Wallowa River/6-Ranch Habitat Restoration

Completion Report

Bonneville Power Administration Project Number 1992-026-01
Contract #37387
Performance Period May 1, 2008 – April 30, 2010

Oregon Watershed Enhancement Board
Grant #208-5010
Performance Period October 29, 2007 – October 31, 2010

By R. Coby Menton, Grande Ronde Model Watershed
With input from
Chas Hutchins, Anderson Perry & Associates

June 2010

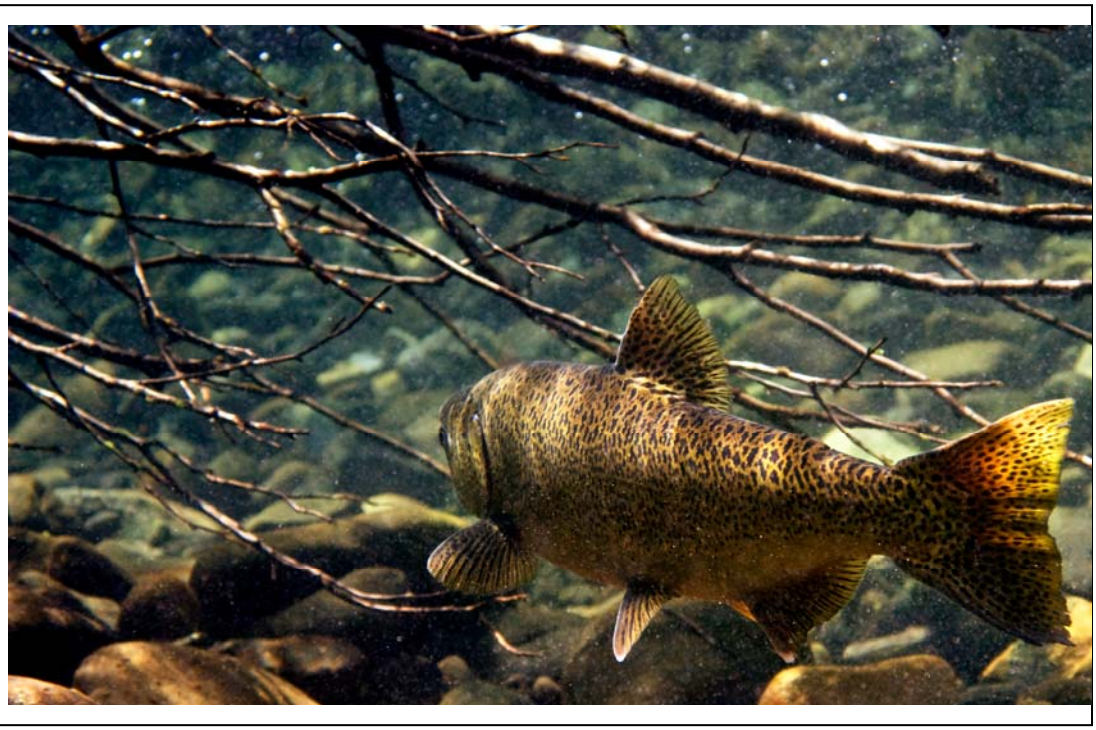

Photo by Mary Edwards, MaryEdwardsphotography.com

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Abstract

Wallowa River restoration efforts at the 6-Ranch, owned by Liza Jane and Craig Nichols near Enterprise, Oregon began in the fall of 2006. Prior land management activities had channelized this section of river reducing channel length, degrading habitat features, riparian condition and flood plane function. Starting in late 2006 and continuing through late 2008, survey, design, permitting and consultation efforts were completed. Using Rosgen Natural Channel Design techniques the final design called for the transformation of 3260 feet of channelized river into 3800 feet of sinuous, complex and diverse habitat. The thalweg, or deepest part of the channel, was constructed to create the different features such as pools, riffles, runs and glides. Access was provided to the floodplains, a critical feature to avoid a "ditch-like" channel. Cross vanes were constructed for grade control (vertical stability), and revetments and J-hooks were installed for horizontal or lateral stability. An aggressive and diverse vegetation recovery effort was made to stabilize the riparian area and floodplain adjacent to the new channel.

The Grande Ronde Model Watershed (GRMW) obtained project funding from four sources including Bonneville Power Administration (BPA), Oregon Watershed Enhancement Board (OWEB), the Jubitz Family Foundation and an anonymous donor. In-kind efforts from Oregon Department of Fish & Wildlife (ODFW), the Nez Perce Tribe (NPT), Confederated Tribes of the Umatilla Indian Reservation (CTUIR), and a multitude of volunteers were realized during a three-day fish salvage effort when the new channel was activated and the old channel abandoned.

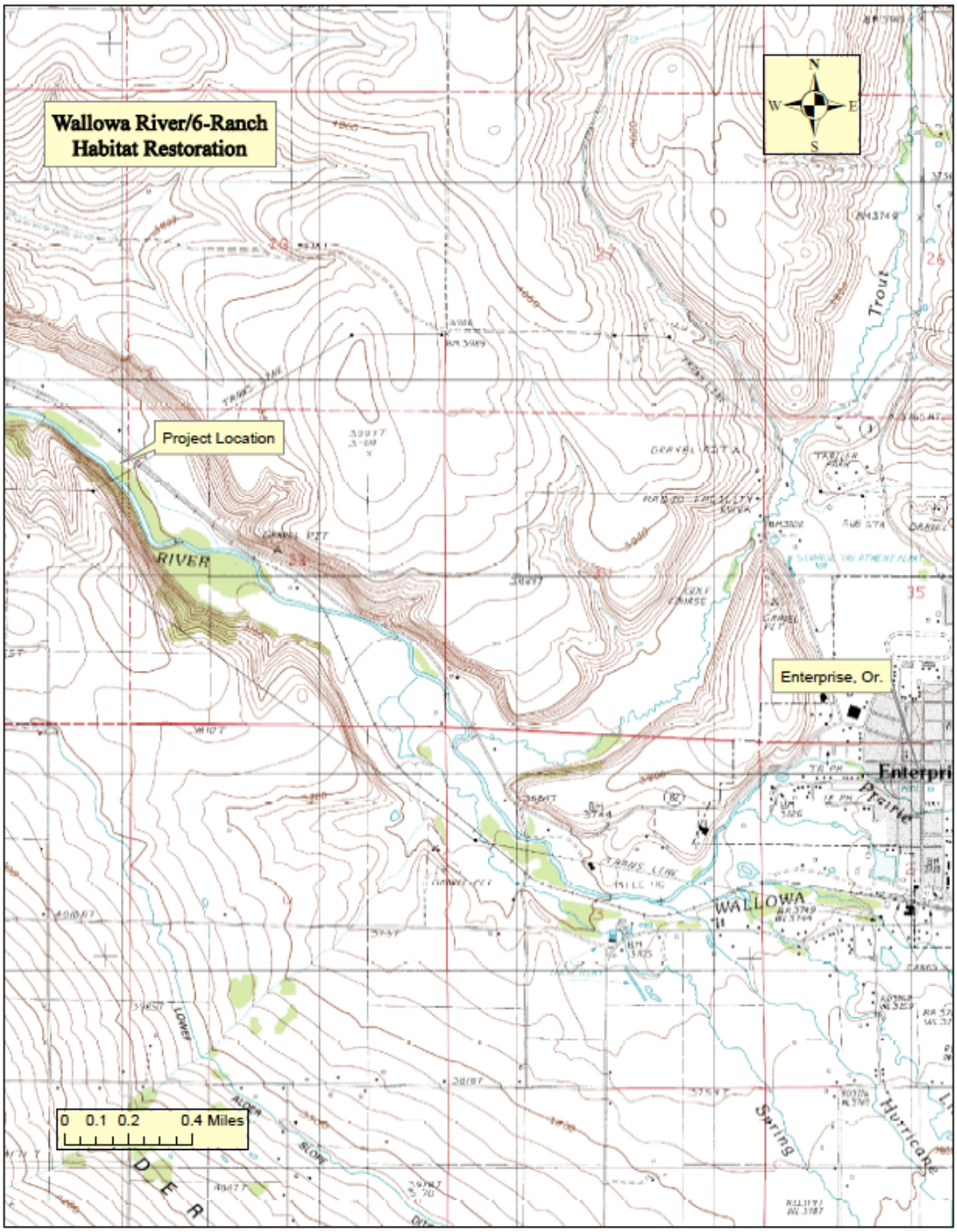
Construction was divided into two phases with all dry land excavation completed between November of 2008 and March of 2009. This work consisted of excavating most of the new channel, installing structural components, and staging spoils for reclamation of the old channel. Construction in the summer and fall of 2009, the connection phase, consisted of installing more structures, activating the new channel, fish salvage and reclamation of the old channel. Revegetation efforts spanned both phases and consisted of seeding disturbed areas with native seed and planting both containerized shrubs and live whip trees.

LD Perry Inc. (LDP) of Enterprise, Oregon under the direction of Anderson Perry & Associates (AP) of La Grande, Oregon, the project-engineering firm, accomplished all construction work. Jones Excavating of Lostine, Oregon was subcontracted to supply boulders for the grade control and J-hook structures and a local fence contractor was hired to drill holes during the revegetation effort. Of the $487,000 spent during construction over $480,000 was spent on local Grande Ronde Basin private sector businesses. Total project cost including design, permitting and construction totaled $578,000 of which $570,000 was spent on contractors, service and material providers and engineering services all based in the Grande Ronde Basin.

Building on the success of the Wallowa River/McDaniel Habitat Restoration projects 7 miles downstream, the 6-Ranch project is well positioned to deliver the same habitat & hydrologic benefits. Since 2005, 9000 feet of the Wallowa River has been realigned and is complete with pools, riffles, glides and an active flood plane. Under agreement with the US Fish and Wildlife Service the 6-Ranch project area is precluded from grazing for a minimum of 10 years. Project maintenance by GRMW and the landowner through monitoring and adaptive management will help ensure project success for many years to come.

Introduction

The Wallowa River/6-Ranch Habitat Restoration project is located in Wallowa County, approximately two miles northwest of Enterprise, at Wallowa River Mile 40. The project is located in Township 1S, Range 44E, Sections 32 & 33, Willamette Meridian, Wallowa County. See Map 1, Project Vicinity Map. The majority of the project site was managed as a seasonal pasture for Corriente cattle with the minority managed for grass hay production.



Map 1: Project vicinity map.

An estimated 38 species of fish, including 15 introduced species, are found in the Grande Ronde River Subbasin (Grande Ronde Subbasin Summary, 2002). The Wallowa River reach within the project area supports spring Chinook salmon (O*ncorhynchus tshawytscha*), summer steelhead trout (*Oncorhynchus mykiss*), bull trout (S*alvelinus confluentus*), resident rainbow/redband trout (*Oncorhynchus mykiss gibbsi*), Mountain whitefish (*Prosopium williamsoni*), and a variety of non-game fish. Spring Chinook and summer steelhead inhabit the project reach year-round. Limited suitable spawning habitat exists for both species in the existing condition. Both species currently utilize the project reach for juvenile rearing. Fluvial bull trout are likely to inhabit the reach during winter and spring, using it as a migration route and as a foraging area.

Much of the Wallowa River within this watershed has been moved, straightened, and channelized to accommodate agriculture, the railroad, and Highway 82. In cooperation with the landowner this project is designed to realign 3,800 feet of the Wallowa River channel according to the Rosgen method. The result will be improvements in fish habitat, channel form and function, channel and floodplain interaction, and riparian condition. Habitat and channel morphology parameters of concern include:

1. Water quality including temperature, chemistry and nutrients.
2. Habitat elements including pool quality, off-channel habitat, and refugia.
3. Poor riparian vegetation recruitment, growth and stability.
4. Channel width to depth ratio.
5. Altered peak and base flow characteristics (influenced by Wallowa Lake Dam).
6. Floodplain connectivity/interaction is absent because of incised channel and diked banks.

Objectives

1. Increase base flow depth in the Wallowa River channel, increase flooding frequency, and create pool and riffle sequences that increase the consistency of bedload transport and deposition on the floodplain.
2. Increase stream channel sinuosity, channel length, and geomorphic stability, and decrease channel gradient.
3. Improve instream, riparian, floodplain conditions and functions, including improved quality and use of riparian areas for native plant communities and wildlife.
4. Improve/increase vegetative cover/shade to moderate stream temperatures.
5. Improve/increase streambank stability.
6. Improve surface water and ground water interaction with resultant lowering of summertime stream temperature and increase wintertime stream temperature.
7. Improve properties of coldwater fish habitat and terrestrial and aquatic macroinvertebrate community composition.
8. Improve/restore use of restored stream channel segments by anadromous fish.

Project Methods & Materials

The GRMW acquired all necessary project funding, acquired all permits, contracted service providers, managed all fiscal aspects, and administered the project. The GRMW is the project sponsor and non-technical partner of the production team and responsible for all implementation, monitoring and fiscal reporting. AP was the technical aspect of the production team and responsible for survey, design, project installation as per final design, adaptive construction management as necessary, and quantitative measurements and monitoring of the project.

Specific actions involved in channel construction include excavation of soil and gravel, shaping point bars, cutting and shaping outside meanders, riffle/channel cross-over sections, and channel thalweg, shaping terraces and streambank slopes, and revegetation. The construction specific actions were completely contracted to LDP and are detailed below.

Proposed Actions

Approximately 3,800 feet of restoration channel will be constructed. The restoration channel will be a C3 Rosgen channel type and have bank full width, mean bank full depth, maximum bank full depth, cross sectional area, sinuosity, & slope appropriate to valley form and function.

Root Wad Revetments & J-Hooks: Large rootwads with tree boles attached will be used to construct rootwad revetments on outside meanders of the restoration channel to ensure stability of the constructed channel radius. Individual rootwads will be spaced appropriately apart with the tree keyed into streambank at an approximate 45-degree angle. Oversized rock will be utilized in key-ways for ballast and stability.

J-hooks will be constructed on outside meanders of the restoration channel to add additional structural stability of the constructed channel radius. Individual structures will be placed appropriately apart and between root wad revetments.

Grade Control: Rock grade control structures will be installed at selected glide-riffle transition cross-sections to maintain vertical channel elevation and minimize risk of channel incision/head-cuts. Typically, cross-vanes will be subsurface features and over time will be mostly buried by sediment, with low visual impact.

Revegetation: Extensive seeding and planting will be completed to accelerate vegetation establishment. Planting efforts will largely be completed while plants are dormant to maximize potential for success. A combination of plant materials and strategies will be employed including:

1. Broadcast seeding with native/native-like seed mix of all disturbed ground including new channel, associated floodplain and construction roads.
2. Installation of sedge/rush plugs and/or mats on suitable sections (fine soil) of the new channel
3. Live-whip installation of willow either mechanically (stinger) or manually
4. Salvage and transplant of shrubs and trees from sections of existing reach planned for reclamation.
5. Installation of containerized shrubs and trees.
6. Installation of a temporary irrigation system utilizing landowners existing water right to provide water to plants during summer period to improve plant survival.

Pond & Wetland: Pond & wetland areas will be constructed as shown on preliminary design maps. Spoils generated from restoration channel construction will be used to fill in the old channel. Typically spoils generated during construction are not sufficient to completely backfill old channel, which provides opportunity to develop pond and shallow wetland habitats. These habitats are expected to hold water year round through overland flood flow and subsurface processes.

Contracted Actions

The work for this contract involves realignment of approximately 3,800 lineal feet of the Wallowa River located near Enterprise, Oregon. Work will generally include construction of grade control structures, bank stabilization structures (J-hooks and cross vanes), ponds, log vane structures, etc., and placement of root wads, woody debris, fish rocks, etc. Excavation, backfill, compaction, planting of trees, brush, plants, etc., will also be required along with all other associated work to complete the project. Bid items include the following:

1. Mobilization/Demobilization (not to exceed 5% of total bid price).
2. Excavation/fill (ponds, river alignment. Excludes placing structures listed below.)
3. 26 root wads.
4. 4 woody debris structures.
5. 12 cross vane structures.
6. 17 J-hook structures.

7. 12 log vanes.
8. 26 fish rocks.
9. 5,400 square-yards of erosion control matting.
10. Planting both riverbanks project length.
11. Pond area planting.
12. Seeding disturbed areas.
13. Water control.
14. Fencing.

Aerial photograph taken by Allen Childs on March 29, 2007. Upstream end of project is at lower left side of photo. Contracted actions detailed above transformed this channelized section of the Wallowa River into a river that has access to its floodplain, meanders across the landscape and improves habitat.

Project Results

Table #1: Deliverable table.

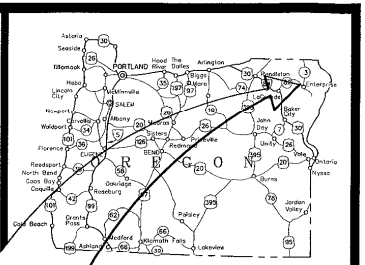
Action	Proposed	Contracted	Delivered	Difference
Survey and design. Contracted to AP as project phase I. While not part of this contract it is part of the project.	One survey and design.	One survey and design.	One survey and design.	None.
Construction management. Contracted to AP.	Manage project construction.	Manage project construction.	Manage project construction.	None.
Excavate river alignment.	3,800 feet.	3,800 feet.	3,800 feet.	None.
Excavate pond.	1 pond.	1 pond.	1 pond.	None.
Install rootwads.	26	26	26	None.
Install woody debris structures	4	4	5	+1
Install cross vanes	12	12	9	-3
Install J-hook structures	17	17	18	+1
Install log vanes	12	12	9	-3
Install fish rocks	26	26	26	None.
Install erosion control matting	5,400 sq-yards	5,400 sq-yards	3,640 sq-yards	-1760
Plant riparian area	Revegetate riparian area with native material.	As per planting summary below.	As per planting summary below.	None.
Plant pond area	Plant area around pond with native material.	As per planting summary below.	Removed from contract due to natural establishment.	No pond area planting.
Seed disturbed areas	Seed all disturbed areas with native material.	As per planting summary below.	As per planting summary below.	None.
Install 5 alcoves	Not proposed	Modification to old channel reclamation/excavation	5 alcoves at the bottom of each reclaimed segment of old river channel.	+ 5 alcoves not originally proposed.
Scatter woody debris in floodplain.	Not proposed	Change order addition to contract.	Debris scattered on 5 floodplain segments	Improved floodplain roughness.
Water control	Manage water during construction and fish salvage.	Non-quantified lump sum in contract.	As intended.	None.
Fencing	Build or maintain fence to preclude livestock from project area.	Remove and replace existing fence.	Replace, repair and construct fence as necessary.	As intended.
Conservation easement	Not detailed in proposal	Agreement with US Fish & Wildlife Service	10 years of deferred grazing and actions not consistent with restoration effort.	As intended.
Install interpretive sign	Not proposed	Change order addition to contract.	One sign at project access point.	One sign.
Repair access road	Not proposed	Change order addition to contract.	Repaired road	As intended.
Video production	Not proposed	One video	30 minute video	One video

Figure 1: Design sheets

GRANDE RONDE MODEL WATERSHED PROGRAM

6 RANCH WALLOWA RIVER RESTORATION

2008



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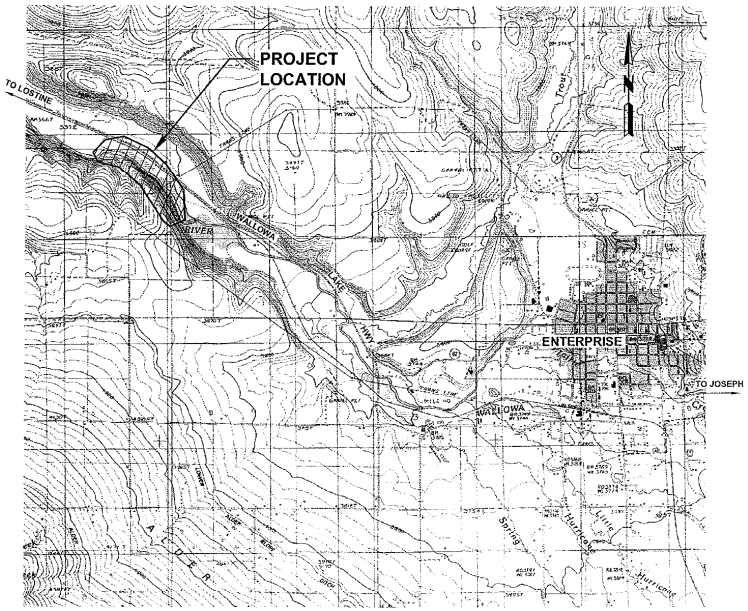

VICINITY MAP
NTS

GRANDE RONDE MODEL WATERSHED

REGISTERED PROFESSIONAL ENGINEER
59,632PE
OREGON
SEPT. 2, 1998
BRETT MOORE
EXPIRES 12-31-08
SIGNED 05-05-08

anderson perry & associates, inc.
engineering surveying watershed testing
LA GRANDE, OR WALLA WALLA, WA

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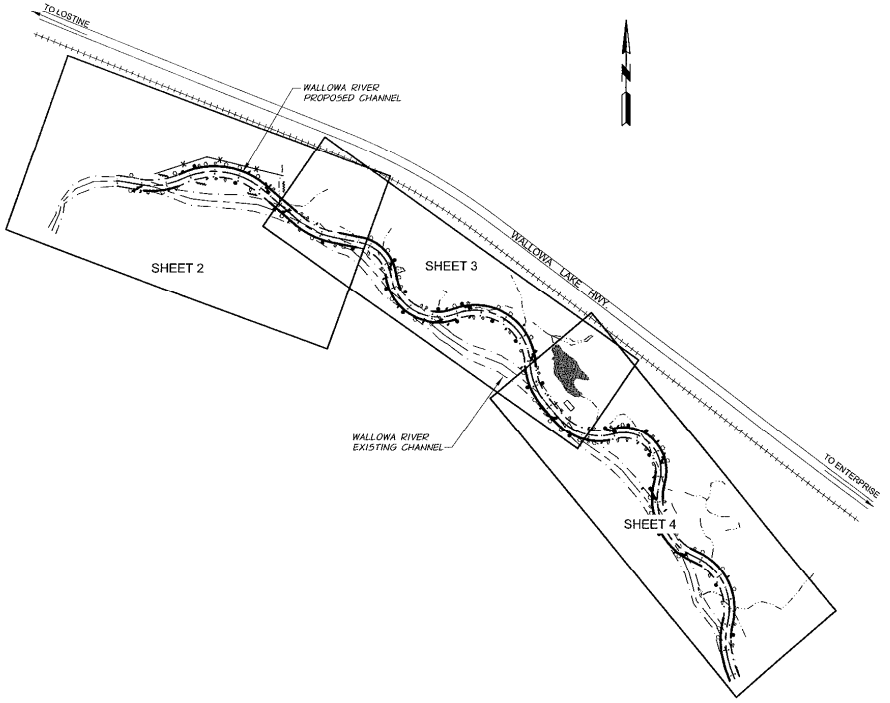
LEGEND

- GATE
- EXISTING BARB WIRE FENCE
- PROPOSED BARB WIRE FENCE
- INDEX CONTOUR 3593
- UTILITY POLE
- GUY ANCHOR
- PROPOSED RIVER CENTERLINE
- EXISTING RIVER CENTERLINE
- PROPOSED EDGE OF CHANNEL
- EXISTING EDGE OF WATER
- EXISTING TOP OF BANK LINE
- EXISTING CONIFER TREE
- EXISTING DECIDUOUS TREE
- FILL AREA
- POND AREA
- DITCH OR OLD CHANNEL CENTERLINE
- CULVERT
- EXISTING BUILDING
- ROCK OUTCROP IN RIVER

NOTES

1. THE HORIZONTAL DATUM FOR THIS SURVEY IS THE OREGON STATE PLANE COORDINATE SYSTEM, NORTH ZONE, NAD 83/91. THE VERTICAL DATUM FOR THIS SURVEY IS BASED ON NAVD 88.

2. NO BOUNDARY SURVEY WAS COMPLETED DURING THIS TOPOGRAPHIC SURVEY. NO PROPERTY LINES ARE SHOWN.



SHEET INDEX

N.T.S.

REGISTERED PROFESSIONAL ENGINEER
59,632PE
OREGON
SEPT. 2, 1998
BRETT MOORE
EXPIRES 12-31-08
SIGNED 05-05-08

REVISION	BY	DATE

DESIGNED BY C. HUTCHINS
DRAWN BY D. CHRISTMAN
REVIEWED BY B. MOORE

XREFS: TD-Wallowa.dwg

HORZ. SCALE NONE VERT. SCALE
JOB NUMBER 1199-249 DATE 2008
ACAD FILE WALLOWA_BASE.dwg

THIS DRAWING HAS BEEN REDUCED 50%. ADJUST SCALE ACCORDINGLY. BARSCALE SHOWN IS ACCURATE.

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GRANDE RONDE MODEL WATERSHED PROGRAM
6 RANCH WALLOWA RIVER RESTORATION

LEGEND AND SHEET INDEX

SHEET 1

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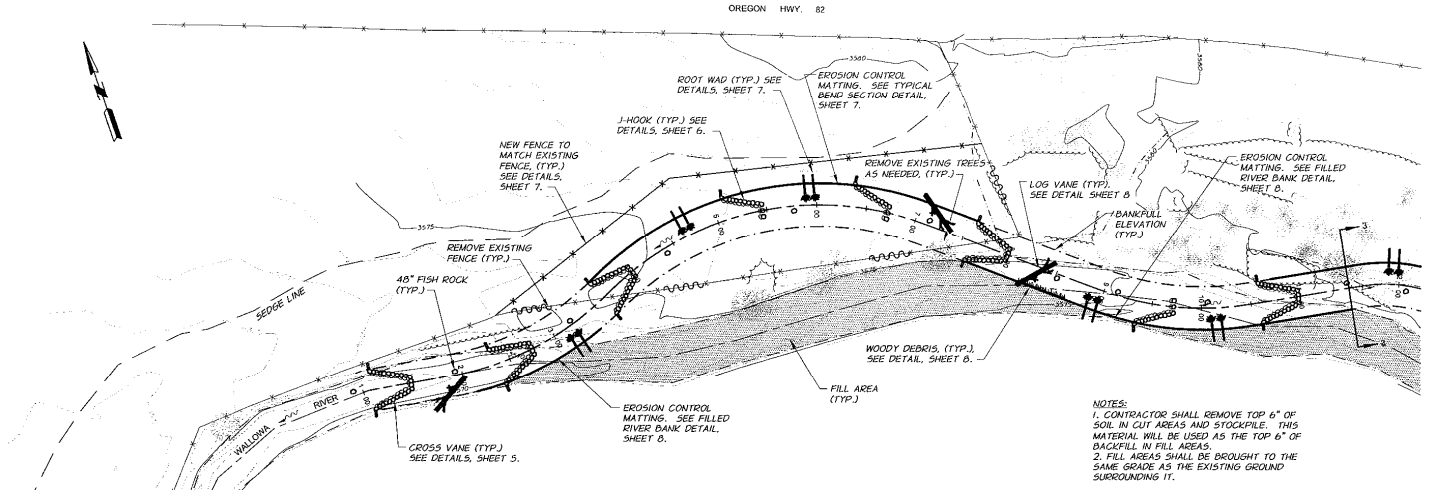

REGISTERED PROFESSIONAL ENGINEER
59,632PE
OREGON
SEPT. 2, 1998
BRETT MOORE
EXPIRES 12-31-08
SIGNED 05-05-08

REVISION	BY	DATE

DESIGNED BY C. HUTCHINS
DRAWN BY D. CHRISTMAN
REVIEWED BY B. MOORE
XREFS: TB-Wallowa.dwg

HORZ. SCALE 1" = 50'
VERT. SCALE 1" = 10'
JOB NUMBER 1199-249
DATE 2008
ACAD FILE: WALLOWA_BASE.dwg

THIS DRAWING HAS BEEN REDUCED 50%. ADJUST SCALE ACCORDINGLY. BARSCALE SHOWN IS ACCURATE.

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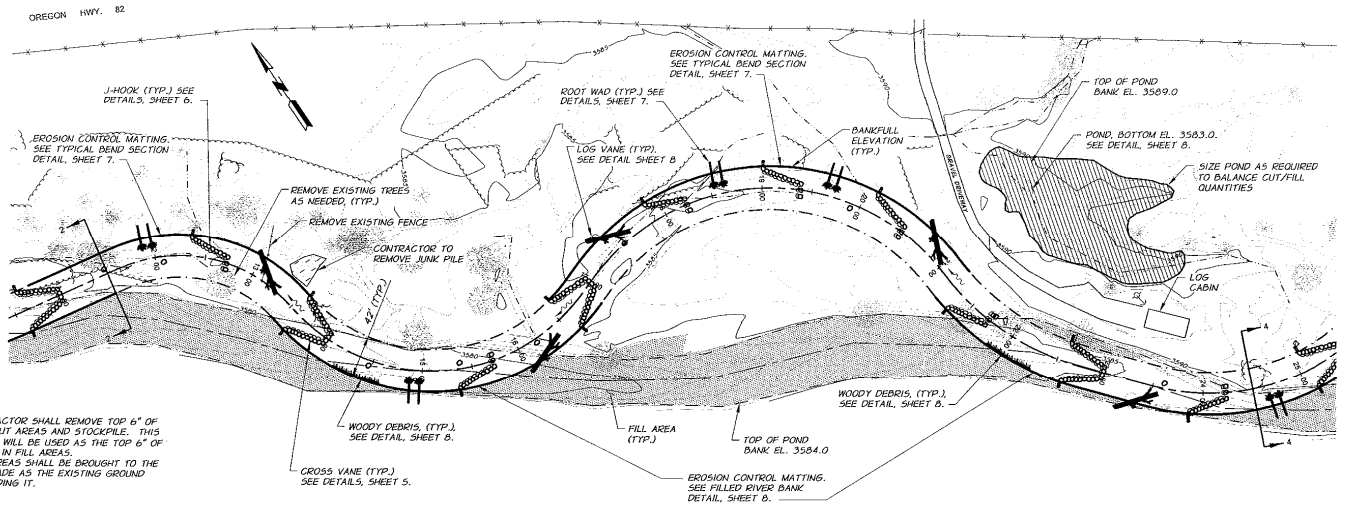
GRANDE RONDE MODEL WATERSHED PROGRAM

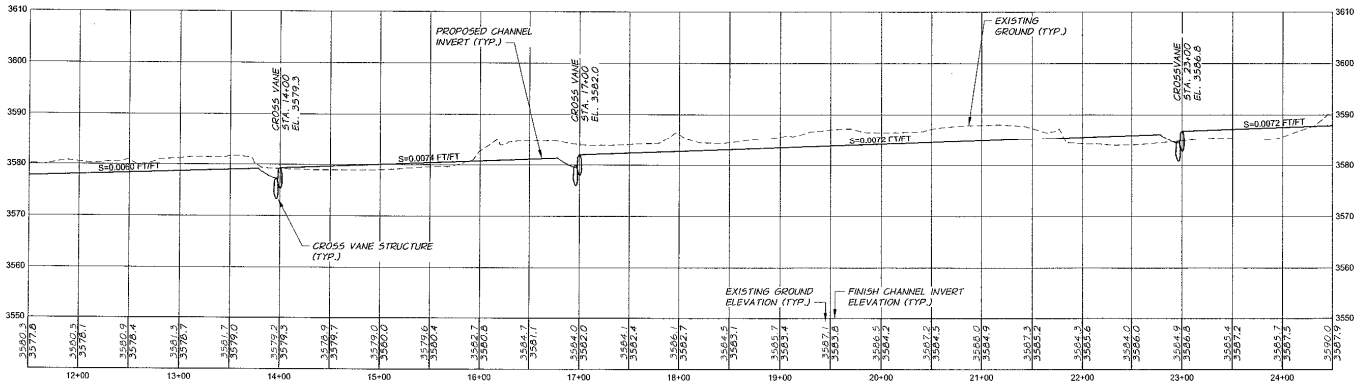
6 RANCH WALLOWA RIVER RESTORATION

PLAN AND PROFILE
STA. 1+00 TO STA. 11+50

SHEET 2



NOTES:
1. CONTRACTOR SHALL REMOVE TOP 6" OF SOIL IN CUT AREAS AND STOCKPILE. THIS MATERIAL WILL BE USED AS THE TOP 6" OF BACKFILL IN FILL AREAS.
2. FILL AREAS SHALL BE BROUGHT TO THE SAME GRADE AS THE EXISTING GROUND SURROUNDING IT.



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BRETT MOORE
EXPIRES 12-31-08
SIGNED 05-05-08

REVISION	BY	DATE

DESIGNED BY C. HUTCHINS
DRAWN BY D. CHRISTMAN
REVIEWED BY B. MOORE
XREFS: TB-Wallowa.dwg

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VERT. SCALE IN FEET: 10 0 10 20 30
HORZ. SCALE 1" = 50'
VERT. SCALE 1" = 10'
JOB NUMBER 1199-249
DATE 2008
ACAD FILE WALLOWA_BASE.dwg

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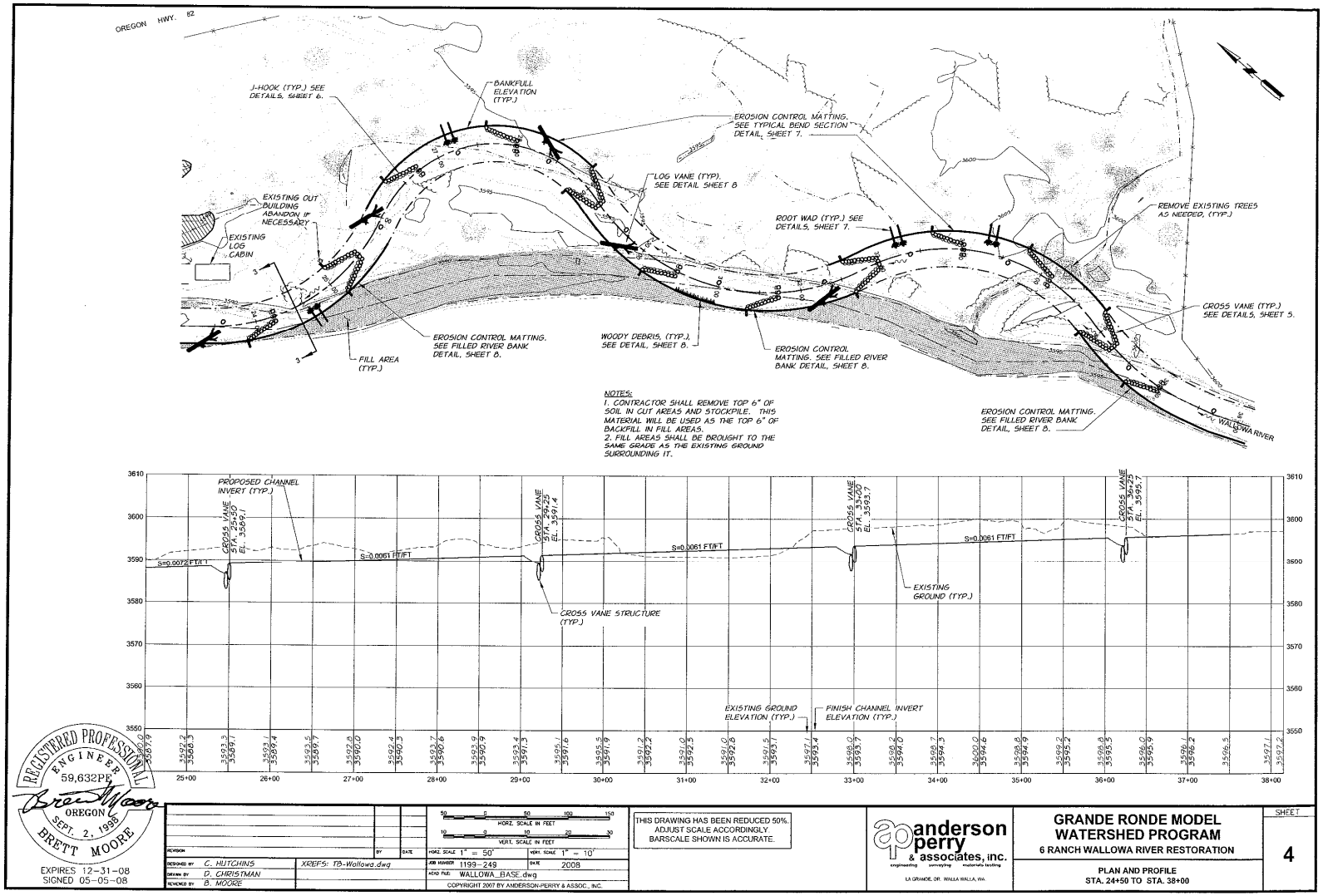
GRANDE RONDE MODEL WATERSHED PROGRAM
6 RANCH WALLOWA RIVER RESTORATION

PLAN AND PROFILE
STA. 11+50 TO STA. 24+50

SHEET 3



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6 RANCH WALLOWA RIVER RESTORATION

PLAN AND PROFILE
STA. 24+50 TO STA. 38+00

SHEET 4

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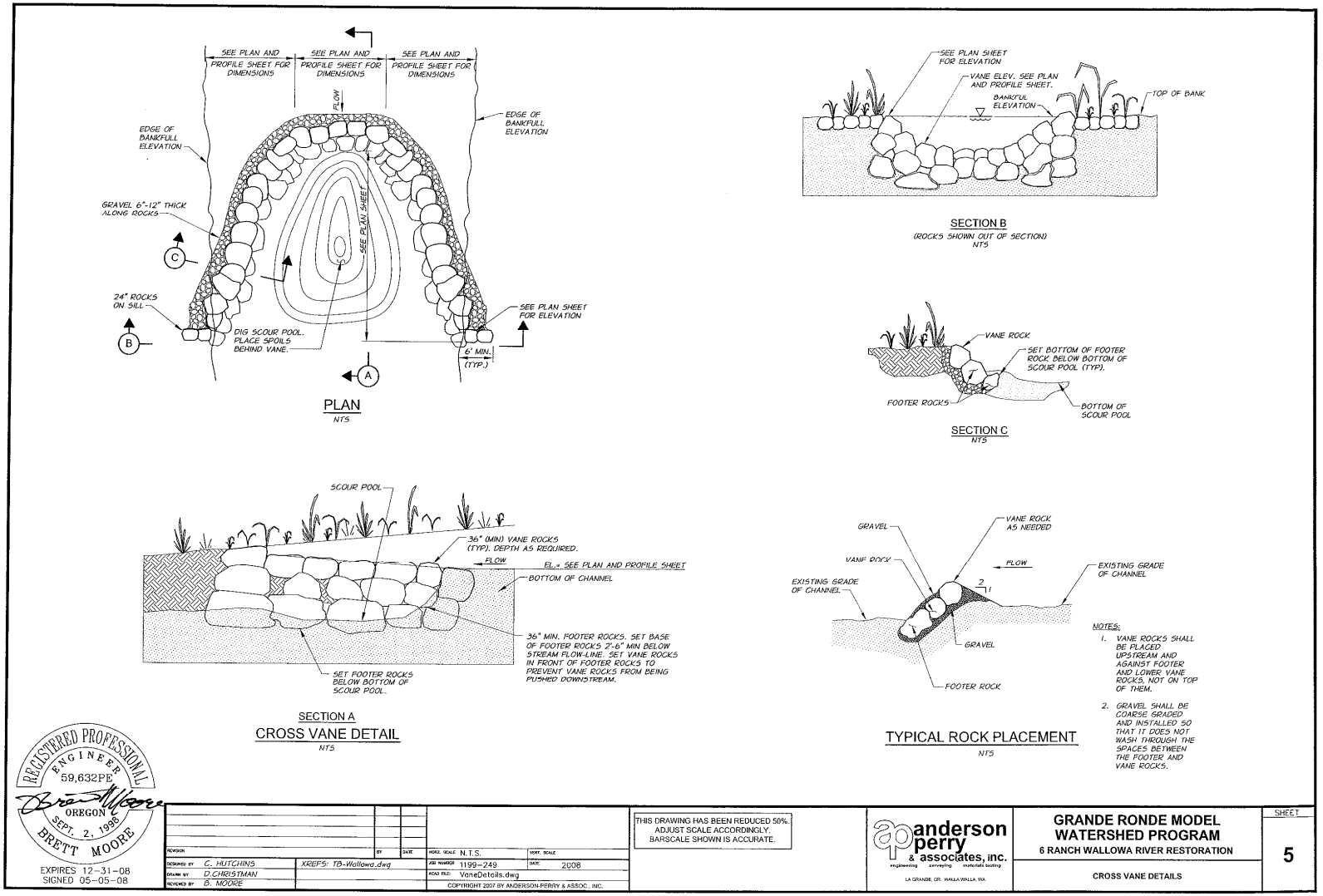
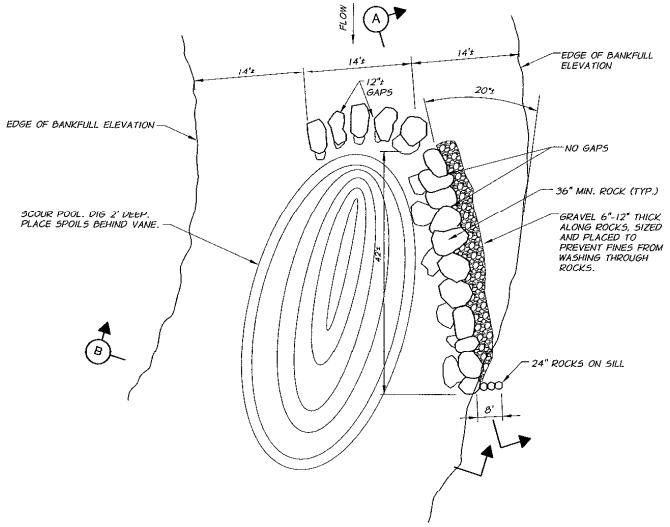
Figure 2: Typical structure detail





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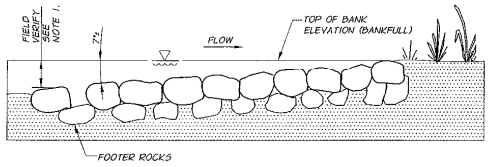
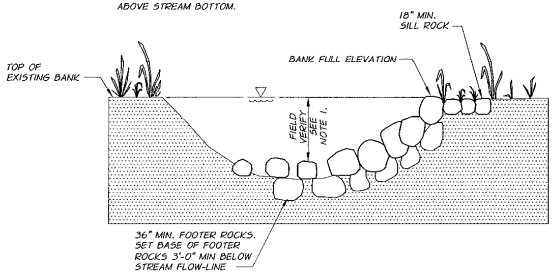


SECTION A

NOTE:
1. HEIGHT OF ROCK AT END OF VANE SHOULD BE ABOUT 10% OF BANKFULL DEPTH ABOVE STREAM BOTTOM. WATER DEPTH OVER END OF VANE SHOULD BE ABOUT 90% OF BANKFULL DEPTH ABOVE STREAM BOTTOM.



SECTION B
(ROCKS SHOWN OUT OF SECTION)

VANE DETAIL
N.T.S.

REGISTERED PROFESSIONAL ENGINEER
59,632PE
OREGON
SEPT. 2, 1998
BRETT MOORE
EXPIRES 12-31-08
SIGNED 05-05-08

REVISION	BY	DATE

HORZ. SCALE: NONE | VERT. SCALE:
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DRAWN BY: D. CHRISTMAN | ACAD FILE: VANE-DET2.dwg
REVIEWED BY: B. MOORE

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GRANDE RONDE MODEL WATERSHED PROGRAM
6 RANCH WALLOWA RIVER RESTORATION
J-HOOK DETAILS

SHEET 6

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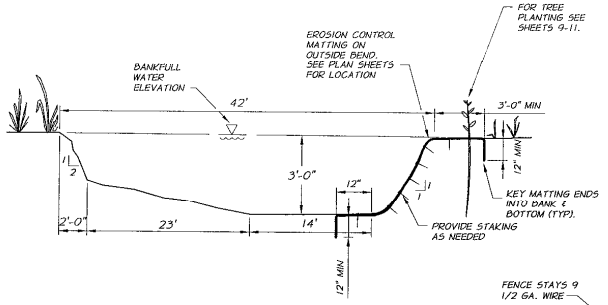

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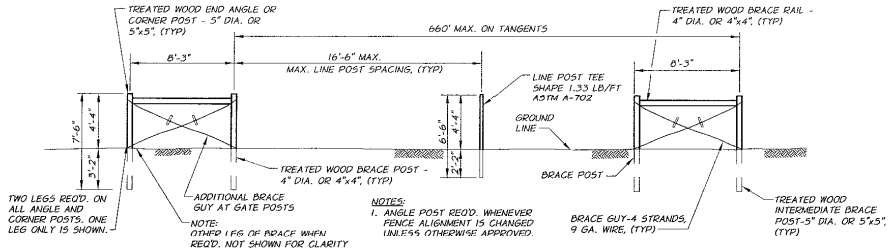

TREATED WOOD AND STEEL FENCE POSTS
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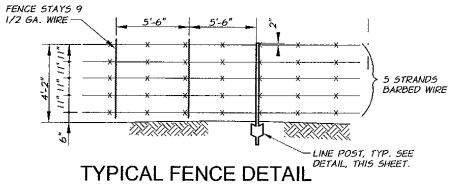

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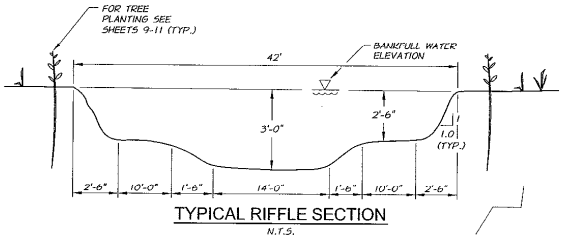

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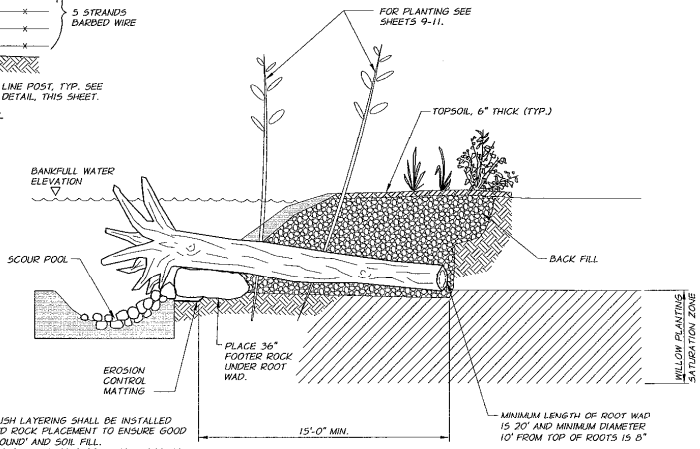

NOTES:
1. WILLOW PLANTING AND BRUSH LAYERING SHALL BE INSTALLED DURING BANK GRADING AND ROCK PLACEMENT TO ENSURE GOOD CONTACT WITH 'NATIVE GROUND' AND SOIL FILL.
2. WILLOW AND BRUSH LAYERS SHALL EXTEND DOWN TO EXPECTED SOIL SATURATION ZONES.
3. CUT SMALL HOLES OR SLITS IN EROSION CONTROL MATTING AS NECESSARY.
4. PLACE SOIL FILL (COBBLES, GRAVEL, SOIL) AROUND CUTTINGS.
5. PLACE ROCK AND SOIL FILL CAREFULLY, DO NOT END DUMP. SOME DAMAGE TO BRUSH LAYERS AND WILLOW IS UNAVOIDABLE AND ACCEPTABLE.
6. MORE THAN 50% OF LENGTH OF ROOT WAD MUST BE BURIED.
7. FINAL INSTALLATION OF ROOT WADS SUBJECT TO THE APPROVAL OF ENGINEER.

ROOT WAD DETAIL
N.T.S.

REGISTERED PROFESSIONAL ENGINEER
59,632PE
OREGON
SEPT. 2, 1998
BRETT MOORE
EXPIRES 12-31-08
SIGNED 05-05-08

DESIGNED BY	C. HUTCHINS	XREFS: TB-Wallowa.dwg	
DRAWN BY	D. CHRISTMAN		
REVIEWED BY	B. MOORE		

SCALE IN FEET (10 5 0 10 20 30)
HORZ. SCALE NONE
VERT. SCALE
JOB NUMBER 1199-249
DATE 2008
ACAD FILE VANE-DET2.dwg

THIS DRAWING HAS BEEN REDUCED 50%. ADJUST SCALE ACCORDINGLY. BARSCALE SHOWN IS ACCURATE.

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LA GRANDE, OR WALLA WALLA, WA

GRANDE RONDE MODEL WATERSHED PROGRAM
6 RANCH WALLOWA RIVER RESTORATION
MISCELLANEOUS DETAILS I

SHEET 7

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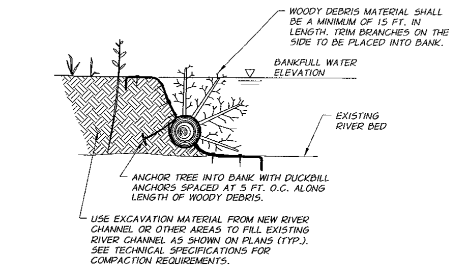
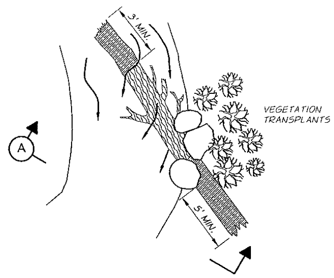


WOODY DEBRIS DETAIL
N.T.S



TYPICAL LOG VANE DETAIL
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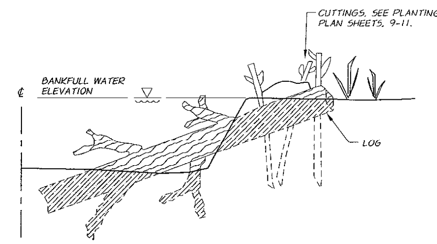

SECTION A
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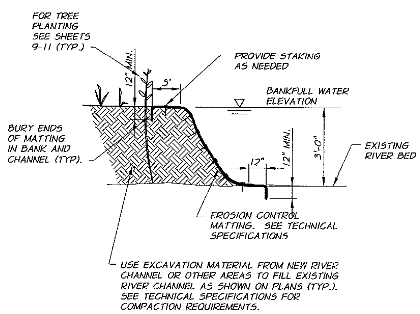

FILLED RIVER BANK DETAIL
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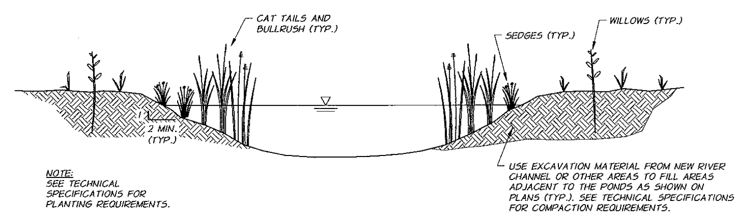

TYPICAL POND DETAIL
N.T.S

REGISTERED PROFESSIONAL ENGINEER 59,632PE OREGON SEPT. 2, 1998 BRETT MOORE
EXPIRES 12-31-08
SIGNED 05-05-08

REVISION	BY	DATE
DESIGNED BY C. HUTCHINS	XREFS: TB-Wallowa.dwg	
DRAWN BY D. CHRISTMAN		
REVIEWED BY B. MOORE		

SCALE IN FEET: 10 0 10 20 30
HORZ. SCALE NONE — VERT. SCALE
JOB NUMBER 1199-249 — DATE 2008
ACAD FILE: VANE-DET2.dwg

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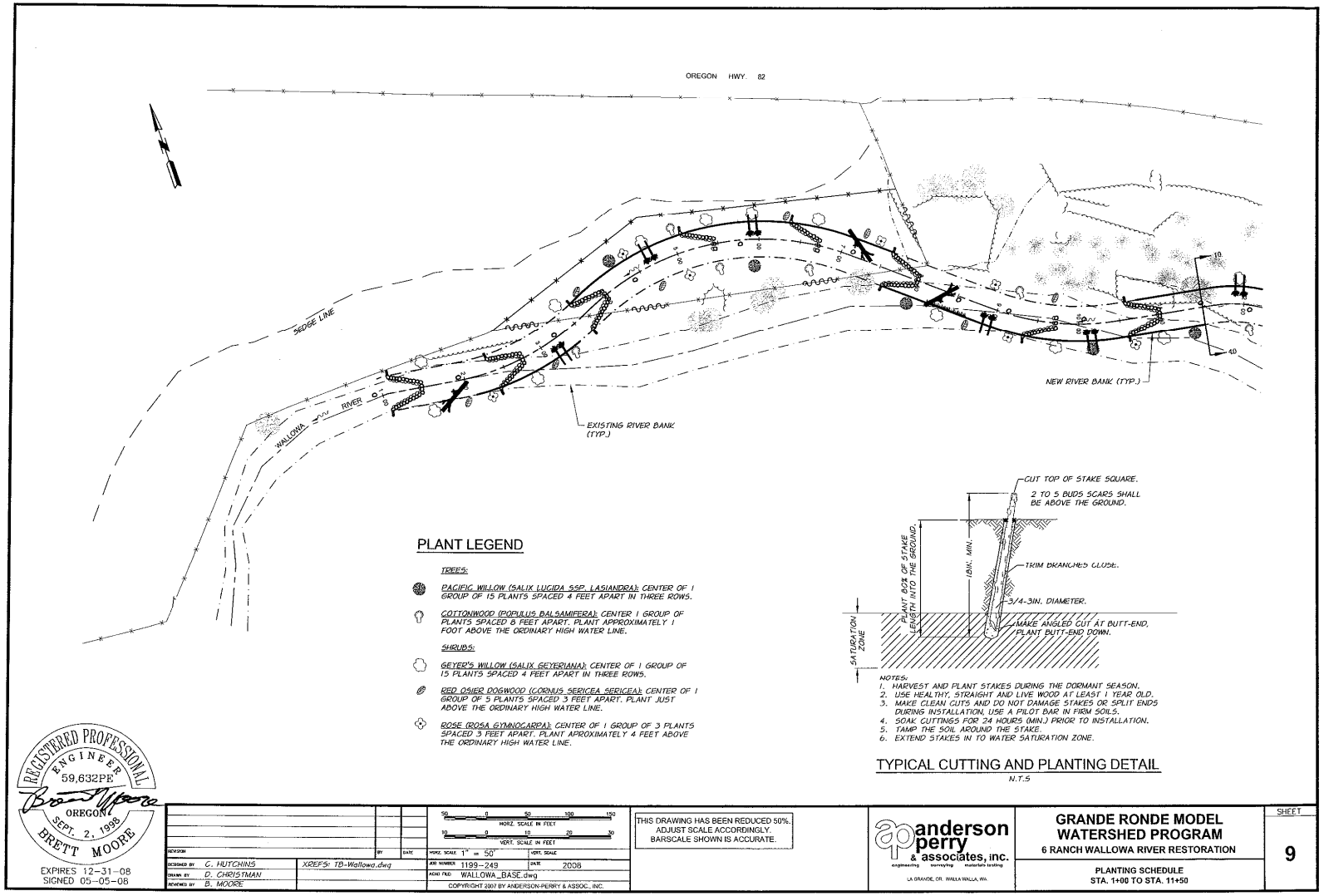
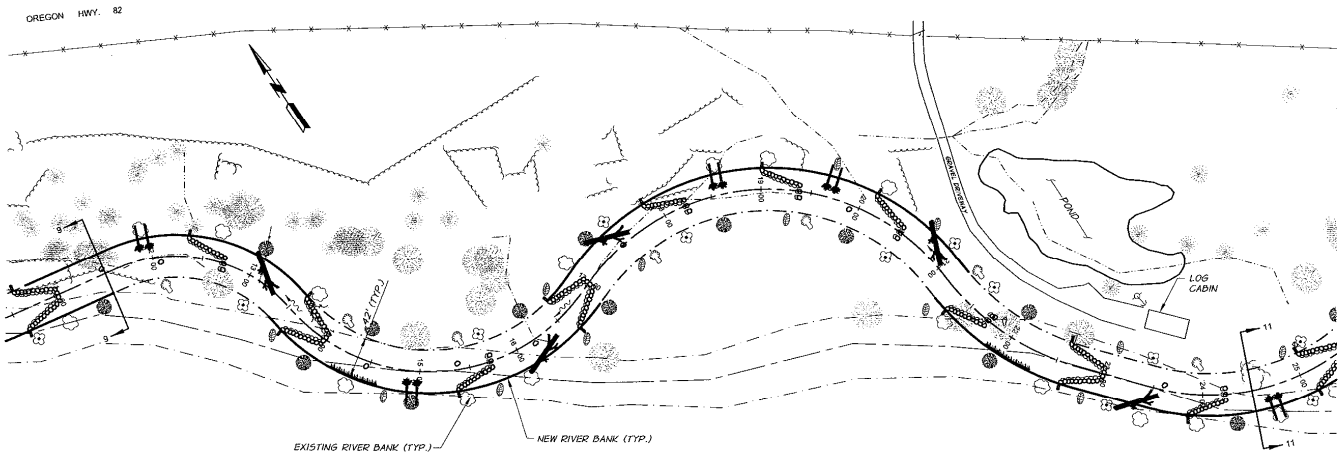
GRANDE RONDE MODEL WATERSHED PROGRAM
6 RANCH WALLOWA RIVER RESTORATION
MISCELLANEOUS DETAILS II

SHEET 8

Q:\Grande_Ronde_MW\2006\1199-249 Wallowa_river06\dwg\VANE-DET2.dwg, DETS III, 5/1/2008 4:20:02 PM, rrasmussen

Figure 3: Planting Plan





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DESIGNED BY	C. HUTCHINS	XREFS: TB-Wallowa.dwg	
DRAWN BY	D. CHRISTMAN		
REVIEWED BY	B. MOORE		

HORZ. SCALE IN FEET (50 0 50 100 150)
VERT. SCALE IN FEET (10 0 10 20 30)
HORZ. SCALE 1" = 50'
VERT. SCALE 1" = 10'
JOB NUMBER 1199-249
DATE 2008
ACAD FILE: WALLOWA_BASE.dwg

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ADJUST SCALE ACCORDINGLY.
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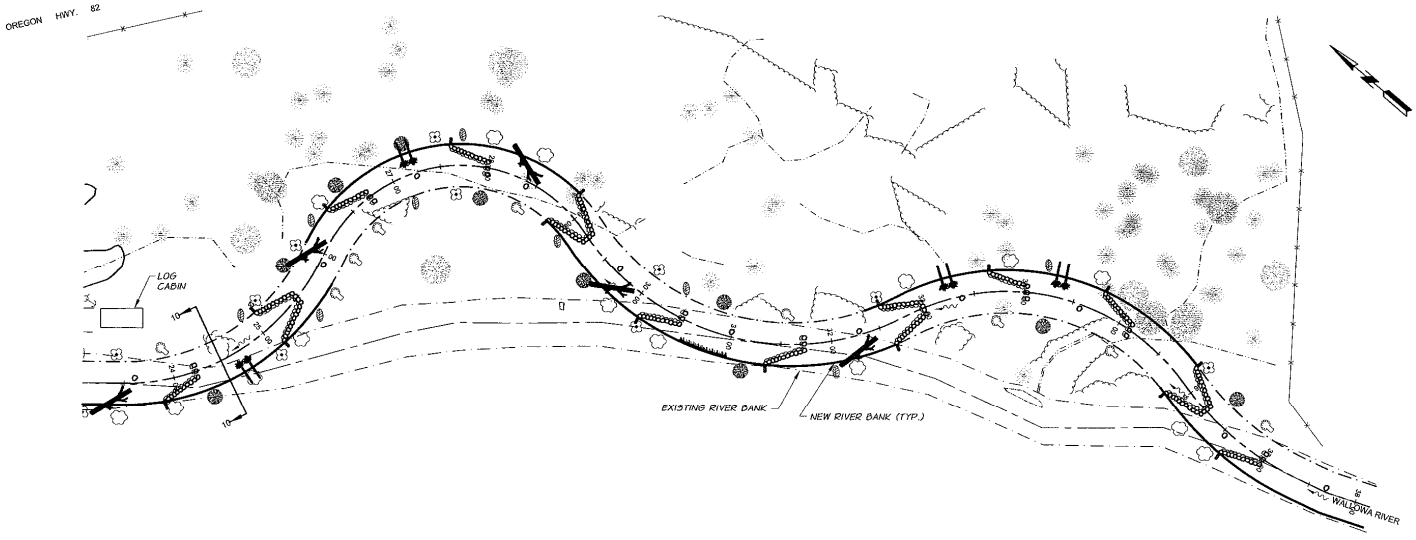
GRANDE RONDE MODEL WATERSHED PROGRAM
6 RANCH WALLOWA RIVER RESTORATION

PLANTING SCHEDULE
STA. 11+50 TO STA. 24+50

SHEET
10



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BRETT MOORE
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SIGNED 05-05-08

REVISION	BY	DATE

DESIGNED BY C. HUTCHINS
DRAWN BY D. CHRISTMAN
REVIEWED BY B. MOORE
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HORZ. SCALE 1" = 50' VERT. SCALE 1" = 10'
JOB NUMBER 1199-249 DATE 2008
ACAD FILE: WALLOWA_BASE.dwg

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engineering surveying materials testing
LA GRANDE, OR. WALLA WALLA, WA.

GRANDE RONDE MODEL WATERSHED PROGRAM
6 RANCH WALLOWA RIVER RESTORATION

PLANTING SCHEDULE
STA. 24+50 TO STA. 38+00

SHEET 11

Discussion

Lessons Learned

Active restoration efforts such as the 6-Ranch project take on the order of 3 years to coordinate, design and implement. The reasons for this are multiple, including production team and landowner coordination, funding acquisition and preferred alternative selection. The most obvious delay in project implementation is with National Marine Fisheries Service (NMFS), Section 7 Consultation. The restoration community is missing one tool to implement timely restoration actions and that is a meaningful and cooperative partnership with NMFS. Absent such a relationship, restoration actions are likely to be delayed, diminished, or terminated prior to completion. The bullet points below echo lessons learned from previous projects and continue to be relevant to the 6-Ranch project:

1. Due to overlapping jurisdictions and permitting requirements, it is essential to have a lead agency well versed in the laws, regulations and permitting processes required for river restoration, particularly in the presence of threatened and/or endangered species. Private landowners cannot be expected to pursue this process without guidance, support and leadership from an experienced and skilled lead agency. The GRMW with contract assistance from AP served this purpose.

2. To the extent possible, flexibility for on-site design modifications should be built into the regulatory review and permitting process. This process remains rigid and risk-averse and may result in missed opportunities to improve end results.

3. Due to the active restoration and dynamic nature of rivers, funding agencies should be prepared to support maintenance and modification of these projects in response to lessons learned from continued monitoring and from short-term disturbances (i.e. spring flooding) that might occur before the newly formed channel is mature and stabilized.

4. Fish Salvage: The salvage effort on this project employed an upstream to downstream technique where fish were encouraged or herded out of the project reach with the objective of handling as few fish as possible. The process is further described below with results enumerated in the following tables. Far fewer steelhead, Chinook and whitefish were handled at the 6-Ranch as compared to the McDaniel Project 2 in 2008.

Fish salvage effort as planned & implemented July 1st - 8th, 2009.

Introduction

The Wallowa River 6-Ranch salvage will be a collaborative effort to remove fish from the 'old' Wallowa River channel and the 'new' Wallowa River channel through the 6-ranch restoration project site. The core group for the project will include staff from Grande Ronde Model Watershed (GRMW), LD Perry contractors (LDP), Oregon Department of Fish and Wildlife (ODFW), the Confederated Tribes of the Umatilla Indian Reservations (CTUIR), the Nez Perce Tribe (NPT), and the U.S. Forest Service (USFS). The core group will be on-site all days of the salvage from July 6th through the 8th, and will be assisted by 15-60 volunteers, depending on the day.

Drawdown process

The Wallowa River 6 ranch restoration site is unique because the restored river channel incorporates short sections of the old channel, thus dividing the restoration site into 5 separate reaches that require salvage efforts. On Wednesday July 1, the downstream end of all five 'new' loops will be opened. At the upstream end of the project site, Wallowa River flow will be diverted into the new channel, reducing the amount of flow in the old channel. Flow will be stabilized at shin-deep levels July 2nd and 3rd, allowing fish to move downstream out of the old channels over

the 4th of July holiday weekend. From July 1st-3rd, ODFW will staff a skeleton shocking crew in case an emergency salvage is needed.

The majority of the salvage effort will take place July 6th-8th. Two sections will be salvaged per day, working from upstream down, leaving the most downstream section for Wednesday morning. Each section to be salvaged will be isolated from Wallowa River flow by placing berms at the upstream, or both, ends of each old channel reach. Block nets will be employed in the salvage reach as necessary.

Fish Collection

Within each reach, a shocking crew will use dip nets and seines to collect as many fish possible in 4 downstream passes. Captured fish will be held in aerated 5-gallon buckets, placed in aerated coolers, and transported to the processing station for release near Sunrise Road. Able-bodied volunteers (buckets are heavy!) will be employed to pass buckets of fish from the shocking crew, across the new channel, and into coolers. In case of high river flows in the new channel, alternative options will need to be explored to safely get fish and volunteers across the main channel.

Sampling

At the processing station, fish will be sedated with MS-222 (catchable legals with alternative), identified and enumerated. A subset of Chinook salmon, *O. mykiss*, and mountain whitefish will be sampled for length and weight, and a scale sample taken to determine age.

Crew structure and roles

Staff will be divided into crews that facilitate essential parts of the salvage, each with their own crew leader (noted in parentheses) to oversee operations and communicate with the salvage coordinator. Leaders will be responsible for securing all necessary gear, assessing staffing needs, and will be provided radio communications during the salvage. Staff without specific roles will be assigned to each crew Monday morning, depending on staffing needs.

Salvage Coordinator (Jeff Yanke, ODFW): Plan and organize salvage effort, communicate with crew leaders to address needs during salvage, provide assistance to crews as needed.

Excavation (Derek Spang, LDP): Divert flow from old channel to new channel, isolate salvage reaches with berms, and maintain shin-deep flow in salvage reaches.

Volunteers (Ian Wilson, ODFW): Welcome and check-in volunteers. Provide ODFW volunteer agreements if needed. Communicate with shocking, transport, and processing crews to assign volunteers where needed.

Block Nets (Bill Atwood, ODFW): Set up and maintain block nets. Assist transport crew to facilitate safe transport of fish across new channel (ex. safety ropes, bridges).

Shocking (Brian Mahoney, CTUIR): Capture stunned fish with dip nets and seines; pass collected fish off to transport crew in 5 gallon buckets.

Transport (Jim Harbeck, NPT): Transport fish in 5 gallon buckets to coolers, transport to Sunrise Rd. site for data crew. Supply shocking crew with empty buckets and aerators.

Processing / Data (Brian Alfonse, ODFW): Identify, enumerate, and sample collected fish. Collect lengths and weights from subset of target species; collect scale samples from subset of Chinook, *O. mykiss,* and mountain whitefish.

Damage Control (Coby Menton and Jeff Oveson, GRMW): Run interference and control the flow of contact between salvage staff and media, luminaries, etc.

Timeline

Wednesday-Friday, July 1st-3rd

- LDP staff opens bottoms of new loops; begin diverting water through new river channel, with goal of leaving shin-deep flow in old channel. Many fish within the old channel will be expected to move downstream out of project site during 4th of July weekend.
- ODFW will staff a skeleton crew on-site or on-call with electrofishing equipment in case an emergency salvage is needed.

Saturday-Sunday, July 4th-5th

- River flow through old channel will be maintained over holiday weekend at shin-deep flows, giving most fish a chance to migrate out of the restoration reach prior to the fish salvage

Monday, July 6th

09:00 – Core group meets at 6-ranch site
09:15 – Core group meeting with intros, role assignments, safety, etc.
10:00 – Set up and organize gear, install block nets and bridges (if needed) across new channel, welcome volunteers and assign roles
11:00 – Begin salvaging reach 1, complete two passes
12:30 – Break for lunch, meet with team leaders to provide feedback on salvage process
13:30 – Finish last two e-fishing passes on reach 1
15:00 – Start salvaging reach 2
17:00 – Finish for day, break down gear, prep for Tuesday

Tuesday, July 7th

07:30 – Core group meets at 6-ranch site
07:45 – Brief meeting with core group
08:00 – Set up and organize gear, install block nets and bridges (if needed) across new channel, welcome volunteers and assign roles
09:00 – Begin salvaging reach 3
11:00 – Finish salvaging reach 3, BBQ and recognition ceremony
13:00 – Begin salvaging reach 4
14:30 – Finish salvaging reach 4, break down gear, prep for last day

Wednesday, July 8th

08:00 – Core group meets at 6-ranch site
08:15 – Brief meeting with core group
08:30 – Set up and organize gear, install block nets and bridges (if needed) across new channel, welcome volunteers and assign roles
09:00 – Begin salvaging reach 5
11:00 – Finish salvaging reach 5, break down gear
12:00 – Brief meeting for thanks and go home.

Table 2: Summery Sheet Six Ranch Salvage 2009															
	Corresponding loop #														
	1		2		3		4		5		Grand Total	Mort Total	Mort %	Min	Max
Species	Total	Morts	Total	Morts	Total	Morts	Total	Morts	Total	Morts					
Steelhead	1		26	1	24	4	20	1	117	7	188	13	6.9%	1	117
Chinook	1		10	1	18		20		8	1	57	2	3.5%	1	20
Whitefish			6	1	1				6		13	1	7.7%	1	6
Dace	12		*		43		21		71		147		0.0%	12	71
Eastern Brook Trout	2								3		5	0	0.0%	2	3
Sculpin	77		*		79		22		51		229		0.0%	22	79

Dace and Sculpin morts not tracked.

* Summary sheet lost containing Dace and Sculpin info.

Table 3: 2008 McDaniel's Project 2			
Species	Grand Total	Mort Total	Mort %
Steelhead	558	69	12.4
Chinook	135	21	15.6
Whitefish	333	80	24

5. Due to the scope and importance of this project the GRMW implemented a public relations effort that included presentations to community service groups, hosted a recognition ceremony on July 7th, 2010 during the fish salvage effort and commissioned the production a documentary video of the project titled "The Best Country". This effort has generated a lot of local and regional interest as demonstrated by the following:
   - Wallowa County Rotary invited GRMW representatives to speak at 3 meetings one of which was held on the project site where Rotarians toured the new river channel.
   - Local youth were provided the opportunity to tour the project and participate as volunteers during the fish salvage effort.
   - On July 7th approximately 120 people participated in and observed the salvage effort, toured the project and heard the perspective of many project participants. Participants included funding sources, Tribes, state and Federal resource managers, elected officials, landowner and extended relations and a multitude of volunteers.
   - The "Best Country" video documents the western lifestyle and profiles two long time Wallowa County Families and their desire to restore their lands while maintaining a productive ranch and farm setting. Green Fire Productions of La Grande, Oregon, produced 30 minutes long video that provides an entertaining and captivating portrayal of both the social and physical elements of channel reconstruction.

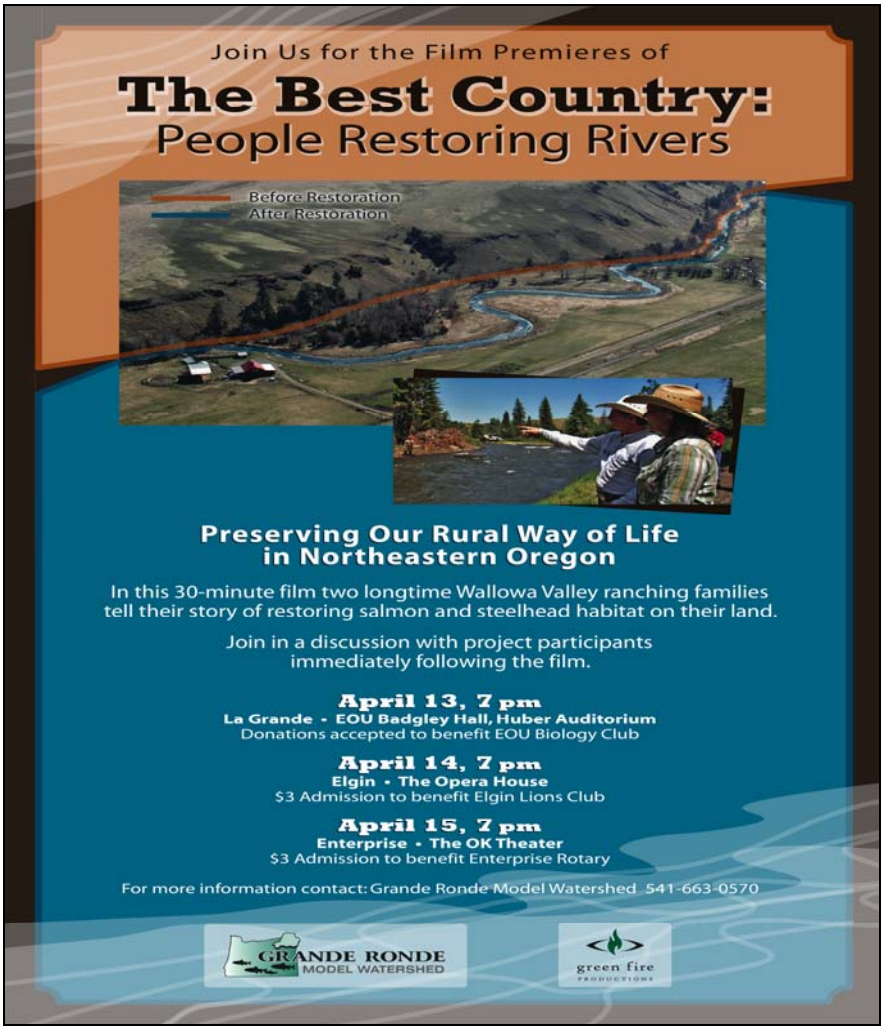

Figure 4: The three Best Country video showings in the Grande Ronde Basin attracted over 200 viewers, stimulated informative panel discussions and is acting as a terrific outreach tool.

Objective Assessment

The as-built dimension and capacity of the reconstructed channel and floodplain suggest that channel form and function, riparian habitat and hydrologic characteristics are staged for improvement. Lengthening the channel through increased sinuosity, activating the floodplain through dike removal, and an aggressive planting plan will promote project objectives. Specific actions to achieve objectives:

1. The Wallowa River channel was rebuilt to a width, depth and gradient as would be expected in natural conditions to increase base flow depth in the Wallowa River channel, increase flooding frequency, and create pool and riffle sequences that increase the consistency of bedload transport and deposition on the floodplain. In the project area the channel is now longer with increased sinuosity and geomorphic stability. Rock cross vanes, J-hooks, rootwads, erosion control fabric and riparian planting are a combination of short and long term strategies to maintain as built channel characteristics and stability.

2. The adjacent floodplain and meadow that is seasonally inundated during high flows will improve vegetative conditions that help moderate stream temperature, provide an area for fine sediment deposition, and improve water chemistry. Removing dikes, engineering floodplain access and the aggressive planting activities are short and long term strategies to improve water quality.

3. Hydrologic function including stream bank and floodplain water storage will improve due to the constructed complex nature of the channel and floodplain access. The lengthening of the channel, reducing flow velocity locally, and spreading flow across the landscape seasonally acts to make water transport less efficient resulting in more surface and groundwater throughout the year. These actions produce improved aquatic and terrestrial habitat features.

A combination of monitoring activities has been designed and initiated to measure and document project effectiveness over the next 10 years. Monitoring includes:

1. Longitudinal profile: A profile of the prior existing channel was completed during the design phase of the project. This profile combined with an as built profile and periodic repeated profiles define features of the original channel, the as-built channel, and channel maturation over time. Longitudinal profiles define pool, riffle, glide, and tail out sequence characteristics and their adjustment over time.

2. Channel cross-sections: Original channel cross sections were completed during the design phase of the project. These cross-sections combined with as-built cross sections and periodic repeated measurements define lateral features of the original channel, the as-built channel, and maturation over time. Bank stability, channel feature depth, and lateral adjustment over time are characterized by these measurements.

3. Pebble counts to measure and assess improvements to the channel substrate, sediment transport, scouring and deposition.

4. Fixed photo-point monitoring to capture channel, streambank, floodplain and vegetative changes over time.

5. Plant surveys to document survival, species, composition and diversity.

Acknowledgment

The Grande Ronde Model Watershed would like to take this opportunity to thank all of those organizations that made the Wallowa River/6-Ranch Habitat Restoration project possible. Without the generous funding support of OWEB, BPA, Jubitz and others; the dedicated technical team at Anderson Perry & Associates; the willing landowners Liza Jane and Craig Nichols; and the diverse group of volunteers this project would not have been possible.

Photo by Mary Edwards, MaryEdwardsphotography.com

Final Budget

Bonneville Power Administration Construction Budget

Grande Ronde Model Watershed Contract 199202601 Fish Passage/Riparian Enhancement			
Contract Number 37387. Performance Period: May 1, 2008 - April 30, 2010			
This Invoice Performance Period: Sept 1 09 - Dec 29 09			
	Approved Budget	**Invoices to Date**	**Funds Remaining**
Six Ranch Construction engineering	$26,000.00	$29,135.03	-$3,135.03
Six Ranch Erosion Control Fabric	$28,000.00	$18,272.80	$9,727.20
Six Ranch J-Hooks	$60,000.00	$60,596.00	-$596.00
Six Ranch Fish Rocks	$5,000.00	$4,192.00	$808.00
Six Ranch Rootwads	$22,000.00	$16,850.55	$5,149.45
Six Ranch Large Woody Debris	$2,500.00	$2,501.00	-$1.00
Six Ranch Cross Vanes	$29,337.00	$29,444.20	-$107.20
Six Ranch Log Vanes	$12,000.00	$6,073.70	$5,926.30
Six Ranch Cutting & Planting	$15,500.00	$13,245.75	$2,254.25
Six Ranch Pond Area Planting	$10,500.00	$1,979.25	$8,520.75
Six Ranch Seeding	$4,689.00	$4,304.00	$385.00
Six Ranch Water Control	$27,500.00	$27,500.00	$0.00
Six Ranch Fencing	$5,000.00	$4,462.00	$538.00
Total	**$248,026.00**	**$218,556.28**	**$29,469.72**

Oregon Watershed Enhancement Board Construction Budget

Grande Ronde Model Watershed Foundation					
Actual Expenditure Tracking Sheet for OWEB Grant 208-5010					
Wallowa River - 6 Ranch Habitat Restoration					
Project Period: 10/29/07 - 10/31/10					
Period Covered: December 1, 2008 - August 20, 2009					
DATE	**VENDOR NAME**	**PROJECT MANAGEMENT**	**CONTRACTED SERVICES**	**ADMIN**	**TOTAL**
		(27,200.00)	**(239,700.00)**	**(7,000.00)**	**(273,900.00)**
12/31/08	LD Perry		$58,370.30		$58,370.30
1/20/09	GRMWF			$1,751.11	$1,751.11
1/5/09	LD Perry		$59,753.20		$59,753.20
2/19/09	GRMWF			$1,792.60	$1,792.60
4/3/09	LD Perry		$24,700.90		$24,700.90
4/13/09	GRMWF			$741.03	$741.03
7/6/09	Ted Hays Signs		$845.00		$845.00
7/9/09	Rahn's Sanitary		$130.00		$130.00
7/27/09	LD Perry		$91,789.00		$91,789.00
8/5/09	GRMWF			$2,000.00	$2,000.00
8/19/09	Anderson Perry		$4,111.60		$4,111.60
8/20/09	GRMWF			$123.35	$123.35
	TOTAL	**$0.00**	**$239,700.00**	**$6,408.09**	**$246,108.09**

Construction Budget Summary

Funding Source	Dollar Amount
Bonneville Power Administration	$218,556.28
Oregon Watershed Enhancement Board	$246,108.09
Anonymous (Construction engineering and contract pilot for filming)	$22,500.00
Total	**$487,164.37**

Pre-Construction Budget Summary

Funding Source	Task	Dollar Amount
Bonneville Power Administration	Survey	$28,000.00
Bonneville Power Administration	Design	$51,076.75
Bonneville Power Administration	Biological Services	$2,500.00
Bonneville Power Administration	Cultural Resources	$3,837.38
GRMW	Removal/fill permit	$3,900.00
GRMW	Project management	$2,000.00
	Total	**$91,314.13**

Cost to coordinate, design, permit and construct 3800 feet of new river channel = $578,478.50.
Project cost per foot of new channel = $152.23.

Photographs

Photo 1: Photo taken in October 2006 showing predominant channel type prior to construction. The river through the 6-Ranch property is ~ 90% riffle and lacks pools, wood and other habitat complexity. The following 3 photos are taken from the same spot.

Photo 2: Photo taken on August 2009 following construction. The channel is now complex with pools, large wood and other habitat features expected in a naturally occurring channel.

Photo 3: Taken on April 14, 2010 prior to high spring flow in the Wallowa River. Planting efforts can be seen in the foreground and includes native seeding, live whip and containerized shrub installations.

Photo 4: Taken on June 3, 2010 at flood stage. The floodplain is activated, large wood has been recruited and revegetation efforts are showing robust results all objectives of the project.

Photo 5: Biologists from Nez Perce Tribe, Confederated Tribes of the Umatilla Indian Reservation and Oregon Department of Fish and Wildlife. This was the core group of biologists who coordinated and implemented the fish salvage efforts on July 6, 7, and 8 2009.

Photo 6: An army of young volunteers helping haul, enumerate and release fish during the salvage effort.

Photo 7: September 2009. Oregon Watershed Enhancement Board of Directors on tour at the project site.

Photo 8: Landowners providing a historical perspective.

Photo 9: Bill Maslen of Bonneville Power Administration addressing salvage day participants.

Photo 10: Excavator, off-road articulating dump truck and a small dozer were the tools used to move 26,000 yards of material, install channel structure and reclaim abandoned sections of the old channel.

Photo 11: Photo taken by Mary Edwards, MaryEdwardsPhotography.com. Juvenile Chinook salmon, one of the primary beneficiaries of the Wallowa River/6-Ranch Habitat Restoration Project.