

CTUIR UMATILLA ANADROMOUS FISHERIES HABITAT PROJECT

A Columbia River Basin Fish Habitat Project

Annual Report

February 1, 2008 to January 31, 2009
Fiscal Year 2008

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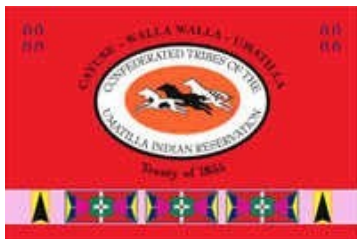
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ABSTRACT

The Umatilla Anadromous Fisheries Habitat Project (UAFHP) is an ongoing effort to protect, enhance, and restore riparian and instream habitat for the natural production of anadromous salmonids in the Umatilla River Basin, Northeast Oregon. Flow quantity, water temperature, passage, and lack of in-stream channel complexity have been identified as the key limiting factors in the basin. During the 2008 Fiscal Year (FY) reporting period (February 1, 2008-January 31, 2009) primary project activities focused on improving instream and riparian habitat complexity, migrational passage, and restoring natural channel morphology and floodplain function. Eight primary fisheries habitat enhancement projects were implemented on Meacham Creek, Birch Creek, West Birch Creek, McKay Creek, West Fork Spring Hollow, and the Umatilla River. Specific restoration actions included: (1) rectifying one fish passage barrier on West Birch Creek; (2) participating in six projects planting 10,000 trees and seeding 3225 pounds of native grasses; (3) donating 1000 ft of fencing and 1208 fence posts and associated hardware for 3.6 miles of livestock exclusion fencing projects in riparian areas of West Birch and Meacham Creek, and for tree screens to protect against beaver damage on West Fork Spring Hollow Creek; (4) using biological control (insects) to reduce noxious weeds on three treatment areas covering five acres on Meacham Creek; (5) planning activities for a levee setback project on Meacham Creek. We participated in additional secondary projects as opportunities arose. Baseline and ongoing monitoring and evaluation activities were also completed on major project areas such as conducting photo point monitoring strategies activities at the Meacham Creek Large Wood Implementation Project site (FY2006) and at additional easements and planned project sites. Fish surveys and aquatic habitat inventories were conducted at project sites prior to implementation. Proper selection and implementation of the most effective site-specific habitat restoration plan, taking into consideration the unique characteristics of each project site, and conducted in cooperation with landowners and project partners, was of paramount importance to ensure each project's success. An Aquatic Habitat Inventory was conducted from river mile 0-8 on Isquulktpé Creek and the data collected was compared with data collected in 1994. Monitoring plans will continue throughout the duration of each project to oversee progression and inspire timely managerial actions. Twenty-seven conservation easements were maintained with 23 landowners. Permitting applications for planned project activities and biological opinions were written and approved. Project activities were based on a variety of fisheries monitoring techniques and habitat assessments used to determine existing conditions and identify factors limiting anadromous salmonid abundance in accordance with the *Umatilla River Subbasin Salmon and Steelhead Production Plan* (NPPC 1990) and the *Final Umatilla Willow Subbasin Plan* (Umatilla/Willow Subbasin Planning Team 2005).

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Our restoration work to enhance and protect anadromous salmonid habitat is dependent on the contributions and cooperation of many government and tribal organizations and individuals, private landowners, and small businesses without whom we would be unable to achieve a desired level of success. We are grateful to the following cooperating partners: American Fisheries Society, American Rivers, Anderson Perry & Associates, Aquatic Contracting, Bauer & Gustafson Resources, Becker Construction, Blue Mountain Land Trust, Bonneville Power Administration, Clear Creek Cattle Company, Columbia Helicopters, Columbia River Inter Tribal Fish Commission, Cunningham Sheep Company, Double Rock Ranch, Ellis Hunting Ranch, Forth Ranch, GeoEngineers, Hoskins Ranches, McClain Spraying, McMillen Engineering, National Marine Fisheries Services, Natural Reclamation Service, Oregon Fish and Wildlife, Oregon Department of State Lands and Forestry, Oregon State Parks and Historical Society, Oregon Water Resources Department, Oregon Watershed Enhancement Board, Peterson Ranches, South County Helicopter, Spratling Farms, Steve Lindley Contracting, Umatilla Soil and Water Conservation District, Umatilla Basin Watershed Council, Union Pacific Railroad, United States Bureau of Indian Affairs, United States Fish and Wildlife Service, United States Forest Service, United States Army Corps of Engineers, United States Department of Agriculture Farm Service Agency and Natural Resource Conservation Service, Oregon Watershed Enhancement Board, Pacific Coastal Salmon Recovery Fund, Umatilla County, Umatilla-Morrow Education Service District, Wallace Drilling, Wild West Riparian, and Whitney Land Company.

ACRONYMS

BA	biological assessment
B&G	Bauer & Gustafson
BMHRC	Blue Mountain Habitat Restoration Council
BPA	Bonneville Power Administration
cfs	cubic feet per second
COTR	Contracting Officer Technical Representative
CREP	Conservation Reserve Enhancement Program
CTUIR	Confederated Tribes of the Umatilla Indian Reservation
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
mph	miles per hour
NMFS	National Marine Fisheries Service
NPPC	Northwest Power Planning Council
NWPCC	Northwest Power and Conservation Council
NRCS	Natural Resource Conservation Service
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
TMDL	total maximum daily load
UAFHP	Umatilla Anadromous Fisheries Habitat Project
UBNPME	Umatilla Basin Natural Production Monitoring and Evaluation Project
UBWC	Umatilla Basin Watershed Council
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UPR	Union Pacific Railroad
WHIP	Wildlife Habitat Incentive Program

Table of Contents

BACKGROUND.....	1
INTRODUCTION AND DESCRIPTION OF THE UMATILLA RIVER BASIN AND PROJECT AREAS....	4
DESCRIPTION OF CREEKS IN PROJECT AREAS	15
DESCRIPTION OF ESA LISTED AND SENSITIVE SPECIES IN THE UMATILLA RIVER BASIN PROJECT AREAS.....	22
METHODS, RESULTS, AND DISCUSSION OF STATEMENT OF WORK DELIVERABLES.....	25
A-C165: PRODUCE ENVIRONMENTAL DOCUMENTATION-PREPARE BIOLOGICAL ASSESSMENTS FOR APPLICABLE PROJECTS; SUBMIT JPA TO STATE AND FEDERAL ENTITIES; CULTURAL RESOURCE PROTECTION AND PRESERVATION	25
D189: REGIONAL COORDINATION WITH OTHER AGENCIES IN PLANNING AND IMPLEMENTING HABITAT IMPROVEMENTS IN THE UMATILLA BASIN	26
E157: COLLECT/GENERATE/VALIDATE FIELD AND LAB DATA – COLLECT VARIOUS FORMS OF PROFESSIONAL, SCIENTIFIC DATA FOR PROJECT POTENTIAL ANALYSIS	30
AQUATIC HABITAT INVENTORY AND FISH MONITORING: ISQUULKTP E CREEK	31
AQUATIC HABITAT INVENTORY AND FISH MONITORING: WEST BIRCH CREEK, RM 2.7	35
AQUATIC HABITAT INVENTORY: WEST BIRCH CREEK, RM 2.8-3.1	36
AQUATIC HABITAT INVENTORY AND FISH MONITORING: WEST BIRCH CREEK, RM 3.2	36
F162: ANALYZE/INTERPRET DATA – ANALYZE/INTERPRET SCIENTIFIC DATA	38
G172: CONDUCT PRE-ACQUISITION ACTIVITIES – SECURE AND ADHERE TO DETAILS OF CONSERVATION EASEMENTS ASSOCIATED WITH HABITAT PROJECT AREAS AS NECESSARY	38
H175: PRODUCE DESIGN AND/OR SPECIFICATIONS: PREPARATION AND SUBMITTAL OF ENGINEERING DESIGNS/SPECIFICATIONS FOR BIRCH/MEACHAM CREEK PROJECTS	38
I34: DEVELOP ALTERNATIVE WATER SOURCE – SATISFY WATER SOURCE REQUIREMENTS OF LANDOWNERS AT PETERSON AND BROUN DAMS	39
J34: DEVELOP ALTERNATIVE WATER SOURCE – INSTALL SECOND WELL FOR ALTERNATIVE LIVESTOCK WATER SOURCE ON B&G EASEMENT, UMATILLA RIVER, RM 38.....	40
K40: INSTALL FENCE – MUTUALLY AGREE ON DECISION TO INSTALL FENCE AT BROUN DAM, BIRCH CREEK.....	40
L85A: REMOVE/BREACH DAM – RECTIFY FISH PASSAGE AT PETERSON DAM, BIRCH CREEK	41
L85B. INSTALL FISH PASSAGE STRUCTURE: INSTALL FISH LADDER AT HOEFT DAM, WEST BIRCH CREEK	42
M85: REMOVE/BREACH DAM – RECTIFY FISH PASSAGE AT BROUN DAM, BIRCH CREEK.....	42
N29: INCREASE INSTREAM HABITAT COMPLEXITY – IMPROVE HABITAT QUALITY AND QUANTITY OF INSTREAM HABITAT FEATURES IN LOWER MEACHAM CREEK	43
O47: PLANT VEGETATION – SUPPLEMENT RIPARIAN AREAS OF EXISTING AND NEW PROJECTS WITH ADDITIONAL VEGETATION	43
P22: MAINTAIN VEGETATION – MAINTAIN VEGETATION PLANTINGS AT ALL CTUIR HABITAT PROJECT AREAS ..	44
Q53: REMOVE VEGETATION – CONTROL OF NOXIOUS WEEDS IN PROJECT AREAS BY PHYSICAL AND CHEMICAL MEANS	45
R186: OPERATE AND MAINTAIN HABITAT/PASSAGE/STRUCTURE – REPAIR DAMAGED FENCING/GASES AND RELATED RIPARIAN PROPERTY AT HABITAT PROJECT SITES IN A TIMELY MANNER	45
S186: OPERATE AND MAINTAIN HABITAT/PASSAGE/STRUCTURE – MONITOR AND TROUBLESHOOT ISSUES THAT INTERFERE WITH PROPER FUNCTION OF INSTREAM IMPROVEMENT STRUCTURE	46
T156: DEVELOP RESEARCH MONITORING AND EVALUATION (RM&E) METHODS AND DESIGNS – DEVELOP STRATEGIC AND SCIENTIFICALLY ACCEPTED MONITORING METHODS FOR APPLICATION	47
U122: PROVIDE TECHNICAL REVIEW – REVIEW AND PROVIDE TECHNICAL INPUT ON ISSUES AND TOPICS THAT AFFECT THE AREA’S NATURAL RESOURCES.....	47
V132: PRODUCE (ANNUAL) PROGRESS REPORT – SUBMIT PROGRESS REPORT FOR THE PERIOD FEBRUARY 2007 TO JANUARY 2008	47
W132: PRODUCE ANNUAL PROGRESS REPORT – SUBMIT ANNUAL REPORT FOR THE PERIOD FEBRUARY 2008 TO JANUARY 2009	48
X119: MANAGE AND ADMINISTER PROJECTS – PRODUCE QUARTERLY STATUS REPORTS TO BPA CONTRACTING OFFICER TECHNICAL REPRESENTATIVE (COTR).....	48
Y185: PRODUCE PISCES STATUS REPORTS AND PERIODIC STATUS REPORTS FOR BPA.....	48

Z174: PRODUCE PLAN: MEMORANDUM OF AGREEMENT (MOA) INITIATE UMATILLA WATERSHED HABITAT ASSESSMENT PLAN	49
AA141: PRODUCE OTHER REPORT – MOA DRAFT 2007-2008 AND 2008-2009 ANNUAL REPORTS.....	49
AB34: DEVELOP ALTERNATIVE WATER SOURCE – MOA DEVELOP ADDITIONAL WATER SOURCES AND STRATEGIES TO IMPROVE SURVIVAL OF RIPARIAN VEGETATION	49
AC48: PRACTICE NO-TILL AND CONSERVATION TILLAGE SYSTEMS – MOA CONDUCT TILLAGE STRATEGIES AT B&G PROJECT TO IMPROVE VEGETATIVE PLANTING SURVIVAL	49
AD53: REMOVE VEGETATION – MOA ADDITIONAL CONTROL OF NOXIOUS WEEDS BY VARIOUS MEANS	49
AE175: PRODUCE DESIGN AND/OR SPECIFICATIONS – MOA INCREASED QUANTITY OF PROJECT DESIGNS FOR ADDITIONAL LEVEE REMOVAL.....	50
AF180: ENHANCE FLOODPLAIN – MOA ENHANCE FLOODPLAIN CONNECTIVITY AND FUNCTION VIA LEVEE SETBACK AT MEACHAM CREEK	50
AG29: INCREASE INSTREAM HABITAT COMPLEXITY – MOA INDIRECTLY INCREASE INSTREAM HABITAT COMPLEXITY, BY ALTERING MEACHAM FLOODPLAIN AND RIPARIAN AREAS	51
AH40: INSTALL FENCE – MOA INSTALL FENCE AT MEACHAM CREEK HEADWATERS TO PROTECT AND ENHANCE WATERSHED CONDITION.....	52
AI160: CREATE/MANAGE/MAINTAIN DATABASE – MOA CREATE THE CAPACITY OF AUTONOMY BY PURCHASING AND DEVELOPING GIS TOTAL SURVEY STATION	52
AJ47: PLANT VEGETATION – MOA PREPARE B&G PROJECT RIPARIAN AREAS FOR 09 PLANTINGS.....	52
SELECTED FY2008 FISH HABITAT ENHANCEMENT AND RESTORATION ACTIVITIES	53
FISH PASSAGE BARRIER RECTIFICATION: WEST BIRCH CREEK	55
INSTALLATION OF TWO SOLAR PANELS AT TWO WELLS AT B&G RESOURCES PROPERTY FOR OFF-CHANNEL LIVESTOCK WATERING AND CREP PLANTINGS	63
SUMMARY AND CONCLUSIONS	70
SUMMARY OF EXPENDITURES	72
LITERATURE CITED	73
APPENDIX A – SALMONID POPULATION ESTIMATE, ISQUULKTPE CREEK (RM 0-8) SAMPLED 9/29-10/13, 2008.....	76
APPENDIX B – ANALYTICAL REPORT, SOILS AT UMATILLA RIVER MILE 40	78

List of Tables

TABLE 1. CONSERVATION EASEMENTS MAINTAINED BY THE CTUIR: LOCATIONS, DURATION, AGREEMENT DETAILS AND RECOMMENDED RENEWAL STATUS PROJECTIONS	39
TABLE 2. FY2008 VEGETATION PLANTINGS AT EXISTING AND NEW PROJECTS.....	43
TABLE 3. ACTIONS AND METRICS ASSOCIATED WITH THE FY2008 UAFHP RESTORATION PROJECT ACTIVITIES	53
TABLE 4. CREP SITES AT B&G RESOURCES, TREE SPECIES AND QUANTITIES (#)	67
TABLE 5. B&G RESOURCES PROJECT ACTIONS, DATES OF WORK, CONTRACTING AGENCIES AND CONTRACTORS....	68

List of Figures

FIGURE 1. UMATILLA RIVER BASIN.....	4
FIGURE 2. EXAMPLE OF PROTECTIVE SCREENING TO MINIMIZE BEAVER DAMAGE ON RIPARIAN PLANTINGS AT PROJECT SITES	6
FIGURE 3. UMATILLA RIVER BASIN FY2008 UAFHP PROJECT SITES	7
FIGURE 4. TYPICAL BEAVER ACTIVITY OBSERVED IN THE UMATILLA RIVER BASIN.....	9
FIGURE 5. TYPICAL REACH OF THE MID-UMATILLA RIVER BASIN	9
FIGURE 6. WEST BIRCH CREEK RM 3.0.....	10
FIGURE 7. MEACHAM CREEK RM 10.....	10
FIGURE 8. LAND USE WITHIN THE UMATILLA BASIN	11

FIGURE 9. RIPARIAN AREA IMPACTED BY LIVESTOCK VS. PROTECTED BY LIVESTOCK EXCLUSION FENCE	11
FIGURE 10. OVERVIEW OF THE MEACHAM CREEK WATERSHED, UMATILLA BASIN, NORTHEAST OREGON, WITH FY2008 PROJECT AREAS DENOTED BY LETTERS A-C	15
FIGURE 11. CTUIR HABITAT PROJECT BIOLOGIST ERIC HOVERSON (RIGHT) DISCUSSES THE COMPLETED HOEFT FISH PASSAGE RECTIFICATION PROJECT WITH DNR DIRECTOR ERIC QUAEEMPTS (2 ND FROM RIGHT) AND PROGRAM MANAGER GARY JAMES (LEFT) AND NRCS REPRESENTATIVE CHET HADLEY (BACKGROUND), OCTOBER 200827	
FIGURE 12. “STRATEGIES FOR IMPROVING FISHERIES HABITAT IN A COLUMBIA RIVER TRIBUTARY” POSTER PRESENTED AT THE AMERICAN FISHERIES SOCIETY, MAY 2008, PORTLAND, OREGON	28
FIGURE 13. <i>CONFEDERATED UMATILLA JOURNAL</i> ARTICLE: FISH RECTIFICATION PROJECT AT HOEFT DAM	29
FIGURE 14. ISQUILKTPA CREEK CHANNEL AND RIPARIAN FEATURES	33
FIGURE 15. METHODOLOGY USED FOR FISH POPULATION MONITORING USING STREAM ELECTROFISHERS TO CAPTURE SALMONIDS AT PROJECT SITES PRIOR TO IMPLEMENTATION	37
FIGURE 16. EXAMPLE OF LIVESTOCK EXCLUSION FENCING AT WEST BIRCH CREEK, RM 3.0.....	41
FIGURE 17. RECREATIONAL DAM ON SF UMATILLA RIVER; SF UMATILLA RIVER POST DAM REMOVAL.....	42
FIGURE 18. CTUIR NATIVE PLANT NURSERY CONTAINERIZED PLANT STOCK	44
FIGURE 19. LOCATIONS OF KNAPWEED BIOLOGICAL CONTROL, MEACHAM CREEK, RM 5.....	46
FIGURE 20. EXAMPLE OF LEVEE ALONG MEACHAM CREEK.....	50
FIGURE 21. LEVEES (SHOWN IN RED) TARGETED FOR SETBACK/REMOVAL.....	51
FIGURE 22. FENCING INSTALLED AT RM 34, MEACHAM CREEK	52
FIGURE 23. PHOTO POINT MONITORING METHODOLOGY OF MEACHAM CREEK LWD CONFIGURATIONS	54
FIGURE 24. HOEFT DAM ON WEST BIRCH CREEK, RM 2.7 PRIOR TO RECTIFICATION	55
FIGURE 25. BLUEPRINT PLAN AND PROFILE, HOEFT DAM, WEST BIRCH CREEK, RM 3.2	57
FIGURE 26. BLOCKNETS USED TO KEEP FISH FROM REENTERING CONSTRUCTION SITE	59
FIGURE 27. HOEFT DAM – PREPARATION OF SUBSTRATE FOR FISHWAY BASE.....	60
FIGURE 28. ONE OF THE THIRTEEN SECTIONS OF THE FISHWAY	60
FIGURE 29. MOVING FISHWAY SECTION INTO PLACE.....	61
FIGURE 30. HOEFT DAM POST CONSTRUCTION	61
FIGURE 31. HOEFT PASSAGE RECTIFICATION PROJECT SHOWING SLOPED BANK AND PLANTINGS	62
FIGURE 32. UMATILLA RIVER RM 40, SHOWING SEVERELY INCISED CHANNEL AND BANK EROSION	64
FIGURE 33. AERIAL PHOTOGRAPH OF B&G RESOURCES PROPERTY, CREP TRACTS, AND WELL SITES.....	65
FIGURE 34. WATERING TROUGHS AND SOLAR PANEL, UMATILLA RIVER, RM 40	66
FIGURE 35. TEST PLOTS USING SOIL FROM CREP AREA AT B&G PROPERTY TO TEST GROWTH OF GRASSES, SHRUBS AND TREES.....	67
FIGURE 36. B&G SOIL PREPARATION AND RIPARIAN TARP PLACEMENT LOCATIONS.....	69
FIGURE 37. CTUIR/ODFW ACCESS RESTRICTION PROJECT, JUNE 2008	69

BACKGROUND

The ancestors of the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) have hunted and gathered food and fished numerous rivers and streams of the Pacific Northwest for thousands of years. They depended upon anadromous fish for subsistence and trade. The indigenous people of the CTUIR still rely on natural resources from several watersheds located within areas of traditional use to provide them with a multitude of life essentials.

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 Anadromous Fisheries Habitat Project (UAFHP) 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.

The Bonneville Power Administration (BPA) funds the CTUIR and other Pacific Northwest Tribes to restore salmonid habitat as part of its mitigation activities due to the harmful effects and loss of habitat caused by the massive Columbia River hydroelectric dams. The CTUIR UAFHP, #1987-100-01, funded by BPA through the Northwest Power Planning Council (NPPC) (renamed Northwest Power and Conservation Council in 2003 [NWPPCC]) Fish and Wildlife Program, is an ongoing project initiated by CTUIR in 1987. The UAFHP is part of the broader effort by Columbia River Tribes to protect and restore salmonid populations and to preserve community traditions that honor and celebrate the CTUIR's ties to this vital food source. The CTUIR is guided in its habitat restoration activities by the *Five-Year Action Plan for the Development and Maintenance of Habitat Improvement Projects in the Umatilla Subbasin: 2006-2010 For BPA-Funded Fish Habitat Improvement Programs* sponsored by: Oregon Department of Fish and Wildlife (ODFW) and Confederated Tribes of the Umatilla Indian Reservation (CTUIR and ODFW 2006).

The goal of UAFHP is to protect, enhance, and restore salmonid habitat and abundance in the Umatilla River Basin. The project focuses on the mainstem Umatilla and tributaries that provide spawning, rearing, and migrational habitat for Middle Columbia River Basin Endangered Species Act (ESA) Listed summer steelhead and bull trout, as well as for spring chinook salmon, a preferred species of traditional importance to CTUIR. Habitat enhancement activities are designed to improve aquatic and riparian habitat resulting in an increase in viable populations of focal species and secondary species of fish and wildlife in the Umatilla River watershed. CTUIR is also engaged in activities to enhance habitat for bull trout, redband rainbow trout, Pacific lamprey, mountain whitefish, fall chinook and coho salmon.

During the 22-year project history, the CTUIR has helped administer and implement a number of fisheries habitat enhancement projects in the Umatilla River Basin. In fiscal year (FY) 2008, the CTUIR maintained 27 partnership habitat enhancement projects along Meacham Creek, Isquilktp Creek, Birch Creek, 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 UAFHP is an integral component of the *Umatilla River Subbasin Salmon and Steelhead Production Plan* (NPPC 1990) and is well integrated into the framework of the *Umatilla Subbasin Plan* (Umatilla/Willow Subbasin Planning Team 2005) established by the NWPC to better coordinate habitat restoration work in the Umatilla River Basin. The CTUIR, ODFW, Natural Resource Conservation Service (NRCS), 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.

Noteworthy accomplishments for the CTUIR UAFHP during FY2008 included:

- Rectifying a fish passage barrier at Hoeft Dam, West Birch Creek, and adding root wads and large boulders for fish habitat enhancement
- Planting 10,000 saplings/cuttings
- Conducting preparation work for a levee setback project on Meacham Creek
- Seeding 225 pounds of native grasses at one site on West Birch Creek and 3000 pounds on 60 acres on the Umatilla River (River Mile [RM] 40)
- Using biological controls of noxious weeds at three treatment areas on 5 acres of Tribal Land on Meacham Creek within the prior year's Large Woody Debris (LWD) Project Site
- Installing 3.6 miles of fencing to exclude livestock (cattle, sheep, and wildlife) on Meacham Creek and West Birch Creek
- Bank sloping and riparian enhancement at West Birch Creek (Hoeft Dam site)
- Donating 400 feet of fencing for beaver control on West Fork Spring Hollow Creek with recommendations to landowner on CTUIR conservation easement property
- Conducting project maintenance activities at all sites
- Conducting an extensive aquatic habitat inventory on 8 miles of Isquilktp Creek and continuing various monitoring and evaluation activities at project areas and easement properties
- Maintaining 27 conservation easements on 23 properties and partnering with the NRCS Wildlife Habitat Incentives Program (WHIP) and Conservation Reserve Enhancement Program (CREP)
- Donating materials (3 watering troughs, 1068 treated fencing posts and 140 steel fencing posts) and 600 feet of fencing to exclude livestock grazing at several easement locations
- Working with ODFW to remove a recreational dam on the South Fork Umatilla River
- Working with ODFW to construct and install an access restriction fence and gate to protect the Bauer & Gustafson (B&G) and Becker easements from off-road vehicle use and human impacts

Project areas where these activities occurred are located on Figure 1. Subbasin planning teams utilized information from a variety of resource assessment sources to classify existing habitat status, determine limiting factors, and identify priority areas for restoration activities. A

combination of both passive and active restoration strategies were then developed to address habitat deficiencies. Collection of aquatic habitat, geomorphology, water quality and fish abundance data is ongoing and utilized for optimizing adaptive restoration plans at project areas.

Although many project areas are in an early stage of recovery, establishment of conservation easements, construction of riparian enclosure fencing, development of off-channel water sources for livestock, revegetation efforts, and instream work, such as passage barrier rectification, channel reconstruction, and large wood additions, have resulted in improving trends including:

- Improved stream channel stability with early succession dimension, pattern and profile
- Increased accessibility to suitable habitat conditions in headwater streams via passage rectification
- Decreased channel width:depth ratios, gradient, and entrenchment and increased channel sinuosity, length, floodplain connection, enhanced pool habitat, increased stream shade and undercut banks
- Increased availability of instream habitat, including backwater and off-channel rearing areas
- Improved condition of riparian and wetland plant communities for fish and wildlife species
- Increased instream habitat complexity and diversity resulting in improved pool-riffle sequences associated with dynamically stable channel morphology

During the 2006 NWPC project solicitation, the CTUIR developed a schedule of planned actions for FY2007-9 in cooperation with the ODFW. For FY2008, a complete project overview and technical approach is thoroughly described in the “Statement of Work Report 3.0.832.0 for the Umatilla Anadromous Fisheries Enhancement – CTUIR” project, which can be accessed from the following website at URL:

<http://pisces.bpa.gov/release/reports/ReportViewer.aspx?RptName=SOWWorkElementsMilestonesPublicVersion&rs%3aFormat=PDF&psReferenceNumber=36848> (BPA 2009).

CTUIR secured funding for habitat improvements from a variety of sources in addition to the BPA, including Pacific Coastal Salmon Recovery Fund (PCSRF), Union Pacific Railroad (UPR) Mitigation, the Environmental Protection Agency (EPA), Oregon Department of Transportation (ODOT), Blue Mountain Habitat Restoration Council (BMHRC), and NRCS.

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 UAFHP dating to 1989, please consult the following website at URL:

<http://www.efw.bpa.gov/integratedfwp/reportcenter.aspx> and search **publications**, typing 1987-100-01 in the project number box provided. Recent projects initiated in FY2007 and continuing in FY2009 are described in *Umatilla River Basin Anadromous Fish Habitat Enhancement Project February 1, 2007-January 31, 2008 Annual Report*, Document ID# P109208, available online at:
<http://pisces.bpa.gov/release/documents/documentviewer.aspx?doc=P109208> (CTUIR 2008).

High Priority Fish Habitat Restoration – Meacham Creek and Birch Creek Watersheds

The *Umatilla/Willow Subbasin Plan* (2004) identified Meacham Creek and Birch Creek as high priority watersheds for fish habitat restoration. 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. CTUIR has initiated restoration activities to address existing habitat deficiencies as part of a long-term watershed restoration plan.

CTUIR and ODFW work together to co-manage and improve habitat in target areas in the Umatilla River Basin. Priority target geographical areas were established in the *Five Year Action Plan for the Development and Maintenance of Habitat Improvement Projects in the Umatilla Subbasin* (CTUIR and ODFW 2006). CTUIR is the lead entity responsible to address habitat deficiencies in the following high priority target areas: (1) Birch Creek: RM 2.0 to Hoeft Road (RM 10.5); (2) East Birch Creek: Mouth to Humphrey Bridge (RM 4.0) and Westgate Canyon Ranch (Baker Property); (3) West Birch Creek: Mouth to Bear Creek (RM 5.0); (4) Meacham Creek: Mouth to Forks, RM 15.3 (including tributaries); and (5) Upper Umatilla River: Mission Bridge (RM 59.5) to Meacham Creek (RM 78.8). In 2005, Birch Creek shifted from being solely managed by ODFW to being co-managed with CTUIR as the primary lead entity.

Priority management strategies are being conducted in accordance with the *Final Umatilla Willow Subbasin Plan* (Umatilla/Willow Subbasin Planning Team 2005). These include:

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

Secondary Priority Fish Habitat Restoration – Spring Hollow Creek and Mid-Umatilla River

Project implementation at locations not designated as of primary importance, such as the Mid Umatilla River Livestock Exclusion Project at RM 40, is ongoing and exemplifies CTUIR's philosophical commitment to holistic watershed health. At the West Fork Spring Hollow Creek, CTUIR worked with a landowner to install tree screens to control beaver impacts to select trees of preferred species (Figure 2). On McKay Creek at RM 17.5, CTUIR planted 100 willow cuttings to assist in riparian habitat enhancement.



Figure 2. Example of Protective Screening to Minimize Beaver Damage on Riparian Plantings at Project Sites

Figure 3 shows a map of FY2008 UAFHP project sites (indicated by letters A-H) where CTUIR conducted its restoration work in accordance with ODFW and CTUIR subbasin and action plans. A brief description of project site locations and restoration strategies follows Figure 3.

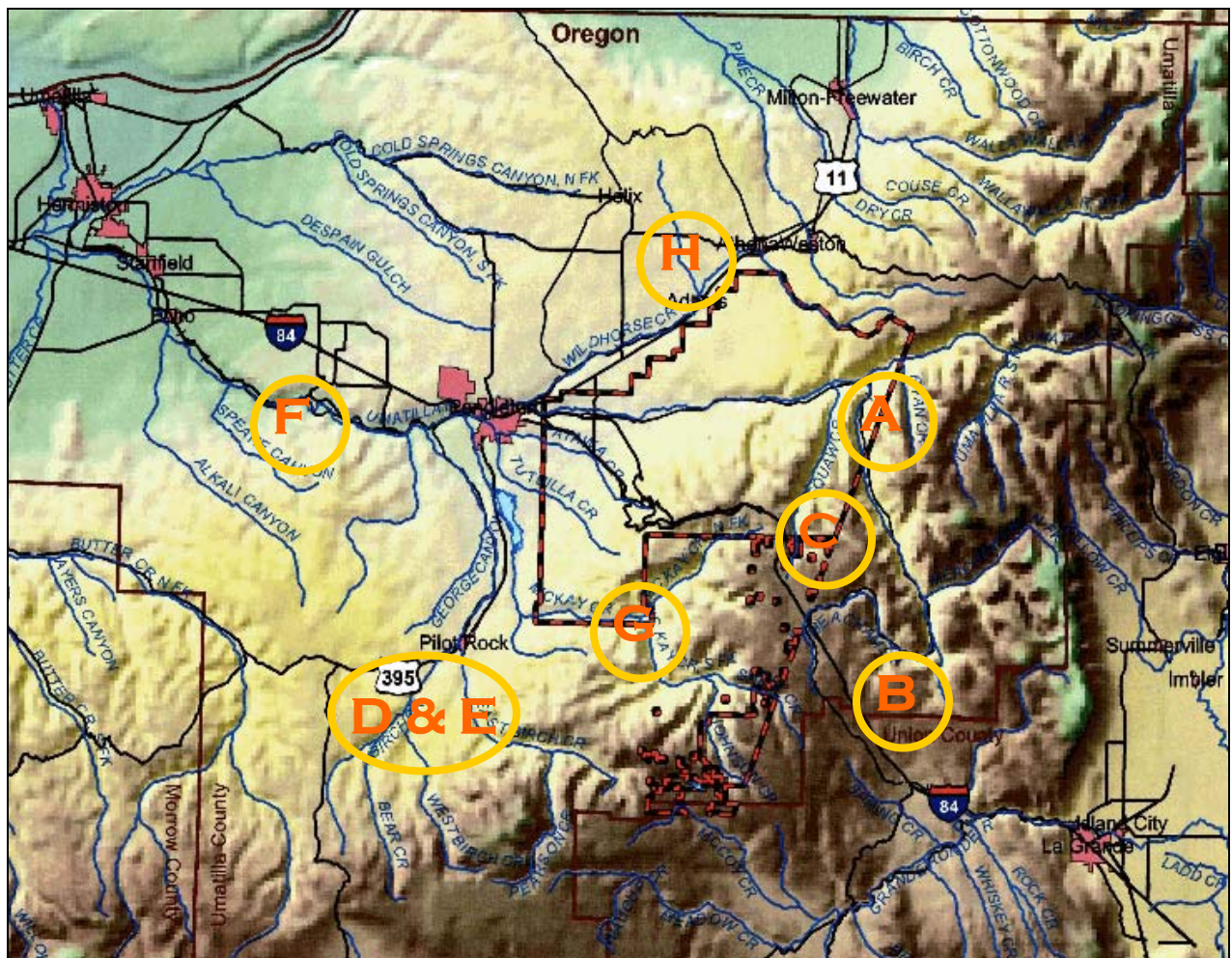


Figure 3. Umatilla River Basin FY2008 UAFHP Project Sites

A: Meacham Creek, RM 5-
Biological Control of Noxious Weeds at 3 Areas on 5 Acres.

B: Meacham Creek, RM 34-
Installed 3.3 Miles of Livestock Exclusion Fencing.

C: Isquiltpe Creek, RM 0-8.0-
Conducted Aquatic Habitat and Fish Inventory.

D: West Birch Creek, RM 2.7-
Fish Passage Barrier Rectified.

E: West Birch Creek, RM 3-
Riparian Plantings and Installed 0.3 miles of Livestock Exclusion Fencing.

F: Umatilla River, RM 40-
Solar Panels Installed at Location of 2 Wells Constructed for Off Channel Livestock Watering.

G: McKay Creek, RM 17.5-
Riparian Plantings With 100 Willow Cuttings.

H: West Fork Spring Hollow, RM 0.2-
Installation of Tree Screens to Prevent Damage by Beavers; 400 Ft of Fencing.

Description of Umatilla River Basin

The Umatilla River drains an area of approximately 2,540 square miles (mi.²) (6,579 square kilometers [km²]) and flows approximately 89 mi. (143 km) from its mouth to where it divides into the north and south forks Umatilla River. Each fork adds another approximately 10 mi. (16 km) of length. Major tributaries in addition to the north and south forks include Meacham Creek, Birch Creek, Butter Creek, and Wildhorse Creek. The Umatilla River originates at elevations up to 4,228 feet (ft; 1,289 m) and flows to an elevation of about 269 ft (82 m) at its confluence with the Columbia River (USFWS 2002).

Geology and Vegetation

The Umatilla River Basin can be roughly divided near the city of Pendleton, Oregon (OR) (RM 53) into two physiographic regions. The lower river, west of Pendleton, has cut a low valley into a broad upland plain called the Deschutes-Umatilla Plateau. Parent geologic materials of the plain are dominated by multiple layers of middle Miocene basalt flows, specifically, the Wanapum and Grand Ronde Basalts, originating 14 to 17 million years ago. Pleistocene and Holocene loess, alluvial, and glaciofluvial deposits are located on top of the Miocene basalts (Walker and MacLeod 1991; USGS 2008). Currently, vegetation on the broad Deschutes-Umatilla Plateau is primarily comprised of dryland crops and sagebrush-grass communities.

The region east of Pendleton is dominated by the Blue Mountain foot hills and the Blue Mountains. The Blue Mountains are accreted terranes that underwent lifting, faulting and folding of volcanic, sedimentary and metamorphic rock from 15-6 million years ago (Alt and Hyndman 1995). The middle Miocene basalts of the lower river are also the dominant parent materials in the headwaters. The river and streams have cut steep-sided canyons into the layers of rock that form the higher elevations of the Blue Mountains. Exposed basalt outcrops fracture into blocks and plates while the unexposed layers remain fairly impervious to water (Walker and MacLeod 1991). The combination of steep canyon walls and impervious bedrock lends to poor ground water recharge (NPPC 1990). Vegetation distribution patterns upstream of Pendleton are typical for the Blue Mountains. Grasses and small shrubs dominate the drier, south facing slopes. Conifers dominate the north facing slopes, higher elevations, and moderately wet areas.

Historically throughout the Umatilla Basin, deciduous trees were abundant in riparian areas on the valley floor. In 1812, Robert Stuart described the Umatilla River near the location of present day Pendleton with “bottoms well covered with cottonwood pofsefs (a good) many Swamps and Ponds in which reside a great multitude of beaver” (Rollins 1935, as cited by USFWS 2002, Chapter 10; see Figure 4). During this same time period, “[M]any of the pioneers traveling through the area noted the cottonwoods along the river (Nagle 1998, as cited by USFWS 2002, Chapter 10).”

Riparian habitat and vegetation on the mainstem Umatilla River and many tributaries are in poor condition. Land use practices over the last hundred years have cleared most of the riparian vegetation along the rivers and streams for irrigated agricultural, livestock, and urban uses. In the lower Subbasin, losses of riparian vegetation are particularly high; one study estimated those losses at greater than 95% as compared to pre-pioneer settlement conditions (c. 1850; Umatilla/Willow Subbasin Planning Team 2004)



Figure 4. Typical Beaver Activity Observed in the Umatilla River Basin

Beavers are beneficial to salmonid habitat recovery and watershed health processes. Beavers were nearly hunted and trapped to extinction by the 1900's, but numbers are on the rise. The CTUIR Fish Habitat Program is supportive of the re-establishment of beaver as important contributors to project success.

Figure 5 shows the valley form and degraded fisheries habitat conditions in the mid-Umatilla River Basin, including the disconnected floodplain, poor width-to-depth ratios, streambank erosion, channel incision, noxious weeds, and lack of adequate stream shading due to the narrow riparian belt width comprised of secondary growth and located a significant distance from the wetted channel. Three-quarters of the Umatilla River has been constrained by levees, and consequently, approximately 70% of 422 miles of inventoried river and streams are in need of improvement (Umatilla/Willow Subbasin Planning Team 2004).



Figure 5. Typical Reach of the Mid-Umatilla River Basin

Our primary areas of focus for restoration projects in FY2008 were Meacham Creek and West Birch Creek. Figure 6 shows typical conditions on West Birch Creek and Figure 7 shows those on Meacham Creek.



Figure 6. West Birch Creek RM 3.0



Figure 7. Meacham Creek RM 10

Land Use

Agriculture, both cropland and pasture, dominate the use of the Umatilla River Basin at the present time and total one million plus acres (Figure 8). Mixed rangeland accounts for one third of the remaining acres. Several land uses have adverse impacts on the Umatilla Basin Watershed and its fisheries habitat including: (1) agriculture (cropland and pasture, irrigated and dryland), (2) livestock grazing (Figure 9) in both forested lands and land not designated for crops, (3) streamside roads, (4) railroads, (5) timber harvest, (6) recreational and municipal water development, (7) housing development and urbanization within the floodplain, (8) irrigation and water withdrawals, (9) recreational use of riparian areas, (10) livestock water developments, and (11) channel modification, such as dams and levees, for flood control projects (USFWS 2002).

When large numbers of livestock have full access to streams, the following impacts may occur: reduction of riparian vegetation, bank erosion, channel incision, reduced stream depths, and reduction of overall water quality. Generally, salmonid abundance is limited in reaches inhabited by unmanaged livestock due to an overall reduction of habitat quality and quantity. Figure 9 (right) shows how well riparian areas can recover with livestock exclusion fencing.

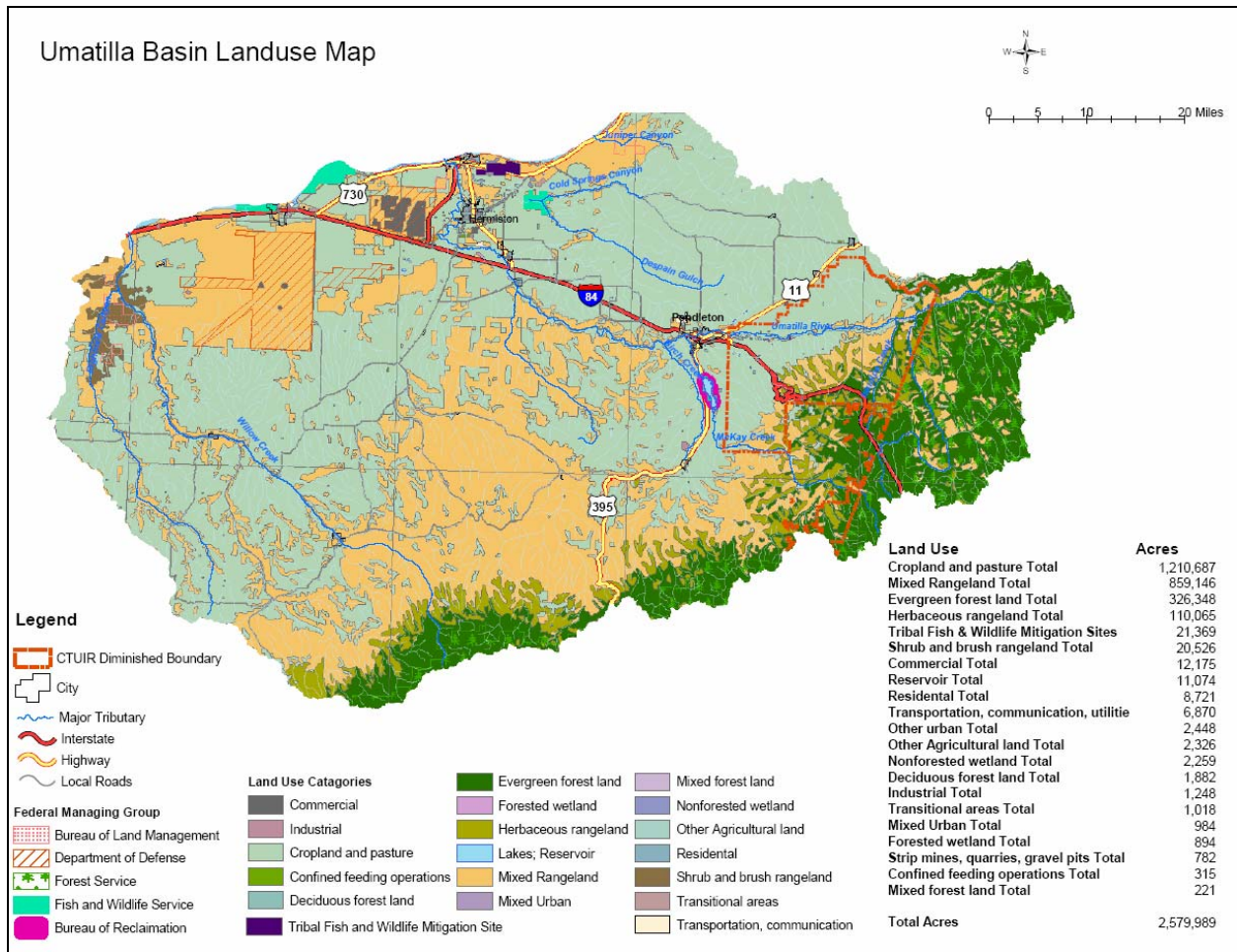


Figure 8. Land Use Within the Umatilla Basin



Figure 9. Riparian Area Impacted by Livestock (left) vs. Protected By Livestock Exclusion Fence (right)

Hydrology

Annual precipitation averages 10 inches/year (in./yr) near the confluence with the Columbia River to 50 in./yr in the headwaters (Taylor 1993). From 1928 to 1999, annual discharge at the gauging station near Umatilla, Oregon (RM 1.9) averaged 345,700 acre-feet (80.7 million cubic

meters [m³]). Average annual discharge of the Umatilla River Basin for calendar years 1995 to 1999 was 531,486 acre-feet (124 million m³) (USFWS 2002).

U.S. Geological Service (USGS) flow data from 1995-2008 at Gibbon, OR (RM 78.5) and the West Reservation Boundary, Umatilla River (RM 56.1) show unstable, flashy hydrograph patterns and extreme low and high flow episodes.¹ The Umatilla River hydrographs exhibit tall peaks indicative of high flows during high rain, snowmelt, and runoff events in the spring and early winter, but severe drops in flow during the semi-arid summer months, when it is not uncommon to have reaches of major tributaries devoid of flows for months at a time. This phenomenon results from the regional geological characteristics and arid climate, but is also influenced by the poor health of the watershed.

This hydrologic effect is less pronounced in the relatively pristine North Fork Umatilla Wilderness Area, apparently because of minimal human disturbance, higher elevations, developed soils, and expansive riparian areas featuring large woody debris and climax plant communities. It is generally perceived as a “reference” reach.

Anthropogenic Effects on Salmonid Habitat

The Umatilla River Basin 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*), rainbow/redband (*O. mykiss sp.*), and mountain whitefish (*Prosopium williamsoni*). Human-caused 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; sockeye and coho were extirpated in 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 completion 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 (Umatilla/Willow Subbasin Planning Team 2004). Subsequently, the abundance of chinook, steelhead, bull trout, and other fish species has also been dramatically reduced. 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 Columbia River spring chinook salmon, summer steelhead, and bull trout as threatened species under the ESA in 1973, 1992, 1997, and 1998, respectively.

The following species listed under the ESA currently occur in the Umatilla River Basin: Columbia River bull trout Critical Habitat (designated), Columbia River bull trout (threatened), and Mid Columbia River steelhead (threatened). 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

¹ US Geological Survey Water Data can be found at the following URL, as accessed November 19, 2008:

http://waterdata.usgs.gov/nwis/uv/?site_no=14020850&agency_cd=USGS
http://waterdata.usgs.gov/nwis/uv/?site_no=14020300&agency_cd=USGS

restricted sport fishing opportunities for steelhead and chinook salmon, there remains significant need to re-build viable, harvestable, and sustainable fish stocks throughout the basin.

Modern human activities have loaded the Umatilla River with agricultural fertilizers, sewage, pesticides, and suspended sediments, as well as urban and industrial pollution (CTUIR 2008). The Oregon Department of Environmental Quality (ODEQ) listed the Umatilla River Basin on the State's list of water quality limited water bodies' 303(d) list. (Please see the ODEQ website at URL <http://www.deq.state.or.us/wq/assessment/rpt0406/results.asp> for details.) A Total Maximum Daily Load (TMDL) was also written for waters within reservation boundaries (CTUIR 2005) that, in combination with CTUIR's habitat enhancement work, should lead to water quality improvements over the long term. (Please see <http://yosemite.epa.gov/R10/WATER.NSF/TMDLs/Approved+TMDLs#OR>, select "Oregon", and navigate to "Umatilla Tribal TMDL" for a copy of this report.)

Throughout much of the watershed, maximum water temperatures exceed lethal limits for bull trout and approach lethal limits for chinook salmon and rainbow/steelhead trout. The high stream temperatures potentially limit carrying capacity, adversely affect fish fitness, and should be considered as a primary factor limiting salmonid production in the watershed. CTUIR's UAFHP is currently taking steps to address water quality issues through its habitat restoration activities.

Habitat Protection/Restoration Activities

Habitat protection and restoration needs in the basin have been recognized in numerous reviews, planning processes, and reports (CTUIR 1993; CTUIR 2000; Umatilla/Willow Subbasin Planning Team 2004; 2005). The National Marine Fisheries Service (NMFS) has recently restarted the recovery planning effort for chinook salmon and steelhead and tributary habitat restoration. The National Research Council (1996) notes the importance of protecting and rehabilitating freshwater habitat as part of salmon recovery and specifically notes the importance of riparian areas. This body recommended that habitat reclamation or enhancement should emphasize rehabilitation of ecological processes and function (NRC 1996). The United States Fish and Wildlife Service (USFWS) draft bull trout recovery plan (USFWS 2002) also recognized the importance of habitat protection and restoration and specifically noted the need to improve water quality, reduce or eliminate fish passage barriers, and restore impaired instream and riparian habitat. Pre-project implementation aquatic habitat inventory surveys conducted by CTUIR revealed that habitat quality ranked poor in 85% of areas surveyed and fair in 15% in the Umatilla River. Flow quantity, water quality, passage, and in-stream channel complexity were identified as key limiting factors.

The *Draft Umatilla Willow Subbasin Plan* (Umatilla/Willow Subbasin Planning Team 2004) determined that the limiting factors could be addressed through habitat restoration and implementation ("Phase III") of the Umatilla Basin Project. Three restoration scenarios were proposed based on the results of the Ecosystem Diagnostic Treatment model: (1) Habitat restoration of the top priority geographic areas singly plus the implementation of Phase III of the Umatilla Basin Project; (2) Habitat restoration of the top 19 geographic areas plus implementation of Phase III; and (3) Habitat restoration of the top 19 geographic areas with no implementation of Phase III.

Not surprisingly, these results suggested that the greatest amount of action (restoring the 19 geographic areas and implementing Phase III flow increases) has the greatest impact on steelhead and chinook salmon productivity and abundance. The *Final Umatilla Willow Subbasin Plan* (2005) models recommended that a scenario with habitat restoration coupled with increased flows would be the most effective means of rehabilitating diminished (from historic levels) runs of chinook and steelhead. Implementation of Phase III will involve increased instream flows in the Umatilla River mainstem from Thornhollow (RM 73.5) to the mouth. In accordance with the 2006 NPCC solicitation outline, the FY2008 CTUIR UAFHP focused its restoration activities primarily on the Meacham and Birch Creek watersheds. However, project development continues to be prevalent throughout the basin when feasible opportunities to succeed arise, such as the Mid-Umatilla River and West Fork Spring Hollow Creek.

The following section describes specific areas where projects were implemented by CTUIR's UAFHP in FY2008.

Description of Creeks in Project Areas

Meacham Creek

The 114,000 acre Meacham Creek Watershed (Figure 10) is located in northeast OR, on the west slope of the Blue Mountains, 23 miles east of the city of Pendleton, OR. The headwaters originate near the towns of Meacham and Kamela, OR, near Salmon Back Ridge. Meacham Creek is a 37-mile long major tributary of the Umatilla River that enters near RM 79. Although intermittent in several reaches, it contributes slightly more than half of the summer flow to the mainstem Umatilla River at the confluence. Data from CTUIR shows that Meacham Creek runs 2-3 °C warmer (16 °C [60.8 °F] vs. 13.5 °C [56.3 °F]) during the summer than the Umatilla River at the confluence.

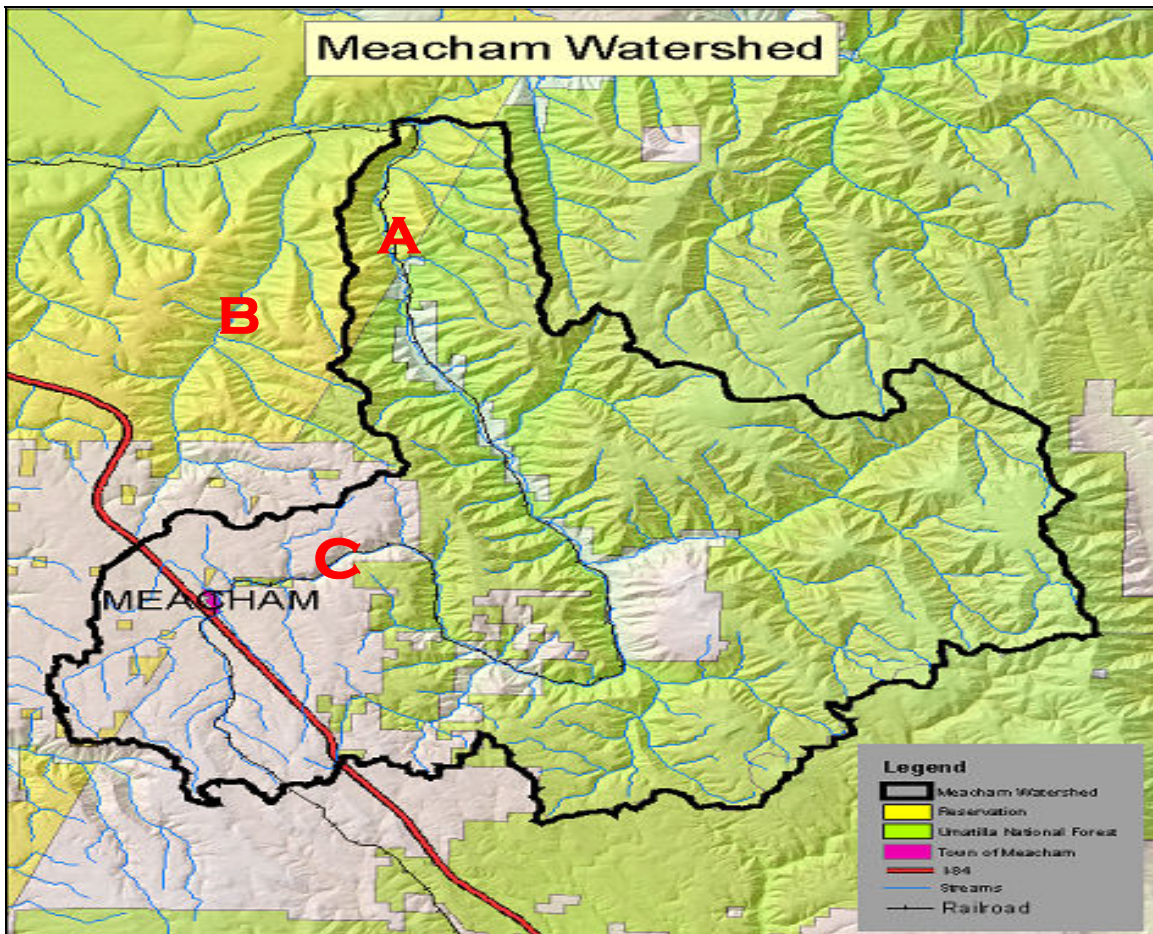


Figure 10. Overview of the Meacham Creek Watershed, Umatilla Basin, Northeast Oregon, with FY2008 Project Areas denoted by letters A-C

Key to Project Sites, Locations and Strategies:

A: Meacham Creek RM 5.0 -

Biological Controls to Remove Noxious Vegetation.

B: Isquultpe Creek RM 0-8 -

Aquatic Habitat Inventory.

C: Meacham Creek RM 34.0 - Installed 3.3 Miles of Livestock Exclusion Fencing.

Topography

The topography of the Meacham Watershed is typical of the Blue Mountain foothills, with broad flat ridges bisected by moderately steep, constraining canyons with a variety of aspects. The valley floor is generally comprised of multiple terraces alternating with moderately steep hillslopes located adjacent to the creek. Elevations range from approximately 1,850 feet above sea level near the mouth of the creek to approximately 2,850 feet at the headwaters. In the lower half of the basin, the watershed is characterized by having a broad valley floor averaging 10.7 times as wide as the active channel. The upper half consists of much steeper and closely orientated hillslopes that encroach upon the channel and contribute increasing proportions of bedrock into the channel and bank composition.

The typical channel morphology is most representative of a Rosgen "C" type classification (e.g., slightly entrenched, meandering, alluvial channels that occur on gentle gradients in broad valleys, as defined in Rosgen 1996) in the lower half of the basin; in the upper basin, the channel becomes increasingly constrained due to natural and human-made conditions.

Hydrology

The USGS maintains a gauging station operated in cooperation with the CTUIR at Gibbon, OR (RM 78.5). The drainage area covered is 176 mi.². Maximum flows peak at 8,800 cubic feet per second (cfs), while minimums of 7 cfs constitute summer base flows. Several vast dry channel reaches are located intermittently throughout Meacham Creek in the summer months. It has been theorized that substantial fish displacement, stranding, and mortality occurs in the system due to these hydrological conditions.

Plant Communities

Plant communities in the Meacham Watershed exhibit a grass-timber mosaic characteristic, typical in the Blue Mountains. North-facing slopes and the riparian corridor support second growth timber. Grasslands are more common on south-facing slopes. In the riparian areas, cottonwoods and conifers (12-20 in. diameter breast height [dbh]) are dominant, various shrubs comprise the second-story growth, and tertiary growth consists of grasses. Riparian shrub communities generally consist of black hawthorn, Himalayan blackberry, willow, and to a lesser extent, oceanspray, various rose species, elderberry, and common snowberry. Other habitat types include upland shrub, predominantly mallow ninebark/common snowberry and common snowberry/rose plant associations, located in stream or draw bottoms.

Anthropogenic Impacts

The Meacham Watershed is of historical significance to Native American people of the area because of its traditional hunting, fishing and gathering opportunities. There are various ancient sites of cultural significance located adjacent to the Meacham waterways. The primary impacts to Meacham Creek are associated with the adjacent UPR railway, built in the early 1900s at close proximity to the mainstem of Meacham Creek for the majority of its 37 river miles. Extensive diking, channel relocation or constraint, and alteration of the vegetative component are impacts associated with construction and maintenance of railway operations. Many of the large trees in the Meacham watershed were likely removed to fuel steam locomotives during the early days of railroad and to supply the needs of a sawmill formerly located near RM 2 of the North

Fork of Meacham Creek (Andrus and Middel 2003). A significant secondary impact to Meacham Creek is the presence of livestock in the riparian area and stream zone, where moderate to heavy grazing pressure occurs.

The current property ownership profile of Meacham Creek and watershed shows a mixture of public, private, and Tribal ownership. Management of the resources in the watershed is controlled by various Tribal, Federal, private, and corporate interests. Much effort is devoted to planning and promoting cooperative participation in the restoration process by the various entities. Project scoping and educational outreach continues to be an important tool in regard to forging mutually beneficial relationships and coordinating restoration efforts among all land managers in the basin.

In limited areas, hunting and fishing opportunities are available to tribal and non-tribal participants, but much of the basin is somewhat restricted to users due to the presence of locked gates at both ends. The UPR installed the gates within the last decade as a means of reducing traffic for railway safety and fire control in an effort to ensure that operations are uninterrupted. The restricted access aids recruitment of numerous fish and wildlife species. This benefit is diluted to some degree by disturbance and mortality associated with the infrastructure of the railroad and its daily operations.

Anadromous Salmonids

The Meacham Creek Watershed produces an anadromous salmonid component which contributes to the harvest of both the recreational and commercial fisheries trades located in the Columbia River and Pacific Ocean as well as the traditional and subsistence uses by Native Americans from the Umatilla Basin. To illustrate the significance of Meacham Creek as a salmonid producer, there are more than twice as many salmonids estimated in the lower 15 miles of Meacham Creek than in the lower 81.8 miles of the Umatilla River, despite having less water volume than the Umatilla River. Currently, the Meacham watershed is a primary producer of steelhead trout and is of secondary importance for chinook salmon and bull trout.

Much of the Meacham Creek Watershed is not in compliance with salmonid temperature requirements and corresponding state and federal water quality standards. Thermal guidelines for bull trout state that water temperatures above 15°C (59 °F) limit distribution. This benchmark is consistently exceeded in the majority of the Meacham Watershed. Physical habitat survey data is ranked as poor overall and is summarized in *Umatilla Basin Natural Production Monitoring and Evaluation Annual Report 1992-1993* (CTUIR 1994).

Meacham Creek's suitability for salmonids is currently classified as marginal, but the restoration potential is good despite limitations imposed by the fixed presence of the UPR. Currently, high stream temperatures, lack of summer flow, limited quantity of pools, lack of overall habitat complexity and shortages of large woody debris are considered as factors limiting salmonid carrying capacity and production in Meacham Creek.

Habitat Enhancement Restoration Activities

In FY2008, CTUIR used biological controls on noxious weeds at RM two passage rectification projects were carried out to benefit anadromous salmonid habitat in Meacham Creek. These include: (1) Meacham Creek RM 1.7, removing cabled boulders and planting 50 cottonwoods, 100 alders and 20 willows; and (2) Meacham Creek RM 20.2, partial dam removal, construction of grade control structures with root wads, and planting 85 alders and 65 willows into the riparian area.

Isquulktp Creek

Isquulktp Creek is a tributary of moderate size that enters the mainstem of Umatilla River at RM 76.7. Isquulktp Creek contributes roughly 5% of the Umatilla River's summer flow and is a known destination for significant numbers of adult steelhead spawning. It is dominated by constraining terraces and predominantly single, Rosgen "C" channel morphology (low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains, as defined in Rosgen 1996). Isquulktp Creek ranked as moderate habitat quality overall for salmonids, primarily due to relative light disturbance and hydrologic stability. Isquulktp Creek receives very little fishing pressure. Hunting opportunities attract the most recreational users.

An intensive Aquatic Habitat and Fish Inventory survey was conducted by CTUIR in 1994 on Isquulktp Creek (RM 0-10). Specific results for individual habitat metrics and fish populations can be found in *Umatilla Basin Natural Production Monitoring and Evaluation Annual Report 1993-1994* (CTUIR 1995). In 1994, the number of juvenile salmonids estimated in the lower 10 miles was 37,611, 97.1% of which were rainbow/steelhead trout; 2.9% were juvenile spring chinook salmon. As part of its FY2008 activities, CTUIR conducted an Aquatic Habitat Inventory and Fish Survey on Isquulktp Creek, RM 0-8, in the summer of 2008. Low numbers of bull trout have been documented in Isquulktp Creek. It is conceivable to foresee the potential of Isquulktp Creek as a rearing area for juvenile bull trout and staging area for adults. Historically, Isquulktp Creek would have theoretically supported moderate abundance of bull trout. The potential for a moderate number of juveniles and low numbers of small adults exists. Connectivity problems to existing populations in other areas of the basin appears to be a primary limiting factor of distribution due to undesirable conditions within the migratory corridor.

McKay Creek

McKay Creek is a moderate-sized tributary that enters the Umatilla River near RM 50.6, just west of Pendleton, OR. It is approximately 36 miles long and its headwaters are in the Blue Mountains near the Umatilla/Union County line. The lower six miles of McKay Creek's hydrology is heavily influenced by the McKay Creek Reservoir and the earthen dam creates a complete passage barrier for migrational fish. The upper 30 miles is inaccessible to migrating fishes but is inhabited by abundant numbers of resident rainbow trout. Historically, it was one a preferred destination for anadromous spawning activity (chinook salmon and steelhead trout) and favorable conditions still exist if not for the presence of the earthen dam located at RM 6. The lower creek is encroached upon by residential housing developments adjacent to both sides of the creek. The upper reach does have alternating agricultural land use (e.g., crops and grazing). The predominant crop is wheat and alfalfa but the encroachment of hillslopes prevents expansive crop fields.

West Fork Spring Hollow Creek

West Fork Spring Hollow Creek is a small tributary to the Wildhorse Creek. It enters Wildhorse Creek at RM 13.8 and flows in a northwesterly direction from the foothills of Wildhorse Mountain. It is predominantly a non salmonid stream, but there are documented accounts of rainbow trout presence in the easement area. In FY 2008, CTUIR protected the riparian trees in its existing easement from damage by beavers; the CTUIR Fish habitat Program supports a no-kill policy in regard to beaver and promotes their return to the watersheds in the Umatilla River Basin.

Birch Creek and West Birch Creek

Birch Creek is a major tributary that enters the Umatilla River near RM 48.5, five miles west of Pendleton, OR. Birch Creek extends 16 miles before meeting West Birch Creek in the City of Pilot Rock, OR. West Birch Creek is of moderate size and measures 10 miles in length. The Birch Creek Watershed headwaters are characterized by elevations up to 4,000 ft above sea level.

Birch Creek

The topography of the Birch Creek Watershed is typical of the Blue Mountain foothills, with broad flat ridges bisected by moderately steep, constraining canyons with a variety of aspects across a broad valley floor. The valley floor is comprised of low and high terraces with much incidence of actively eroding banks with an overall lack of instream cover. Thin riparian transects contain sparse tree growth. Water temperatures and habitat conditions throughout Birch Creek are classified as marginal for salmonids. Several passage issues in the lower basin are in the process of being evaluated by the UAFHP and ODFW and are quite problematic for migrating salmonids seeking more desirable conditions in the upstream areas of the basin. The upper reaches consist of moderately-steep, closely orientated hillslopes that cradle the channel and support substantial tree growth, and cooler waters.

Diking and straightening practices have generally concentrated flows into one predominant channel. Therefore, secondary channels account for a small portion of the overall streamlength. Much of the large wood in the Birch Creek Watershed was likely removed to clear lands for agriculture or for timber harvest reasons. The poor health of the banks is primarily attributed to land use practices, such as clearing, overgrazing, and channelization and flashy hydrographs. Due to the relatively high composition of fine substrate and eroding banks, turbidity levels can become relatively high during heavy rainfall events. Summer flows are very low and the surface flow deficiency is magnified due to irrigation withdrawals. Open sky exposure to the wetted channel is at generally at undesirable and excessive levels.

Mid to lower portions of mainstem Birch Creek are very entrenched and provide poor juvenile rearing habitat for salmonids. Many of these channels have lost connection with their historic floodplain. Their degree of entrenchment is extremely erosive and unstable and produces excessive sediments that fill in pools, embed spawning substrates and accelerate horizontal channel migration.

In addition to poor physical habitat features such as lack of in-stream cover, several water quality issues have been identified as limiting factors of salmonid-rearing production in the Birch Creek Watershed during the summer months. Excessive water temperature, bacteria and sediment loads

were identified and listed by the Umatilla Basin TMDL committee. Birch Creek is listed as water quality limited for temperature, habitat modification, and iron concentrations on Oregon's 1998 303(d) list. Extremely low summer flows are very common and magnify the issues with the categorical TMDL and 303d listings.

Despite severe human impacts and limiting factors, the Birch Creek Watershed is the migratory corridor to some of the most important summer steelhead spawning tributaries in the Umatilla River Basin. Its tributaries continue to provide primary spawning areas for adult steelhead and it is a significant producer of steelhead juveniles.

In FY2007 riparian plantings were added to two important areas of Birch Creek where fish passage obstructions were evaluated by Umatilla Basin managers. One project (RM 15.5) was rectified in FY2007; the other (RM 10.3) is still under evaluation.

West Birch Creek

West Birch Creek land use is primarily rural-residential in the lower reach, crop production and grazing in the middle reach, and timber production in the headwaters. The typical vegetative portrait of the lower two-thirds of West Birch Creek is comprised of crop lands or grasses whereas the upper tributaries present a mosaic of diverse, multi-level grass/shrub/tree growth. West Birch Creek has been heavily impacted by agricultural developments along the majority of its length. There are significant quantities of water withdrawals (up to 100%) for agricultural uses, diked and straightened channels, areas of severe livestock grazing, and crop fields in close proximity to the stream channel.

The majority of fish that inhabit lower West Birch Creek in the summer are from the family *Cyprinidae*. CTUIR studies have shown that ratios of non-salmonids (dace, suckers, shiners) to salmonids were approximately 1,000:1 in lower West Birch Creek during the summer.

West Birch Creek has vast, extensive areas of favorable substrate and desirable slope characteristics. These features give the subbasin a favorable spawning potential, but numerous passage issues in the mainstem of Birch Creek hinder the overall potential of this system. If passage and other habitat deficiencies are addressed, the projected potential of steelhead production in the Birch Creek Watershed is quite impressive.

The specific purpose of the passage rectification project on West Birch Creek (RM 2.7) accomplished during FY2008 was to improve fish passage and riparian conditions. Just upstream, CTUIR donated fencing materials to the landowner at RM 3.0, where the Cunningham Fish Passage Rectification Project was completed in FY2007. The projects did not directly address water quality, but both contribute to improved watershed health conditions.

Umatilla River

The Umatilla River originates on the west slope of the Blue Mountains, east of Pendleton, OR and flows 115 miles in a northwesterly direction to the Columbia River at RM 289. The basin has a drainage area of 2,540 mi² (6,579 km²). The basin's hydrologic unit number is 17070103. Many reports describing the Umatilla River are available on the following BPA website at URL: <http://www.efw.bpa.gov/integratedfwp/reportcenter.aspx>.

The Mid-Umatilla River has been highly altered by human development. Stream channel morphology and flows have been significantly altered by irrigation structures and withdrawals, channelization, development, and clearing of the riparian area and adjacent uplands (CTUIR 2008). Stream temperatures between RM 35 and 49 are positively influenced by cold water releases from McKay Reservoir and provide suitable rearing temperatures for salmonids. These releases elevate flows from 45 cfs to between 250 and 325 cfs (Yoakum, OR flow gage) and decrease water temperatures (CTUIR 2008). The gradient in this reach is relatively constant, and the increased flows provide abundant fast water habitat types (CTUIR 2008). Umatilla River stream temperatures in the 14 miles below the McKay Reservoir are comparable to those found in upper reaches near the headwaters (RM 80-90).

In FY2007, CTUIR installed two wells at the Bauer & Gustafson (B&G) Resources property (RM 40) for off-channel cattle watering and planted 100 cottonwood saplings in the riparian area. In FY2008, CTUIR installed two solar panels to provide electricity for off-channel cattle watering stations. This project is a cooperative effort with the NRCS who oversees the CREP site riparian plantings that CTUIR implements and maintains.

DESCRIPTION OF ESA LISTED AND SENSITIVE SPECIES IN THE UMATILLA RIVER BASIN PROJECT AREAS

Bull Trout – Umatilla River Watershed

Bull trout (*Salvelinus confluentus*) are a sensitive species in regard to habitat requirements in that they need complex conditions in addition to high quality cold water. Bull trout numbers have declined dramatically from historical levels in the Umatilla Basin due to degraded habitat conditions and the species is classified as “threatened”. Adult bull trout population estimates for the entire Umatilla Basin number approximately 500 individuals. The North Fork of the Umatilla River holds approximately 85% of the basin’s bull trout, three fourths of which are located between RM 3-6. The low numbers and concentrated distribution pattern of bull trout in the Meacham Creek Watershed categorizes the population as “increasing threat” and “high risk” of extinction. Not surprisingly a report on the status of Oregon’s bull trout (Buchanan and Gregory 1997) classified the small bull trout population in Meacham Creek as “high risk”.

It is currently believed that adult bull trout in the Umatilla Basin move downstream in late fall to over-winter in the mainstream Umatilla River where seasonal growing conditions are more suitable. In the springtime, as water temperature begins to increase, adults migrate back into cooler headwater areas. Most bull trout in the Umatilla Basin are residential, showing only limited migratory patterns. The limited movement appears to be an evolutionary adaptation due to the vast detrimental impacts to habitat quality and quantity.

Bull Trout – Meacham Creek Watershed

Meacham Creek is classified as critical habitat for bull trout due to its historical importance, knowledge of inhabitation, and potential for connectivity with the core population located in the North Fork Umatilla River. Bull trout numbers in the Meacham Watershed are highest in the headwater tributaries, and considerably lower in the mainstem (Andrus and Middel 2003). An estimated 15 bull trout inhabit the lower 15.3 miles of Meacham Creek during the summer months. It is suspected that bull trout staging in lower Meacham Creek during this time have migrated in from the upper Umatilla River or North Fork Meacham Creek. Population levels of sexually mature bull trout in the entire Meacham drainage is estimated at less than 50 individuals, most of which are located in the North Fork Meacham Creek, which joins the mainstem Meacham Creek at RM 15.5.

Bull trout have never been documented in Camp Creek. Year-round hospitable habitat is found in only a minority of the Meacham watershed, generally near cold water inflows or relatively deep pools with additional desirable qualities such as shade and cover. Therefore a migratory life stage component would appear beneficial to Meacham’s bull trout population. The senior author saw only one sub adult bull trout during large wood debris monitoring near Meacham Creek at RM 2.5 on August 28, 2007.

The habitat conditions for bull trout in the mainstem of Meacham Creek are severely limited and currently classified as marginal at best. Meacham Creek currently lacks both the quantity of complex habitat, and water quality essentials associated with systems that have strong populations of bull trout.

Current bull trout management strategy concentrates on protective measures such as fishing restrictions and preventive monitoring of actions that may cause “take”. Population estimate trends show moderate increases since 1998. The combination of education, protection and recovery efforts along with habitat enhancement and closed fishing seasons are probable explanations for the positive response.

Protecting the Meacham sub-population is important to preserve the genetic integrity of the species as well as to enhance the migratory corridor from a connectivity standpoint with the primary core population located in the North Fork Umatilla River. The potential for connectivity improves the odds of species preservation over time, especially during catastrophic events and diversifies evolutionary genetic exchange between populations when conditions dictate the necessity for such. Proposed UAFHP restoration activities are intended to improve the status of bull trout in the Meacham Creek watershed by accommodating the specific needs of the species in an effort to increase numbers of this fragile sub-population over time.

The removal of noxious vegetation at RM 5 of Meacham Creek and the fencing off of livestock at RM 34 (FY2008), the placement of 160 whole trees into Meacham Creek (FY2006) and the rectification of fish passage barriers at RM 1.7 and RM 20.2 of Meacham Creek and RM 0.3 of Camp Creek (FY2007), in addition to riparian plantings, and other planned projects (levee setbacks) will contribute to the ecological restoration of potential bull trout habitat in the Meacham Creek watershed.

Steelhead Trout – Birch Creek Watershed and Meacham Creek Watershed

NMFS listed summer Middle Columbia River Steelhead as an Ecologically Significant Unit in 1999. In the Umatilla Basin, the wild steelhead run is supplemented with hatchery stock. Many of the returning hatchery fish reproduce naturally. A portion of wild adults are trapped upon their return from the ocean and spawned artificially at hatchery facilities.

Birch Creek Watershed

The Birch Creek Watershed was historically, and continues to be, a major producer of summer steelhead trout, but the current population of this ESA-Listed species is at a fraction of historic levels due to detrimental anthropogenic impacts. However, the basin is considered a primary destination for summer steelhead spawning in the Umatilla Basin. Rainbow/steelhead trout have proven to be best suited for conditions in the Birch Creek Watershed and are the most abundant salmonid species. The dominance of this species can be attributed to the beneficial timing of life cycle characteristics and the resilient adaptation to changing conditions in the basin, which has given the species a competitive advantage over other salmonids.

Meacham Creek Watershed

From 1993-2008, CTUIR established several fish sampling sites throughout the Meacham Creek Watershed. The sites were sampled for fish several times annually, usually during the spring, summer and fall periods. Results showed that densities of captured salmonids were highly variable during different times of year, indicating strong migratory patterns and turnover. Rainbow/steelhead trout are the most abundant salmonid species in the Meacham Creek Watershed throughout the year.

Unlisted, Sensitive Species of Significance to Tribal Culture: Middle Columbia Spring Chinook Salmon

Spring chinook salmon were extirpated from the system in the early 1900s due to seasonal passage issues in the lower Umatilla River caused by irrigating dams and dewatering. A neighboring strain of spring chinook salmon have been successfully reintroduced in the Umatilla River using hatchery techniques. A plethora of management strategies have been successfully exercised in effort to reestablish the species. The abundance of naturally produced juveniles has substantially increased in recent years, and adults now return to the basin annually. Meacham Creek supports all age classes of spring chinook salmon and all age classes show increasing trends of abundance. However, there is little evidence of use by any age class in Birch Creek.

METHODS, RESULTS, AND DISCUSSION OF STATEMENT OF WORK DELIVERABLES

Work elements and identifier codes assigned by the BPA Division of Fish and Wildlife are presented in the following section. The work elements and milestone descriptions provide a comprehensive view of FY2008 UAFHP work activities.

A-C165: Produce Environmental Documentation-Prepare Biological Assessments for Applicable Projects; Submit JPA to State and Federal Entities; Cultural Resource Protection and Preservation

The following deliverables were required for FY2008 projects:

- Prepare Biological Assessments (BA) for Applicable Projects.
 - A. Prepare a BA that covers Meacham Creek levee alteration and instream enhancement.
 - B. Prepare a BA that covers both Birch Creek passage improvement projects.
 - Deliverable: C. Official acceptance and approval of BA's by applicable compliance representatives.

- Submit JPA to State and Federal Entities
 - A. Prepare & submit JPA for Meacham Creek levee removal/relocation.
 - B. Prepare & submit JPA for instream habitat enhancement on Meacham Creek.
 - C. Prepare & submit JPA for Birch Creek Peterson property fish passage rectification.
 - D. Prepare & submit JPA for Birch Creek Broun property fish passage rectification.
 - E. Apply for point of diversion change for Birch Creek Peterson property.
 - F. Apply for point of diversion change for Birch Creek Broun property.
 - Deliverable: G. Obtain DSL/USACE approval on JPA permits.

- Cultural Resource Protection and Preservation
 - A. Obtain cultural resource clearance and approval for Meacham Creek instream and levee projects.
 - B. Obtain cultural resource clearance and approval for Birch Creek passage rectification projects.
 - Deliverable: C. Obtain official approval from Tribal & state cultural resource preservation agency representatives.

CTUIR successfully submitted all applicable and required permitting documents to the appropriate federal, tribal, state, county entities for select implementation projects in a timely manner. 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, BAs, 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.

For FY2008, CTUIR UAFHP:

- Prepared a biological assessment (BA) in FY2007 that covered FY2008 instream enhancement at Birch Creek passage improvement project (CTUIR 2007).
- Prepared and submitted one Joint Permit Application (JPA) in FY2007 to the US Army Corps of Engineers (USACE) and Oregon Department of State Lands (DSL) for the West Fork Birch Creek Hoeft Property Fish Passage Rectification Project.
- Obtained cultural resource survey/reports, clearances and approvals by the State Historical Preservation Office and the CTUIR's Cultural Resource Protection Program for the Hoeft Passage Rectification Project.

D189: Regional Coordination With Other Agencies in Planning and Implementing Habitat Improvements in the Umatilla Basin

- A. Participate in Soil and Water Conservation District meetings and interact with stakeholders.
 - B. Participate in Umatilla Basin Watershed Council meetings and interact with stakeholders.
 - C. Coordinate with Umatilla Basin co-managers Oregon Department of Fish and Wildlife.
 - D. Network with professional experts in the discipline of habitat restoration.
- Deliverable: E. Active participation with co-managerial interests in the Umatilla Basin.

Coordination with other agencies in planning and implementing habitat improvements in the basin is undertaken to facilitate development of habitat restoration and enhancement projects, participate in Subbasin, ESA planning processes and project selection processes, and assist with providing watershed restoration education. In FY2008, CTUIR actively participated in constructive interactions with the ODFW, UBWC, NRCS, Farm Services Agency (FSA), and Umatilla County Soil and Water Conservation District to utilize networking structures and increase cooperative partnerships to strengthen project effectiveness. CTUIR conducted post-implementation tours of the West Birch Creek RM 2.7 (Figure 11) passage rectification project and riparian fencing project at RM 3.0. In addition, CTUIR toured the Meacham Creek Levee Setback Project in October 2008 with cooperating landowners and consultation entities. This contributed to the initial planning phase of the levee setback. CTUIR prioritizes regional coordination and encourages frequent cooperative efforts with its project partners.



Figure 11. CTUIR Habitat Project Biologist Eric Hoverson (right) Discusses the Completed Hoeft Fish Passage Rectification Project with DNR Director Eric Quaempts (2nd from right) and Program Manager Gary James (left) and NRCS representative Chet Hadley (background), October 2008

In May 2008, project biologists Eric Hoverson and James Webster presented a poster at the 2008 Western Division American Fisheries Society Annual Meeting, Portland, Oregon (Figure 12). Entitled “Strategies for Improving Fisheries Habitat in a Columbia River Tributary: A One Year Perspective and Illustration of Diverse Techniques Used to Address Habitat Deficiencies in the Umatilla River Subbasin, Oregon,” the presentation provided an overview of habitat enhancement and restoration activities and highlighted several large-scale projects undertaken by the CTUIR and project partners. The poster was invaluable for networking with other colleagues for future projects and for sharing our current work.



**Figure 12. “Strategies for Improving Fisheries Habitat in a Columbia River Tributary”
 Poster Presented at the American Fisheries Society, May 2008, Portland, Oregon**

As part of its continuing efforts at outreach to publicize its restoration work, CTUIR published the article about the rectification project at Hoelt Dam in its newspaper, *Confederated Umatilla Journal*, page 31, on October 2008 (Figure 13).

Weirs improve passage at Hoelt Dam

PILOT ROCK - A three-phased project in the works for a dozen years has protected a "sentimental" dam while improving passage for endangered steelhead returning to the Birch Creek Basin.

Hoelt Dam, an eight-foot tall barrier at river mile 2.7 on West Birch Creek, two miles northwest of Pilot Rock and within the historical and traditional range of the Confederated Tribes, had for decades delayed or stopped upstream adult steelhead returning from the ocean to spawn in the headwaters of West Birch Creek.

The Umatilla Subbasin Plan had identified Hoelt Dam as the most significant impediment to the migration of adult steelhead as well as juvenile trout trying to seek cooler waters during the summer months, said Eric Hoverson, who took the project lead for the CTUIR Fisheries Program.

"We had several incidences of fish stranding and mortality associated with this phenomenon," said Hoverson. "A makeshift fish ladder was constructed many years ago in an attempt to improve passage, but success was limited due to an inadequate design, which was not sufficiently applicable to the conditions at the site."

The CTUIR Umatilla Basin Habitat Enhancement Project took responsibility to address the fish passage issue, but were challenged by stipulations set forth by the landowner, Hoverson said.

The Hoelt family insisted that the dam not be removed under any circum-



The primary improvements, Hoverson said, are improved passage and habitat conditions for migrating fish, more pools that are wider and deeper, and increased shade.

stances. The dam, they said, had sentimental value because it had been constructed by family members, and it served as a primary source for irrigation.

"We respected the importance of the dam to the family and set forth to devise a remedy that would satisfy both agricultural and fisheries interests," said Hoverson.

That was not an easy task. The effort had started in 1996 when McMillen Engineering out of Boise developed a blueprint for rectifying passage at the dam, but for various reasons, several agencies could not implement the plan.

In 2003, the CTUIR Fisheries Program embraced the challenge and secured funding to improve passage at Hoelt Dam. The Tribes also took on the duty of planning and securing project approval through a permitting process that took five years.

Hoverson said McMillen Engineering was contracted again to develop final design and implement the work, which generally encompassed three phases.

Phase one, which began in 2003, involved updating and solidifying the design of the fishway.

Phase two, which occurred in December 2007, included off-site fabrication of a fishway comprised of 13 large concrete weirs.

Phase three, which took place in August and September of this year, involved the actual placement of the weirs into the channel, as well as strategic placements of rootwads and boulders.

CTUIR Fisheries Program crews captured and relocated thousands of fish prior to the third phase to minimize potentially harmful effects caused by heavy machinery entering the stream channel.

The creek was temporarily diverted around the work site by way of the existing irrigation ditch and returned back to the creek downstream of the worksite.

This fall, the Tribes will be planting stream bank vegetation.

The primary improvements, Hoverson said, are improved passage and habitat conditions for migrating fish, more pools that are wider and deeper, and increased shade.

There was a commendable amount of effort contributed over the past 12 years by a multitude of agency personnel to solve passage at Hoelt Dam," Hoverson said. "The reward for such enormous dedication and effort will be realized in the form of improved watershed health and function, while improving the conditions for associated fish and wildlife."

The full potential of the project also was enhanced by an additional passage improvement project recently conducted by the Tribes about a half mile upstream at the Cunningham Sheep property. Solving passage at the two sites assures improved passage conditions to improve spawning and rearing areas located along 30 miles of stream in the upper basin, Hoverson said.

The CTUIR Fisheries Program will be conducting tours to this and other habitat enhancement project sites in the future.

Anyone interested in touring project sites should call 541-276-4109 for more information.

Figure 13. *Confederated Umatilla Journal* Article: Fish Rectification Project at Hoelt Dam

E157: Collect/Generate/Validate Field and Lab Data – Collect Various Forms of Professional, Scientific Data for Project Potential Analysis

- A. Environmental compliance requirements complete.
- B. Conduct annual photo point cross sections related to specified project areas.
- C. Conduct photo documentation at 36 whole tree configuration sites, in Meacham Creek, various flows.
- D. Do aquatic habitat inventory assessment survey of Isquulktp Creek RM 0-10.
- E. Do aquatic habitat inventory baseline at project areas prior to implementation.
- F. Conduct fish inventory surveys in association with fish relocation prior to instream Work.
- G. Perform riparian tree planting survival inventory at selected areas.
- Deliverable: H. Develop and utilize applicable and effective monitoring techniques.

CTUIR independently collected pre-project data on the following: water temperature, aquatic habitat inventory, fish composition, abundance and spawning. CTUIR cooperatively participated in the collection of turbidity, aquatic insect composition and abundance. CTUIR counted steelhead spawning redds and collected carcass data in Meacham Creek in the spring of 2008. Spring chinook redd and carcass data was collected in the fall of 2008 by CTUIR in various areas of the Umatilla River Basin, including Meacham Creek. Cooperating partners at the ODFW conducted steelhead spawning studies in the Birch Creek Watershed. Macroinvertebrate sampling was accomplished via the ongoing professional services of Wooster and DeBano, and data is available in various technical reports available through CTUIR. CTUIR also conducted habitat surveys on West Birch Creek at RM 2.7 and 3.2. A fish survey was conducted at RM 2.7. CTUIR also conducted a habitat and fish survey from RM 0-8 on Isquulktp Creek in FY2008. Isquulktp Creek is a tributary of moderate size of the Umatilla River and enters from the south at RM 76.7. The elevation at the confluence is 1640 ft.

Aquatic habitat methods developed by Oregon Department of Fish and Wildlife were used to inventory aquatic and riparian habitat on all creeks (Moore et al. 2002). Field surveys were conducted by one to two persons walking upstream, dividing the stream into a series of individual habitat quadrats. Quads were identified as riffle, rapid, glide, scour pool, off-channel/sub-unit pool, and numbered sequentially. Dimensions of quadrats were determined primarily on distinct hydraulic features as defined in the ODFW methods.

The following data was recorded for each quad; habitat type, latitude, longitude, mean length, wetted and high-flow width, depth, shade, canopy, wood rating, substrate composition, channel type, percent flow, land use, bank class, undercut bank, dominant and secondary vegetation. Blackberries and young deciduous growth were classified as shrub cover. Wood ratings were categorical and useful for quantifying the value of in-river woody debris habitat for fish. In addition, pieces of woody debris were tallied if they met minimum size requirements, and were located within the high water channel. Shade values were taken when standing in the middle of a quadrat, while canopy estimates were made from each adjacent shoreline. Notes were taken to supplement the standard entry requirements.

Currently protocol within the CTUIR UAFHP recommends that a pre-implementation fish inventory be conducted to establish baseline data including fish density and species composition. This protocol was established in order to obtain measurable results for our habitat enhancement

work over time to determine the effectiveness of habitat enhancement actions. Fish surveys were conducted at three habitat enhancement project sites and are discussed below.

Aquatic Habitat Inventory and Fish Monitoring: Isquulktp Creek

Aquatic Habitat Inventory: Isquulktp Creek, RM 0-8

An Aquatic Habitat Inventory was conducted on RM 0-8 of Isquulktp Creek in July 2008. The most notable improvements in the 14 years since the last survey was conducted included: (1) the increase in undercut banks from 3.8% to 13.2% (due to blackberries); (2) the increase in the quantities of pieces of wood by 250 (220 were added by CTUIR via helicopter in past years); (3) the increase in wood rating for fish benefit from 1.3 to 1.6; and, (4) channel shade increased 5%, from 40% to 45%.

A summary of metrics measured included: (1) average wetted width: 2.6 m; (2) average active channel width: 8.2 m; and, (3) average depth: 0.18 m. Substrate consisted of the following types: 56.2% gravel; 20.4% sand; 16.4% cobble; 3.5% bedrock; 2.0% boulder; 1.5% silt.

Twenty steelhead redds were documented by CTUIR in the spring of 2008. The redds were stratified, not concentrated into a central area, and were located throughout the entire survey reach. Based on visual observation, resident adult trout aged three years and older began inhabiting the creek near RM 5.5. The lower 5.5 miles appeared to be primarily comprised of anadromous steelhead juveniles.

Additional information obtained from the survey includes the following data/observations:

- Many 4 in. rainbow trout, some spring chinook juveniles observed
- Maximum water depth recorded in the survey was 1.2 meters
- Three important spring seep sources were documented that had water temperatures ranging from 9.5-14.5°C, whereas the adjacent Isquulktp Creek had temperatures from 16.5-21.5 °C
- Caddisfly larvae are very abundant (Figure 14)
- Some light cattle grazing due to cattle trespass issues
- An old gravel logging road runs parallel to the creek
- Evidence of old timber harvesting (tree stumps)
- Juvenile salmonids were observed trapped within isolated pools due to summer low flows (figure 14)
- Recent beaver activity
- Two passage concerns associated with natural bedrock falls (Figure 14)
- Bachelor Canyon Creek, a tributary at RM 4, was dry during the survey period
- Healthy alder trees were typically leaning over the creek at angles approaching 45 degrees, providing shade (Figure 14)
- Biota documented included: butterflies, hummingbirds, crayfish, owls, frogs, grouse, and bears
- Riparian habitat available for wildlife, e.g., snags for pileated woodpeckers (Figure 14)
- A recent event, a 90-mph windstorm, knocked down conifers and cottonwoods (Figure 14)
- Filamentous algae covered much of the substrate in one section of the upper reaches (Figure 14)

- Little Isquultpe Creek contributed 5% of the flows to Isquultpe Creek and had water temperatures that were 14 °C versus temperatures of 22 °C in Isquultpe Creek

The two most beneficial components of shade are mature alder growth at close proximity to the channel and the plush understory of blackberries that provide a continuous band of channel shading, overhead cover, undercut bank, and winter habitat for fish and wildlife. Blackberries retain bank structure, temporarily lay down during high flow events to buffer erosional damage from sheer stress, and provide stream shade in this temperature-limited system. Blackberries also provide cover and conceal steelhead adults near redds on Isquultpe Creek where there is an overall lack of hiding cover and pool habitat. Blackberry growth has produced a notable response due to resting of the riparian area from livestock since the CTUIR made the initial purchase of the property around 1997. Despite being viewed by some habitat managers as non-native, noxious growth, blackberries are functioning very well in this particular system, and have produced a measurable response physically and biologically under the Tribe's management of the area. They restrict human access and natural grazing by livestock to allow accelerated recovery.

A fish salvage operation was conducted in July 2008 on the lower 0.5 miles of Isquultpe Creek. Salvaging is necessary because the channel annually becomes devoid of flows in this area due to extensive human disturbance of its lower reach, primarily caused by the presence of the railway and paved road. Two-day rescue total counts of juvenile salmonids were as follows: 1075 rainbow/steelhead trout, 5 spring chinook salmon, 3 coho salmon, and 1 bull trout. Other quantities of species relocated were 50 sculpin *spp.* and 7 pacific lamprey juveniles. Fish captured were relocated to adjacent areas of the creek where summer flows were known to persist. Within a week of the salvage effort, the entire half mile reach became dry. Salvaging should be a planned action every summer at this reach until habitat conditions are improved enough to sustain persistent flows throughout the summer period.

Figure 14 shows various habitat types inventoried in Isquultpe Creek, RM 0-8.



Actively Eroding Bank and High Terrace



Mature Alder Provided Abundant Habitat Complexity



Blackberries Provided Substantial Undercut



Large Wood Debris Accumulation



Natural Falls Classified as a Partial Fish Passage Barrier



Pool and Encroaching Hillslope and Formation of Lateral Pool

Figure 14. Isquiltpe Creek Channel and Riparian Features



Caddisfly Larvae on Substrate



CTUIR Fish Salvage Operations



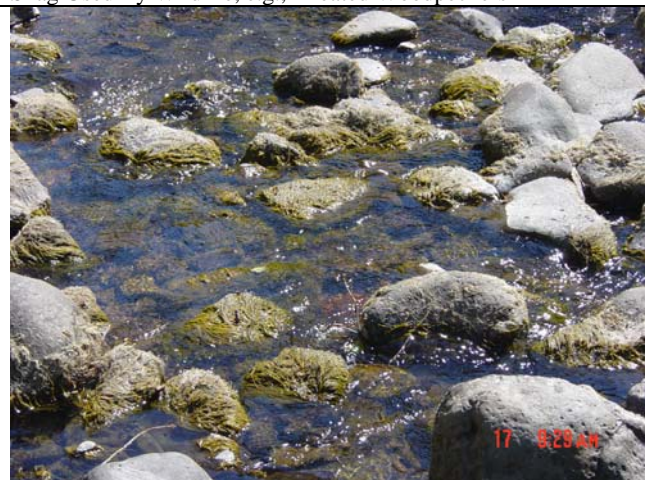
Juvenile Salmonids Were Observed Trapped In Isolated Pools



Snag Used By Wildlife, e.g., Pileated Woodpeckers



Mature Conifer Recently Felled by 90 mph Windstorm



Abundant Algae on Substrate

Figure 14 (continued)

Fish Population Monitoring: Isquulktpe Creek, RM 0-8

A crew of two to three persons were used when conducting fish surveys. One backpack electroshockers manufactured by Smith Root Inc. was used to sample fish at site locations previously inventoried for habitat. Navigating to the sites was assisted by global positioning satellite (GPS) technology.

Blocknets were used at the lower and upper ends to isolate each site. Care was taken not to displace fish from the section as nets were being set. A variety of unit-types with different physical characteristics were sampled to represent the habitat complexity within and between unit types. All species were targeted and captured with dip nets and removed on successive electrofishing passes. Electrofishers were operated in a similar manner for the same number of seconds (or slightly more) as the previous pass. Electroshocker settings (i.e., volts, pulse) remained constant for each removal pass.

Captured fish were temporarily held in buckets, and then placed in a flow-through livewell upstream from the uppermost blocknet. A portion of the fish were identified to species, measured and weighed. Differentiation between anadromous steelhead and resident rainbow trout could not be determined; therefore, all were classified as rainbow trout. After examination, fish were released back into the site where captured, or in some cases relocated just up or downstream from the sampled reach if conditions appeared significantly better.

Electrofishing crews sampled 4.4% of the total wetted stream bed area surveyed by the habitat crew. A total of 26,201 salmonids were estimated within the study reach (RM 0-8). A comparable fish survey was conducted by CTUIR in 1994 and an estimated 25,698 salmonids were present within the same reach (RM 0-8). The overall density was estimated at 36.2 salmonids per 100m². Appendix A provides specific details on habitat features and associated salmonids estimated within each habitat type.

Aquatic Habitat Inventory and Fish Monitoring: West Birch Creek, RM 2.7

Aquatic Habitat Inventory

An Aquatic Habitat Inventory was conducted on 50 meters at RM 2.7 of West Birch Creek on August 8, 2008. This was the first survey that was conducted on the creek to provide baseline data prior to the implementation of the Hoelt Dam Rectification Project. Major habitat components included the following: (1) 8% of the bank length was classified as undercut; (2) no wood was documented in the survey section and the wood rating for fish was 1.0; (3) channel shade was 13%; and, (4) canopy closure was 9.5% in the riparian area. Some recent beaver activity was noted on large mature cottonwoods, as several of these trees had been felled. Beaver were subsequently eradicated by the landowner in 2008.

A summary of metrics measured includes: (1) average wetted width: 4.3 m; (2) average active channel width: 9.1 m; and, (3) average depth: 0.15 m. Substrate consisted of the following types: 34% gravel, 30% bedrock, 16% sand, 14% cobble, 5% silt, and 1% boulder.

There was a 10 ft tall actively eroding bank on the right side of the stream. All stream flow was being diverted by the Hoeft Dam irrigation ditch. Hoeft Dam was identified a partial fish passage barrier due to a step height of 2.3 m and having a substandard fish ladder.

Fish Population Monitoring

On August 18, 2008, CTUIR electrofished 0.6 mi. from RM 2.1 (location of Hoeft irrigation ditch effluent) to RM 2.7 (location of Hoeft Dam). Eighty-five percent of the streambed was dry (naturally occurring). Electrofishing occurred for a duration of 1000 seconds during which time the following were captured: 38 naturally produced rainbow trout, 750 speckled dace, 1 sculpin *spp.*, 1 shiner, and 1 sucker *spp.* Thirty-six of the rainbow trout were stranded just below the dam. Typically, fish would perish at the base of the dam when the pool would eventually dry up on an annual basis.

On August 19, 2008, CTUIR conducted an additional fish survey to salvage the remaining fish that were not caught the previous day during the de-watering of the creek by the construction contractors during the Hoeft Dam Rectification Project. Fish salvaged during this period included: 12 rainbow trout, 7 sculpin *spp.*, and 1750 dace.

Aquatic Habitat Inventory: West Birch Creek, RM 2.8-3.1

An Aquatic Habitat Inventory was conducted on 384 meters from RM 2.7 (Hoeft Dam) to RM 3.1 (below Cunningham Bridge) of West Birch Creek on October 16, 2008. This was the first survey that was conducted on the creek to provide baseline data prior to the construction of the riparian fence and installation of one water gap on the Cunningham sheep property. Seven per cent of the bank length was classified as undercut. Two pieces of wood that met minimum size criteria were documented. The wood rating for fish was 1.2 and there was 29% channel shade. Most of the mature cottonwoods had died due to being girdled by beaver within the past few years. Beaver had been eradicated from the property by the landowner in 2007.

A summary of metrics measured includes: (1) average wetted width: 3.2 m; (2) average active channel width: 7.3 m; and, (3) average depth: 0.15 m. Substrate consisted of the following types: 49% gravel, 27% sand, 14% cobble, 9% silt, and 1% boulder.

There was a 12 ft actively eroding bank on the right side of the stream. A unique feature was noted: bulrushes growing within the wetted channel provided quality rearing habitat for juvenile salmonids.

Aquatic Habitat Inventory and Fish Monitoring: West Birch Creek, RM 3.2

Aquatic Habitat Inventory

An Aquatic Habitat Inventory was conducted on 50 meters at RM 3.2 of West Birch Creek on November 26, 2007. This was the first survey that was conducted on the creek to provide baseline data prior to the implementation of the passage barrier rectification project at Cunningham Bridge. Major habitat components included the following: (1) 51% riffle; (2) 19% stepover bedrock; (3) 16% glide; and, (4) 14% plunge pool. Seven percent of the bank length was classified as undercut. No wood was documented in the survey section and the wood rating for fish was 1.0. There was 35% channel shade and the canopy closure was 30% in the riparian

area that was comprised primarily of 15 ft tall willow trees. Most of the mature cottonwoods had died due to being girdled by beaver within the past few years. Beaver had been eradicated from the property by the landowner in 2007.

A summary of metrics measured includes: (1) average wetted width: 4.0 m; (2) average active channel width: 8.6 m; and, (3) average depth: 0.32 m. Substrate consisted of the following types: 28% gravel, 20% bedrock, 18% sand, 17% cobble, 11% silt, and 6% boulder.

There was a 15 ft tall actively eroding bank on the right side of the stream. Cunningham Bridge was identified a partial fish passage barrier due to a step height of one meter. CTUIR rectified this passage barrier during FY2007.

Fish Population Monitoring

On November 26, 2007, CTUIR electrofished 50 m at RM 3.2 of West Birch Creek. Electrofishing occurred for a total duration of 600 seconds. During this period the following species were captured: 4 naturally produced rainbow trout, 15 speckled dace, 1 sculpin *spp.*, 1 shiner, and 1 sucker *spp.* The captured trout appeared to be undergoing smoltification in preparation for migration to the Pacific Ocean. Figure 15 shows crews using the electrofishing method for fish population monitoring.



Figure 15. Methodology Used For Fish Population Monitoring Using Stream Electrofishers to Capture Salmonids at Project Sites Prior To Implementation

F162: Analyze/Interpret Data – Analyze/Interpret Scientific Data

- A. Interpret suspended solids data collected for Meacham Creek via professional services subcontract.
 - B. Interpret redd & carcass data for salmon/steelhead redd data, Meacham & Birch Basins.
 - C. Interpret the applicability of aquatic benthic macroinvertebrate data collected on Meacham Creek.
- Deliverable: D. Summarized data in the format of professional scientific reports.

CTUIR successfully completed these ongoing deliverables for FY2008. CTUIR participated in the analysis and interpretation of suspended solids on Meacham Creek and the Umatilla River and steelhead/salmon redd data on the Umatilla River and all major tributaries where known spawning activity occurs. Benthic invertebrate data was collected and analyzed on Meacham Creek and the Umatilla River. Results of the findings are available in various outsourced reports and can be requested through CTUIR's UAFHP.

G172: Conduct Pre-Acquisition Activities – Secure and Adhere to Details of Conservation Easements Associated with Habitat Project Areas as Necessary

- A. Adhere to details of existing easements and/or initiate additional agreements as feasible.
- Deliverable: B. Adherence to details of conservation easements.

CTUIR has secured several long-term conservation easements in throughout the Umatilla Basin (Table 1). During FY2008, CTUIR staff initiated on site care, maintenance, and improvements to the properties and discussed details of the easements and future plans with the cooperating landowners.

H175: Produce Design and/or Specifications: Preparation and Submittal of Engineering Designs/Specifications for Birch/Meacham Creek Projects

- A. Deliver design drawings & specifics for Peterson dam passage project, Birch Creek.
 - B. Deliver design drawings & specifics for Broun dam passage project, Birch Creek.
 - C. Deliver design drawings & specifics for Meacham levee alteration project.
 - D. Deliver design drawings & specifics for instream channel shaping & enhancement, Meacham Creek.
 - E. Deliver design drawings for second well addition for watering livestock away from the Umatilla River.
- Deliverable: F. Delivery of engineered implementation designs/drawings with specifications.

Design drawings and specifications for FY2008 projects, mainly in the Birch Creek and Meacham Creek watersheds, were successfully completed and were an important step towards receiving permission to proceed from regulatory agencies.

Table 1. Conservation Easements Maintained by the CTUIR: Locations, Duration, Agreement Details and Recommended Renewal Status Projections

#	Waterway	RM	Start Date	End Date	Actions Performed	Renewal Status
1	Wildhorse	9.5	5/1/2004	5/1/2024	fence, weed, plant, watering, weeding, gradient	No
2	Wildhorse	12.0	10/12/1995	10/12/2010	fence, weed, plant, watering, weeding, gradient	No
3	Wildhorse	12.5	5/1/2004	5/1/2024	fence, weed, plant, watering, weeding, gradient	No
5	Umatilla	42.0	1/1/2001	1/1/2016	fence, weed	No
6	Umatilla	43.0	1/25/2003	1/25/2023	fence, weed, well	No
7	Cottonwood	1.0	10/1/2001	10/1/2026	culvert replacement	No
8	Mission	2.5	1/1/2001	1/1/2011	barrier remedy, fence, native grass	Yes
9	Umatilla	68.5	10/1/1999	10/1/2014	none	Yes
10	Buckaroo	1.0	10/1/1999	10/1/2014	none	Yes
11	West Birch	3.2	11/4/1999	11/4/2014	barrier remedy, plantings, water, weed	Yes
12	McKay	16.5	6/1/1999	6/1/2014	education, bio monitoring, plant, weed	No
13	Umatilla	40.0	9/30/2004	9/30/2024	plant, weed, water, wells	No
14	East Birch	10.5	9/1/1997	9/1/2017	fence construction, maintenance	No
15	Umatilla	82.5	7/1/2000	7/1/2015	instream bank protection	Yes
16	McKay	17.0	12/2/1995	12/2/2011	education, bio monitoring, plant, weed	No
17	West Birch	2.7	2/1/2005	2/15/2025	passage remedy, plant, water, weed	Yes
18	Buckaroo	1.0	10/1/1999	10/1/2014	none	Yes
19	Wildhorse	7.5	11/4/1994	11/4/2009	fence, gradient, weed	No
20	Buckaroo	1.5	5/7/2002	5/7/2022	fence, bio monitoring	Yes
21	Spring Hollow	2.5	9/1/1996	9/1/2011	plant, fence, bio monitor	No
22	Birch	2.7	10/1/1999	10/1/2014	plant, weed, water	Yes
23	Wildhorse	8.5	10/1/2002	10/1/2020	fence, gradient, weed	No
24	Umatilla	87.5	10/1/2002	10/1/2020	instream bank protection, channel shaping	Yes
25	Umatilla	61.5	10/1/2002	INDEF	instream bank protection, planting	Yes
26	Greasewood	0.5	10/12/1995	10/12/2010	barrier remedy, fence, weed, plant, bio monitor	Yes
27	Meacham	0.5	10/1/1999	10/1/2014	fence, weed	Yes

I34: Develop Alternative Water Source – Satisfy Water Source Requirements of Landowners at Peterson and Broun Dams

- A. Environmental compliance requirements complete.
- B. Mutually agreed water source at Peterson Dam.
- C. Mutually agreed water source at Broun Dam.

Deliverable: D. Secure a mutually agreed water source for landowners at Peterson & Broun dams.

Environmental compliance, engineering designs and implementation contracts were granted but any work, other than riparian plantings at Birch Creek RM 2.7, has been suspended indefinitely due to disagreements between adjacent landowners. It is standard operational procedure for the CTUIR UAFHP to have approval from all parties involved prior to proceeding. CTUIR worked closely with Oregon Water Resources Department (OWRD) and the landowners to plan these projects. Landowners could not come to agreement to develop the water sources to rectify the passage impediments at both the Broun and Peterson sites. To remedy this situation to the best of our ability, CTUIR planted riparian vegetation at both the Peterson and Broun locations. The following species were planted at the Peterson site as whole rooted plugs: 300 sagebrush, 255

chokecherries, 225 alders, and 200 mock oranges. An additional set of 1300 willow cuttings were also planted. At the Broun site, CTUIR planted 50 cottonwoods and 50 alders. Passage rectification is to be explored in the future.

J34: Develop Alternative Water Source – Install Second Well for Alternative Livestock Water Source on B&G Easement, Umatilla River, RM 38.

- A. Environmental compliance requirements complete.
 - B. Construction of a second well at B&G property for alternative watering source for livestock.
 - C. Addition of solar powered source for water delivery operation.
- Deliverable: D. Installation of second well at B&G property.

This project is located at RM 40 on the Umatilla River at the B&G Resources Property Easement. Planning with landowners, the NRCS and FSA included site visits and several meetings to confirm design specifications and project details. Two wells were drilled to provide off-channel watering sources for livestock on January 18, 2008. Solar-powered watering troughs were completed in FY2009.

K40: Install Fence – Mutually Agree on Decision to Install Fence at Broun Dam, Birch Creek

- A. Environmental compliance requirements complete.
 - B. Mutually agree on decision in regard to fence at Broun Dam, Birch Creek.
- Deliverable: C. Installation of fence at Broun property.

Landowners could not come to agreement to develop the water sources to rectify the passage impediments at both the Broun and Peterson sites. To remedy this situation to the best of our ability, CTUIR planted riparian vegetation at both the Peterson and Broun locations. Pending landowner approval, the fencing project will be completed in the future.

In FY2008, CTUIR donated fencing materials to the Cunningham Sheep Company at RM 3.0 on West Birch Creek to assist in the protection of the fish passage rectification and instream habitat project it completed in FY2007. CTUIR connected the passage projects at RM 2.7 (Hoeft Dam) and 3.0 with a fenced-off fish migratory corridor. Sheep impacted the riparian area (shown in the Figure 16A) at the Cunningham Project Site, just upstream of the Hoeft Dam. Prior to CTUIR donating fencing materials (Figure 16D) the sheep were allowed full access to the creek and its riparian area. Students from University of Idaho planted riparian vegetation as part of an outdoor education/career development curriculum and annual field trip to CTUIR (Figure 16C) and fencing was completed in the summer of 2008 (Figure 16B).

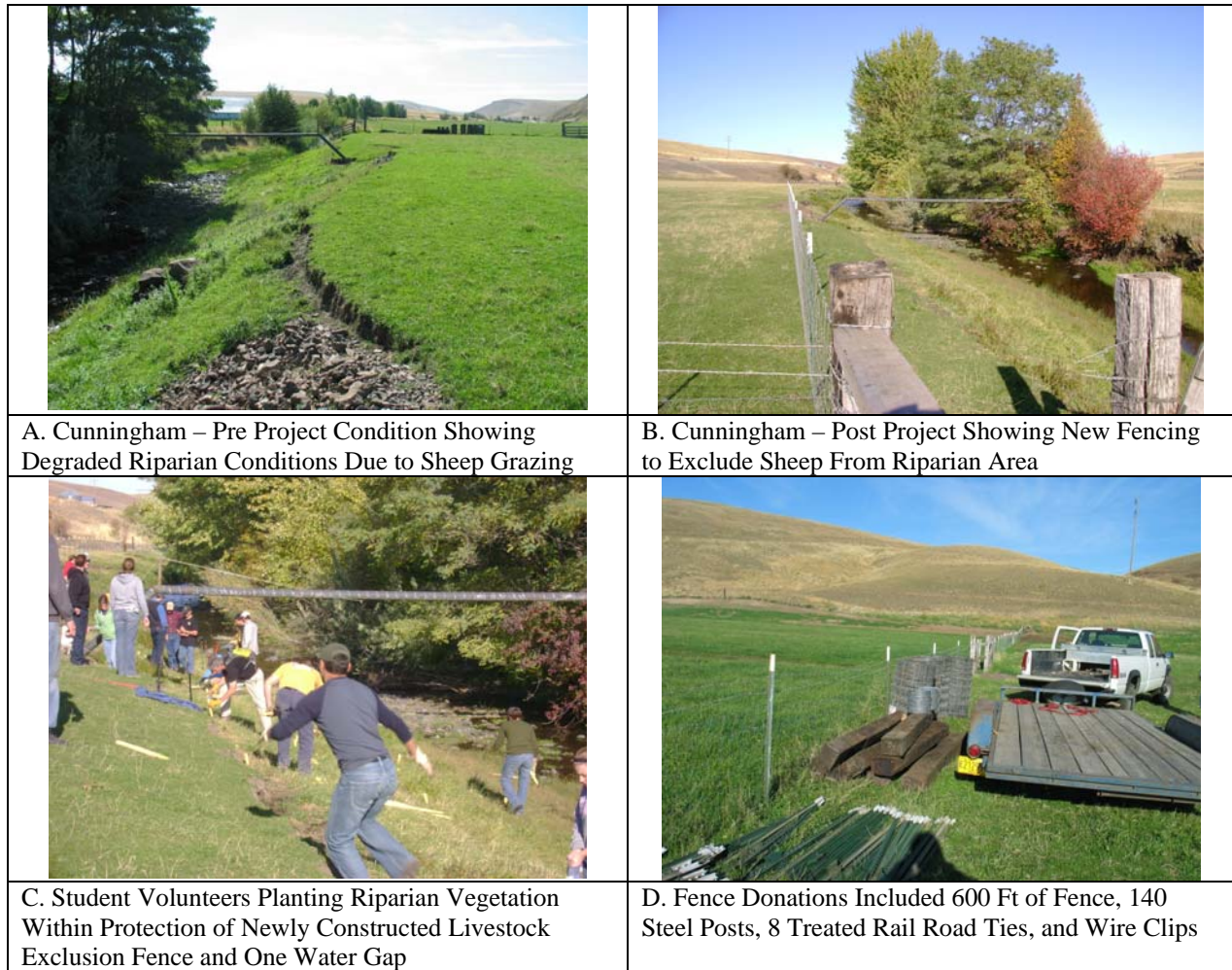


Figure 16. Example of Livestock Exclusion Fencing at West Birch Creek, RM 3.0

FY2009 activities include monitoring the fencing at this location and all project sites to ensure that adaptive management strategies can occur in a timely manner. Increased staffing and focus will target further improvements in project maintenance.

CTUIR conducts project maintenance at all of its project sites. Project maintenance includes conducting custodial responsibilities on individual projects to ensure that project structures are functioning repair and habitat recovery is progressing towards meeting projects goals and objectives. Activities include, but are not limited to, maintaining communications and good standing with landowners, installing and repairing fences, maintaining or installing water gaps, or other developments that will protect or improve riparian and riverine conditions.

L85a: Remove/Breach Dam – Rectify Fish Passage at Peterson Dam, Birch Creek

- A. Environmental compliance requirements complete.
- B. Rectify fish passage issue at Peterson Dam.
- Deliverable: C. Improve passage conditions at Peterson Dam.

CTUIR developed this project to the fullest extent possible and it was scheduled for FY2008 implementation. Unfortunately, the landowners’ lack of final cooperation between each other precluded completion. This project was suspended indefinitely.

However, CTUIR routinely monitors the streams/ivers within the Umatilla Basin and rectifies fish passage barriers when they are found and/or reported to CTUIR. For example, Figure 17 (left) shows a dam put up by recreational users across the channel in the South Fork Umatilla River. The dam inhibited spring chinook salmon from migrating to spawning grounds upstream, provided an easy place for poachers to catch fish, and prohibited normal channel functioning. CTUIR facilitated the demolition of the dam in a cooperative effort with ODFW, who physically removed the dam, shown in Figure 17 (right).



Figure 17. Recreational Dam on SF Umatilla River (left); SF Umatilla River Post Dam Removal (right)

L85b. Install Fish Passage Structure: Install Fish Ladder at Hoeft Dam, West Birch Creek

CTUIR is including this work element as “L85b” although it is not specifically listed as such in the FY2008 Statement of Work. It was a primary component of FY2007 work and carried over to FY2008. Planning, completing environmental compliance documents, initial site preparations for this project, and fabrication of all 13 sections of the concrete fishway were accomplished in FY2007. Several technical meetings and discussions with the engineer, landowner and cooperating partners were held and complete installation of the fishway was accomplished in FY2008. Please see the “Selected FY2008 Fish Habitat Enhancement and Restoration Activities” section in this document for details on this project.

M85: Remove/Breach Dam – Rectify Fish Passage at Broun Dam, Birch Creek

- A. Environmental compliance requirements complete.
- B. Rectify passage issues associated with Broun Dam, Birch Creek.
- Deliverable: C. Rectify passage issues at Broun Dam.

This project was planned and contracted for work to be performed in FY2008. CTUIR maintained coordination and oversight from OWRD and the partial dam removal was discussed on site with the cooperating landowner on several occasions. CTUIR was successful in securing agreements with two of three landowners, but needed 100% agreement to proceed. However, CTUIR did secure agreements to participate in riparian enhancement activities on the properties in the hopes that an agreement to modify passage at Peterson Dam will be realized in the future.

N29: Increase Instream Habitat Complexity – Improve Habitat Quality and Quantity of Instream Habitat Features in Lower Meacham Creek

- A. Environmental compliance requirements complete.
- B. Increase complexity of instream habitat features with natural materials.
- C. Alter or remove select levees and dikes from the lower Meacham Creek floodplain.
- Deliverable: D. Improve instream habitat conditions on Meacham Creek.

Planning activities for this project were pursued in FY2008. More detailed planning will occur in FY2009 and implementation is projected to occur thereafter.

O47: Plant Vegetation – Supplement Riparian Areas of Existing and New Projects with Additional Vegetation

- A. Environmental compliance requirements complete.
- B. Establish vegetation in existing project areas ID as lacking, & potentially successful & feasible.
- C. Plant vegetation in new project areas.
- D. Establish an agreement with the CTUIR Nursery to supply trees for assorted projects on demand.
- Deliverable: E. Vegetative planting in existing and new project areas.

In FY2008, CTUIR conducted planting projects at the stream sites shown in Table 2. The table shows the name of the water body, the location (river mile, [RM]), pounds (#) of seeds, and type and number of plantings.

Table 2. FY2008 Vegetation Plantings at Existing and New Projects			
Water Body	RM	# Seed	Plantings
Birch Creek	2.7		675 alder, 300 sage, 255 cherry, 200 mock orange, 105 hawthorn, 105 rose, 100 willow plugs, 25 cottonwood, 1300 willow cuttings
West Birch Creek	2.7	225	125 willow, 75 alder, 50 elderberry, 25 cottonwoods
West Birch Creek	3.0		1000 alder, 700 willow cuttings
McKay Creek	17.5		100 Willows planted in riparian area for Watershed Field Days
Umatilla River	10.0		Donated 300 willows to UBWC for planting at Oxbow site
Umatilla River	40.0	3,000	3000 willow cuttings
Umatilla River	75.0		450 willow cuttings
Meacham Creek	0.5		810 willow cuttings
Meacham Creek	20.2		150 willow cuttings
Camp Creek	0.3		150 willow cuttings
TOTAL		3,225	10,000

New project sites in FY2008 were the West Birch Creek (Hoelt Dam Fish Passageway Rectification) and McKay Creek. Existing projects were the Umatilla River Oxbow site and the West Birch Creek RM 3.0 (Cunningham Bridge Fish Passageway Rectification), reported in FY2007.

Planting tasks include site planning and development of planting strategies, collection and preparation of materials (pruning and conditioning of live whip material), pre-order coordination with the CTUIR native plant nursery (Figure 18), 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 UAFHP relies heavily on the nursery to provide plants for use on restoration projects. Features of the ever expanding nursery include a greenhouse, refrigerated cooler, irrigated stool beds, and containerized plant stock and its capabilities are growing steadily. The availability and quantity of plants is increasing on a daily basis due to demand, increased funding, and professional staffing.

CTUIR UAFHP also contributes native plants and fencing materials to its partners to assist them in their restoration efforts. An example is the donation of 300 willows to Umatilla Basin Watershed Council for planting at Oxbow site, Umatilla River, RM 10.



Figure 18. CTUIR Native Plant Nursery Containerized Plant Stock

P22: Maintain Vegetation – Maintain Vegetation Plantings at All CTUIR Habitat Project Areas

- A. Environmental compliance requirements complete.
- B. Water vegetation and reduce weed competition to improve survival at CTUIR pre existing project areas.
- C. Water vegetation, reduce weeds to maximize survival of riparian plantings at new project sites.

Deliverable: D. Maximize survival of vegetation plantings in CTUIR project areas.

Project activities conducted in FY2007 and FY2008 included the monitoring and maintenance of 27 conservation easements on 23 individual landowner properties. CTUIR maintained vegetation at five additional locations in cooperation with our habitat project partners. CTUIR personnel routinely maintain and replant vegetation, water and weed plantings, and maintain structural integrity of riparian enclosure and livestock fencing at project sites.

Q53: Remove Vegetation – Control of Noxious Weeds in Project Areas by Physical and Chemical Means

A. Environmental compliance requirements complete.

B. Physical removal of non -preferred species of vegetative growth from project areas.

C. Weed control in project areas by chemical means.

Deliverable: D. removal of non-preferred species of vegetative growth from project areas.

Noxious and/or undesirable weeds are present on several project areas. As with our work on conservation easements, CTUIR subcontracts professional, licensed applicators to spray/control noxious weeds on several project sites. CTUIR complies with BPA standards and supplies a report to BPA detailing the types and quantities of herbicides applied to specified locations. However, in FY2008, CTUIR used biological controls on a project site on Meacham Creek to control invasive knapweed (Figure 19).

Noxious and/or undesirable weeds are present on several project areas held in easement agreements with CTUIR. CTUIR subcontracts professional, licensed applicators to spray/control noxious weeds on several project sites. CTUIR complies with BPA standards and supplies a report to BPA detailing the types and quantities of herbicides applied to specified locations.

The frequency of watering, weeding and maintenance methods for each easement or project site varies. 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 (CWCB). CTUIR staff provides assistance to landowners by coordinating and managing herbicide application vendors, 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. Primary weed species prioritized for treatment in the Umatilla River Basin include leafy spurge, spotted knapweed, Canada thistle, yellow star thistle, and other non native species.

R186: Operate and Maintain Habitat/Passage/Structure – Repair Damaged Fencing/Gates and Related Riparian Property at Habitat Project Sites in a Timely Manner

A. Environmental compliance requirements complete.

B. Repair damaged fencing/gates and related riparian property in project areas in a timely manner.

Deliverable: C. Repair fencing/gates and related properties in riparian areas at habitat project sites.

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 fences, maintaining or installing water gaps, removing logs and sticks on all passage rectification

projects and monitoring other developments that will protect or improve riparian and riverine conditions.

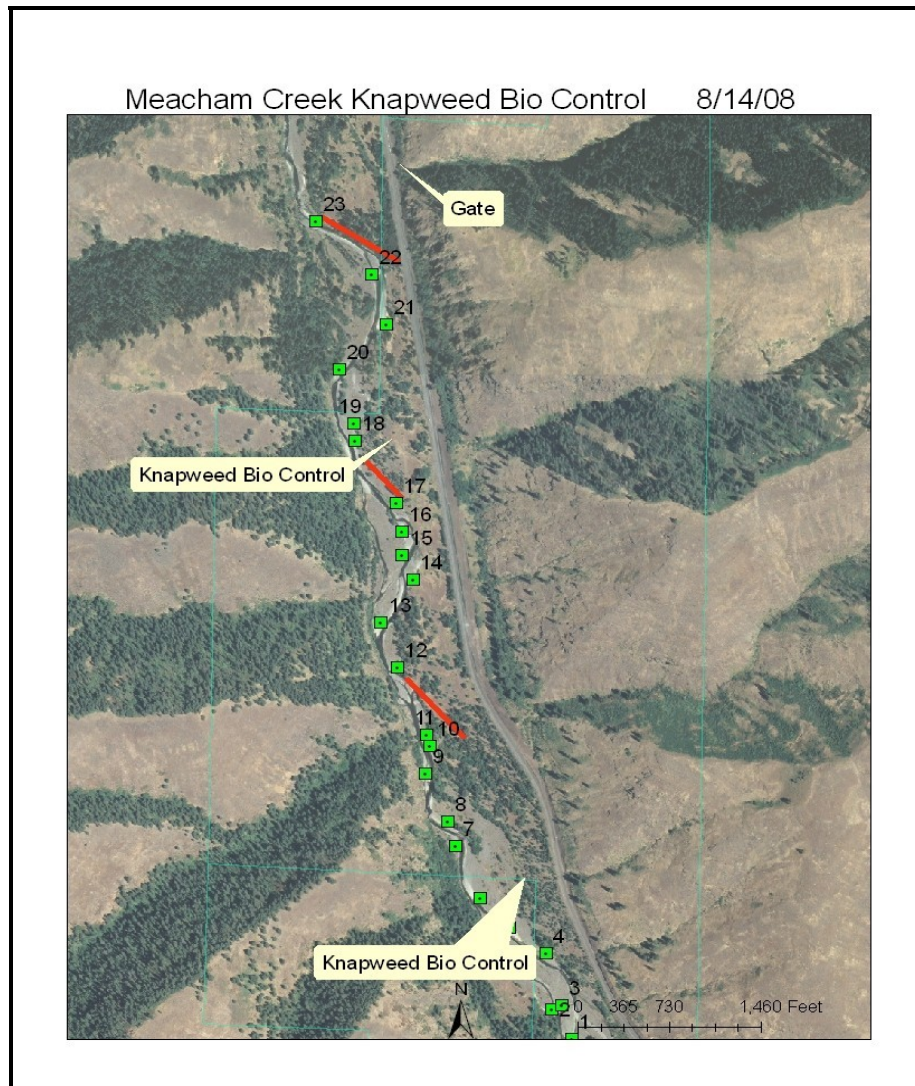


Figure 19. Locations of Knapweed Biological Control, Meacham Creek, RM 5

S186: Operate and Maintain Habitat/Passage/Structure – Monitor and Troubleshoot Issues that Interfere with Proper Function of Instream Improvement Structure

- A. Environmental compliance requirements complete.
- B. Monitor project areas & initiate process as necessary for repairs to restore function as designed.
- Deliverable: C. Maintaining proper operation of instream habitat structures.

Monitoring of individual projects is conducted either independently by the CTUIR or jointly with project partners such as ODFW. CTUIR monitoring professionals reported the removal of a small logjam at the Cunningham barrier rectification project that was impeding passage and deflecting flows towards the east bank and causing notable erosion. CTUIR conducts ongoing

maintenance to keep the passage projects clear of debris that accumulates over time, as specified in the conditional language of state and Federal permits.

Monitoring and evaluation efforts include annual photo points, installation of water quality monitoring devices, channel cross sections, longitudinal surveys, fish population and habitat surveys, census evaluation surveys on revegetation efforts, and groundwater monitoring. Post-treatment surveys are routinely conducted to monitor and quantify changes to physical, biological, and ecological components of the system, and to identify trigger-mechanisms responsible for instigating change.

In conjunction with maintaining activities on instream improvement structures, public tours, workshops, and presentations of individual projects were conducted during the reporting period. These activities provide for the discussion of various approaches, restoration techniques, successes, failures, and ultimately adaptive management. Monitoring activities conducted by the UAFHP in FY2008 will contribute towards providing improvements in habitat conditions and continued progress towards the goal of eradicating limiting factors detrimental to salmonid populations.

T156: Develop Research Monitoring and Evaluation (RM&E) Methods and Designs – Develop Strategic and Scientifically Accepted Monitoring Methods for Application

A. Develop aquatic habitat inventory assessment methods for pre and post implementation utility.

B. Develop biological monitoring prototype to show fish community response to habitat components.

Deliverable: C. Produce methods for use as monitoring project effectiveness.

CTUIR developed the protocol used in the Isquultpe Creek Habitat Monitoring Survey and refined it to meet our needs. The same refined protocol was done at the Hoeft Dam and the Cunningham Fencing project. CTUIR also developed the survey method used to inventory fish at the Hoeft Dam in FY2008.

U122: Provide Technical Review – Review and Provide Technical Input on Issues and Topics that Affect the Area’s Natural Resources

A. Conduct review and provide input as necessary on natural resource preservation issues.

Deliverable: B. Review and provide technical input on issues that may adversely affect natural resources.

CTUIR commented on applications for OWEB grants in coordination with the UBWC, on CTUIR’s Department of Water Quality plans, Section 404 removal and fill permits, on Department of Transportation plans, and DEQ pollution control plans during FY2008. The review process was achieved within the allotted time frames.

V132: Produce (Annual) Progress Report – Submit Progress Report for the Period February 2007 to January 2008

A. Submit progress report for external review.

B. Confirm BPA has posted the progress report.

Deliverable: C. Attach 2007 Progress Report in Pisces.

Annual reports provide updates on project progress on an annual basis and follow standard BPA formatting. CTUIR submitted the 2007 Annual Report on December 2, 2008. The report was reviewed and edited prior to submission to BPA. It was confirmed by BPA that it had been posted on the same date as an attachment. Thirty days later, it was posted to the PISCES website for public viewing. The URL for this report is: <http://pisces.bpa.gov/release/documents/documentviewer.aspx?doc=P109208>, as accessed on January 21, 2009.

W132: Produce Annual Progress Report – Submit Annual Report for the Period February 2008 to January 2009

- A. Review annual progress report format requirements.
- B. Submit annual progress report for internal contractor review.
- C. Submit annual progress report for external review.
- B. Confirm BPA has posted the progress report.
- Deliverable: E. Attach 2008 Progress Report in Pisces.

CTUIR reviewed annual progress report requirements and submitted the report for internal review on December 31, 2008. By submission of this FY2008 Annual Report, CTUIR has fulfilled its contractual obligations to BPA by reporting the FY2008 project details for the period February 2008 to January 2009.

X119: Manage and Administer Projects – Produce Quarterly Status Reports to BPA Contracting Officer Technical Representative (COTR)

- A. Submit property inventory to appropriate source using designated template.
- B. Submit Statement of Work (SOW) with budget funding exercise package to COTR after internal review process completed.
- C. CTUIR Fish and Wildlife Program Administrator submits budget accrual estimate to BPA.
- Deliverable: D. Complete, produce & have quarterly status reports accepted by COTR.

This work element includes a suite of management actions required to administer the project, including preparation of annual operations and maintenance budgets, managing and preparing statements of work (SOW) and budgets, and property inventory to the assigned BPA COTR. The project leader reports milestone and metrics to BPA using the BPA Pisces Program, supervises, trains, and directs staff activities, conducts vehicle and equipment maintenance and management, performs payroll, purchasing, subcontracting for services, and administers habitat enhancement activities.

Y185: Produce Pisces Status Reports and Periodic Status Reports for BPA

- A. Feb-Mar 2008 (2/1/2008 - 3/31/2008) - Completed
- B. Apr-Jun 2008 (4/1/2008 - 6/30/2008) - Completed
- C. Jul-Sep 2008 (7/1/2008 - 9/30/2008) - Completed
- D. Oct-Dec 2008 (10/1/2008 - 12/31/2008) - Completed
- E. Final Jan 2009 (1/1/2009 - 1/31/2009) - Completed

Quarterly Pisces reports were prepared, reviewed, and accepted by the BPA project COTR. These reports provide a regular update on project progress on status of work elements and associated milestones to allow adaptive management.

Z174: Produce Plan: Memorandum of Agreement (MOA) Initiate Umatilla Watershed Habitat Assessment Plan

A. MOA Assess relevant spatial datasets, process watershed reaches.

Deliverable: B. Compile spatial data base of riverine habitat in the Umatilla Basin.

The Plan was initiated and is progressing on schedule.

AA141: Produce Other Report – MOA Draft 2007-2008 and 2008-2009 Annual Reports

A. MOA draft 2007-2008 annual report.

B. MOA draft 2008-2009 annual report.

Deliverable: C. Assemble report draft of 2007-2008 summary of projects.

CTUIR submitted these budgetary reports to the COTR and they were accepted and approved. Funds were awarded accordingly.

AB34: Develop Alternative Water Source – MOA Develop Additional Water Sources and Strategies to Improve Survival of Riparian Vegetation

A. MOA Environmental compliance requirements complete.

B. MOA Develop additional mobile water source on project truck.

C. MOA Develop additional water source on project 6 wheeler.

D. MOA Develop additional on-site water source at B&G property.

Deliverable: E. Development of additional water sources to supplement the low annual precipitation of 11 in.

During FY2007, CTUIR drilled two wells at B&G Resource's property adjacent to the Umatilla River (RM 40) west of Pendleton, Oregon, to provide off-channel watering for cattle outside of the fenced riparian zone which is enrolled in the United States Department of Agriculture's CREP program (CTUIR 2008). The second well is a small component of alternative water sources. We are exploring well #2 on a conditional use through OWRD. In FY2008, CTUIR purchased a six-wheeler with a 65 gallon tank for mobile watering on harder-to-reach areas and a 300 gallon tank for use on our project pick-up truck.

AC48: Practice No-till and Conservation Tillage Systems – MOA Conduct Tillage Strategies at B&G Project to Improve Vegetative Planting Survival

A. MOA Environmental compliance requirements complete.

B. MOA Conduct tillage strategies at B&G project to improve vegetative survival, NRCS compliance.

Deliverable: C. Utilize area farming practice methods to till established weed areas at the B&G property.

CTUIR conducted conservation strategies at B&G Umatilla RM 40 on 60 riparian acres. This was done to prepare the soil for the planting of 13,000 trees before March 31, 2009.

AD53: Remove Vegetation – MOA Additional Control of Noxious Weeds by Various Means

A. MOA Environmental compliance requirements complete.

B. MOA additional weed control by means of physical tilling.

C. MOA additional weed control by means of chemical application.

Deliverable: D. Removal of non-desirable species of noxious weeds from project area.

CTUIR crews hand pulled weeds and physically pulls weeds at selected easements and when planting in new habitat projects and monitoring habitat project sites. CTUIR engages a professional herbicide applicator to spray noxious weeds in easements. CTUIR conducts conservation tilling and mowing to suppress noxious weed growth.

AE175: Produce Design and/or Specifications – MOA Increased Quantity of Project Designs for Additional Levee Removal

A. MOA additional designs required for increased # of levees & fence removed at Meacham Creek.

Deliverable: B. Produce expanded project design for removal of levees on Meacham Creek.

CTUIR has previously conducted surveying of the levees which included location, axis (direction) identification, and volume estimates of material that would need to be removed during the setback process. On average, the levees are 10 feet wide and 8 feet high. They disconnect the creek from its floodplain. Development planning activities have continued and matured in scope. Implementation work was scheduled to be completed in FY2008; however, it is now planned to be completed in the future. Figure 20 shows an example of the levees that need to be setback; Figure 21 shows a topographic map with the locations of the proposed levees to be set back.



Figure 20. Example of Levee Along Meacham Creek

AF180: Enhance Floodplain – MOA Enhance Floodplain Connectivity and Function Via Levee Setback at Meacham Creek

A. MOA Environmental compliance requirements complete.

B. MOA enhance riverine process and floodplain connectivity at Meacham Creek via levee setback.

Deliverable: C. Improve riverine process via levee setback on Meacham Creek.

Implementation work was scheduled to be completed in FY2008; however, it is now planned to be completed in the future.

AG29: Increase Instream Habitat Complexity – MOA Indirectly Increase Instream Habitat Complexity, by Altering Meacham Floodplain and Riparian Areas

A. MOA Environmental compliance requirements complete.

B. MOA Indirectly increase instream habitat complexity by altering Meacham floodplain & riparian.

Deliverable: C. Indirectly improve instream habitat conditions in Meacham Creek by softening levees.

This work will be accomplished in association with the levee removal project (AF180).

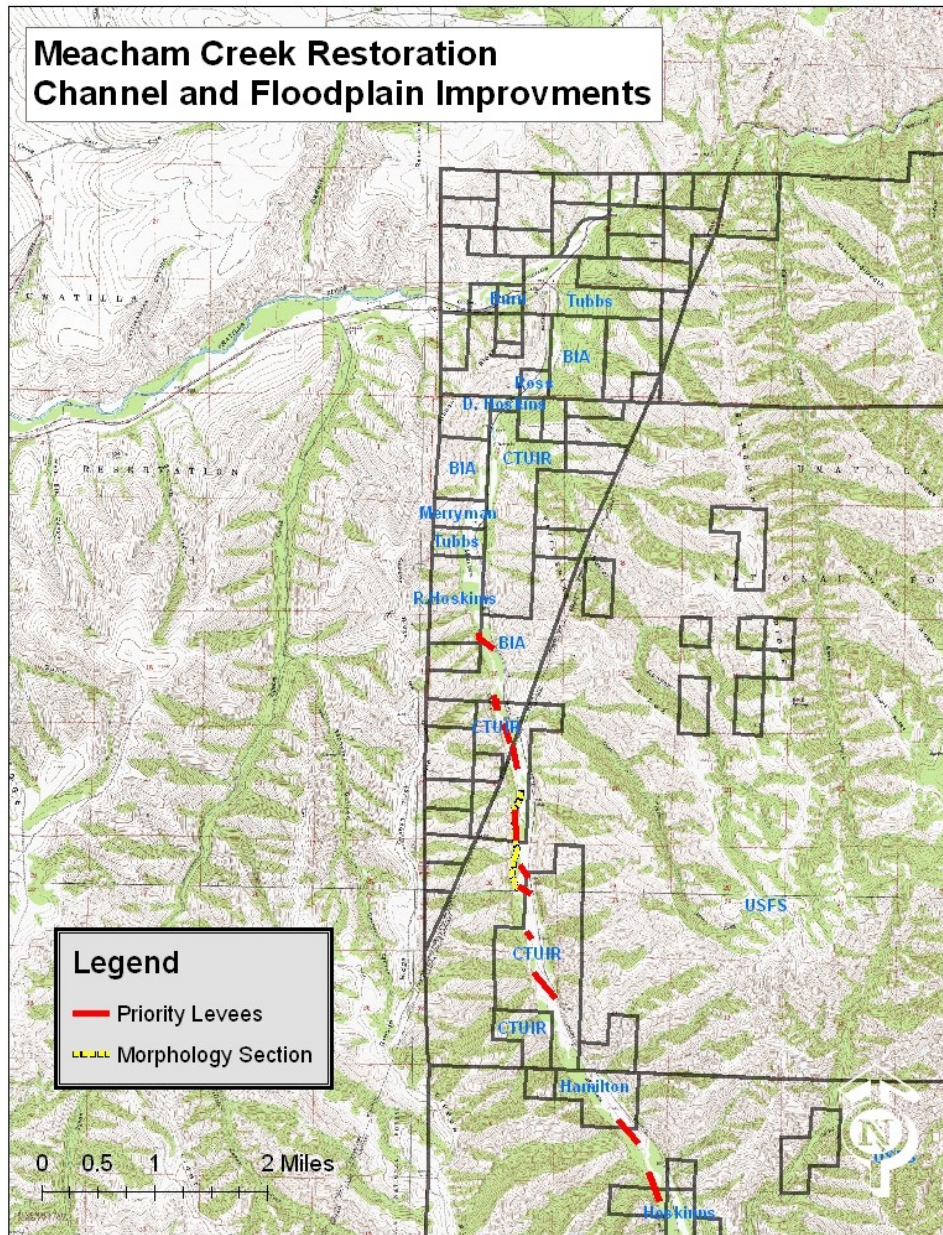


Figure 21. Levees (shown in red) Targeted For Setback/Removal

AH40: Install Fence – MOA Install Fence at Meacham Creek Headwaters to Protect and Enhance Watershed Condition

A. MOA Environmental compliance requirements complete.

B. MOA Install fence at Meacham headwaters to protect and enhance watershed condition.

Deliverable: C. Participate in the process of installing a riparian fence, Meacham headwaters.

Three and a quarter miles of livestock exclusion fencing were installed in the riparian area adjacent to Meacham Creek at RM 34 (Figure 22) in accordance with ODFW specifications.

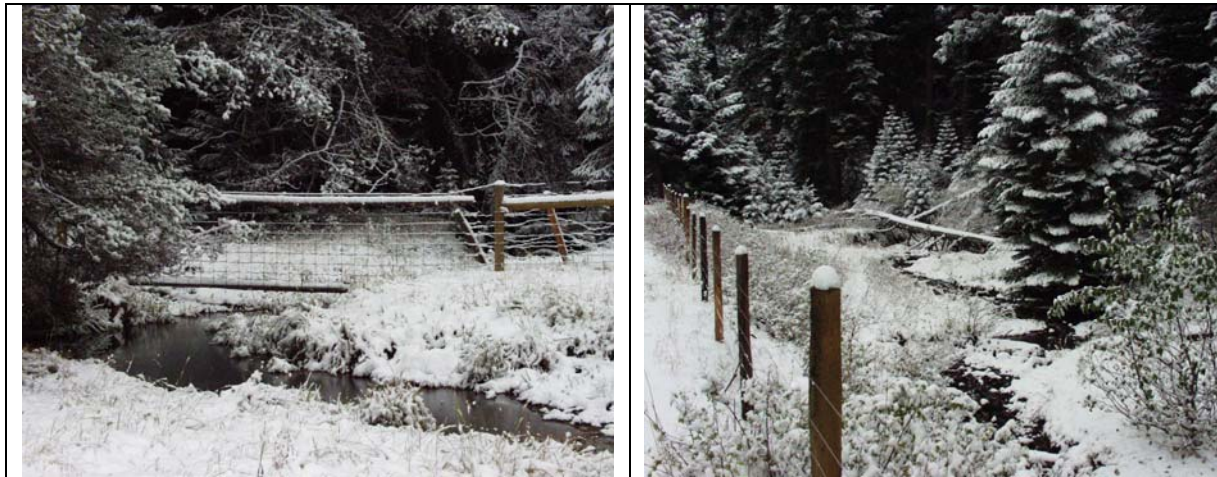


Figure 22. Fencing Installed at RM 34, Meacham Creek

Fencing consisted of several strands of high tensile smooth wire, treated wooden posts and fencing across the creek to allow livestock access to drink at selected sites and to manage livestock intensity and access at specific points.

AI160: Create/Manage/Maintain Database – MOA Create the Capacity of Autonomy by Purchasing and Developing GIS Total Survey Station

A. MOA Acquire GIS Total Station, formulate applicability in regard to data base potential.

Deliverable: B. Acquire GIS Total Station and initiate preparations for maximizing use.

A GPS (Global Positioning System) total station was purchased for shared-use between all project leaders within CTUIR ceded boundaries. The equipment is presently being used for the initial planning and survey phases of habitat projects. Training sessions are scheduled to enable staff to get the most applicable use out of this technology in the near future and will be a valued tool for project assessment.

AJ47: Plant Vegetation – MOA Prepare B&G Project Riparian Areas for 09 Plantings

A. Environmental compliance requirements complete.

B. MOA Clean, reset and prepare riparian tarps.

C. MOA Order and prepare NRCS-required deer guards and stakes.

D. MOA Produce and grow plants, B&G project area via Tribal nursery.

Deliverable: E. Proper preparation of soil in riparian area for upcoming grass, shrub, and tree plantings.

CTUIR tilled, sprayed herbicide, mowed weeds, and then cleared, repaired and reset riparian weed control tarps as necessary. We anticipate planting to occur in March 2009. As mentioned in Work Element AC48, CTUIR conducted conservation strategies at B&G on the Umatilla River, RM 40, on 60 riparian acres. This was done to prepare the soil for the planting of 13,400 trees scheduled for February/March 2009. A vendor was selected and will supply mesh deer guards and conduct the planting. All selected species and quantities were raised at the CTUIR Native Plant Nursery.

SELECTED FY2008 FISH HABITAT ENHANCEMENT AND RESTORATION ACTIVITIES

The following section provides selected project information for several of the eight primary projects separated into five general action categories implemented by CTUIR's UAFHP in FY2008. Table 3 provides FY2008 project metrics, and locations are shown in Figure 2.

Table 3. Actions and Metrics Associated with the FY2008 UAFHP Restoration Project Activities

Action	Project Metrics
1. Project Monitoring a) Macroinvertebrate: 13 sites, Meacham Cr, Umatilla R b) Temperature: 40 sites, Meacham Cr c) Turbidity: Meacham Cr, RM 1.8	<ul style="list-style-type: none"> • Before and After Photos of 7 FY2008 Projects • Aquatic Habitat Inventory, 9 River Miles • Fish Inventory at 3 Sites (West Birch, Isquulktppe) • Photo Points at Several Easements and Project Sites
2. Rectification of Fish Passage Barrier	<ul style="list-style-type: none"> • West Birch Cr, RM 2.7
3. Riparian Plantings	<ul style="list-style-type: none"> • 10,000 Riparian plants (see Table 2 for specific details)
4. Cattle Exclusion Fencing	<ul style="list-style-type: none"> • 3 Miles Riparian Fence, Meacham Creek, RM 34 • 400 feet of fencing, West Fork Spring Hollow, RM 0.2 • 600 feet of fencing, W. Birch Creek, RM 3.0
5. Electricity Provided For Off-Channel Cattle Watering	<ul style="list-style-type: none"> • Installed 2 Solar Panels for 2 Wells, Umatilla R, RM 40

Monitoring

In addition to project implementation, various forms of ongoing monitoring activities are exercised by the CTUIR UAFHP. Monitoring plans are intended to provide a comprehensive measurement of effectiveness of restoration actions and are intended to measure project changes over a range of physical and biological parameters through time. Parameters include suspended sediment and turbidity, stream temperature at specific points throughout the project reach and monumented cross-sections, longitudinal profiles, stream habitat surveys, macroinvertebrate sampling, and fish sampling. A portion of the temperature and suspended sediment characteristics have been monitored since the mid-1990s and will continue for the purpose of long-term trend analysis. Additional forms of monitoring have also been used, such as the experimental design regimen of Before-After, Control-Influence or BACI (Smith 2002). Well planned monitoring strategies offer a means to quantify measurable results of habitat actions which promotes adaptive management to achieve optimal results. Permanent photo points are scheduled on a bi-annual basis to show project progress. Photos are cataloged and stored on computer hard drives and back up disks maintained by the CTUIR UAFHP. This information

provides a very valuable visual source of restoration progress and is also used for public education. Project site visits are also conducted to enable identification of deficiencies or potential impacts to restoration activities. Addressing impacts in a timely manner increase the probability of project success.

Photo Point Monitoring of Meacham Creek Large Wood Placement Project

Photo points at 36 sites have been established at the Meacham Creek Large Woody Debris project (implemented in FY2006) to provide a visual record of changes in channel morphology and riparian recovery. In FY2008, standardized photos were taken at each of the 36 sites and correlated to flow data documented by date (Figure 23) derived from a USGS internet web site.

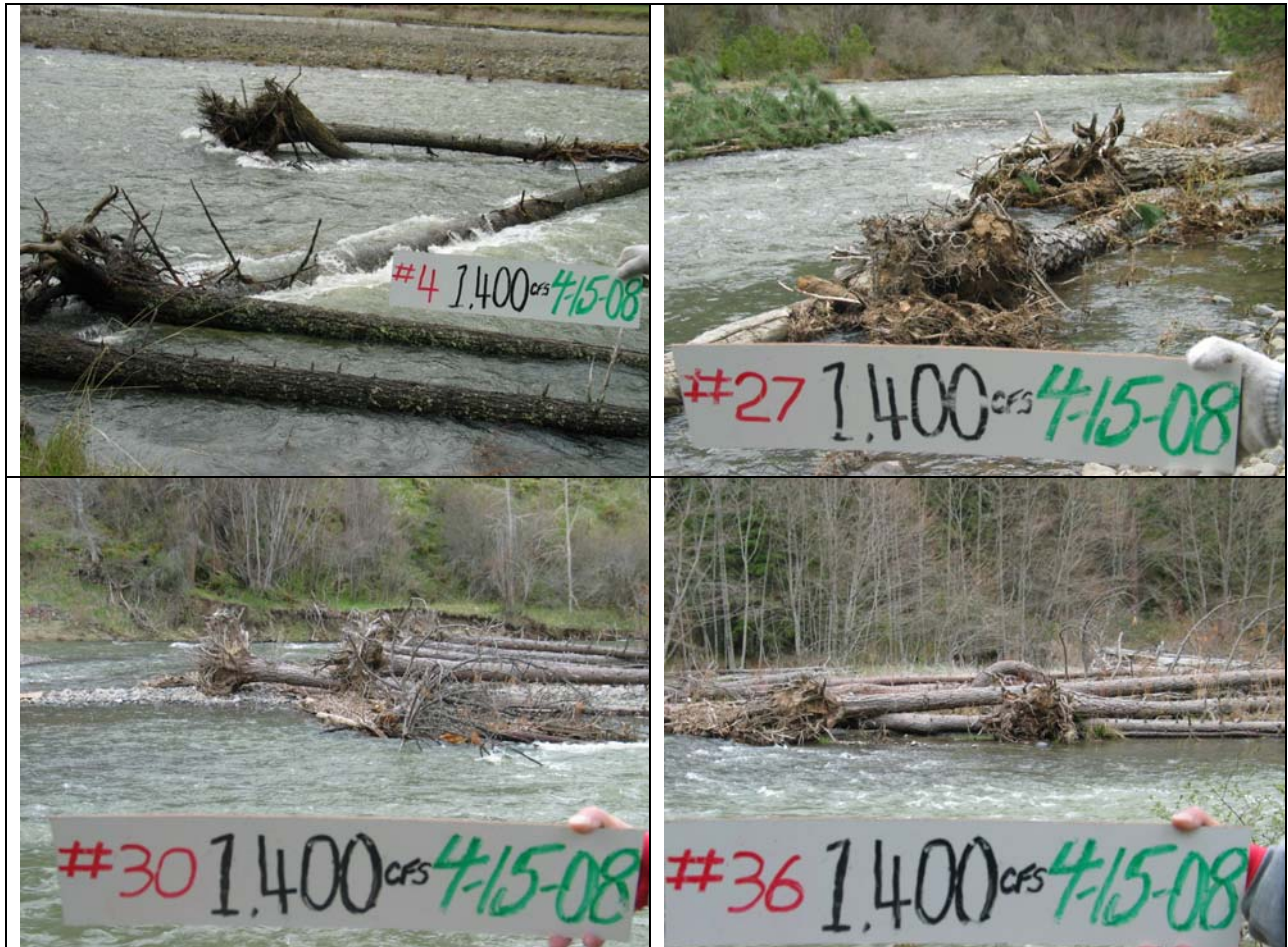


Figure 23. Photo Point Monitoring Methodology of Meacham Creek LWD Configurations

Fish Passage Barrier Rectification: West Birch Creek

The Meacham and Birch Creek watersheds were identified by CTUIR and ODFW in the *Five-Year Action Plan for the Development and Maintenance of Habitat Improvement Projects in the Umatilla Subbasin: 2006-2010* (CTUIR and ODFW 2006) as priority areas for fish habitat restoration activities. An analysis of habitat conditions in the Umatilla Basin was conducted by CTUIR and ODFW. In addition to the historical relevance of these watersheds, fisheries data collected over the last two decades illustrated the importance of the basin to anadromous and resident salmonids. These watersheds are a primary focal point of the CTUIR effort to improve habitat conditions in the Umatilla Basin because of the current habitat status, historical significance and recovery potential. CTUIR initiated restoration activities to address existing habitat deficiencies as part of long-term watershed restoration plan.

West Birch Creek, RM 2.7. In FY2004, CTUIR took a leadership role in the rectification of a fish passage barrier, the Hoeft Dam on West Birch Creek at RM 2.7 (Figure 24). This dam was preventing the migration of adult steelhead ascending upstream to optimal spawning areas and impeding the movement of fish seeking optimal rearing areas and/or cooler water refuge areas during the summer months.



Figure 24. Hoeft Dam on West Birch Creek, RM 2.7 Prior to Rectification

The Hoeft Dam was recognized as the most significant passage impediment for migratory fishes in the Birch Creek drainage. The 30 foot-wide dam provided a gravity head for a screened

diversion ditch. The dam had a drop of seven feet during low water periods. Although there was a structure on the left bank that was intended to serve as a fish ladder, its width and depth made it ineffective for fish passage under certain flow conditions. Approximately 40 miles of summer steelhead spawning and rearing habitat existed upstream from the dam but seasonal passage issues limited the abundance of salmonid distribution upstream. Design drawings for a full-span concrete fish ladder were completed to the 90% level in 1996 but lack of implementation funding stalled the improvement until FY2008. CTUIR subcontracted McMillen Engineering to construct an engineered fishway to create passage at Hoeft Dam in FY2008. Step heights were targeted to fall within the six inches or less guideline as established by the ODFW.

During the initial study for an improvement project at this location, ODFW and the McMillen Engineering assessed several alternatives to a concrete passage structure. Because of the success of full-span, concrete fishway ladders at many other locations in Oregon – the nearest example to the proposed ladder being located near the mouth of East Fork Birch Creek in the town of Pilot Rock – this type of improvement was selected. The final design is shown in Figure 25.

Key objectives of the barrier rectification project include:

- Improve access for salmonids to stream headwater areas and cool water refuges
- Increase the quantity and quality of accessible salmonid habitat
- Approach historical free-flowing migratory corridor through passage improvement
- Approach natural stream slope, function and appearance
- Improve connectivity for populations of listed salmonid species to improve genetic exchange/integrity to improving fitness and long term survival capability
- Increased salmonid population dynamics and carrying capacity of preferred species
- Fulfill tasks identified in restoration plans by addressing limiting factors
- Improve survival rates by reducing stressors on salmonids
- Reduce impacts to various stream biota associated with structural passage barriers

In FY2007, CTUIR submitted a supplemental BA, *Birch Creek Salmonid Passage Improvements* (CTUIR 2007) for the rectification project to the appropriate sources to supplement a Joint Permit Application (JPA). Representatives from the CTUIR Cultural Resource Protection Program conducted preliminary surveys of the project areas and granted official clearance to proceed with implementation activities. CTUIR UAFEP prioritizes the involvement of Cultural Resource staff to ensure that cultural interests are protected and preserved in a manner consistent with CTUIR policy.

During passage rectification and habitat enhancement projects, fish relocation operations conducted by CTUIR are authorized under various pre-existing permits which allow the capture and handling of listed fish species for scientific purposes. CTUIR has a very experienced and certified crew including an on-site project leader with 16 years of experience working with naturally produced Pacific Northwest salmonids. CTUIR uses well-maintained fish capturing gear and techniques that minimize impacts on fish health. Fish capturing crews use nets to make as many passes as necessary in attempt to remove 100% of the fish from the work sites

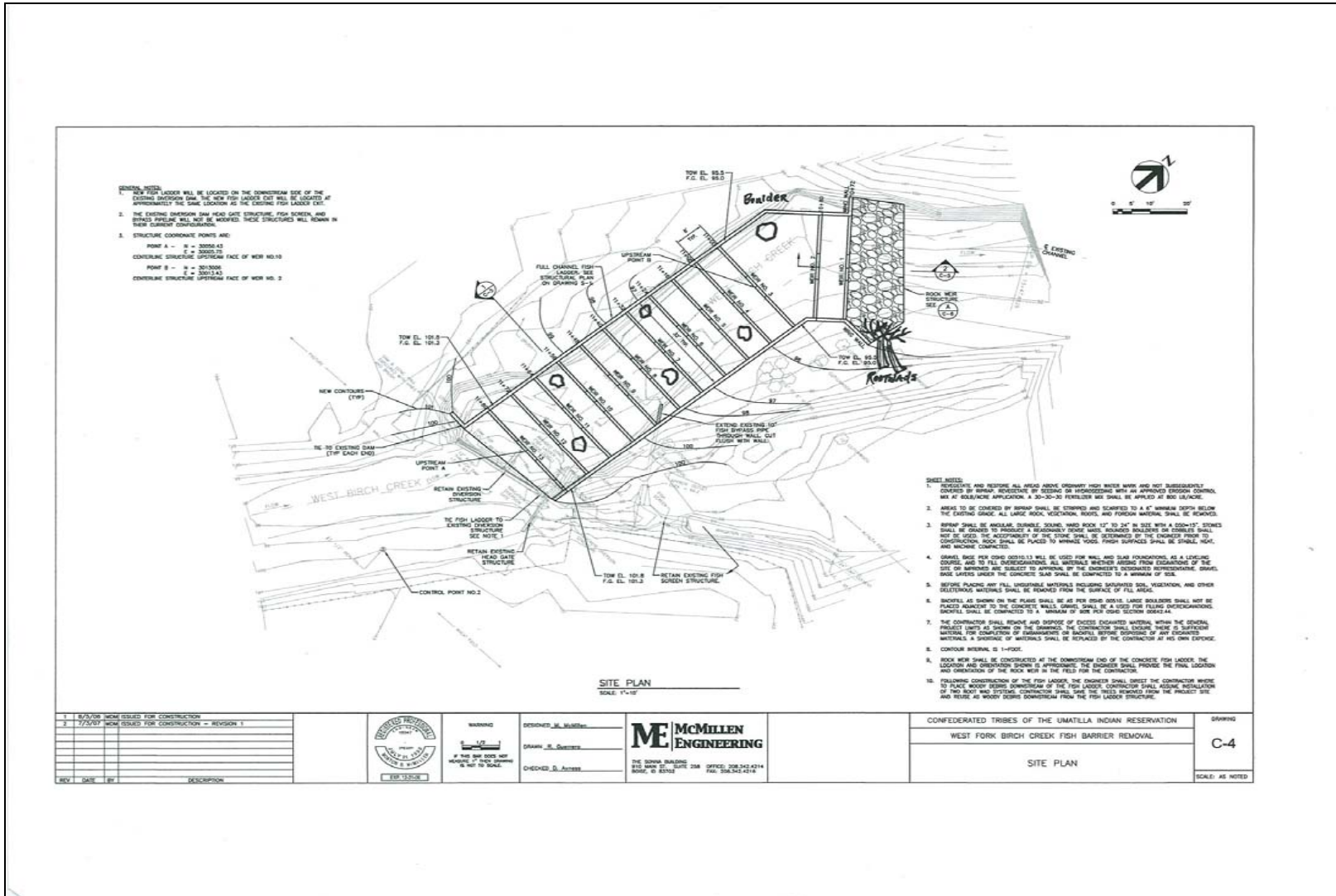


Figure 25. Blueprint Plan and Profile, Hoefft Dam, West Birch Creek, RM 3.2

Approximately 130 feet of existing channel downstream from the dam was to be changed from natural substrate to a concrete base; however, the creation of step pools was believed to be more beneficial to salmonids than the existing channel which became virtually dry during low flow months. The lateral sides of the step pools were designed so they would acquire gravel from upstream accretion, thus providing at least as much gravel/cobble habitat for benthic invertebrate production. The pools were designed to add complexity to a stream channel severely lacking pools. Creation of pools will result in cooler water temperatures and prolong the dry channel phenomenon and possibly hold water within the fishway year round, thus ameliorating to some degree a major limiting factor to salmonid rearing in the Birch Creek drainage.

Work at the Hoeft Dam site included the following sequence of actions:

- (a) Conducting an aquatic habitat inventory survey prior to work.
- (b) Isolating the implementation site by placing three blocknets at strategic locations to prevent organisms from re-accessing the site following removal efforts. One blocknet was placed upstream from the dam and one net was located downstream from the dewatering flow-return (Figure 26). Nets remained in place for the duration of the work period and prevented both the upstream and downstream movement of fishes and secured the boundaries of the work site.
- (c) Rerouting of stream flow from upstream of the work area to downstream of the work area leaving a dry channel within the work area.
- (d) Capturing fish using electrofishing gear during the onset of the channel de-watering process. CTUIR fisheries staff was present at the project site during the entire implementation process to monitor contracted, permitted activities and protect fish and wildlife resources.
- (e) Inventorying captured fish to provide baseline monitoring data and provide species composition and estimate abundance. This data will be beneficial for biological monitoring activities when used to compare data sets from the pre-implementation baseline versus post-project inventories to quantify fish response to restoration activities.
- (f) Returning captured fish to the natural river channel upstream from the project area with improved conditions for survival, safely away from potential hazards associated with the construction work.
- (g) Preparing substrate with a track hoe for the fishway base (Figure 27).
- (h) Mobilization of 13 cross-vane weirs from off site fabrication location to the restoration site (Figure 28).
- (i) Installation of forms in dry channel for concrete pouring.
- (j) Adding 13 cross-vane weirs at a right angle to stream flow at about ten foot intervals; said vanes to increase six inches in height from downstream to upstream to meet step height criteria as defined by the State of Oregon (Figure 29).
- (k) Softening techniques were applied in the form of three root wads and six boulders to increase natural aesthetics and habitat complexity.
- (l) Sloping the banks from 90 degrees to a 45 degree angle prior to planting and re-seeding.
- (m) Re-routing the bypassed flow into the new ladder. This was accomplished by securing the streambed by slowly pumping water onto the altered channel until a

satisfactory level of flow stability was achieved. Natural stream flow was then allowed to access the surface of the rehabilitated reach by natural means (Figure 30).
(n) Planting and re-seeding banks with native grasses and shrubs (Figure 31).



Figure 26. Blocknets Used to Keep Fish From Reentering Construction Site



Figure 27. Hoeft Dam – Preparation of Substrate for Fishway Base



Figure 28. One of the Thirteen Sections of the Fishway



Figure 29. Moving Fishway Section Into Place



Figure 30. Hoeft Dam Post Construction



Figure 31. Hoeft Passage Rectification Project Showing Sloped Bank and Plantings

Cumulative Effects

Meacham Creek Watershed

The Meacham Watershed restoration plan involves strategies to restore several diverse components of the basin's ecosystem. A variety of habitat improvement activities are part of the general Meacham Creek Watershed Enhancement Plan as recommended by Andrus and Middel (2003). These are: 1) restoration of channel sinuosity on lower Meacham Creek via levee setback; 2) remediation of manmade obstacles to fish passage; 3) excavating deep, complex pools; 4) fireproofing land near the mouth of North Fork Meacham Creek; 5) fencing portions of the stream; 6) re-establishment of stream-side vegetation; 7) replacement of a road bridge; and 8) increasing off-channel rearing habitat.

As reported in the FY2007 Annual Report (CTUIR 2008), the main road bridge was replaced in 2005, the large wood implementation phase and riparian plantings occurred in the fall of 2006, and the passage phase was completed in September 2007. In FY2008, the riparian fencing installed at RM 34 and the control of noxious weeds at RM 5 provide beneficial aspects with only minor short-term disruption while dramatically improving conditions over the long term.

West Birch Creek Watershed

We expect a desirable response of the vegetative component in addition to many beneficial long term responses of various fish and wildlife species in the action area. We foresee a future channel that allows improved mobility for fish, and improvements in the structural integrity of the box culvert as well the functionality of the structure at a wider variety flows. We also project improvements to instream and riparian cover and associated characteristics. Active monitoring of the site will quantify the degree of change and help to determine what additional steps CTUIR may need to take to mitigate and adaptively manage this project area for achieving optimal long term results.

Rectification of the Hoeft Dam continues CTUIR's work to improve conditions and is the second step of a long-term co-management plan with ODFW aimed at improving conditions for steelhead trout in this important tributary. In FY2007, CTUIR completed rectification of the Cunningham Bridge on West Birch Creek at RM 3.2. CTUIR expects the passage improvement phase of the Birch Creek Watershed restoration effort to directly contribute results in the form of increased salmonid carrying capacity and adult returns and improved watershed quality and function.

Installation of Two Solar Panels at Two Wells at B&G Resources Property for Off-Channel Livestock Watering and CREP Plantings

During FY2007, CTUIR drilled two wells at B&G Resource's property adjacent to the Umatilla River (RM 40) west of Pendleton, Oregon, to provide off-channel watering for cattle outside of the fenced riparian zone which is enrolled in the United States Department of Agriculture's CREP program (see CTUIR 2008). In FY2008, CTUIR planned and installed two solar panels to power the pumps used for these wells, and participated with NRCS in the planning of riparian plantings at the CREP sites.

B&G Resources is located on lands where a large Corps of Engineers dam was removed abruptly via dynamite by disgruntled sportsmen in the 1950s. The abrupt, unprofessional demolition removal of the dam caused significant channel incision due to erosional forces and left 30-ft high terraces, most notably upstream (Figure 32) of the dam site. In FY2007 and FY2008, CTUIR worked with the landowners and NRCS to devise a site-specific planting strategy through the CREP program to address the degraded riparian condition.



Figure 32. Umatilla River RM 40, Showing Severely Incised Channel and Bank Erosion

The terraces are largely devoid of water due to the distance from the water table and arid climate of this location. CTUIR is planning to reestablish native grass and tree species upon the terraces in cooperation with NRCS and FSA in FY2009. In previous years, CTUIR gathered baseline aquatic habitat and fish data in this area (CTUIR 1995).

Figure 33 shows B&G Property characteristics including two well location sites and four CREP tracts designated by the letters A-D. The CREP sites are intended to help provide improved riparian habitat conditions along the Umatilla River (RM 38-41).

Notable Characteristics of the B & G Property

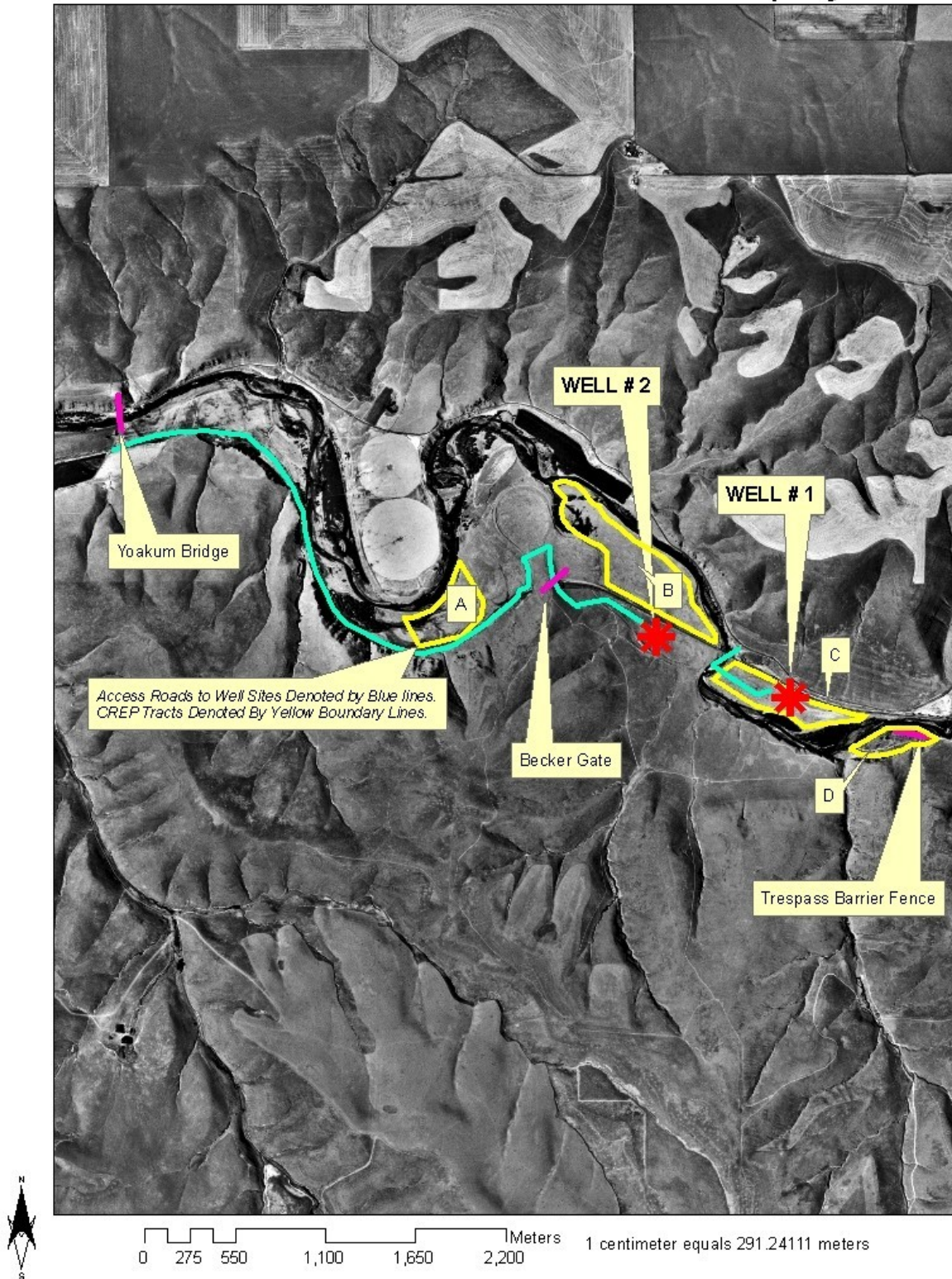


Figure 33. Aerial Photograph of B&G Resources Property, CREP Tracts, and Well Sites

Well drilling occurred on January 18, 2008 at two locations on the B&G property. Solar-powered panels and water troughs were completed on January 29, 2009 (Figure 34). Additional plans at this site call for weeding, mowing, spraying, seeding, and planting of CREP sites along the Umatilla River at this property before March 31, 2009.



Figure 34. Watering Troughs and Solar Panel, Umatilla River, RM 40

Soil Testing

In FY2007, NRCS directed CTUIR to test the soils prior to planting. Soils were tested at the CTUIR Nursery to determine if any residual contaminants from prior herbicide applications would affect plant growth (Figure 35). Test plots were set up in which grass, shrubs, and trees were planted to test the fitness of the soil for plant growth. Additional soil samples were sent to Pacific Agricultural Laboratory, Portland, Oregon. Appendix B provides the data showing the test results and documents the findings that the soils were suitable for replanting. Based on the results, it was concluded that soils at the B&G property were suitable for planting in 2009. CTUIR bore the cost of the soil testing (\$3500).



Figure 35. Test Plots Using Soil from CREP Area at B&G Property to Test Growth of Grasses, Shrubs and Trees

Planting Activities

The B&G Resources have worked with the CTUIR and Ellis Ranches to develop a site-specific strategy for preparing the CREP planting area. The following actions were taken during FY2008:

- Mowing once to retard weed growth and reduce fire risk.
- Spraying herbicide twice to control noxious weed growth.
- Plowing once to discourage weed growth, break down existing herbicide residuals, and prepare for planting.
- Rototilling once to break up soil and rigid plant matter to prepare soil for planting.
- Disking three times to break up soil and rigid plant matter to prepare soil for planting.
- Cultivating twice to break up soil and rigid plant matter to prepare soil for planting.
- Rod weeding twice to remove rigid plant matter to prepare soil for planting.

The CREP tarps will be replanted during the spring of 2009. Plants are species and quantities are shown in Table 4.

Table 4. CREP Sites at B&G Resources, Tree Species and Quantities (#)

Site 9896		Site 10504		Site 11948	
Tree Species	#	Tree Species	#	Tree Species	#
Alder, Thinleaf	100	Ponderosa Pine	50	Alder, Thinleaf	50
Choke Cherry	750	Choke Cherry	400	Choke Cherry	300
Cottonwood, Black	200	Cottonwood, Black	100	Cottonwood, Black	200
Currant, Golden	800	Currant, Golden	400	Currant, Golden	300
Dogwood, Red Osier	200	Dogwood, Red Osier	75	Dogwood, Red Osier	50
Elderberry, Blue	1,400	Elderberry, Blue	600	Elderberry, Blue	300
Mock Orange	800	Mock Orange	400	Mock Orange	300
Rabbit Brush	150	Rabbit Brush	100	Ponderosa Pine	50
Rose, Wild	1000	Rose, Wild	400	Rose, Wild	200
Sage Brush	1,500	Sage Brush	600	Sage Brush	250
Sumac	600	Sumac	300	Sumac	50
Willow, Coyote	150	Willow, Coyote	75	Willow, Coyote	50
Ponderosa Pine	150				
Total Seedlings	7,800	Total Seedlings	3,500	Total Seedlings	2,100

CTUIR has developed the following table to track progress at the B&G site. Table 5 shows the date actions were taken by various agencies and the contracting firms hired to carry out the project actions.

Table 5. B&G Resources Project Actions, Dates of Work, Contracting Agencies and Contractors

Date	Action	Contracting Agency	Contractor
10/2004	CTUIR Easement signed	CTUIR	B&G Resources
12/2004	CREP contract signed	NRCS/FSA	B&G Resources
7/2005	Installed exclusion fence on east field near well #1.	CTUIR	CTUIR
7/2005	Installed trespass fence on southeast side.	CTUIR	CTUIR
8/2005	Prepare for work, cultural resource coordination.	CTUIR	CTUIR
12/2005	Burn and mow fields	CTUIR	A2Z Engines
1/2006	Riparian planting (CREP)	B&G	Wild West Riparian
3/2006	Weed removal on tarp areas	B&G	Wild West Riparian
4/2006	Mow areas around tarps	CTUIR	CTUIR
4/2006	Weed control spraying in Zones 1 & 2 (Weed R, Milestone, Aqua neat)	CTUIR	Umatilla County
6/2006	Weed control, aerial spraying of field (Tordon 22k, 2-4D Amine, R-11)	CTUIR	Cliff Hoeft
6/2006	Watered riparian plants	CTUIR	CTUIR
7/2006	Watered riparian plants	CTUIR	CTUIR
7/2006	Weed control, targeting thistle (Clopyralid, Picloram, Chorsulfuron)	CTUIR	McLain Spraying
11/2006	Weed control, aerial spraying (Roundup RT, Class Act, Coral Poly)	CTUIR	Cliff Hoeft
4/2007	Mow in preparation for grass seeding.	CTUIR	Cliff Hoeft
4/2007	Plant grass, no-till drill	CTUIR	Cliff Hoeft
5/2007	Weed control (Clopyralid, Picloram, Chorsulfuron)	CTUIR	McLain Spraying
8/2007	Mowed areas around tarps	CTUIR	CTUIR
1/2008	Drilled 2 wells for livestock watering	CTUIR	Wallace Drilling
5/2008	Noxious weed control – herbicides and physical removal	CTUIR	Ellis Ranch
6/2008	Access Restriction Project, B&G and Becker Easement	CTUIR/ODFW	ODFW
7/2008	Extensive soil preparation for future plantings	CTUIR	Ellis Ranch
1/2009	Installed 2 solar panels and livestock watering tanks	CTUIR	Ellis Ranch

Figure 36 shows soil preparation activities (black tarps and mowing) at the CREP project sites. Figure 37 shows the location and design of the access restriction fence and gate through the Forth property access easement that were installed to protect the B&G and Becker property easement to reduce impacts from human disturbances. Drivers of recreational off-road vehicles had been trespassing on the property and across the CREP planting areas. The access restriction project was a cooperative effort between CTUIR, ODFW, and the three adjacent landowners. CTUIR facilitated the implementation of this project by proposing the design for the gate and fence and worked with the landowners to move this projected forward. ODFW installed the fencing, gate and sign. This has resulted in improved landowner relations and has preserved the standing of this easement with the landowners for the duration of the agreement. It has protected the plantings and improved the overall aesthetics of the project area.



Figure 36. B&G Soil Preparation and Riparian Tarp Placement Locations

Proposed Access Restriction, Forth Property, Umatilla RM 43



Figure 37. CTUIR/ODFW Access Restriction Project, June 2008

SUMMARY AND CONCLUSIONS

The CTUIR UAFHP completed eight primary habitat enhancement projects and several additional adaptive management and monitoring projects in the Umatilla River Basin. Extensive aquatic habitat inventories and fish surveys were conducted at various project areas. Maintenance work continued at 27 pre-existing long-term easements with 23 landowners. Major project highlights included implementation of a fish passage rectification project, planting 10,000 saplings and cuttings, seeding 3,225 pounds of native grass, installing 3.3 miles of riparian fencing, and donating 1000 ft of riparian fence and 1208 fence posts and associated hardware for livestock exclusion and to protect trees from beaver damage. We designed and installed two solar-powered off channel water developments to exclude livestock from the riparian zone.

A principal strength and focus of the CTUIR UAFHP project is the ability to work cooperatively with the various entities throughout the restoration process. This was demonstrated by CTUIR's donations of fencing and riparian plants to project partners UBWC, ODFW, and Cunningham Sheep Company. Strong partnerships increase the magnitude and frequency of success and often facilitate additional project opportunities. Professional and effective networking efforts provide opportunities to recruit specialized experts in the profession to jointly develop project strategies to strengthen the result of restoration and enhancement actions.

The CTUIR is emphasizing more attention toward project planning in regard to developing a systematic approach for site selection based on scientific data as well as to increase efforts towards effectiveness monitoring (both have been considered as shortfalls in the past from review committees). The new CTUIR philosophy emphasizes adaptive management as a means of maximizing success at each project site.

The UAFHP project provides technical assistance to other entities to assist in the development of associated projects. The CTUIR UAFHP program will continue to work with project partners in the basin, to achieve successful improvements in watershed conditions, and facilitate recovery of ESA-Listed fish stocks by accomplishing unprecedented quantity and quality of results.

The CTUIR UAFHP hypothesizes that both ecological and physical forces currently limit salmonid production in the Umatilla River Basin and that the relationship between physical habitat conditions, ecological conditions, and salmonid abundance will improve in sites that receive habitat treatments. This is demonstrated by measured improvements in the physical habitat condition of Isquultpe Creek (RM 0-8) which has resulted in an increased abundance of salmonid populations. Post-treatment monitoring is an important component of the habitat restoration process and is vital towards determining measurable results of restoration actions and identifying trigger-mechanisms responsible for instigating positive change. Project success is ultimately determined by technique applicability, accurate implementation, effective monitoring and timely adaptive management. The CTUIR UAFHP is recognized as experts in the discipline of fish habitat restoration in this geographic region and strives to maintain this status.

Recognition of the unique characteristics of each project site should be considered in conjunction with landowner parameters when selecting the most effective, site-specific habitat restoration plan. A plethora of management strategies have been successfully applied in effort to reestablish

the salmonids to self sustaining levels. We expect exponential response of salmonid populations once habitat deficiencies are 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.

SUMMARY OF EXPENDITURES

CTUIR UMATILLA ANADROMOUS FISHERIES ENHANCEMENT PROJECT FY2008 BUDGET

Contract Period: February 1, 2008 – January 31, 2009

Project # 1987-100-01 – Contract 36848

		Base	MOA*	Total
PERSONNEL				
5000	Salaries	\$138,923	\$26,933	\$165,856
5010	Fringe Benefits	<u>\$49,864</u>	<u>\$9,653</u>	<u>\$59,517</u>
	PERSONNEL SUB TOTAL	\$188,787	\$36,586	\$225,373
TRAVEL				
5101	Per diem	\$1,600		\$1,600
5150	Training	\$680		\$680
5160	Vehicle Insurance	\$900		\$900
5190	Vehicle Expense	<u>\$10,421</u>		<u>\$10,421</u>
	TRAVEL SUB TOTAL	\$13,601		\$13,601
SERVICES & SUPPLY (S&S)				
5210	Office Supplies	\$243		\$243
5225	Field Materials	\$1,500	\$25,000	\$26,500
5250	Non-Capital Equipment		\$18,500	\$18,500
5400	Communication	\$250	\$750	\$1,000
5410	Postage/Freight	\$100	\$100	\$200
5436	Permits/Fees	\$275		\$275
5450	Printing/Duplication	\$100	\$100	\$200
5470	Repairs & Maintenance	\$1,938	\$1,500	\$3,438
5770	Professional Services	<u>\$3,000</u>		<u>\$3,000</u>
	S&S SUB TOTAL	\$7,406	\$45,950	\$53,356
	DIRECT TOTAL	\$209,794	\$82,536	\$292,330
8500	Indirect 38.8%	\$81,404	\$32,026	\$113,430
6100	Subcontracts	\$44,702	\$271,231	\$315,933
6300	Capital Equipment		\$25,000	\$25,000
	PROJECT TOTAL	\$335,900	\$410,793	\$746,693

* MOA = Memorandum of Agreement

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**Appendix A – Salmonid Population Estimate, Isquulktp Creek (RM 0-8)
Sampled 9/29-10/13, 2008**

Type	Area m ²	Area Sampled m ²	%	Weighted Cumulative	Density 100m ²	Exp Pop Est
AL		22		99	4.5	
AL		32		1600	50.0	
AL		16		1200	75.0	
AL	227	70	31%	2899	41.4	94
BW		18		3001	166.7	
BW		9		100	11.1	
BW		20		1100	55.0	
BW		6		300	50.0	
BW	532	53	10%	4501	84.9	452
GL		154		9902	64.3	
GL		99		2505	25.3	
GL		46		5198	113.0	
GL		168		4402	26.2	
GL		34		1299	38.2	
GL		152		3602	23.7	
GL	11672	653	6%	26908	41.2	4809
IP		50		2300	46.0	
IP		29		499	17.2	
IP		7		200	28.6	
IP	638	86	13%	2999	34.9	223
LP		90		1503	16.7	
LP		6		2100	350.0	
LP		16		1904	119.0	
LP		79		6999	88.6	
LP		48		1402	29.2	
LP	5927	239	4%	13908	58.2	3450
PD		28		1400	50.0	
PD		76		699	9.2	
PD		46		400	8.7	
PD		5		1000	200.0	
PD		92		2116	23.0	
PD	575	247	43%	5615	22.7	131
RB		91		2202	24.2	
RB		40		500	12.5	
RB		150		4200	28.0	
RB		47		498	10.6	

Type	Area m ²	Area Sampled m ²	%	Weighted Cumulative	Density 100m ²	Exp Pop Est
RB		67		2499	37.3	
RB		21		601	28.6	
RB	5150	416	8%	10500	25.2	1298
RI		58		899	15.5	
RI		28		400	14.3	
RI	10261	86	1%	1299	15.1	1549
RP		191		8404	44.0	
RP		109		1700	15.6	
RP		121		4997	41.3	
RP		41		500	12.2	
RP	32467	462	1%	15602	33.8	10974
RR		8		700	87.5	
RR		44		2398	54.5	
RR		21		1401	66.7	
RR		82		4002	48.8	
RR		60		4902	81.7	
RR	612	215	35%	13402	62.3	381
SP		20		2900	145.0	
SP		120		10896	90.8	
SP		14		1900	135.7	
SP		155		4604	29.7	
SP	3564	309	9%	20299	65.7	2342
TP		43		3100	72.1	
TP		121		9995	82.6	
TP	366	164	45%	13095	79.8	292
CR*	153	153	100%	9532	62.3	95
PP*	20	20	100%	1358	67.9	14
TOTAL	72,164	3,173	4.4%	141,917	36.2	26,102
* Used comparable unit types to estimate density for 1CR, 1 PP not sampled in field						
Note: 1997 fish survey estimated 25,698 salmonids within same reach boundaries						

Notes:

AL = alcove
 BW = backwater pool
 CR = cascade over bedrock
 GL = glide
 IP = isolated pool
 LP = lateral scour pool
 PD = puddled

RB = rapid over boulders
 RI = riffle
 RP = riffle with pockets
 RR = rapid over bedrock
 SP = straight scour pool
 TP = trench pool
 PP = plunge pool

Appendix B – Analytical Report, Soils at Umatilla River Mile 40

Pacific Agricultural Laboratory

12505 N.W. Cornell Rd. • Portland, OR 97229-5651 • Ph 503.626.7943 • Fx 503.641.0644

June 13, 2008
Ellis Ranch, Inc.
68726 Shaw Road
Pilot Rock, 97868

Report Number: P08 0289
Client Project ID: none given
Sample Matrix: soil
Number of Samples: 4

Analytical Report

Client Sample in: #10504 Field #4

PAL Sample ID: P08028901

Ext Date	Analysis Date	Analyte	Amount Detected	Method Reporting Limit
5/29/08	6/10/08	2,4-D	Not detected	0.0 17 mg/kg (ppm)
		Clopyralid	Not detected	0.0 17 mg/kg (ppm)
		Picloram	Not detected	0.0 17 mg/kg (ppm)

Surrogate Recovery 99

Surr. Recovery Range 40-120%

(Dichlorophenylacetic acid (DCPAA,) was used as the surrogate)

5/29/08	6/3/08	Glyphosate	0.19 mg/kg	0.017 mg/kg (ppm)
5/29/08	6/3/08	AMPA	0.11 mg/kg	0.017 mg/kg (ppm)
5/29/08	6/2/08	Chlorsulfuron	Not detected	0.40 µg/kg (ppb)
5/29/08	6/2/08	Metsulfuron methyl	Not detected	0.40 µg/kg (ppb)
5/29/08	6/2/08	Sulfometuron methyl	Not detected	0.40 µg/kg (ppb)

P080289 Page 1

Client Sample ID; #9896 Field #8 PAL **Sample ID: P08028902**

Ext. Date	Analysis Date	Analyte	Amount Detected	Method Reporting Limit
5/29/08	6/10/08	2,4-D	Not detected	0.0 17 mg/kg (ppm)
		Clopyralid	Not detected	0.0 17 mg/kg (ppm)
		Picloram	Not detected	0.0 17 mg/kg (ppm)

Surrogate Recovery 92

Surr. Recovery Range 40-120%
(Dichlorophenylacetic acid (DCPAA) was used as the surrogate)

5/29/08	6/3/08	Glyphosate	0.16 mg/kg	0.017 mg/kg (ppm)
5/29 /08	6/3/08	AMPA	0.041 mg/kg	0.017 mg/kg (ppm)
5/29/08	6/2/08	Chlorsulfuron	Not detected	0.40 µg/kg (ppb)
5/29/08	6/2/08	Metsulfuron methyl	Not detected	0.40 µg/kg (ppb)
5/29/08	6/2/08	Sulfometuron methyl	Not detected	0.40 µg/kg (ppb)

Client Sample ID: #9896 Field #10 PAL **Sample ID: P08028903**

Ext. Date	Analysis Date	Analyte	Amount Detected	Method Reporting Limit
5/29/08	6/10/08	2,4-D	Not detected	0.0 17 mg/kg (ppm)
		Clopyralid	Not detected	0.0 17 mg/kg (ppm)
		Picloram	Not detected	0.0 17 mg/kg (ppm)

Surrogate Recovery 92

Surr. Recovery Range 40-120%
(Dichlorophenylacetic acid (DCPAA) was used as the surrogate)

5/29/08	6/3/08	Glyphosate	0.19 mg/kg	0.017 mg/kg (ppm)
5/29 /08	6/3/08	AMPA	0.068 mg/kg	0.017 mg/kg (ppm)
5/29/08	6/2/08	Chlorsulfuron	Not detected	0.40 µg/kg (ppb)
5/29/08	6/2/08	Metsulfuron methyl	Not detected	0.40 µg/kg (ppb)
5/29/08	6/2/08	Sulfometuron methyl	Not detected	0.40 µg/kg (ppb)

P080289 Page 2

Client Sample ID: #11948 Field #2

PAL Sample ID: P08028904

Ext. Date	Analysis Date	Analyte	Amount Detected	Method Reporting Limit
5/29/08	6/10/08	2,4-D	Not detected	0.0 17 mg/kg (ppm)
		Clopyralid	Not detected	0.0 17 mg/kg (ppm)
		Picloram	Not detected	0.0 17 mg/kg (ppm)

Surrogate Recovery 97

Surr. Recovery Range 40-120%
(Dichlorophenylacetic acid (DCPAA) was used as the surrogate)

5/29/08	6/3/08	Glyphosate	Not detected	0.017 mg/kg (ppm)
5/29 /08	6/3/08	AMPA	Not detected	0.017 mg/kg (ppm)
5/29/08	6/2/08	Chlorsulfuron	Not detected	0.40 µg/kg (ppb)
5/29/08	6/2/08	Metsulfuron methyl	Not detected	0.40 µg/kg (ppb)
5/29/08	6/2/08	Sulfometuron methyl	Not detected	0.40 µg/kg (ppb)

P080289 Page 3

Quality Assurance Report

Extr. Date	Analysis Date	Batch QC Sample #	Analyte	% Recovery	Expected % Recovery
Method Blank Data					
5/29/08	6/10/08	P080289 MB	Acid herbicides	Not detected	<reporting limits
5/29/08	6/3/08	P080287 MB	Glyphosate	Not detected	<0.017 mg/kg (ppm)
5/29/08	6/3/08	P080287 MB	AMPA	Not detected	<0.017 mg/kg (ppm)
5/29/08	6/2/08	P080297 MB	Chlorsulfuron	Not detected	<0.40 µg/kg (ppb)
5/29/08	6/2/08	P080297 MB	Metsulfuron methyl	Not detected	<0.40 µg/kg (ppb)
5/29/08	6/2/08	P080297 MB	Sulfometuron methyl	Not detected	<0.40 µg/kg (ppb)
Matrix Spike Data					
5/29/08	6/10/08	P08028901 MS	2,4-D	59	40-120
5/29/08	6/10/08	P08028901 MS	Clopyralid	37*	40-120
5/29/08	6/10/08	P08028901 MS	Picloram	27*	40-120
5/29/08	6/10/08	P08028901 MSD	2,4-D	48	40-120
5/29/08	6/10/08	P08028901 MSD	Clopyralid	27*	40-120
5/29/08	6/10/08	P08028901 MSD	Picloram	47	40-120

* The spike recovery is below the provisional lower control limit. Permanent control limits have not been established.

Extr. Date	Analysis Date	Batch QC Sample #	Analyte	% Recovery	Expected % Recovery
5/29/08	6/3/08	P080287 LCS	Glyphosate	100	40-120
5/29/08	6/3/08	P080287 LCS	AMPA	92	40-120
5/29/08	6/3/08	P08028701 MS	Glyphosate	96	0-145
5/29/08	6/3/08	P08028701 MS	AMPA	85	0-163
5/29/08	6/2/08	P08029701 MS	Chlorsulfuron	77	10-142
5/29/08	6/2/08	P08029701 MSD	Chlorsulfuron	55	
5/29/08	6/2/08	P08029701 MS	Metsulfuron methyl	83	0-188
5/29/08	6/2/08	P08029701 MSD	Metsulfuron methyl	65	
5/29/08	6/2/08	P08029701 MS	Sulfometuron methyl	75	21-137
5/29/08	6/2/08	P080289701 MSD	Sulfometuron methyl	62	

P080289 Page 4

Additional Project Information

Methodology Employed

Chlorinated Herbicides in Soil

EPA Method 83218 (HPLC-MS)

Glyphosate in Soil

Monsanto Method (1-IPLC-FLD)

Sulfonylurea Herbicides in Soil

DuPont Method (I-JPLC-MS)

Additional Project Notes:

1. The chlorinated acids were converted to their free acid forms. These residues were then quantitated as free acids.
2. AMPA is the primary degradation product of Glyphosate.

P080289 Page 5