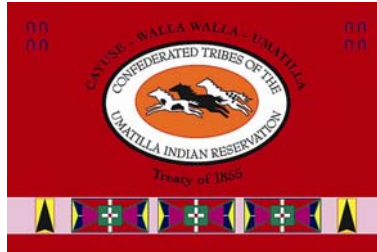


WALLA WALLA RIVER BASIN FISH HABITAT ENHANCEMENT PROJECT ANNUAL REPORT

January 1, 2007 – December 31, 2008



Prepared for:

U.S. Department of Energy
Bonneville Power Administration

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Pendleton, Oregon

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ABSTRACT

This document reports stream habitat restoration activities completed by the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) Fisheries Habitat Program in the Walla Walla River Basin in 2007 and 2008. Maintenance activities (noxious weed control, fence maintenance, etc.) were completed in all existing conservation areas. All environmental clearances required for project implementation were secured through the BPA environmental group, state, federal, and local agencies as needed. Two rock weirs and four j-hook vanes with root wads were constructed on the mainstem Walla Walla River in July of 2007. Approximately .25 miles of fence was constructed on Cottonwood Creek and one mile of fence was repaired following fire damage on Patit Creek. Four rock weirs and two rock barbs were constructed on Couse Creek in the fall of 2008. This effort also included meander reconstruction on approximately 800 linear feet of Couse Creek and the placement of 25 whole conifer trees. The project seeded 13 acres of upland habitat into native grasses on the mainstem Walla Walla River and planted more than 1200 native trees and shrubs into two separate projects on the mainstem Walla Walla River. Cost share for \$155,000 was secured from the Oregon Department of Environmental Quality for the removal of a levee on the mainstem Walla Walla River. A qualified consulting agency was contracted to begin the process of developing a site assessment and project design for two separate project sites on the mainstem Walla Walla River with construction planned for 2010 and 2012.

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This project is funded by the Bonneville Power Administration to protect and restore native fish habitat in the Walla Walla River Basin. This report defines project activities for the period of January 1, 2007 through December 31 of 2008. Past reports for this project are available at BPA's web site under "publications". Do a search for "Walla Walla Basin Fish Habitat Enhancement".

HISTORICAL BACKGROUND

The conditions we see today in the Walla Walla River Watershed reflect the land-use practices that have occurred in the basin throughout its history (United States Dept. of Agriculture, 1941). The earliest inhabitants of the Walla Walla River Basin included three Native American Tribes: the Cayuse, Walla Walla, and Umatilla. The Tribes ceded all of the land within the Walla Walla Basin to the United States in an 1855 treaty (CTUIR, 2001).

In 1805, the now infamous Corps of Discover led by Lewis and Clark came into the valley. On the Touchet River near its mouth they wrote "The hills of this creek are generally abrupt and rocky, but the narrow bottom is very fertile, and both possess 20 times as much timber as the Columbia itself; indeed, we now find, for the first time since leaving Rock fort (the Dalles), an abundance of firewood. The growth consists of cottonwood, birch, crimson haw, red and sweet willow, choke-cherry, yellow currants, gooseberry, and sumac together with some corn-grass and rushes (Lewis and Clark, 1805-1806)".

The large influx of Euro-Americans to the basin began in the mid-1800's. At this time, timber and brush mixed with grass and forbs were found in the Blue Mountains, bunch grasses in the middle portions of the watershed, and wild rye and sagebrush in the valleys (U.S. Dept of Agriculture, 1941). In 1858, Charles Dickerson, the son of an early settler on Pine Creek (near the city of Milton Freewater, OR), remembered the raw farm land of his childhood as being fertile but covered thickly with clumps of tall rye grass (Caverhill,1971). In 1839, an early explorer near Whitman Mission on the Walla Walla River wrote, "The plain about the waters of this river is about thirty miles square. A great part of this surface is more or less covered with bunch grass" (Farnham, 1839). Further downstream near the mouth of the river, Lewis and Clark in 1806, and David Douglas in 1826, noted the surrounding country as being predominated by sagebrush just as it is today.

Horses were introduced into the Walla Walla Valley from New Mexico in the 1730's and Native American Indians began to make use of them soon afterward. In the mid-1800's, large numbers of domestic cattle, sheep, and draft horses were introduced to the area (United States Dept. of Agriculture, 1941). Ultimately, the rangelands were overgrazed which, not surprisingly, led to native plant populations being replaced by more competitive introduced plant species and widespread soil erosion.

The earliest noted agriculture in the valley occurred in about 1825 at Fort Nez Perce, near the mouth of the Walla Walla River (Walt Gary, personal communication). In 1839, the area around Whitman Mission was primarily wheat, corn, onions, melons, and various other crops (Farnham, 1839). Prior to the establishment of Whitman Mission in 1836, the grass covered hills were thought to be only suited for grazing. However, by 1850, small amounts of cropland were situated along the river bottoms including some irrigation. In the fall of 1863, a farmer sowed 50 acres of wheat on the upland near Weston, Oregon and the following summer collected an

average of 35 bushels to the acre. From this point forward, land was broken out at an accelerated rate and by the late 1870's, Walla Walla County was considered one of the nation's leaders in cultivated grains (United States Dept. of Agriculture, 1941).

As agriculture in the Walla Walla Valley continued to expand, so too did the availability of large machinery capable of manipulating the landscape. Harper et al. (1938) indicates that steam-powered tractors were available in Umatilla County (Oregon) in 1904 and 1905, caterpillar-type gasoline-powered tractors were introduced from 1907 to 1909, and diesel oil-burning caterpillar type tractors could be purchased in 1932. Heavy machinery allowed riparian areas to be cleared for farming and grazing, and extensive stream channel straightening to begin (Figure 1).

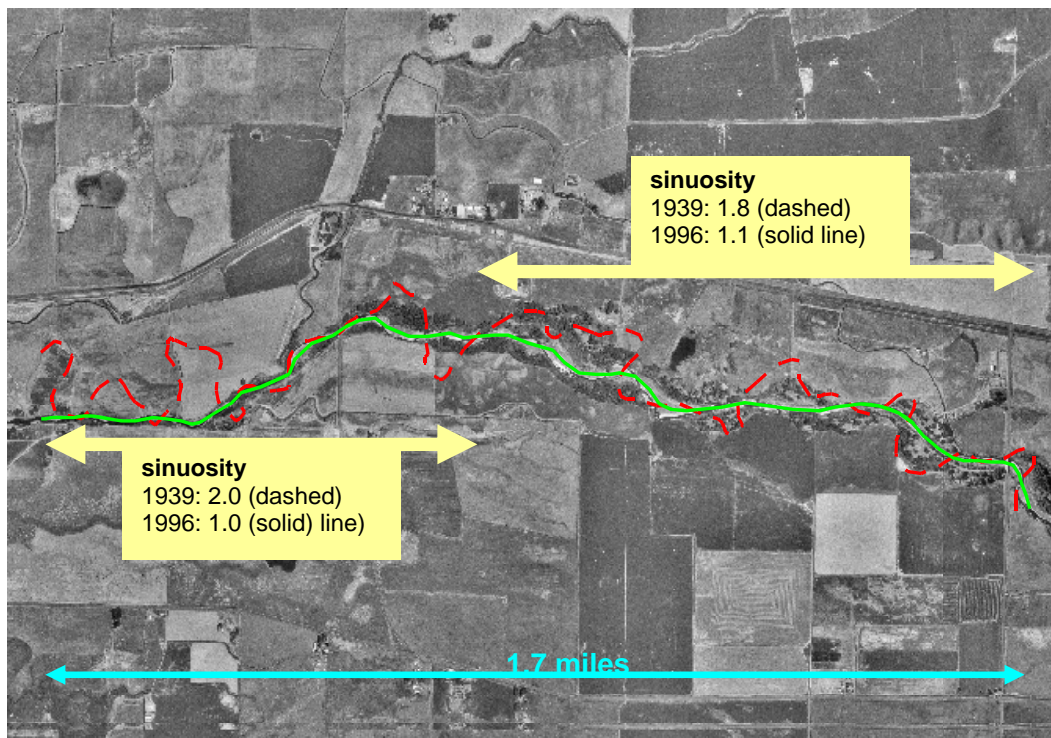


Figure 1: Aerial view of Walla Walla River near Lowden Washington depicting stream channel in 1939 (dashed line) and stream channel in 1996 (solid line) (Walla Walla Subbasin Temperature TMDL, 2005-page 58).

A scientist named Dice conducted vertebrate studies in the Touchet River Basin from 1904 to 1914 (Kuttel, 2001). He wrote, "The animal habitats of southeastern Washington have been greatly altered by the work of man. Farming is extensively carried on and in the prairie area; a very large percentage of the land is under cultivation. Irrigation is also practiced in valleys of both prairie and sagebrush areas. All of the land not under direct cultivation has been heavily grazed by cattle and stock. Part of the timber along the streams has been cut down and much of the brush has been cleared away. These changes in the environment have caused great changes in the abundance of the different species of vertebrates" (Dice, 1916 cited in Mudd, 1975).

Historical accounts clearly validate the presence of several now extinct species of salmon in the Walla Walla River. Some species, particularly fall chinook and chum, were likely spillover from the Columbia River, essentially of Columbia River origin but occupying the lower portions of the Walla Walla River during spawning periods. Nevertheless, runs of spring and fall chinook, chum, coho, and sockeye salmon are reported to have been present at some level (Swindell, 1942). Several historical journals remark that the Touchet, Mill Creek, mainstem Walla Walla, and various other tributaries contained healthy populations of spring chinook salmon at one time. The last spring chinook salmon run of any significance was reported in 1925 (Van Cleve and Ting, 1960). By 1955, only 18 spring Chinook salmon were reported to have been captured in the sport fishery (Oregon Game Commission, 1956 and 1957). Today, the remaining native fish include summer steelhead at severely depressed levels, bull trout, resident redband trout, reintroduced spring chinook salmon and various other non-game species. Summer steelhead and bull trout are presently listed as threatened under the Federal Endangered Species Act (ESA).

It is also important to recognize the impact that over-appropriation of water and inadequate passage conditions have had on the once abundant populations of salmon and steelhead. In 1950, Nielson reported a total of 130 points of irrigation diversion in the basin of which 123 had no protective fish device of any kind. Numerous historical journals report "sacks of smolts" being collected from the cropland fields in the spring out-migration months. Early accounts by local people note that annual returns of spring chinook salmon reduced dramatically following the construction of nine-mile dam at Reese Washington in 1905 (Nielsen, 1950; Van Cleve and Ting, 1960, Figure 2). In addition, Van Cleve and Ting (1960), while summarizing data for the period of 1935-36, wrote that it would be "practically impossible for spring chinook salmon to ascend the river under the present system of water use".

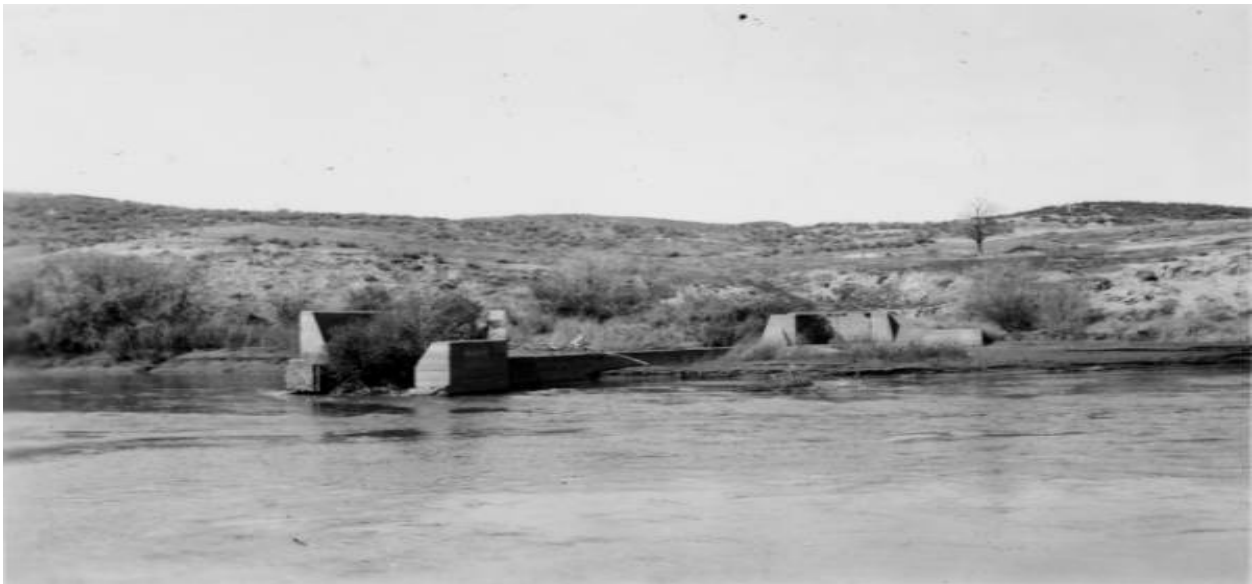


Figure 2: A portion of Nine Mile Dam near Reese Washington can be seen in this undated photo on the mainstem Walla Walla River. This dam was reportedly built in 1905 and eventually removed.

INTRODUCTION

Funding needed to protect and reintroduce native salmonid fish in the Walla Walla Basin has increased dramatically in recent years. Hatchery supplementation, habitat protection and restoration, and adult and juvenile passage improvement projects are all part of the restoration approach. Perhaps the largest effort is a flow enhancement study being performed by the US Army Corps of Engineers (COE) and the CTUIR. Long-term solutions may include irrigation efficiency, reservoir storage, Columbia River pumping, and purchase of water rights from willing sellers. It is expected that this project will result in minimum stream flows reaching the mouth of the river during all months of the year.

Juvenile and adult fish passage improvement projects have been completed at the Little Walla Walla Diversion, Nursery Bridge, Burlingame Dam, and Lowden I and II on the Walla Walla River. A new fish ladder was constructed at Hofer's Dam on the Touchet River. A new fish ladder was also constructed at Gose Street on Mill Creek, and new juvenile screens were built at the division works for Garrison Creek. On Mill Creek, new work is planned for the fish ladder at Rooks Park and major channel modifications to the concrete weirs and cement channel are being studied.

Habitat restoration work is being completed in the basin by the CTUIR, ODFW, WDFW, Snake River Salmon Recovery Board, the local conservation district and NRCS, Tri-State Steelheaders, Blue Mountain Land Trust, and others. The majority of funding is provided by the Bonneville Power Administration (BPA) but other sources such as the State of Washington Salmon Recovery Board, Pacific Coastal Salmon Board, Oregon Watershed Enhancement Board and the Department of Agriculture are also large contributors.

Project Goal:

To protect, enhance and restore functional, healthy and sustainable floodplain, channel and watershed process for the purpose of restoring fisheries and aquatic species in the Walla Walla Basin.

Project Objectives:

1. Identify priority actions and geographic areas based on factors limiting anadromous salmonid and other important aquatic species populations.
2. Improve watershed function and fisheries habitat
3. Continue fisheries habitat protection and improvement through the maintenance of past project sites.
4. Measure the effectiveness of fisheries habitat projects through monitoring and apply learned lessons to future planning efforts.
5. Develop coordinated partnerships with other key agencies and stakeholders in order to maximize project efficiency and success.

PROJECT AREA

The Walla Walla River Basin originates in the Blue Mountains at an elevation of nearly 6,500 feet. The Walla Walla River and its major tributaries the Touchet River and Mill Creek comprise a subbasin of 1,758 square miles and 2,454 stream miles (Mendel, et al, 2005) in northeast Oregon and southeastern Washington (Figure 3). Of this area, 73 percent is located in Washington and 27 percent in Oregon. The basin is bordered by the Snake River Basin on the north, the Tucannon and Grande Ronde Basins to the east, and the Umatilla Basin to the south (US Army Corps of Engineers, 1997). Approximately 15 percent of the subbasin is comprised of forestland, and 82 percent is used for cropland and grazing. Over 90 percent of the subbasin in Washington is privately owned.

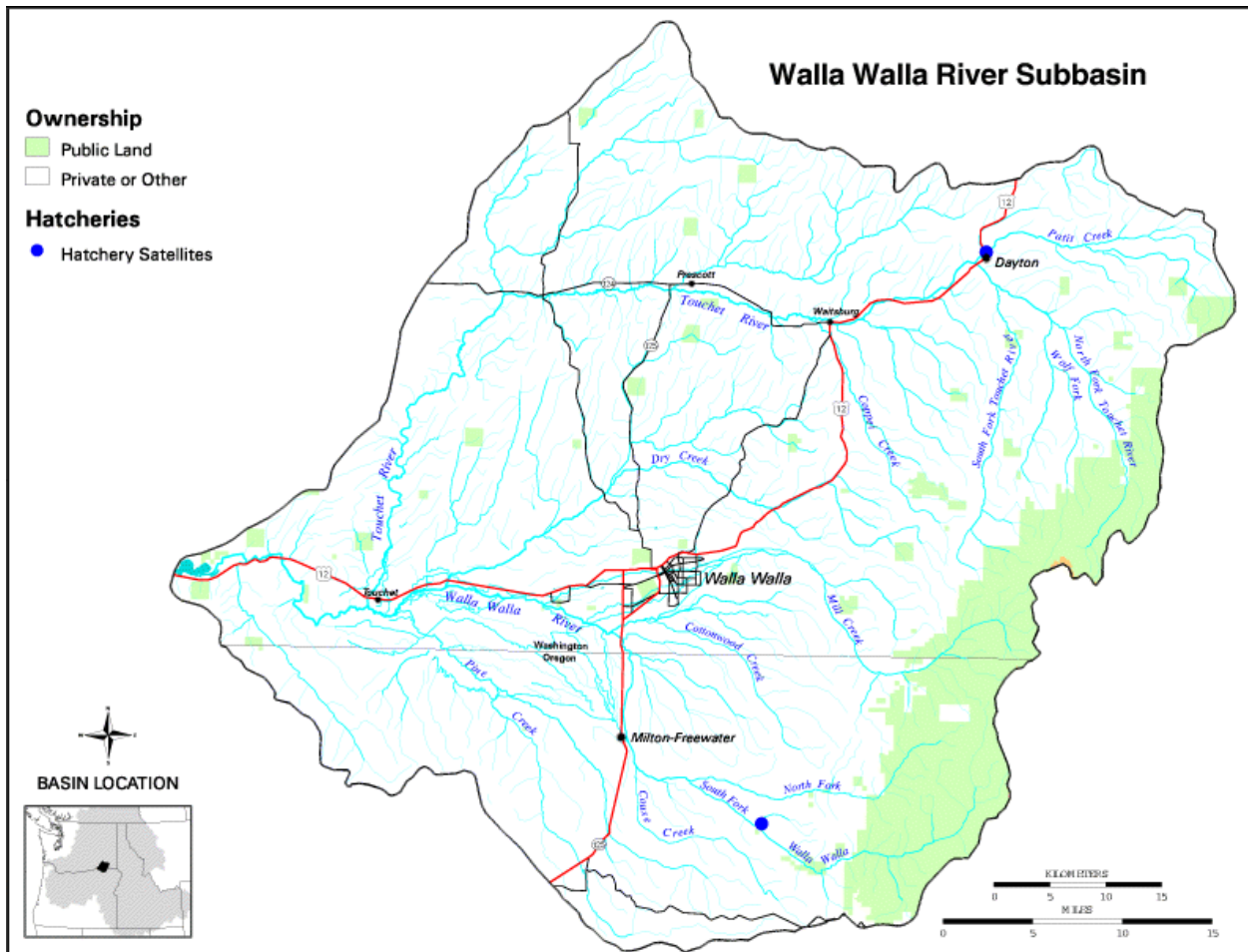


Figure 3: Map of the Walla Walla River Basin.

Annual precipitation in the middle and lower reaches of the basin averages 10-16 inches with more than 40 inches accumulating in higher elevations (Corps of Engineers, 1997).

Cultivation, domestic livestock grazing, and flood control activities have affected riparian vegetation throughout much of the mid-lower elevation reaches. The loss of stream channel complexity is significant throughout the basin because of extensive levees and destruction of riparian, wetland, and forest areas.

Irrigation is the principal water use in the basin. Stream flows characteristically peak in April, dropping sharply in May as high elevation runoff subsides and low elevation irrigation diversions increase (CTUIR, et al.). These conditions annually lead to unacceptable habitat for salmonid fishes in the mid-lower portions of the basin.

Conservation easements in the basin:

Approximately seven miles of stream corridor habitat is currently protected in long-term conservation easements between private landowners and the CTUIR under this project. Project areas are located within Blue Creek, Couse Creek, the mainstem Walla Walla, the South Fork of the Walla Walla, and Patit Cree (Figure 4).

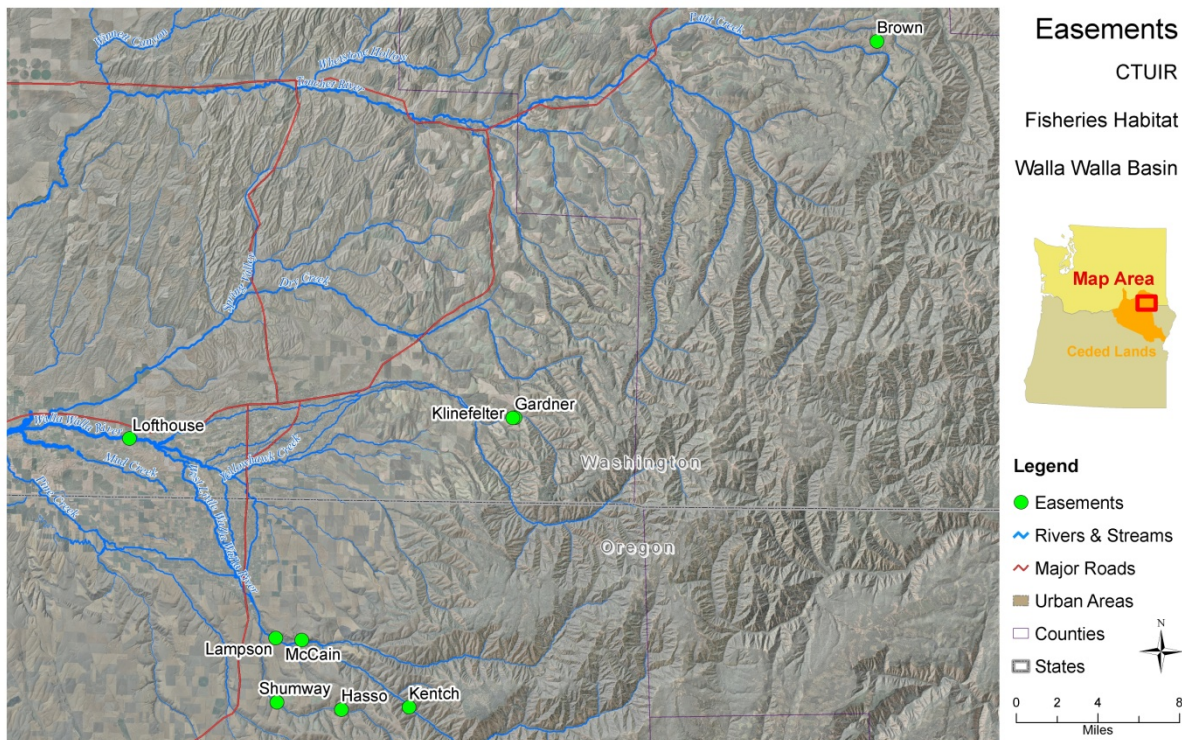


Figure 4: Long-term (15 years) conservation habitat conservation easements between the CTUIR and private landowners in the Walla Walla River Basin.

METHODS

Landowner Conservation Easements:

Habitat restoration and protection projects implemented on private lands begin with long-term (minimum 15 years) or perpetual Conservation Easements. Landowner easements are legal documents designed to protect the resource, the landowner, the CTUIR, and all funding sources. Easements are very descriptive, clearly defining the project boundaries, livestock fence placement if any, various land use restrictions, and the expectations and goals of all parties. Most of all, the easements are designed to best meet the individual needs of the landowner and the interests of the CTUIR.

Once signed by both CTUIR and the landowner, easements are notarized and filed at the County Courthouse. Easements therefore transfer to new landowners in the event that the property ownership changes. Ongoing coordination with the landowner is an essential part of the restoration process and flexibility on the part of both parties is an integral part of project success.

Environmental Clearances:

Habitat projects require a variety of environmental clearances depending on the restoration action. Passive actions such as the construction of livestock exclusion fences and riparian plantings typically fall under the BPA programmatic process. More aggressive restoration actions such as in-water stream work (revetments, weirs, vanes, large wood additions, etc.) require Fill and Removal Permits from the applicable State, Federal, and Local regulatory agencies prior to implementation.

As required under the Federal National Historic Preservation Act (NHPA), the project also coordinates as necessary with the CTUIR Cultural Resource Protection Program (CRPP) at proposed habitat enhancement sites involving ground disturbance. CRPP staff conducts file and literature searches, pedestrian surveys and/or archeological excavations to determine if cultural resources potentially eligible for inclusion to the National Register of Historic Places are present at proposed enhancement sites. Final reports documenting their findings are prepared and submitted to the State Historic Preservation Office.

Project Implementation:

Restoration actions implemented by the project include various types of adult and juvenile passage improvements, livestock exclusion fencing, riparian/upland planting, and stream channel enhancements. Projects requiring the use of heavy equipment (dozers, excavators, large trucks, etc.) are subcontracted to qualified independent contractors through a competitive bidding process consistent with requirements of the funding source.

Livestock fence construction is contracted out to private contractors meeting all license, insurance, and qualifications. The fence design generally follows specifications provided by the USDA in an effort to protect livestock and migrating wildlife. Small fencing jobs, routine maintenance, and livestock water gaps are generally completed by project technicians.

Only plants native to the region are used for restoration of riparian and upland project areas. Potted plants and tublings are most often obtained through the CTUIR Native Plant Nursery.

Newly planted trees and shrubs are watered through the drought months of July through September in the first year after planting with a 300-gallon water tank and sprayer mounted on a truck. Live willow cuttings are collected at or near the project site and installed by trenching them into the soil with the use of a cat-track excavator. Willows placed in this manner require no maintenance and have proven very successful.

Reestablishment of native grasses is often the first management step taken within upland areas. Once established, grasses provide excellent cover for wildlife species, control of soil erosion and perhaps most important management of competitive noxious weeds. Grass seed is obtained from area suppliers and includes a mix of site appropriate species.

If left uncontrolled, noxious weeds will generally out-compete native trees and shrubs. The CTUIR annually contracts with a licensed contractor to treat noxious weeds within project areas. Additional mechanical/chemical weed control measures are done throughout the year as needed by project technicians. All chemical weed applications are consistent with Oregon Revised Statute (ORS).570.505 and Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) Regulations, and NOAA.

Project effectiveness Monitoring:

Various monitoring strategies are used to measure physical and biological changes within project areas. Rather than monitor all project sites, a representative portion of project areas are monitored in an effort to reduce the considerable cost associated with this task.

Most of the monitoring methods used are modified from protocol developed by Oregon Department of Fish and Wildlife in 1993 (Moore et al., 1993). Other sources include Monitoring Stream and Restoration by Roni 2005, Stream Channel Reference Sites, a USFS publication by Harrelson et al. 1994 (www.stream.fs.fed.us), and an AFS publication entitled Aquatic Habitat Assessment by Bain and Stevenson, 1999. A copy of the project effectiveness monitoring methods guide may be obtained from the CTUIR Fisheries Habitat Program upon request.

Physical parameters generally monitored over time include shade, large wood contribution, cross sections, longitudinal profile, and vegetation grids. For some of the projects a detailed field survey is done with equipment manufactured by Trimble which through the use of global positioning (GPS) plots the location and form of the stream on an aerial map and allows quantitative measurements of various habitat types (pools, riffles, glides, etc.), Rosgen Level I calculations, and visual interpretation. Biological monitoring is typically completed by the CTUIR Natural Production Research Monitoring and Evaluation Project.

RESULTS AND DISCUSSION

Landowner Conservation Easements

Blue Creek (Warriner and Gardner):

This conservation area is located at approximately RM 2 on Blue Creek, a small tributary to Mill Creek east of the City of Walla Walla, Washington. The site consists of two adjacent properties with separate owners and Conservation Easements. The 15-year Conservation Easements were signed between the CTUIR and landowners in September of 1997. The stream length included within the project boundary is approximately 0.25 miles.

The site is at an elevation of approximately 1,800 feet. Residential encroachment in recent years is affecting much of the system both above and below the project area. The valley-bottom within the project area is approximately 200 meters in width with timbered stringer draws on the south side of the stream and grasslands to the north. Stream flows are perennial although very low in late summer. Maximum daily stream temperatures typically exceed 75 degrees (F) for several days in late July of each year. Native redband trout/summer steelhead can be found in the project area throughout the year and one bull trout was found while sampling in October of 1997 and one juvenile spring chinook in 2008.

In February of 1996, the Blue Creek Project Area experienced a flood of such dimension that virtually all instream woody debris and riparian vegetation was removed. During and after this event a considerable amount of channel work was done with heavy equipment by private landowners. As a result, much of the stream was straightened and channelized which ultimately caused the streambed elevation to drop and a severe head-cut to move upstream through the lowest two miles of Blue Creek.

In 1997, a 15-year conservation easement was signed with two separate but adjacent landowners. In the fall of 1997, the project installed three log weirs and several rock grade-control structures in an attempt to improve instream habitat conditions, stabilize the stream channel grade and reduce bank erosion. Two of the log weirs ultimately failed because of further changes in the channel grade. The remaining log structure and rock structures are still in place and functioning as designed.

Recovery of riparian vegetation at this site has been excellent. Riparian areas completely devoid of vegetation following the flood of 1996 now contain strong stands of various native trees and shrubs. Stream canopy shade has improved throughout the entire project corridor and active bank erosion has been mostly eliminated. The stream channel remains incised as a result of stream channel work done in 1996 below the project area and a push-up dike on the right bank. This situation prevents access to the floodplain and formation of high-water channels and off-channel habitat. Further results and discussion regarding the Blue Creek Project Area is included in the monitoring section of this report.

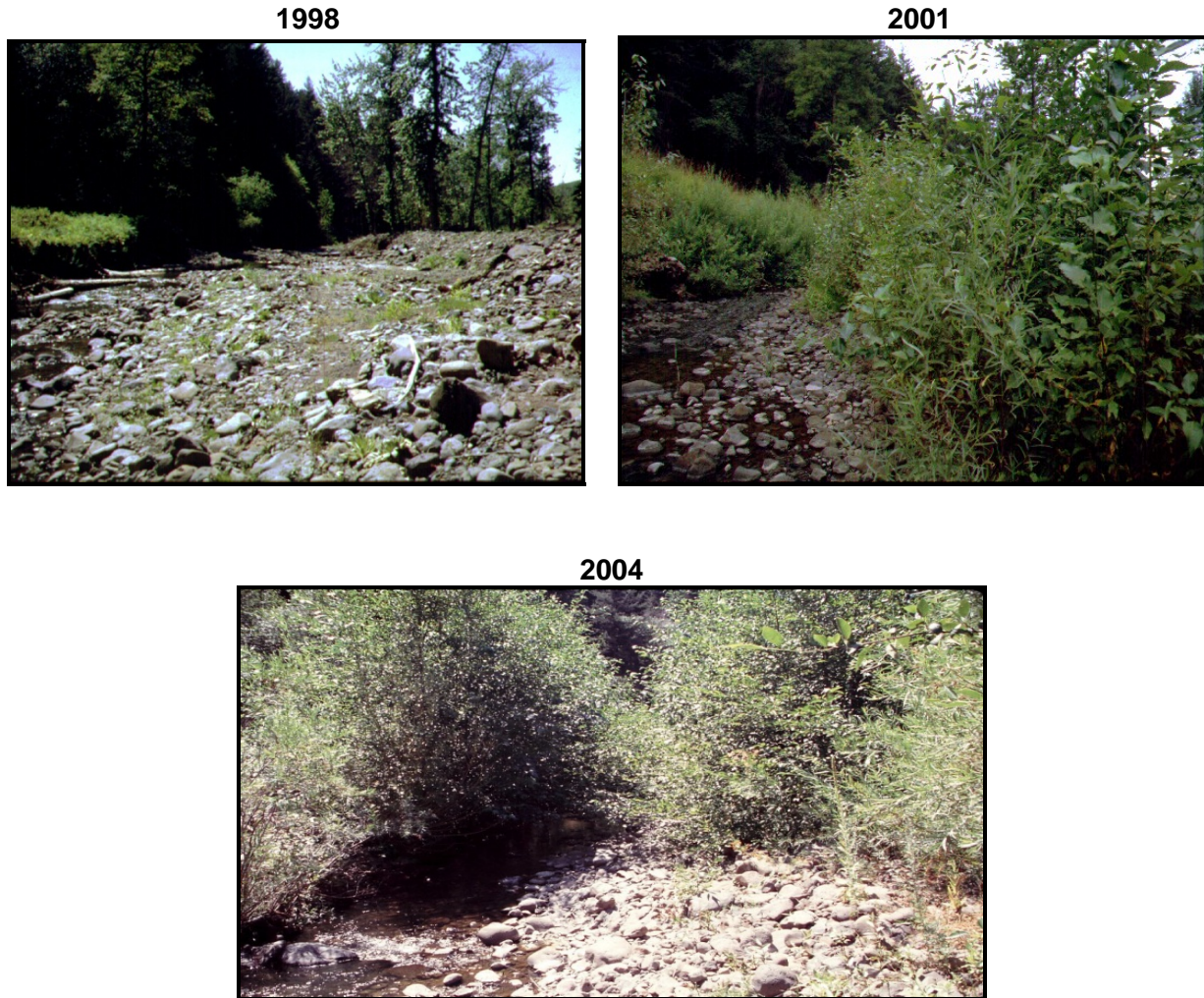


Figure 5: Project photo-points on Blue Creek within the project area collected at the same location in 1998, 2001, and 2004. All of the willows shown above the log structures and within the riparian corridor were placed with the aid of an excavator and stinger in 1998.

Couse Creek (Banks):

Couse Creek is a small tributary entering the mainstem Walla Walla River east of Milton Freewater, Oregon. Decades of dry-land farming, livestock grazing, and channel manipulation have severely influenced the stream and adjacent riparian and upland areas. Couse Creek generally has surface flows throughout the months of December through June of each year. From July through November, flows are intermittent throughout much of Couse Creek leaving isolated pools and reaches with interrupted flow regimes.

Native redband trout can be found in Couse Creek during any month of the year and a small population of summer steelhead spawn in the upper reaches of the stream each spring. One bull trout was found downstream of the project area by the CTUIR in August of 1999 (Gene Shippentower, CTUIR Fish Biologist personal communication).

This project is split into two separate reaches on Couse Creek both owned by the same private landowner. Despite being separated by only two miles, the stream channel conditions at each site are much different.

The downstream project reach is extremely incised with the distance from the top of the bank to the water surface exceeding 15 feet in some areas. Under these conditions, stream access to the floodplain is impossible under typical flow regimes and virtually no large wood or off-channel habitat is available. Vertical banks prevent vegetation from growing adjacent to the stream although a considerable amount of trees and shrubs are present along the narrow riparian corridor at the top of the bank. In 2001, the project seeded approximately 32 acres of uplands adjacent to the stream reach with native grasses. The grasses have been very helpful in controlling noxious weeds and reducing soil erosion.

The upstream project reach had experienced years of over-grazing and agricultural impacts by the time the CTUIR restoration effort started in 1997. In the fall of 1997, several rock barbs designed by the local NRCS were installed by the CTUIR. The barbs proved very effective at eliminating bank erosion and protecting riparian vegetation but eliminated virtually all stream sinuosity and channel complexity.

In the fall of 2008, the project removed the rock barbs, installed 25 whole conifer trees, several thousand willow cuttings, constructed several grade control structures, and reshaped the channel into a form based on measurements taken in an upstream relic reach. Monitoring data and analysis resulting from this work will be provided in the 2009 annual report of progress.

Mainstem Walla Walla River (Lampson):

This conservation project area is located on the mainstem Walla Walla River approximately two miles east of Milton Freewater, Oregon at River Mile 49. The 15-year Conservation Easement was signed between the CTUIR and landowner in April of 1998. The landowners have generously allowed the CTUIR to work within a wide riparian and upland corridor encompassing approximately 25 acres and more than one half mile of the mainstem Walla Walla River. River flows are perennial and stream temperatures are less than 60 degrees (F) throughout the year. Native redband trout/summer steelhead, bull trout, and recently reintroduced spring chinook salmon are present in good numbers.

Conditions limiting site potential include a large rock levee that prevents lateral migration along the right bank, channel straightening, sinuosity, lack of large wood, reduced riparian cover, floodplain function, and excessive fast-water habitat.

In the spring of 2001, the project installed 36 large (41' x 100') black plastic weed barrier tarps purchased from Layfield Plastics Incorporated of Bellevue, Washington. The tarps are designed to eliminate competitive weeds and aid in the maintenance of soil moisture. Each tarp was secured in place by burying the perimeter with topsoil. Small rocks were also arbitrarily positioned on the tarps as additional protection against high winds. The tarps were placed in a random pattern throughout the 20-acre restoration area in an attempt to mimic the natural succession of a shrub, tree, and grass ecosystem (Figure 6). Each tarp was planted with a compliment of approximately 200 native plants appropriate for the site. Plants were maintained throughout the first and second years with summer watering during the months of June through September. Growth of the trees and shrubs has been outstanding with many of the cottonwood trees exceeding 50 feet in height and 15 inches in diameter at the base. The weed barrier tarps

although designed to decay over a period of five years are still in good condition after seven years of use. We are hoping that with time and the addition of naturally falling plant litter (leaves, branches, etc.) that the tarps will eventually decompose.

Noxious weeds are controlled during the growing season with herbicides and hand pulling as needed. A private contractor is hired to treat the project area with herbicides once in the spring and again in the fall. Project technicians apply additional herbicides to problem areas when needed.

In 2009, the project will begin an effort to improve instream conditions on this project site. The project will be requesting proposals (RFP) for an assessment of site conditions and restoration recommendations from qualified consultants. The products from this effort will increase our understanding of current conditions, provide a better understanding of site potential, assist in the development of strategies for achieving desired future conditions, and direct out-year stream restoration activities. A summary of the assessment and design will be provided in the 2009 annual report of progress.



1998



2001



2004



2006

Figure 6: Photo points taken from a ridge over-looking the mainstem Walla Walla River (Lampson) project area in 1998, 2001, 2004 and 2006.

Couse Creek (Hasso):

This site is located at approximately RM 7 on Couse Creek, a small tributary to the Walla Walla River near Milton Freewater, Oregon. The landowner, a resident of California, signed a 15-year Conservation Easement with the CTUIR in December of 1999. The Conservation Easement encompasses the stream and entire floodplain on both shorelines for a distance of approximately 1.2 stream miles. The landowner is also enrolled in the Conservation Reserve Enhancement Program (CREP) administrated through the United States Department of Agriculture.

This area of Couse Creek has been severely over-grazed by livestock for more than 75 years. The upland slopes that were historically dominated by perennial grasses are now mostly comprised of non-native yellow-star thistle (*Centaurea solstitialis*). The riparian and floodplain areas are comprised of sparse stands of annual grasses and a few drought tolerant shrubs. Soils are typically shallow and most of the riparian corridor is comprised of river rock. In recent years, the stream channel has been dry from late June through November. The site is further complicated by prodigious amounts of streambed material following each high water event because of a dramatic change in valley width within the upper reaches of the project area. The floodplain contains a myriad of high flow and abandoned stream channels indicating that the stream has changed its course many times over the last several decades. Summer steelhead spawn within reaches of the project area and juvenile redband trout/steelhead are found when water is present.

Restoring riparian vegetation to this site is particularly challenging because of the extended summer drought, ephemeral flows, and poor soils. As a result, the project has chosen to focus on “passive restoration approaches” including livestock exclusion and self-watering willow cuttings. Several thousand native willow cuttings were collected nearby on the North Fork of the Walla Walla River and trenched in adjacent to the stream with an excavator during the fall of 2000. Survival of the cuttings was higher than 80 percent the following spring but as summer progressed and stream flows eventually ceased many of the plants began to die. By the summer of 2008, approximately 40 percent of the original willows are remaining and we are confident that the plants will begin to multiply. Other plant species including cottonwood trees, hawthorn, rose, and various other species are beginning to reestablish themselves also. We expect that with continued livestock exclusion and time, perhaps decades, the entire riparian corridor will again support a healthy riparian plant community and properly functioning stream channel and floodplain.



1999



2006

Figure 7: Photo-points taken within the project area on Couse Creek (Hasso) in 1999 and 2006. A century of over-grazing, shallow soils, and summer drought make this restoration site particularly slow to recover. The stream is narrowing, however, and vegetative is slowly recovering.



1999



2006

Figure 8: Photo-points taken in 1999 and again in 2006 over-looking the project area on Couse Creek (Hasso).

Patit Creek (Brown Landowner):

This project area is located at approximately RM 3, on West Patit Creek, a small tributary to the Touchet River near Dayton Washington. The landowner signed a 15-year Conservation Easement with the CTUIR in November of 1999 and is participating in the CREP Program administrated through the United States Department of Agriculture. Timbered stringer draws, shrub species, and grasses are found on the valley slopes to the west while various perennial grasses and invasive yellow star thistle are predominately found on slopes on the east. Stream flows are typically very low during the summer months forcing native fish to find refuge in small pools. Summer steelhead, native red band trout, and various other native fish species are present in good numbers throughout the year.

The area included within the Conservation Easement is approximately two stream miles in length and includes the stream and entire floodplain (exceeding 200 meters in width in some areas) on both shorelines. A livestock exclusion fence was constructed along the perimeter of the project (four miles) in 2000.

The uppermost one half mile of the project area was severely impacted by high water in February of 1996 leaving much of the channel braided, actively eroding and lacking pool habitat and riparian cover. An instream enhancement plan was developed by the CTUIR to address these concerns in 1999 and construction occurred in 2000. The work included eight vortex weirs, two root wad revetments, two keyed logjams, meander bend and point-bar enhancement. Several thousand willow cuttings were also installed by trenching them in below the water line and adjacent to the stream.

The stream channel and riparian corridor have remained stable since the instream work occurred in 2000. Large wood placed on point-bars in an effort to increase roughness is catching sediment and allowing riparian vegetation to be reestablished. Willow cuttings and various trees and shrubs reintroduced to the project area continue to mature and provide positive benefits to the stream bed and banks. (see the photo-points below).

Noxious weed infestations, particularly yellow star thistle originating on the eastern slopes above the project continue to be a management challenge. Native grasses are being used in an attempt to out-compete unwanted weeds with some success. The project has also hired a contractor to treat the project reach with herbicides in the spring and again in the fall of each year.

2000



2006





Figure 9: Patit Creek photo points taken in 2000 and repeated in 2006. The willows along the shoreline in the top right photo were planted by the project during instream enhancement activities conducted in 2000.

Walla Walla River-Lofthouse Landowner:

This project is located near RM 32 on the mainstem Walla Walla River, several miles east of the city of Lowden Washington. The landowner signed a 15-year Conservation Easement with the CTUIR in November of 2001. The conservation area includes approximately .25 miles of the main Walla Walla River, the riparian corridor on both shorelines, and 12 acres of floodplain/upland corridor. Until recently, the upland portion of the property was being cultivated. At the time the conservation easement was signed, the upland fields had been left fallow and contained a mixture of non-native weed species.

In its current condition the riparian corridor on both shorelines is narrow (less than 30 meters) and includes a mix of native tree and shrub species including cottonwood, wild rose, and willow. The stream channel flows along the left bank and portions of the shoreline are actively eroding. The channel is overall incised with a distance of approximately 300' between a terrace on the left bank and a rock levee along the right.

An early traveler at Whitman Mission very near this project site wrote, "The Walla Walla is a pretty stream. It's channel is paved with gravel and sand, and about three rods in width; water two feet deep, running five or six miles the hour, and limpid and cool through the year" (Early Western Travels, Farnham's Travels, 1839). Today flows at the project site are very low (less than 10cfs) during the summer months. Recent legal agreements resulting from the Endangered Species Act between upstream irrigation districts and the federal government have allowed a minimum amount of water (less than 15cfs) of water to continue downstream. Although this has helped improve stream conditions, flows and stream temperatures are still not meeting the needs of salmonid fishes during many months of the year.

Water temperatures in this portion of the river exceed 70F during most of the summer months and are thus marginal for salmonid fish. Nevertheless, small populations of juvenile salmonid fish may be found in spring return areas during the summer. Adult and juvenile spring chinook, summer steelhead, and an occasional coho are found in this reach during the fall, winter, and spring migration periods.

In March of 2002 approximately 10 acres of upland habitat within the project area was seeded to native grasses. The field was irrigated during the first summer and two applications of broadleaf herbicide were applied. In an attempt to strengthen the grass stand the field was no-till seeded again in the spring of 2004. Broadleaf weeds are treated once in the spring and again the fall of each year. Some patches of cheat grass remain in the field but these are expected to eventually be crowded out by perennial grasses.

Large weed barrier tarps were installed and planted on ten acres of the project area in February of 2008. A mixture of site appropriate tree and shrub species including black cottonwood, rose, ninebark, elderberry, willow, and snowberry were included in the plantings. Project technicians watered the new plants during the months of June through September and hand-pulled competitive weeds as needed. Survival of the new plants through the first year was approximately 60%. Geese grazing on the plants created some problems and so did the dry hot summer months despite continued watering. All of the dead plants have been replaced with a compliment of healthy native tree and shrubs.

Walla Walla River-McCain Landowner:

The project area is located at RM 50 on the mainstem Walla Walla River approximately five miles southeast of the city of Milton Freewater, Oregon. The project signed a 15-year riparian easement with the landowner in February of 2003. The conservation area takes in approximately .25 miles of the stream and includes a riparian buffer of 150-300 feet on both shorelines. The upland area on the south side of the stream (left bank) was most recently used as an apple orchard and includes the landowner's residence and several outbuildings. The apple orchard was removed during the last five years and is now a horse pasture. To the north of the stream are steep slopes, basalt outcroppings, and shallow rocky soils providing at best marginal pasture.

Historical photos of this area from the early 1900's show dense cottonwood galleries extending several hundred yards out across most of the floodplain. Today the riparian corridor is 60 feet wide at most along both the left and right stream banks. Riparian plants currently found on site include alder, cottonwood trees, rose and invasive blackberry. At the time the conservation easement was signed, the riparian corridor also contained large amounts of discarded vehicle parts, cement blocks, household items, etc., presumably used for bank protection by previous landowners. These items have since been removed by the project.

The stream has perennial flows, high water quality, and contains strong populations of summer steelhead, bull trout and recently reintroduced spring chinook salmon during all months of the year. It is clear that at some point the stream was pushed to the side of the valley for agricultural benefits. The stream channel is confined, straightened and a small levee has been constructed along the left bank to prevent overbank flow and transport water more efficiently. All of this has significantly reduced instream habitat complexity and nearly the entire project length is comprised of riffle habitat.

To improve instream conditions, a restoration design was developed by Jim Webster, CTUIR hydrologist in 2007 (Appendix A). The understood goal of this effort is to improve habitat conditions for salmonids and maintain channel stability. Specific objectives of this project included the following:

1. Increase and improve the quality of hiding cover for salmonid fish species defined as deep pools, undercut banks, overhanging vegetation, and complex roughness features.
2. Increase aquatic habitat complexity by diversifying habitat types between riffles, runs, pools, and glides.
3. Promote healthy riparian vegetation conditions through improving floodplain connection and planting native vegetation.
4. Improve and maintain channel stability through the decrease of channel width and increase of channel depth in specific areas.

Partney Construction of Lagrande, Oregon was contracted to complete the instream work in July of 2007. Two boulder cross vanes and four rock j-hook vanes were constructed. Each of the vanes included a 20' conifer tree and attached root wad buried into the bank so that the root wad extends into the stream below the high water mark. Some placement of large boulders, minor channel shaping and planting of willow cuttings was also part of the effort.

Mainstem Walla Walla River-CTUIR:

With assistance from the Trust for Public Lands, the CTUIR purchased a 46-acre property on the South Fork of the Walla Walla in December of 2003. A combination of Pacific Coastal Salmon Funding and CTUIR Wildhorse Gaming Resort dollars were used to fund the acquisition. The 46-acre property is located in the foothills approximately 13 miles east of Milton Freewater, Oregon on the mainstem Walla Walla River. Included in the property is 0.5 miles of the river, an older 900 square foot family dwelling in need of much repair (currently vacant) and several outbuildings. Also attached with the property is a water right for approximately 13 acres of pasture.

Water quality at this point of the river is excellent throughout the year and provides refuge for strong populations of summer steelhead, red-band trout, spring chinook salmon, and bull trout. The river channel is confined by a dike along the right bank and an abrupt hillside with conifer trees and basalt out-croppings to the south. Limiting factors include riparian and upland vegetation, floodplain function, and instream habitat quality.

In February of 2007, a contract was developed with an area contractor to have approximately 15 acres of former pastureland prepared for seeding. Several large clumps of blackberry were removed and the soil was tilled and seeded with native grasses. The field was treated with broadleaf herbicides in May and November of 2007. In March of 2008, portions of the field were broadcast seeded with native grasses in an attempt to strengthen the grass stand. Broadleaf herbicides were applied in the spring and fall of 2008. The upland field now has a good stand of native grasses but it will take several more years of weed control measures before the grass becomes fully established.

Similar to the Lampson project site, the project will be requesting proposals (RFP) in 2009 for an assessment of site conditions and restoration recommendations from qualified consultants. The products from this effort will increase our understanding of current conditions, provide a better understanding of site potential, assist in the development of strategies for achieving desired future conditions, and direct out-year stream restoration activities. A summary of the assessment and design will be provided in the 2009 annual report of progress.



Figure 10: Photo looking upstream on the mainstem Walla Walla River within the property owned by the CTUIR.

PROJECT EFFECTIVENESS MONITORING

Measurable ecological benefits associated with habitat restoration often require years to come to fruition. Therefore, the project provides monitoring data, analysis and discussion on a three year cycle. A thorough examination of project effectiveness monitoring data and discussion will be provided in the 2009 Annual Report of Progress.

ADDITIONAL ACCOMPLISHMENTS

- Coordinated with various local, state, and federal agencies in the prioritization and selection of habitat restoration sites;
- Conducted on-site visits with landowners;
- Attended the Northwest River Restoration Conference in Stevenson Washington for three days in each of the reporting years.
- Provided fencing materials as cost-share for project with the ODFW on Cottonwood Creek.
- Provided construction oversight of an instream restoration project on Cottonwood Creek in the fall of 2007.
- Secured all necessary environmental permits for instream work on the McKain property in 2007 and the Shumway property in 2008.
- Developed noxious weed subcontracts and oversight in each of the reporting years

- Project technicians repaired approximately 1.5 miles of livestock exclusion fence damaged during a fire on Patit Creek.
- Maintained all field equipment including tractor, various implements, and hand tools.
- Met with subcontractors interested in bidding on the design project for the Kentch and Lampson sites.
- Completed RFP for the Kentch and Lampson assessment and design.
- Secured a \$150,000 grant for levee removal/modification from the Oregon Department of Environmental Quality.
- Completed all quarterly and annual Pisces and written reports;
- Provided written/verbal comments to ODFW, WDFW, and Walla Walla County regarding various proposed instream/upland activities impacting salmonid habitat;
- Coordinated with participating landowners in meeting their concerns, project objectives, future tasks, etc.
- Attended basin strategy, planning, and funding meetings including the Mill Creek Working Group, the Priority Projects Group, and the Snake River Recovery technical team.
- Provided tours of project restoration areas to the NWPPC, BPA, and others as needed;

CONCLUSION

A multitude of factors have led to the extinction of salmon and severe reduction of summer steelhead in the Walla Walla River Basin. Nevertheless, irrigation withdrawals and inadequate passage conditions have been the most damaging. There is today, as there was a hundred years ago, irrigation withdrawals that leave streams with inadequate flow for months of the year.

In recent years, particularly since the listing of several species under the Endangered Species Act, we have begun to take the first steps toward protection of salmonid fish in the Northwest. With time, education, and continued funding, many of the obstacles now facing salmon can be eliminated. We must strive to protect and enhance all salmonid habitat and enforce existing laws structured to protect the salmon life cycle. Logging, grazing, and agriculture can coexist with the needs of salmon. We must continue to learn, always striving to improve our methods of restoration and protection while working on a system that is fair to all participants including native fish and wildlife. Stream buffers and zoning laws that protect riparian areas from further development are desperately needed. County land management plans must recognize the need to restrict development of critical riparian and wetland areas, this is currently not happening. Minimum stream flows should be maintained to protect critical spawning, rearing, and migration periods. Moreover, with ever-increasing amounts of dollars invested by state and federal agencies, particularly farm programs; it is imperative that funding aimed at helping native fish be directed toward projects that will provide the greatest benefit.

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- Celeste Reeves for secretarial assistance; and
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Appendix A.

South Fork Walla Walla River - Dale McCain Property Initial Reconnaissance Jim Webster, 2007

Goals and Objectives

The McCain property was visited on March 9, 2006 by Jim Webster and Bill Goodrich as initial reconnaissance for designing a restoration project for the South Fork Walla Walla River (SFWW River). The understood goal of the restoration is to improve habitat conditions for salmonids (anadromous species, bull trout and resident miscellaneous trout) and maintain channel stability. In order to address this goal, river morphology will need to be assessed as a major driver in floodplain processes. Specific objectives of this project may include the following:

1. Increase and improve the quality of hiding cover for salmonid fish species defined as deep pools, undercut banks, overhanging vegetation, and complex roughness features.
2. Increase aquatic habitat complexity by diversifying habitat types between riffles, runs, pools, and glides.
3. Promote healthy riparian vegetation conditions through improving floodplain connection and planting native vegetation.
4. Improve and maintain channel stability through the decrease of channel width and increase of channel depth in specific areas.

Existing Condition

In the region of this project, the SFWW River flows through a relatively flat, broad valley of alluvial gravels and fine soil. Based on this valley type and material composition, the estimated historic channel morphology would have been a low gradient (<1%), moderately sinuous (>1.2) channel with low entrenchment. The floodplain would have been accessible to overbank flow and water exchange would have occurred regularly, both surface water and shallow groundwater. Riparian vegetation would have been plentiful and the channel would have had significant shade, cover, and input from the riparian canopy.

In its current condition, the SFWW River channel has been highly impacted by land use and management. Farming practices have required the use of the valley floor and required the realignment and relocation of the channel to the side of the valley. Levees have been constructed along a significant length of the channel and through the McCain property in order to reduce overbank flow and evacuate water from the valley more efficiently. Floodplain access by overbank flow is limited along the left bank by this levee and along a majority of the right bank by natural landform (side of valley). Additional bank hardening in the form of rock groins and barbs have been used at key locations to reduce bank erosion and limit the channel from lateral migration.

The resulting morphology leaves a channel with higher gradient, lower sinuosity, and greater entrenchment than the historic condition or the condition that the valley would support. Bankfull width through the proposed project area ranges between 70 and 90 feet with long areas of shallow riffle. Sinuosity is low and estimated to be less than 1.1. Stream energy must be higher due to the loss in stream length over the same valley length and resulting higher channel gradient. Higher channel entrenchment creates conditions for higher shear stress during high flows, which will result in larger substrate material and may not be as conducive to spawning

area development. Stream habitat surveys also suggest that the diversity in habitat types has been reduced and the expected array of riffles, runs large pools, and glides has been replaced by a more homogeneous riffle and glide condition with pocket pools.

Recommendations

With the channel being constrained by a levee and the valley side, any proposed restoration actions should not decrease channel or floodplain capacity further and consideration must be given when adding roughness features to the channel and floodplain. Large log jams and obtrusive boulder structures will further reduce channel capacity and exacerbate bank instability and erosion if placed in the bankfull channel. Actions that increase channel capacity and floodplain connection should be considered and are recommended.

Roughness features can still be added to the reach to improve aquatic habitat and achieve the stated objectives. The attached diagram shows the proposed structures for the McCain reach of SFWW River. The upstream portion of the reach is very straight with a few larger boulders providing some diversity in flow conditions. The addition of boulder clusters, large wood rootwads and a full-spanning cross-vane boulder structure would add a variety of cover types and flow diversity while maintaining channel stability. The boulder clusters would consist of a set of 4 to 6 boulders (24"-40" diameter) arranged with a footer and invert rock to create a small pocket of low flow velocity. The large wood rootwads would consist of a rootwad with a 20-foot bole that is buried into the bank so that the rootwad remains in the active channel and below the bankfull level; providing hiding cover and a low velocity area. The cross-vane would be built to the appropriate channel cross-section form, provide vertical stability to the channel and focus flow to maintain a large scour pool in the center of the channel. This structure would provide diverse flow and habitat conditions by creating areas of deposition and scour in the existing riffle/glide.

In the only existing meander bend in the project reach, complex J-hook vanes are proposed. A total of four structures are proposed along the left bank. Existing boulder material on site can be removed and used in the construction of these structures. The structures would be keyed into the bank, extend upstream and into the channel at an angle of approximately 30 degrees, and slope into the channel at 5-7 degrees. The end of the structure would have a hooked end that will define the location of the thalweg through the meander bend. Large woody material could be added to the downstream side of these structures for additional habitat complexity.

The final downstream structure would be another boulder cross-vane. This vane would span the entire channel and direct the main thalweg flow to the center of the channel. Again, this structure would be installed below the bankfull channel and slope down the center of channel. The invert rocks in the center 1/3rd of the channel will be spaced apart to allow the passing of bedload material, although hydrologic control will be maintained. The structure will create a scour pool on the downstream side and create areas of low shear stress in the near bank regions.

More detailed site information is needed before further design work can be completed. A longitudinal elevational profile of the channel that identifies channel and habitat forms will be needed. Also, channel cross-sections will be needed at specific locations where the larger structures will be constructed. During these surveys, bankfull dimensions will be noted along with other morphological characteristics. Monitoring and evaluation information could also be collected at this time and be used later to determine the effectiveness and success of the project.