 (CTUIR, 1995 and CTUIR, UBNPME 1995 Annual Report, 1996). However, major flood events during the fall of 1995 and winter of 1996 likely altered pre-project physical characteristics, formerly identified in these habitat surveys.

3. ..... Aquatic Macroinvertebrate Sampling:

Macroinvertebrate surveys are an important tool in describing the condition and relative health of the aquatic ecosystem. Macroinvertebrates are components of the aquatic environment that provide a connecting link in the food chain between multicelled periphyton, detritus from terrestrial sources and the fish population. As a food source they are essential to the growth and production of fish and, because of their strict habitat requirements, are very useful as indicators of changes in aquatic habitat (USDA, Forest Service, 1985). The diet of immature chinook salmon has been shown to be 95% insects, and immature coho salmon consume about 99% insects (Johnson and Ringler, 1980). Steelhead diets are largely insect as well (Johnson and Ringler, 1980).

CTUIR Habitat Enhancement Project Personnel sampled aquatic macroinvertebrate populations in late October 1998 in the Spring Hollow Creek

and Mission Creek drainages. Three stratified, random macroinvertebrate samples were collected from riffles within each of three established stations (stations were located in stream reaches upstream (a control), within and downstream of habitat enhancement project areas) in each stream. Station three on Mission Creek, previously located upstream of Umatilla County Road 900, had to be shifted downstream approximately 55 to 80 yards (below the county road bridge) due to lack of stream flows. A total of nine macroinvertebrate samples were collected per stream.

Physical habitat characteristics collected in conjunction with aquatic macroinvertebrate surveys included: stream gradient, depth, velocity, discharge, substrate types and streambank vegetation. Water chemistry parameters measured at the time of the surveys included: stream temperature, alkalinity, specific conductance, pH, sulfate, nitrate nitrogen and ortho phosphate concentrations.

Aquatic macroinvertebrate samples and field support data were sent to the BLM Aquatic Ecosystem Lab in Logan, Utah for analysis. Data analysis indices included: taxa richness, sample abundance, Ephemeroptera, Plecoptera and Trichoptera (EPT) Taxa Richness and Abundance Summary, number of insect families, percent taxon or family dominance, Shannon Diversity Index, Simpson Diversity Index, Margalef Diversity Index, Menhinick Diversity Index, Hill's Evenness Index, USFS Community Tolerant Quotient/Biotic Condition Index, Hilsenhoff Biotic Index, functional feeding group measures, number of clinger taxa, number of long-lived taxa and relative taxon pollution tolerance. Data summaries can be viewed in Appendix A - Aquatic Macroinvertebrate Summary Data.

Data about macroinvertebrates is site-specific. Aquatic ecosystems cannot be managed on the basis of average values over large diverse areas (U.S. BLM, 1988). However, site-specific aquatic macroinverbrate data will assist in assessment and improvement of aquatic habitat and water quality within a given stream reach. Information obtained from aquatic macroinvertebrate surveys should prove useful in showing the effects of physical and water chemistry influences (i.e. habitat improvements) within project areas over time. This was the third year macroinvertebrates were sampled in the Spring Hollow Creek and Mission Creek project areas. Aquatic macroinvertebrate sampling will continue to be repeated annually at these sites.

4. .....Water Temperature Monitoring:

Temperatures in excess of 65 F impair growth and survival in salmonids (USFWS and National Marine Fisheries Service, 1981). Abnormally high temperature conditions during migration can contribute to outbreaks of disease among adult chinook salmon often resulting in pre-spawning mortality. Temperatures in excess

of 68 F have been shown to result in impairment of chinook salmon. High stream temperatures may also stress juvenile steelhead during warm summer months. Temperatures exceeding 73 F result in direct mortality to chinook salmon and steelhead (*Oncorhynchus mykiss*) (Bell, 1984).

Thermographs were deployed at 20 locations including: three sites on the Umatilla River, three sites on Wildhorse Creek, one site on Greasewood Creek, one site on Spring Hollow Creek, one site on Eagle Creek, three sites on Mission Creek, one site on Moonshine Creek, one site on Coonskin Creek, two sites in the Buckaroo Creek Watershed, two sites on Squaw Creek and two sites on Meacham Creek. (see Figure , page for river mile locations). Stream temperature data was summarized into tabular form, illustrating maximum, average and minimum daily celsius and fahrenheit temperatures during thermograph deployment periods. A binder containing water temperature tables is maintained in the CTUIR Habitat Enhancement Project Office. Summer (June, July, August and September) stream temperatures were graphed to determine if temperatures exceeded limits detrimental to anadromous salmonids. Graphed data can be viewed in Appendix B.

The thermograph at RM 56 Umatilla River was deployed incorrectly, resulting in loss of 1998 stream temperature data at this site. The instrument at RM 0.20 Eagle Creek was cabled to a bridge abutment on Umatilla County Road 685. The bridge was removed for replacement along with the attached thermograph by county highway personnel on July 27, 1999. This resulted in the loss of July 27 through September 30, 1998 temperature data. Project personnel later recovered the instrument and salvaged June 1 through July 26 temperature data. The thermograph deployed at RM 9.5 Wildhorse Creek was discovered out of water resulting in loss of data from to 1998. The instrument located at RM 2 Meacham Creek malfunctioned and data was unrecoverable for the 1998 project period.

Figure 5. illustrates the total number of days average and maximum stream temperatures exceeded 65 F, 70 F, 75 F and 80 F between June 1 and September 30, 1998 at thermograph deployment sites. Due to the problems mentioned in the previous paragraph, data from four sites could not be summarized, as is indicated in Figure 5.

Figure 5. ….June 1 - September 30, 1998 Number of Days Average and Maximum Stream Temperatures Exceeded 65, 70, 75 and 80 Degrees Fahrenheit

Thermograph Location	Number of days temperature	Number of days temperature	Number of days temperature	Number of days temperature

	over 65 F		over 70 F		over 75 F		over 80 F	
	Avg Temp	Max Temp	Avg Temp	Max Temp	Avg Temp	Max Temp	Avg Temp	Max Temp
Umatilla River RM 56	No data							
Umatilla River RM 76.5	52	93	6	70	0	27	0	0
Umatilla River RM 81.7	18	69	0	35	0	0	0	0
Wildhorse Creek RM 0	95	110	51	95	20	63	0	38
Wildhorse Creek RM 9.5	Incomplete data set							
Wildhorse Creek RM 26	17	75	0	21	0	0	0	0
Greasewood Creek RM 0.1	56	97	19	52	0	20	0	0
Eagle Creek RM 0.20	Incomplete data set							
Spring Hollow Creek RM 3.5	33	68	4	23	0	2	0	0
Mission Creek RM 1.25	0	3	0	0	0	0	0	0
Mission Creek RM 3.7	0	5	0	0	0	0	0	0
Mission Creek RM 3.8	0	38	0	1	0	0	0	0
Moonshine Creek RM 1.1	53	86	5	61	0	19	0	0

Coonskin Creek RM 0.2	2	29	0	0	0	0	0	0
Buckaroo Creek RM 2	53	98	16	79	0	47	0	19
Little Buckaroo Creek RM 0.04	3	94	0	52	0	30	0	20
Squaw Creek RM 2	37	105	0	75	0	34	0	0
Squaw Creek RM 9	29	89	0	68	0	26	0	2
Meacham Creek RM 2	No data							
Meacham Creek RM 5.25	31	94	0	70	0	24	0	0

Mission Creek and Coonskin Creek exhibited the most conducive temperatures for salmonid survival and rearing. However, a habitat inventory conducted by CTUIR UBNPME Staff during the summer of 1995 documented that 77% of Mission Creek was dry by late summer (CTUIR, UBNPME 1995 Annual Report, 1996). The CTUIR discovered mean salmonid densities in Mission Creek to be 0.0931 fish per m^2 and 0.3200 fish per m^2 in Coonskin Creek (CTUIR, 1996. UBNPME Annual Report 1995).

Stream temperatures were highest at RM 0 Wildhorse Creek and at the two sites monitored in the Buckaroo Creek Drainage. Large contiguous stretches of open stream channel, lacking thermal cover (riparian vegetation), combined with low and intermittent stream flows are suspect of contributing to warmer temperatures at these sites.

5. ..... Suspended Sediment Monitoring:

Siltation, a leading cause of non-point source pollution, is especially harmful to fish and aquatic ecosystems. Sediments harm fish by reducing dissolved oxygen levels and by smothering eggs and newly hatched fry. Sediment deposits also can eliminate aquatic plants that provide cover for fish and the invertebrates they consume (Trout Unlimited, 1994).

CTUIR Habitat Enhancement Project Personnel collected daily suspended sediment data from three ISCO Model 2700 Wastewater Samplers. Data obtained was averaged and combined with gage station stream flow data to arrive at daily estimates of total sediment yield at RM 2 Meacham Creek (at USGS Gage Station No. 14020300), RM 56 Umatilla River (at USGS Gage Station No. 14020850) and RM 81.7 Umatilla River (at USGS Gage Station No. 14020000) for the 1998 annual year. Due to the samplers malfunctioning or requiring repair from flood events, several months of suspended sediment data was unobtainable. Suspended sediment data was graphed, and this information is presented in Appendix C (absence of data is indicated by lack of a contiguous sediment yield line on graphs). Tabular daily sediment yield data and stream discharge data is currently maintained at the CTUIR Habitat Enhancement Project Office.

Stream flows during 1998 ranged from a peak of 1,810 cfs on December 30 to a minimum of 10 cfs from September 1 through September 6 at RM 2 Meacham Creek, a peak of 4,690 cfs on December 30 to a minimum of 43 cfs on several days in late August and early September at RM 56 Umatilla River, and a peak of 1,970 cfs on December 30 to a minimum of 42 cfs in late August and early September at RM 81.7 Umatilla River.

Peaks in sediment yield generally corresponded closely with winter and early spring high flow events. Maximum documented 1998 daily sediment yields of 157 tons per day at RM 2 Meacham Creek, 145 tons per day at RM 56 Umatilla River and 171 tons per day at RM 81.7 Umatilla River occurred on March 23, 1998 during a major high flow event. The highest annual sediment yields likely occurred on December 30, 1998 during peak flow periods. However, this can not be substantiated because all three sediment samplers were inoperative on that date.

Objective III: ..... Continue Watershed Planning, Scoping and Education Process by Identifying Problems and Developing Creative Solutions to Land Use Problems Impacting Fisheries Habitat in the Umatilla River Basin.

1. ..... Watershed Analysis:

WSU Staff and CTUIR Habitat Enhancement Project Personnel held several watershed analysis coordination meetings to exchange ideas, obtain agency input and update interested parties on progress. Efforts to develop a Umatilla Basin Watershed Analysis will continue through 1999. A finalized document will be available by fiscal year 2000.

2. ..... Community Outreach Efforts:

The following public outreach efforts occurred during the 1998 project period:

- .....Participated in a three day Stream Process, Classification, Evaluation and Rehabilitation Workshop (modified Rosgen Methodology) to obtain information regarding various habitat restoration approaches.

- **.....** Participated and provided displays and educational literature to students and the public at the Umatilla-Morrow Education Service District (ESD) Career Showcase and the CTUIR Salmon Restoration Open House.

- **.....** Coordinated with the WSU Environmental Learning Center and local Boy Scout Troop 740 to plant native trees and shrubs in the Wildhorse Creek and Meacham Creek project areas.

- **.....** Provided macroinvertebrate sampling and identification to elementary students from northern Umatilla County schools during an environmental field day sponsored by the Walla Walla Basin Watershed Council.

- **.....** Coordinated with Umatilla County Farm Services Agency Staff to develop a process to merge CTUIR Riparian Easements with federal CRP Agreements on private-owned agricultural properties. The purpose of such a merger is to provide opportunities to extend restoration efforts beyond the riparian corridor into adjacent floodplain areas and to provide additional cost share opportunities.

- **.....** Provided hands-on habitat restoration presentations to elementary students at the annual ESD Watershed Field Day over a two day period.

- **.....** Provided a one day native vegetation planting workshop to Washington School fifth grade students (Willow cuttings were planted in the Spring Hollow Creek Project Area.).

- .....Provided macroinvertebrate sampling and identification to elementary students from Heppner School District in the Bull Prarie Lake Watershed during a school retreat.

- **.....** Attended a two day Legal Seminars International - ESA Workshop in Portland, Oregon to better understand ESA, Section 7 consultation proceedings and necessary requirements to implement habitat enhancements.

- **.....** Attended a COE Public Hearing in Salem, Oregon to obtain information regarding proposed modifications to existing NWPs and creation of new NWPs under Section 404 of the federal Clean Water Act. Submitted comments to COE at a later date, expressing concerns with proposed

changes in the NWP process and potential impacts to habitat enhancement projects as a result of such changes.

◆ **.....** Met with Umatilla County Soil and Water Conservation District to discuss their proposal to enhance 65,000 acres of private land within the Butter Creek Watershed.

.....◆ **.....** Provided a tour of existing habitat enhancement projects to ODSL Personnel, Jenifer Robinson, Special Assistant to the Director, and Bob Brown, Natural Resource Coordinator.

◆ **.....** Participated in a tour of CTUIR Projects to demonstrate habitat recovery measures to Americorps Members', Joe and Matt Kennedy (the late Robert F. Kennedy's grandsons).

◆ .....Participated in Umatilla River Basin Regulatory Work Group Meetings with ODSL, COE, other commenting agencies and the public. The focus of this group is to provide technical assistance to landowners before approving their instream permit requests (as permitted under 401 and 404 federal Clean Water Act Regulations), provide a more streamlined permit review process for landowners and to address instream activities on a reach by reach basis (to discourage unnecessary detrimental instream practices). CTUIR participated not only because of our role as a commenting agency, but also to address potential detrimental instream practices impacting stream habitat.**..**.....

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Appendix A

Aquatic Macroinvertebrate

Summary Data

Appendix B

Water Temperature Graphs

Appendix C

Suspended Sediment Graphs

CTUIR HABITAT ENHANCEMENT PROJECT TABLE

PROJECT LOCATION	NO. OF STREAM MILES ENHANCED	NO. OF LANDOWNER AGREEMENTS
Lower Meacham Creek	4.5	15
Upper Umatilla River	3.2	9
Boston Canyon Creek	0.25	1
Wildhorse Creek	2	4

Greasewood Cr. Drainage	1.75	2
Spring Hollow Creek	0.6	1
Mission Creek	0.4	1
Buckaroo Creek	0.3	1
SQUAW CREEK	1.2	0 (TRIBAL PROPERTY)
TOTAL	14.2	34