

THE WHOLE WATERSHED RESTORATION JOINT VENTURE

Focusing partner
resources to restore
priority watersheds

**PROGRESS REPORT
2006-07**



**By: Ecotrust
PNW Region, US Forest Service
To: The Oregon Watershed Enhancement Board**

**May 19, 2007
LaGrande, OR**

BACKGROUND: On May 17, 2006, the OWEB Board approved \$500,000 of capital funds for use in the Whole Watershed Restoration Joint Venture (Joint Venture), a program administered by Ecotrust and the Pacific Northwest Region, US Forest Service (FS). The Joint Venture is designed to accelerate completion of essential restoration work in a selection of Oregon’s most important salmonid streams. The purpose of this report is to provide an update to the OWEB Board on program accomplishments.

The underlying intent of the Joint Venture partnership is to tangibly demonstrate progress in recovery of listed salmon, trout, and water bodies through completion of whole watershed restoration. The Joint Venture directs collaborative investments to ‘priority work’ in selected watersheds. Priority work is defined as the actions needed to repair/restore basic aquatic habitat-maintenance processes and functions necessary to support native fish stocks and aquatic ecosystems. These actions are identified through watershed analysis and incorporate limiting factors/ actions identified in applicable recovery planning efforts.

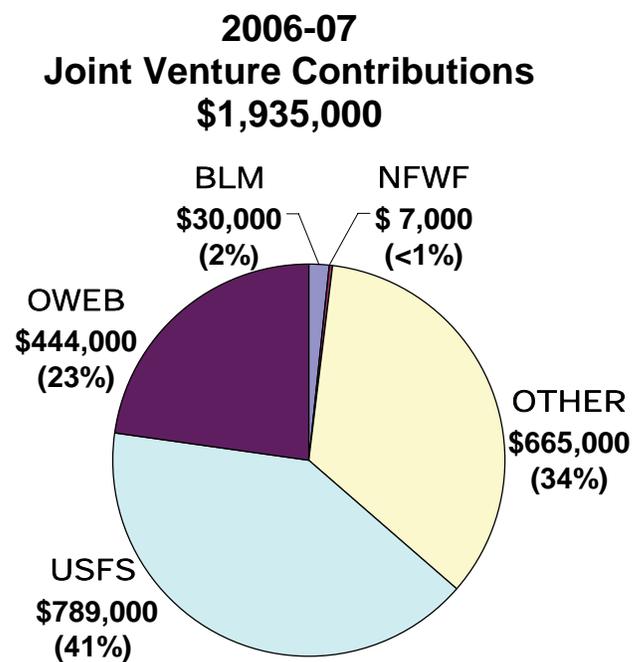
To focus collaborative efforts, the Joint Venture partners have identified priority basins (3rd field HUC). The basins include the John Day, Lower Columbia, Rogue, Umpqua, and Mid/North Coast. Within these basins, the FS and local partners have selected priority 5th or 6th field watersheds and developed watershed action plans, detailing priority work and implementation.

The Joint Venture provides seed money for priority projects to these local partnerships, who then leverage additional funds for further work. Proposals are submitted to, reviewed and ranked by a Joint Venture technical team composed of FS, OWEB,

BLM, USFWS, Ecotrust, and TU representatives. The highest ranked projects are then matched with the best suited source of Joint Venture funding and grants made directly from fund sources. For this initial Joint Venture effort, twenty-eight projects were funded. OWEB funds contributed to 14 projects, while other partners funded the balance.

Projects from non-priority watersheds are also funded by the Joint Venture, where outstanding opportunities for partnerships and resource benefits exist.

PARTNERSHIPS: The partnership currently includes OWEB, FS, Ecotrust, National Fish and Wildlife Foundation (NFWF), BLM, Oregon Trout and WolfTree, Inc. To date, \$444,000 of OWEB funds have been matched with almost \$1.5 MM of partner resources to implement priority work over the last two years. NOAA has now joined the Joint Venture, with a significant 3-year grant to Ecotrust, intended to expand the partnership in 2008.

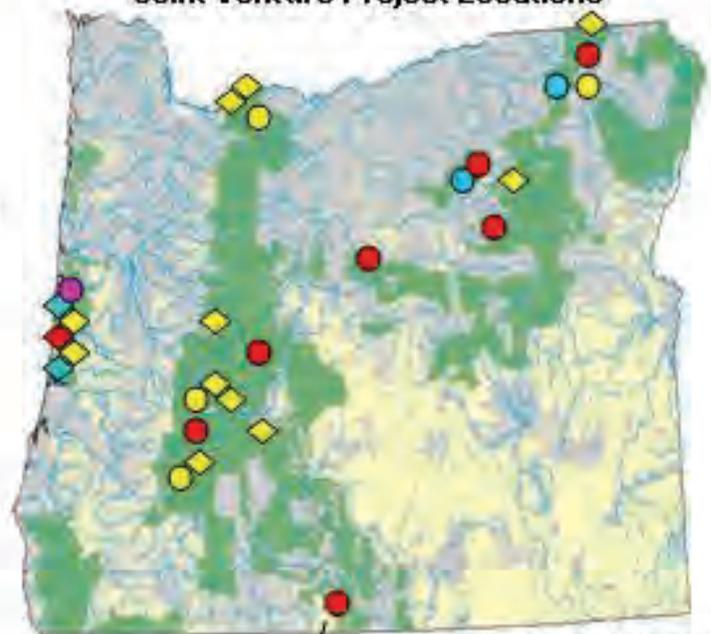


PROGRAM ACCOMPLISHMENTS

- 28 restoration projects
- 130 miles of streams improved
- 135 acres of watershed improved
- >13 miles road decommissioning
- Watershed Action Plans completed in all priority basins
- 15 projects in priority basins

<u>Projects funded by OWEB</u>			
Passage	● Stream/Riparian	● Road Dec.	●
<u>Projects funded by other partners</u>			
Passage	◆ Stream/Riparian	◆ Road Dec.	◆

Joint Venture Project Locations



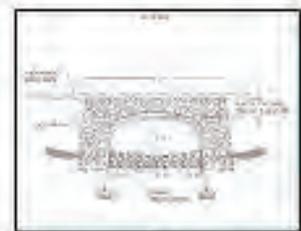
Map depicts general locations

JOINT VENTURE HIGHLIGHT

Whole Watershed
Restoration in Deming Creek



Before – Culvert 5' wide



After (2008) – Culvert 14' wide

OWEB funded a 2008 culvert replacement in Deming Creek, the capstone project restoring access to 3.5 miles of habitat and completing whole watershed restoration in an important area for Klamath Basin bull trout.*

- **Watershed Needs:** reduce sediments from streamside roads and restore fish passage
- **Accomplishments:** obliterated 6 miles of roads and removed three fish barriers
- **Monitoring Results:** bull trout population stabilized and range expansion

*Refer to Deming Creek Project Report in appendix

The FUTURE: The scope of the Joint Venture program is significantly expanding. In 2008, the FS intends to dedicate over \$1,000,000 annually to fund Joint Venture project work. The NOAA/EcoTrust grant contributes another \$400,000 annually over the next three years. Much of the ‘new’ funding from both organizations is focused on fish passage, as well as road decommissioning and drainage improvement. Combined FS and NOAA Joint Venture funds equal \$1,400,000 per year, totaling at least \$4,200,000 for the next three years. It is our intention to use these funds to recruit additional Venture Fund partners, with a goal of increasing annual investment level to over \$2 MM by 2009.

With this significant growth in partnerships and two years of experience and accomplishment, the Joint Venture is poised to make large strides in achieving its goal of accelerating restoration of whole watersheds. Additional benefits will accrue through increased emphasis on public outreach, and local partner capacity building/leadership in project development and implementation. Integration of action plans and individual project proposals with emerging state and federal recovery planning for Threatened and Endangered fish and listed water bodies is also being strongly emphasized.

CONTINUING THE PARTNERSHIP:

The involvement of OWEB to date has been tremendously helpful in piloting the Joint Venture effort, especially for the role State funding has played in encouraging new Federal partners. The other Joint Venture partners encourage OWEB’s continued participation, especially given the prospects for increased leveraging of restoration funds. OWEB participation is viewed as critical for continued success and expansion of this effort. Ecotrust and the Forest Service would like to bring a formal request for OWEB’s continued involvement to the January 2008 Board meeting.

Another OWEB-funded Venture Project: Summit Creek Culvert Replacement



Before: 6’x 4’ culvert, blocking 1.5 miles of Snake River Basin steelhead habitat.



After: 11’x 4.5’ culvert, restoring access to 1.5 miles of prime habitat. For details, refer to Summit Creek Project Report in appendix

CONTACTS

ECOTRUST:

- **Brent Davies**, (503) 467-0761

US Forest Service:

- **Dave Heller**, (503) 808-2994
- **Jeff Uebel**, (503) 808-2847
- **Scott Peets**, (503) 750-7181

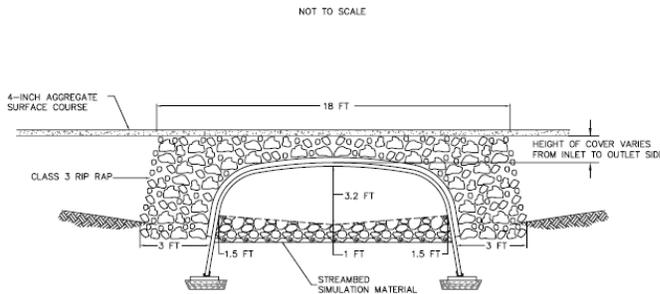
Appendix I

OWEB Funded Projects

2006-07 Whole Watershed Restoration Joint Venture Project Summary

Project Name: Deming Creek Culvert		OWEB #: 206833-5372	
Project lead:	Fremont-Winema NFs	OWEB Funding:	\$60,000
Project Contact:	Dave Hogen	FS Funding:	\$23,000
Phone/Email:	541 947-6258	Other Funding:	\$50,000 (RAC / Title II)
Focus watershed:	Deming Creek, Sprague River, Klamath Basin	Total Cost:	\$ 133,000

Specific Project Purpose/Objective: Restore volitional aquatic organism passage to 3.5 miles of headwater fish habitat. This project will complete high priority restoration efforts on the Forest within the Deming Creek drainage.



**Final design for the approved stream simulated
Deming Creek culvert (14 ft wide)**

Context and expected benefits (contribution to whole watershed restoration)

Approximately 3.5 miles of bull trout and redband trout habitat exists upstream of the of the project site. This habitat is in a relatively undisturbed, pristine condition, and occurs within a large roadless area adjacent to and within the Gearhart Mountain Wilderness. Restoring fish passage at the site will allow fish to access high quality habitat upstream. This restored connectivity is very important for the long-term viability of the Deming Creek bull trout subpopulation.

Work Performed and Status

The project is nearing completion. Over the past three months, design was fully completed and approved by regulatory agencies (5/19/07), consultation was finalized (6/14/07), and NEPA was signed (7/24/07). The project will be through contracting next spring and completed by the end of the in-stream work window in 2008 (September 30 for Deming Creek).



**Existing culvert outlet (5 ft wide) prior
to replacement**

Primary Partners (Name, Role or Contribution):

Oregon Watershed Enhancement Board (Joint Venture Funds), Fremont-Winema National Forest Resource Advisory Committee (RAC), Oregon Department of Fish and Wildlife, Klamath Basin Bull Trout Working Group, and the Fremont-Winema National Forest

2006-07 Whole Watershed Restoration Joint Venture Project Summary

Project Name: Summit Culvert Passage (originally submitted as Upper Joseph Creek Collaborative Watershed Restoration Project)		OWEB #: 206833-5365	
Project lead:	Wallowa Resources, W-WNF/ Wallowa Mountains Zone	OWEB Funding:	\$62,000
Project Contact:	Alan Miller & Dana Orrick	FS Funding:	\$15,900
Phone/Email:	Alan: 541-426-5682 Dana: 541-426-5690 amiller@fs.fed.us, dorrick@fs.fed.us.	Other Funding:	\$23,780 BPA \$12,895 TNC & Pacificorp
Focus watershed:	Chesnimnus (formerly Upper Joseph Creek (UJC)) Watershed (1706010604)	Total Cost:	\$114,575

Specific Project Purpose/Objective: Restore volitional passage to 1.5 miles of historic habitat for all life stages of listed Snake River Basin steelhead and other aquatic species.



**Summit arch outlet after replacement;
April 2007**

Context and expected benefits (contribution to whole watershed restoration)

Replacing the perched culvert with a bottomless arch restored aquatic organism passage to over 1.5 miles of habitat in Summit Creek, specifically spawning and rearing for threatened steelhead trout. The larger structure better accommodates flood flows, allowing for passage of most woody debris and decreasing the risk of blockage, road damage and erosion. This project completes the second of three major fish passage improvement needs in the UJC watershed, restoring 11 miles of steelhead habitat thus far.

Work Performed and Status

The 6' x 4' squashed culvert on FS road 4625 with a 1.8' vertical leap that connected Summit Creek with Devils Run Creek was replaced with an 11' x 4.5' multi-plate steel arch using stream simulation techniques. Aquatic organism passage has been restored and the downstream banks have since been planted with native hardwoods. This project was also videotaped by the San Dimas Technology and Development Center for use as a case study in their upcoming interactive DVD on Aquatic Organism Passage.



**Summit culvert outlet prior to replacement;
April 2006**

**Primary Partners
(Name, Role or
Contribution):**

Wallowa Resources – fund raiser and contractor.

2006-07 Whole Watershed Restoration Joint Venture Project Summary

Project Name: Rock Creek Fish Passage		OWEB #206833-6004	
Project lead:	Ochoco National Forest	OWEB Funding:	\$ 9,000
Project Contact:	Daniel Rife	FS Funding:	\$ 20,000
Phone/Email:	541-383-5534 drife@fs.fed.us	Other Funding:	\$ 34,000
Focus watershed:	Rock Creek	Total Cost:	\$ 63,000

Specific Project Purpose/Objective: Restore volitional passage to 9 miles of historic habitat for all life stages of listed MC Steelhead and other aquatic species. Replace screens on diversion to reduce impingement of steelhead.



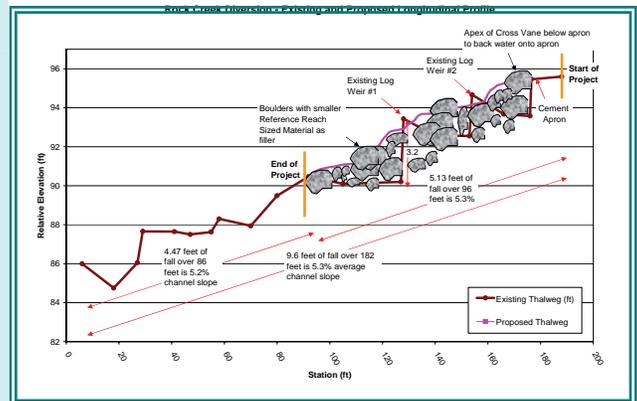
Passage concerns before work at diversion.

Context and expected benefits (contribution to whole watershed restoration)

Upstream passage at the diversion is limited to adults. Two log weirs that are 3 feet and 1.5 feet in height prevent juvenile passage. The project will create a 100 foot long high gradient riffle that will facilitate passage for all life stages of steelhead in the drainage. Rock Creek is one of the most important tributaries of cold water to the lower John Day River. ODFW is replacing the screens at the diversion at the same time to facilitate unimpeded downstream passage away from the diversion.

Work Performed and Status

All rock and logs have been stock piled on site. Permits have been obtained and the task orders for the contract have been signed. Work will be started the second week of September.



Project Design - High gradient riffle profile

Primary Partners (Name, Role or Contribution):

Oregon Department of Fish and Wildlife \$32,000 – Replacement of screens on diversion. Antonne Ranch - \$2,000 – Rock material for the project and access to Forest parcels.

2006-07 Whole Watershed Restoration Joint Venture Project Summary

Project Name: Metolius Passage		OWEB #:206833-6003	
Project lead:	Upper Deschutes Watershed Council	OWEB Funding:	\$ 10,560
Project Contact:	Kristine Senkier	FS Funding:	\$ 3,627
Phone/Email:	541-382-6103 x36	Other Funding:	\$10,000 (OWEB small grant)
Focus watershed:	Metolius is a Key Watershed in NWFP	Total Cost:	\$ 24,187

Specific Project Purpose/Objective: Restore volitional passage to 2 miles of habitat for juvenile bull trout in the upper extent of their range and passage for other aquatic species.



Culvert inlet post project

Context and expected benefits (contribution to whole watershed restoration)

Higher than expected flows scoured the inlet and outlet of the culvert and left a plunge that was a juvenile fish barrier. Restoring fish passage at the project was the goal and the project will accomplish this by building a high gradient riffle at the outlet of the bottomless arch culvert installed after the B&B Fire. This fish passage project will restore juvenile bull trout access to 2 miles of rearing habitat. The improved outlet will better resist flood flows, allowing for passage of large debris, while decreasing the risk of future scour and development of a passage barriers.

Work Performed and Status

The inlet was stabilized with a low profile hard rock grade control that will reduce scour inside the culvert. The outlet grade was restored by constructing a high gradient riffle to transition the streambed out of the culvert without a plunge. Rock ribs were placed to stabilize the outlet and gravel mix was placed to seal and lock in the matrix. A longitudinal profile was shot before and after the project to monitor the results of grade control and will be repeated after the first bankfull flow.



Culvert outlet prior to project

Primary Partners: Deschutes National Forest:

Deschutes National Forest provided the planning, design, NEPA, and boulders for the project. Also served as contract inspector.

2006-07 Whole Watershed Restoration Joint Venture Project Summary

Project Name: Cedar Creek Aquatic Connectivity Project		Project #: 206833-6027	
Project lead:	Umpqua National Forest	OWEB Funding:	\$40,000
Project Contact:	Ron McMullin	FS Funding:	\$40,000
Phone/Email:	(541)496-3532 rgmcmullin@fs.fed.us	Other Funding:	\$150,000*
Focus watershed:	Steamboat Cr. Watershed., Cedar Cr. Sub-Watershed	Total Cost:	\$230,000

Specific Project Purpose/Objective: Restore passage to 1.2 miles of historic habitat for all life stages of Oregon Coast steelhead, Oregon Coast and resident cutthroat trout, and other aquatic species.



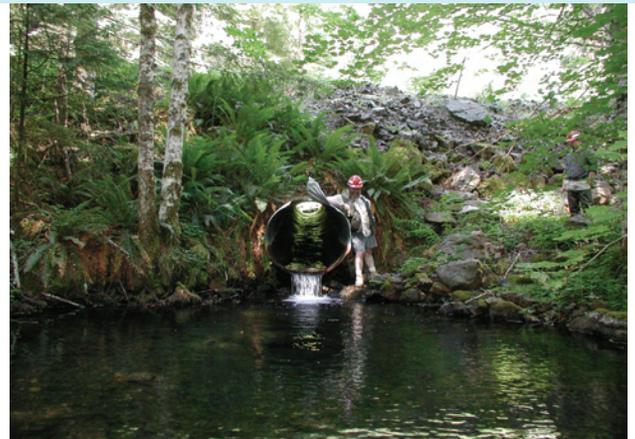
Example culvert outlet post replacement

Context and expected benefits:

Replacing two existing culverts with embedded pipe arches will restore steelhead passage to over 1 mile of prime spawning and rearing habitat. The larger structures will better accommodate flood flows, allowing for passage of large debris and decreasing the risk of blockages, road damage or erosion. This project completes all major fish restoration needs in the Cedar Creek focus watershed. In 1997, instream large wood placement enhanced aquatic habitat complexity in the lower 3 miles of Cedar Creek. Replacing these culverts will complete planned restoration efforts for this sub-watershed.

Work Performed and Status

To date all NEPA, surveys and design work have been completed (USFS funded). There are 2 sites associated with this project. Both pipes are under sized and in poor condition. The Joint Venture Funds have not been obligated to date. These funds and other supporting funds will be applied to 2008 contract. The design is stream simulation and allows enough width to accommodate bankfull (~14ft.) stream dimensions.



Culvert outlet prior to replacement.

Primary Partners: OWEB is the primary partner with the USFS in this project. * = FS Other, source to be determined (e.g., Hydro Mitigation Fund or Capital Investment)

2006-07 Whole Watershed Restoration Joint Venture Project Summary

Project Name: Upper Beaver Culvert Replacement		OWEB #: 206833-5371	
Project lead:	Malheur NF	OWEB Funding:	\$ 55,000
Project Contact:	Holly Bentz	FS Funding:	\$60,000
Phone/Email:	541-575-3012/ hbentz@fs.fed.us	Other Funding:	\$ -
Focus watershed:	Camp Creek 1707020302	Total Cost:	\$ 115,000

Specific Project Purpose/Objective: Restore passage to 1.0 mile of historic habitat for all life stages of listed MC Steelhead and other aquatic species.



Culvert outlet prior to replacement

Context and expected benefits (contribution to whole watershed restoration)

Replacing the existing structure with a bottomless arch will restore over 1 mile of prime steelhead spawning and rearing habitat. The larger structure will better accommodate flood flows, allowing for passage of large debris and decreasing the risk of blockages, road damage or erosion. This project completes one of approximately 50 culverts to be removed or replaced in the Camp Creek Watershed. Of the 50, 10 have been removed or replaced and 10 are under contract to be replaced or are in the design process.

Work Performed and Status

The existing culvert (60" diameter x 80' long) on FS road 4557506 will be replaced with a 14' span, structural plate bottomless arch w/square ends. Stream simulation techniques will be used to simulate step-pools due to the steep grade at this location. Although originally scheduled for construction in 2007, staff shortages delayed the project so the contract was not awarded in time to meet fish windows. The project has been awarded and will be constructed the summer of 2008.



Culvert inlet prior to replacement

**Primary Partners
(Name, Role or
Contribution):**

OWEB

2006-07 Whole Watershed Restoration Joint Venture Project Summary

Project Name: Bear Meadow Cr. Road Decommissioning		Project #: 206833-5367	
Project lead:	Wallowa-Whitman N.F.	OWEB Funding:	\$2961
Project Contact:	Mark Gomez	FS Funding:	\$4738
Phone/Email:	541-962-8591 magomez@fs.fed.us	Other Funding:	\$2,184
Focus watershed:	Meadow Creek (Grande Ronde)	Total Cost:	\$ 9883.00

Specific Project Purpose/Objective: Improved riparian function and water quality by eliminating sediment delivery from segments of a draw-bottom road and removed upstream fish barriers (5 culverts). Decommission and re-contour 1.6 miles of draw bottom road, move stock watering site from draw bottom to mid-slope site.



Bear Creek Photo Point 2 before

**Context and expected benefits
(contribution to whole watershed
restoration)**

Bear Creek contains important Snake River Basin steelhead spawning and rearing habitat, and is a major producer of steelhead in the Meadow Creek Drainage. This project improved riparian function and water quality by eliminating sediment delivery from segments of the draw-bottom road. The road crossed Bear Creek at five locations, and as a result five culverts—barriers to fish passage—were removed, thereby restoring access to 1 mile of spawning and rearing habitat..

Work Performed and Status

All project work for Bear Creek has been accomplished with the exception of planting 700 Ponderosa and Western Larch. Trees have been ordered for spring 2008 planting. This project will be monitored for three years for noxious weeds.



Bear Creek Photo Point 2 after

Primary Partners (Name, Role or Contribution):

**OWEB 30%, BPA 20%
Wallowa Whitman N.F 50%**

FY2007 R6 Northwest Forest Plan Project Summary

National Forest: Umatilla		State: OR	OWEB#:206833-5370 & 6005
Project Name:	FS Road 5510 Decommissioning and Road-Stream Crossing Restoration	FS JV Funding: (OWEB 2006, 2007)	\$ 52,000 \$ 30,000*
Focus watershed:	NF John Day River-Big Creek	Other FS Funding: (Type= NFVW, Title 2, Coop roads)	\$50,000
Project Contact:	Caty Clifton	Non-FS Partner Contributions:	\$ -
Phone/Email:	541-278-3822, cclifton@fs.fed.us	Total Project Cost:	\$132,000

Specific Project Purpose/Objective: Decommission 3 miles of unstable, unneeded road to improve hillslope stability, reduce upland sources of sediment, remove fill from watercourses, reestablish natural drainage, improve infiltration, and improve overall watershed conditions.



Decommissioned roads in Oriental Basin, within the 1996 Tower fire area

Context and expected benefits (contribution to whole watershed restoration)

Over 30 miles of road have been decommissioned in the 10 years after a 50,000 acre severe wildfire. This work is ongoing as part of post-fire recovery efforts in the NFJD-Big Creek watershed (HU#1707020203). Many roads constructed for logging, which are no longer needed, were identified as impairments to watershed function. Oriental Creek, supporting steelhead and rainbow trout, is a tributary to the NFJD. The NFJD contains spawning, rearing, and migratory habitat for chinook, steelhead and bull trout. Approximately 3 miles of aquatic habitat in Oriental Creek benefit from the project.

Work Performed and Status

Engineer's surveys were completed in summer '06, and contracts were prepared during winter '06/'07. An indefinite quantity time and equipment rental contract was awarded in June, '07. The award was less than Government estimate. Work began on 8/30/07 with an expected completion date of 9/30/07. \$52,000 of OWEB funding (2006) has been obligated under contract, along with other funds (Title 2, coop roads, and appropriated). **NOTE:** We requested an additional \$30,000 in OWEB funding in 2007 based on the engineer's survey which identified 34 culverts, including 13 road-stream crossings. Additional OWEB funds were requested based on revised contract estimate. However not all funds may be needed due to lower bid price. We will know within 2 weeks what funds will be needed to complete the project.



Example of unstable 5510 road section and stream crossing fill to be removed and recontoured

Primary Partners (Name, Role and/or Contribution):

Umatilla County (Title 2 funding), OWEB (JV funding), Coop road funds

2006-07 Whole Watershed Restoration Joint Venture Project Summary

Project Name: Green River LWD project		OWEB #: 206833-5363	
Project lead:	MidCoast Watersheds Council	OWEB Funding:	\$ 48,190
Project Contact:	Wayne Hoffman	FS Funding:	\$ 1,000 + \$22,000 in-kind
Phone/Email:	541-265-9195	Other Funding:	\$
Focus watershed:	Alsea River	Total Cost:	\$ 71,190

Specific Project Purpose/Objective: Improve rearing habitat for Coho and other Salmonids in upper Green River, and document fish response.



Chinook Helicopter at Green River

Context and expected benefits (contribution to whole watershed restoration)

This 0.75 mile large wood project brings the total Green River treatment area to 7 miles. Monitoring results have documented a doubling in Coho overwintering survival since implementation of previous treatments. The project improves an additional section of habitat, but also allows us to further refine our analyses of Coho response, as it has 5 years of pre-implementation monitoring.

Work Performed and Status

Large logs were placed in 0.75 miles of upper Green River by heavy-lift helicopter, in five structures. In addition, juvenile salmonid populations are being assessed summer and winter throughout the 7 mile project reach to determine how much the introduced wood increases Coho salmon productivity.



Large wood structure in Green River

Primary Partners (Name, Role or Contribution):

US Forest Service – logs, staff time, funding
Roseboro Timber Co. Permission, access
OWEB – primary funding

2006-07 Whole Watershed Restoration Joint Venture Project Summary

Project Name: Joe Hall In-Channel		Project #:206833-5362	
Project lead:	Partnership for Umpqua Rivers	OWEB Funding:	\$ 27,000 (#206-086 \$67,345)
Project Contact:	Calib Baldwin	FS Funding:	\$ 36,000
Phone/Email:	(541) 825-3133 ctbaldwin@fs.fed.us	Other Funding:	\$ 128,000
Focus watershed:	Joe Hall Creek/Elk Creek Watershed (SF Umpqua)	Total Cost:	\$ 258,345

Specific Project Purpose/Objective: Cooperatively restore 3 miles of OC coho salmon, OC steelhead and OC cutthroat trout habitat with private landowners along Joe Hall Creek.



Lower Joe Hall Creek Post-Restoration

Context and expected benefits (contribution to whole watershed restoration)

The anticipated condition upon project completion will be stream reaches containing complex large wood and boulder structures providing key winter habitat for juvenile fish. As the gravels accumulate over time, spawning habitat will improve, the stream channel width will be reduced and the channel will begin to meander. Equally as important, due to the cooperative nature of this project an additional fifteen landowners along a ten mile reach of Elk Creek have expressed interest in completing an aquatic habitat restoration project on their properties.

Work Performed and Status

One hundred and sixty-one logs (all key pieces) were placed at 32 sites using a helicopter and excavator, and 220 boulders were placed at 15 structures along the lower 1.5 miles of Joe Hall Creek. Logs were placed on both private property and US Forest Service managed-lands and boulder structures were placed on private lands. Seventy logs with rootwads attached and ninety logs without rootwads were placed using helicopter (120) and excavator (40). The average log length was 50' with an average diameter of 24 inches. An additional 30 whole trees will be lined over into the remaining 1.5 miles of upper Joe Hall Creek this winter.



Lower Joe Hall Creek Pre-Restoration

Primary Partners (Name, Role or Contribution):

Partnership for the Umpqua Rivers
Stanley Petrowski (Landowner)
Leland Crumpton (Landowner)
Julie Edmonds (Landowner)
The Nature Conservancy (Pacific Power Habitat Fund)
Rogue-Umpqua Resource Advisory Committee (RAC)
Natural Resource Conservation Service
Oregon Watershed Enhancement Board
US Forest Service
Cow Creek Band of the Umpqua Indian Tribe

2006-07 Whole Watershed Restoration Joint Venture Project Summary

Project Name: Devils Run, Elk and Chesnimnus Creeks Instream Structure Modifications (originally submitted as Upper Joseph Creek Collaborative Watershed Restoration Project)		OWEB #: 206833-5364	
Project lead:	Wallowa Resources, W-WNF/ Wallowa Mountains Zone	OWEB Funding:	\$20,000 total; \$10K in 2006 and \$10K in 2007
Project Contact:	Alan Miller & Dana Orrick	FS Funding:	\$11,200 in 2006 \$12,840 in 2007
Phone/Email:	Alan: 541-426-5682 Dana: 541-426-5690 amiller@fs.fed.us, dorrick@fs.fed.us.	Other Funding:	\$13,993 BPA* in 2006 \$10,475 WR** in 2007 \$21,575 BPA* in 2007
Focus watershed:	Upper Joseph Creek (UJC) & Chesnimnus Watersheds (1706010605 & 1706010604)	Total Cost:	\$35,193 in 2006 \$54,890 in 2007

Specific Project Purpose/Objective: Improve juvenile fish passage for Snake River Basin steelhead along 17.5 miles of stream and assist in restoring natural stream form and function. Note: OWEB funding was split across 2 years.



Chesnimnus segment F reference reach



Chesnimnus structure F52 pre-modification



Chesnimnus structure F52 post-modification

Context and expected benefits (contribution to whole watershed restoration)

These instream structure modifications took place in 3 phases across 2 watersheds from 2005-2007. A total of 313 structures were modified along 23.5 miles of Rosgen C- and E- type streams to allow for complete juvenile fish passage and appropriate channel form and function.

Work Performed and Status

An excavator was used to remove geo-textile material and rusty wire from the streambed, remove and empty out gabion baskets holding logs in place, and reconfigure structure logs. Some trees were also pushed over to add large woody debris to the channel. Modifying these structures – check dams that are not appropriate for Rosgen C- and E-type channels – has restored juvenile fish passage and will allow hydrologic processes to shape the channel.

Primary Partners (Name, Role or Contribution):

Wallowa Resources (WR) – fund raising and contracting.

*WR and FS jointly applied for and received monies through BPA from 2005-2007. Title II money was also jointly applied for and used in 2007.

**WR found other sources to contribute money to this project, such as the Wildhorse Foundation and the National Forest Foundation.

2006-07 Whole Watershed Restoration Joint Venture Project Summary

Project Name: Robinhood Creek Large Woody Debris Restoration		OWEB #: 206833-6009	
Project lead:	Mt. Hood National Forest Hood River Ranger District	OWEB Funding:	\$18,000 (through agreement with HRSWCD*)
Project Contact:	Darcy Morgan	FS Funding:	\$33,500
Phone/Email:	(541) 352-6002 Ext. 627 darcymorgan@fs.fed.us	Other Funding:	\$15,000 (CTWS*) \$24,000 (Payco*) \$2,500 (HRWG*) \$16,500 (OWEB**)
Focus watershed:	East Fork Hood River	Total Cost:	\$109,500 Note: Table depicts funds for 2007 and 2008

*Hood River Soil and Water Conservation District

*Confederated Tribes of the Warm Springs Reservation of Oregon

*Payments to Counties (Title II)

*Hood River Watershed Group

**OWEB funds obtained through separate non-Joint Venture application for culvert removal

Additional funds for culvert removal and project surveys completed in 2006:

\$25,700 (Payco) for culvert removal

Specific Project Purpose/Objective: To prepare the lower 1.5 miles of Robinhood Creek and 15 acres of associated floodplain for the eventual capture of Newton Creek during a debris torrent.



Robinhood Creek following timber harvest and stream clean-out, 1985.

Context and expected benefits (contribution to whole watershed restoration)

Robinhood Creek shares a large alluvial fan with Newton Creek, a glacial stream that is subject to repeated debris torrents due in part to the receding Newton-Clark glacier on Mt. Hood. During torrents in 2000 and 2006, Newton Creek migrated towards the Robinhood Creek channel, and currently could easily jump its channel and avulse into Robinhood. In addition, the Robinhood Creek drainage has been subject to extensive timber harvest and stream clean-out, and as a result there is a lack of woody material both in the channel and particularly on the floodplain. Following treatment, the creek and associated floodplain will have the roughness elements necessary to lessen the impacts from future flooding and/or debris torrents; collect and sort sediment and LWD, reduce large-scale erosion during flood and debris torrents, aggrade the currently incised channel, and provide improved fish habitat in terms of pool development and maintenance, spawning habitat creation and maintenance, and high flow refuge areas. A related goal is to reduce the amount of sediment that would enter the East Fork Hood River during and following a debris torrent originating in Newton Creek. Thinning to improve riparian stand health along Robinhood Creek is also planned. This project was originally identified in 2002 and was promptly incorporated into the Hood River Watershed Group's "Watershed Action Plan" that outlines a strategy to meet restoration goals in the Hood River Watershed Assessment.

Work Performed and Status

Projects within the Robinhood Creek 7th-field watershed:

2006

- Three fish passage barrier culverts removed with funding from Payco and the Mt. Hood Complex fire.
- One major side slope road closed and stormproofed.

2007

- Phase 1 of LWD project: 80 logs placed in stream channel and 90 logs in floodplain during implementation in upper 0.3 mile of project area. All disturbed areas were seeded with native seed by the Wilderness Volunteers immediately following project completion.

2008

- Phase 2 of LWD project: Additional 200-400 logs placed in stream channel and floodplain during implementation in lower 0.75 miles of stream. Riparian thinning completed throughout project area (from the mouth upstream 1.5 miles).
- The two access roads into Robinhood Creek will be closed and stormproofed.



Spyder excavator placing logs in the upper portion of the project area, August, 2007.



Completed structure and floodplain wood placement, August, 2007.

Primary Partners (Name, Role or Contribution):

Hood River Soil and Water Conservation District, Confederated Tribes of the Warm Springs Reservation of Oregon, Payments to Counties (Title II), Hood River Watershed Group, Oregon Watershed Enhancement Board, Wilderness Volunteers.

FY2007 R6 Northwest Forest Plan Project Summary

National Forest: Willamette		State: Oregon	OWEB #: 206833-5373
Project Name:	Middle Fork Willamette River: Large Woody Debris Enhancement Project	FS NWFP Funding: (EBLI= NFXN3507)	\$20,000
Focus watershed:	Upper Middle Fork Willamette River 17090001	Other FS Funding: (Type= NFWF18)	\$12,000
Project Contact:	Doug Larson District Fish Biologist	Non-FS Partner Contributions:	\$0
Phone/Email :	(541) 782-5332 dlarson@fs.fed.us	Total Project Cost:	\$ 32,000

Specific Project Purpose/Objective: Enhance and restore habitat for bull trout and spring Chinook salmon in the Upper Middle Fork Willamette River Watershed.



Before Middle Fork Willamette Enhancement Structures

Context and expected benefits (contribution to whole watershed restoration)

There is a limited amount of high quality spawning and rearing habitat available for bull trout and salmon in some sections of the Middle Fork Willamette River. Low levels of in-stream wood result in low stream complexity and reduced refuge habitat. By adding large wood to the stream channel, we facilitated the formation of deep pool habitat with reduced stream velocity, creating areas where fish thrive. This project was a portion of a much larger watershed-scale restoration project for the entire Upper Middle Fork Willamette River, with a goal of restoring stream conditions to a point where aquatic species and populations are healthy and sustainable.

Work Performed and Status

We used heavy equipment to place large logs in the Middle Fork Willamette River stream channel. This work enhanced habitat, changing low quality rearing habitat to high quality spawning habitat for bull trout and salmon. Our intent was to create deeper pools for juvenile fish to rear and capture gravel to provide high quality spawning areas for adults. The photos show a side channel of the Middle Fork Willamette that we were able to successfully create these types of habitat.



After Middle Fork Willamette Enhancement Structures

Primary Partners (Name, Role and/or Contribution):

None

Appendix II

Watershed Action Plan Example

Aquatic Restoration Plan

for National Forest System Lands of the

Applegate River-McKee Bridge 5th Field Watershed



Photo 1. McKee Bridge on the Applegate River

January 30, 2006

Revised August 17, 2007

Rogue River-Siskiyou National Forest
Applegate Ranger District



Approved By

Jerry Darbyshire

Acting Applegate District Ranger

Contributors

Forest Service

Susan Maiyo

Fisheries/Editor

Jon Brazier

Water Quality/Editor

Barb Mumblo

Botany/Noxious Weeds

Dave Austin

Wildlife Riparian Habitat

Dave Green

Roads

Dick Boothe

Riparian Vegetation

Ian Reid

Fisheries

Larry Cosby

Recreation & Mining

Robert Shoemaker

Fuels

Bureau of Land Management, Medford District (*Star Gulch subwatershed only*)

Chris Volpe

Fisheries

Reviewed & Supported by

Tim Franklin

Council Coordinator, Applegate River Watershed Council

Chris Vogel

Monitoring Coordinator, Applegate River Watershed Council

Jay Doino

Fisheries Biologist, Oregon Department of Fish and Wildlife

Bill Meyers

Rogue Basin Coordinator, Oregon Department of Environmental Quality

"There are just two things on this material earth - people and natural resources."

Gifford Pinchot

Table of Contents

Executive Summary	1
-------------------------	---

Aquatic Restoration Plan

I. The Integrated Work Planning Process and Restoration of the Watershed ...	3
------------------------------------------------------------------------------	---

II. The Applegate River-McKee Bridge Watershed At a Glance	4
------------------------------------------------------------------	---

III. Past Restoration	5
-----------------------------	---

IV. Looking Ahead to Future Restoration	5
-----------------------------------------------	---

V. Restoration Priority Table and Map.....	8
--------------------------------------------	---

VI. Proposed Aquatic Monitoring for Active Restoration Activities on NFSL.....	11
--------------------------------------------------------------------------------	----

APPENDICES (<i>Removed August 17, 2007</i>).....	52
----------------------------------------------------	----

Literature Cited	13
------------------------	----

Figures, Tables, and Photos

Figures

Figure 1. Location Map I	1
--------------------------------	---

Figure 2. Location Map II	1
---------------------------------	---

Figure 3. Vicinity Map with Fish Distribution	4
-----------------------------------------------------	---

Figure 4. Proposed Aquatic - Active Restoration Activities on NFSL.....	10
-------------------------------------------------------------------------	----

Tables

Table 1. Proposed Aquatic - Active Restoration Activities on NFSL	8
-------------------------------------------------------------------------	---

Table 2. Proposed Aquatic Monitoring for Active Restoration on NFSL.....	11
--------------------------------------------------------------------------	----

Photos

Photo 1. McKee Bridge over the Applegate River	Title Page
------------------------------------------------------	------------

Photos 2 & 3. A Day on the Applegate River	2
--------------------------------------------------	---

Page left blank

Executive Summary

The Applegate River-McKee Bridge 5th watershed encompasses 52,256 acres and is depicted in red outline on adjacent map. The watershed is located in southwest Oregon within the Applegate River sub-basin (depicted in brown outline) and Rogue River basin (depicted in black outline with green being National Forest System Lands (NFSL) ownership). A segment of the Applegate River and three main tributaries (Beaver Creek, Palmer Creek, and Star Gulch) reside within the watershed. The watershed contains coho salmon, a listed fish species under the Endangered Species Act (ESA), two races of steelhead trout, fall Chinook salmon, cutthroat and rainbow trout, Pacific lamprey and other non-game fishes. The aquatic restoration plan for this watershed analyzes existing aquatic and riparian data and strategically displays an active and passive restoration approach. Factors that limit aquatic productivity and diversity within the watershed are water quality, fish habitat and riparian forest health.

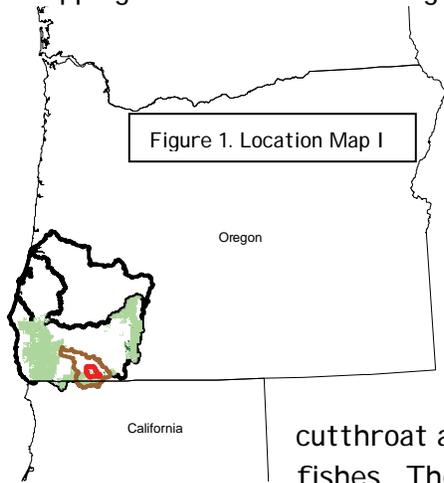


Figure 1. Location Map I

Fish habitat capability as well as water quality have been reduced by past management activities. Habitat problems include low pool quality and quantity, lack of spawning gravels, and some partial fish passage barriers. Water quality parameters affected include elevated

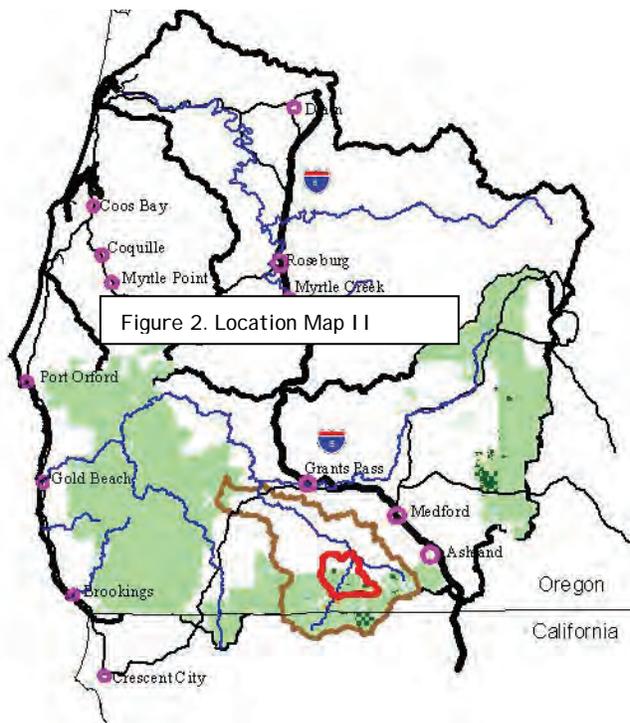
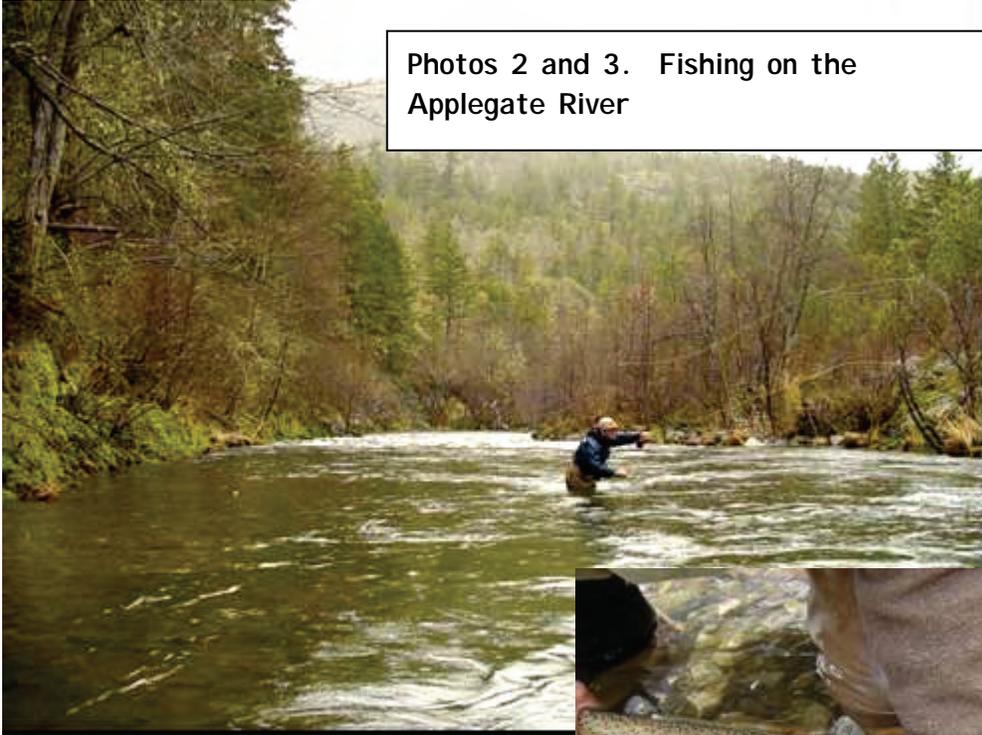


Figure 2. Location Map II

stream temperatures and excessive sedimentation. Specific management activities that have directly degraded water quality and fish habitat include road-building within riparian areas, timber harvest of large trees in the riparian area, stream cleanout of large wood, water diversions, and hydraulic and placer mining. The riparian forest has been impacted by roads, past mining impacts, past timber harvest, noxious weeds, and fire exclusion. The result of riparian impacts is a lack of future large wood recruitment to floodplains and streams – a primary component in these stream systems for high quality fish habitat and water quality.

Proposed active restoration within the watershed on NFSL was prioritized by water quality (\$1,629,600, Table 6), fish habitat (\$832,000, Table 10), and riparian forest conditions (\$901,000, Table 12); totaling \$3,362,600. These projects were then combined

and prioritized with a watershed approach for restoration, selecting the highest priority projects as depicted on Table 1. Total estimated cost for these high priority activities is \$1,816,600. High priority projects are surface-flow restoration, road improvement or



Photos 2 and 3. Fishing on the Applegate River

decommissioning, removal of a partial fish barrier, mining violation enforcement, thinning riparian vegetation, placement of instream large wood, and removal of non-native plant species within riparian areas.



These projects will be the focal point during the next few years. Work will continue until these high priorities are completed. Completion of this priority work will place the watershed in a recovery mode. Cooperative work, partnerships and supplemental external funding will increase restoration success in this watershed and more completely

involve the public in understanding and meeting restoration objectives. Passive restoration, for example vegetation recovery and growth, and protection of the processes that provide a natural range of large wood, sediment and shade to streams, could take as much as 200 years. Completion of the projects listed in this report will have immediate short-term benefits such as fine sediment reduction, better fish passage and improved fish habitat and the long-term benefit of allowing more natural processes to operate within the watershed to improve and maintain water quality and aquatic and riparian habitat.

The following three appendices (water quality, fish habitat, and riparian forest condition) are supporting documentation for this report and provide in-depth discussion regarding existing conditions, active and passive restoration and prioritization of projects depicted on tables and maps.

Aquatic Restoration Plan

Applegate River-McKee Bridge Watershed

I. The Integrated Work Planning Process and Restoration of the Watershed

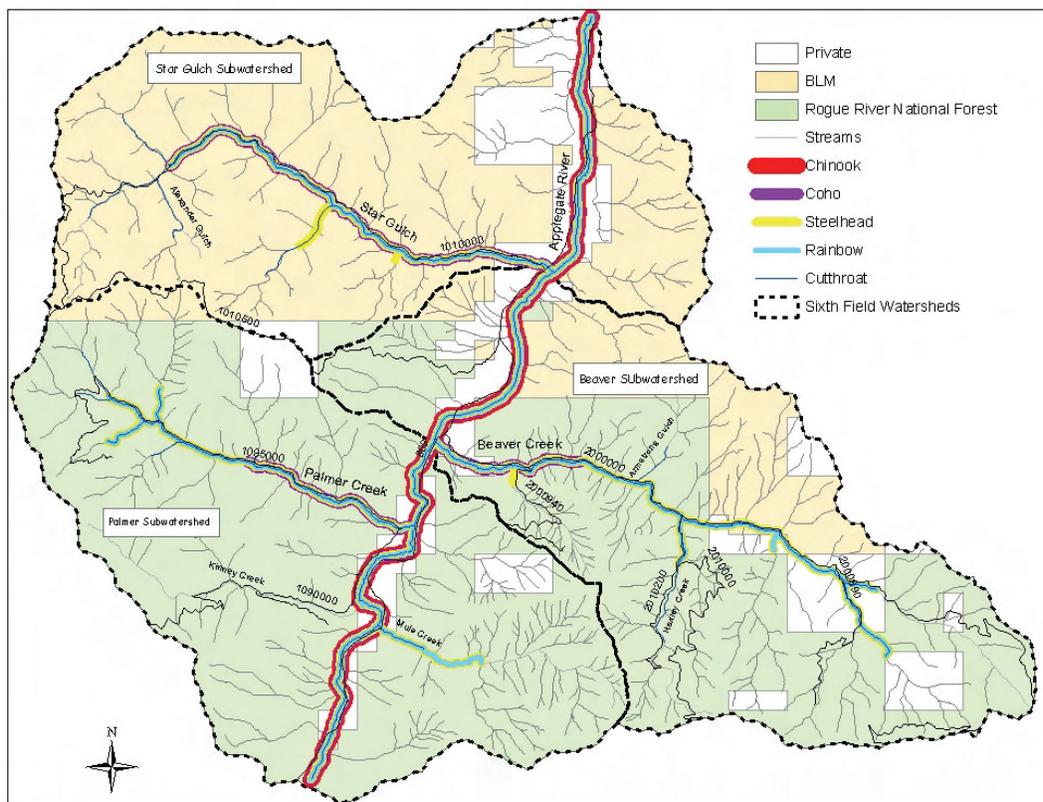
This plan prioritizes aquatic restoration projects on National Forest System Lands (NFSL) within the Applegate River-McKee Bridge 5th field watershed for the improvement and recovery of water quality, fish habitat, and riparian forest conditions. The Forest Integrated Work Planning process (IWP) describes the restoration goals on the Forest and rates the Applegate - McKee Bridge Watershed as one of the third highest overall priority for restoration on the Forest. This plan tiers to the Regional Watershed Restoration Strategy goals of restoring high priority water and fish watersheds with a combination of active and passive restoration strategies. Active restoration includes the usual suite of projects associated with watershed restoration - road upgrades, fixing erosion problems, culture of riparian forests and instream habitat improvement. Passive restoration is vegetation recovery and growth accompanied with substantive and effective aquatic input by fish biologists and hydrologists during project planning to ensure the watershed remains on a recovery path.

The analysis for this plan was an interdisciplinary team effort with review from multiple Federal and State agencies. Watershed Analysis, Water Quality Restoration Plan, Road Analysis, stream and fish surveys, and existing aquatic and riparian data were utilized to determine the current condition and present needs for the watershed. This plan provides a listing of projects, suggested timeline and costs that restoration specialists, decision makers, and grant writers may use in promoting a team and interagency approach to improvement of aquatic resources in this watershed. Partnerships are an essential element of the implementation of this plan. Restoration, through cooperative work and supplemental external funding will more than double restoration outputs and increase restoration success in this watershed.

II. The Applegate River- McKee Bridge Watershed at a Glance

Applegate River-McKee Bridge 5th Field Watershed (52,256 acres) is located in the Klamath Mountains Physiographic Province in Southwestern Oregon within the Applegate River 4th field sub-basin, 491, 520 acres in size. Annual average precipitation is approximately 40 inches. Applegate River-McKee Bridge 5th Field Watershed has three priority watersheds: Beaver (17,489 acres), Palmer (18,668 acres), and Star Gulch (16,099 acres). Land ownership of the watershed entails Rogue River-Siskiyou National Forest (27,457 acres, 53%), Medford Bureau of Land Management (17,800 acres, 34%), and private land (7,004 acres, 13%). Most of the land ownership in Beaver and Palmer subwatersheds is on NFSL. Land ownership in Star Gulch is mostly managed by Medford Bureau of Land Management (BLM) with NFSL encompassing $\frac{3}{4}$ mile of stream segment in the lower subwatershed. Important fish-bearing streams in the watershed are the Applegate River and the three principal tributaries: Beaver Creek, Palmer Creek, and Star Gulch. This watershed contains four anadromous fish species (coho salmon, Chinook salmon, summer and winter runs of steelhead trout), Pacific lamprey and two resident salmonids (rainbow and cutthroat trout). Southern Oregon/Northern California (SONC) coho salmon and coho critical habitat are listed as threatened under the Endangered Species Act (ESA).

Figure 3. Vicinity Map with Fish Distribution



III. Past Restoration

Past restoration on National Forest System Lands (NFSL) in the watershed include road rehabilitation and closure, culvert replacement and culvert revetment for fish passage, fish habitat enhancement, surface-flow restoration, irrigation diversion dam fish barrier removal, water rights transfer, riparian planting, and fuels reduction outside of the inner (<150 feet) Riparian Reserve. Projects were accomplished with the help of various partners (PayCo, Applegate Watershed Council, Oregon Water Trust, Oregon Department of Fish and Wildlife, USDI Bureau of Land Management-Medford District (BLM)), grants, and USDA Forest Service (FS) funds. Broad networks of partners have provided support, linkage to the community and access of additional funding sources not readily accessible to the FS.

IV. Looking Ahead to Future Restoration

Active Restoration

Proposed projects restoring the major aquatic limitations within the watershed were prioritized first by water quality, Table 6; fish habitat, Table 10; and riparian forest conditions, Table 12, then prioritized as an entire group, by 5th field watershed, Table 1, below. The high priority projects depicted in Table 1 will be the focal point during the next few years to restore the Applegate River-McKee Bridge 5th field watershed on NFSL. Work should continue until the top ten overall high priority projects are completed. With these projects completed, the watershed will be on its way toward recovery. Recovery is a relative term in today's paradigm of major roads and active management in these anadromous subwatersheds. Successful restoration will minimize the negative effects of this infrastructure and these activities on aquatic and riparian habitats in the watershed.

Subwatersheds within the Applegate-McKee Bridge watershed have different aquatic limitations. Channel surface flow is primarily a concern within Palmer Creek and Star Gulch (Priority 1) as dry stream channels presents a direct barrier to migrating fish. Road sediment is the primary aquatic habitat degradation factor within the Beaver Creek subwatershed (Priorities 2 and 3), especially in Haskins Gulch (Priority 2), as large amounts of decomposed granite sand fills gravel interspace in many areas. An irrigation diversion dam within lower Palmer Creek (Priority 4) is a concern during lower stream flows for coho salmon and steelhead trout fish passage upstream. It appears that most anadromous fish are able to migrate above the irrigation diversion dam during high flows, although during a low water year, the dam is a concern.

Large wood placement in Star Gulch, Palmer, and Beaver could occur in the next two to three years and improve stream habitat for several decades until riparian areas grow to contribute future large wood. Priority areas are those within coho habitat and lacking habitat complexity. Project Priority 1, located in Star Gulch on NFSL, should be evaluated and implemented (if project is deemed necessary) along with instream wood. Next priority would occur in Palmer Creek in coho areas without prior instream wood placement followed by areas

still below optimal levels. Instream wood placement has occurred within Beaver Creek in coho habitat on NFSL. At this time, no recommendations are made in this reach except to reevaluate past large wood placement and add wood in coho reaches where wood is currently below optimal levels on private lands.

After large wood enhancement has been completed within coho critical habitat, place large wood within steelhead reaches in Beaver and Palmer Creeks. Beaver Creek would have highest priority since higher summer stream flows generally exist, followed by Palmer Creek which has been observed with minimal flows during low water years; typically retains surface flow in reaches above Sourdough Gulch in Palmer Creek. Steelhead habitat within Star Gulch on NFSL also contains coho critical habitat and would be enhanced when Priority 1 is implemented.

Gullying on a closed nonsystem road within China Gulch (Priority 7) is a problem, but a lower priority due to the small measured impacts from this area. Hanley Gulch has high road density in a watershed with granitic geology, but is a lower priority (Priority 8) since a nominal amount of sediment movement has been observed after storm events.

Thinning riparian areas (Priority 8) and blackberry removal (Priority 9) will improve future large wood recruitment and shade by increasing native riparian species reestablishment success are recommendations common to all these subwatersheds.

Total estimated funds for high priority proposed restoration work are \$1,816,600, as stated in the last row of Table 1. Project priority locations are depicted on Figure 4.

Potential partners for restoration work are: Applegate Watershed Council, Oregon Watershed Enhancement Board, PayCo Title II, Oregon Water Trust, Oregon Department of Fish and Wildlife, BLM and National Forest Fish and Wildlife Foundation (NFWF).

Passive Restoration

Passive restoration occurs simultaneously with active restoration and active restoration work complements and accelerates soil stabilization, vegetation recovery and general healing in the watershed. Active restoration in Applegate – McKee Bridge watershed will include efficient work to facilitate these processes over a longer time period. For example, after thinning and other riparian culture work is completed, full recovery of riparian areas could take as much as 200 years. Riparian tree growth will re-establish historic large wood contribution levels for streams and fish habitat.

Passive restoration will take over when the most efficient and cost-effective active measures have been completed. Lower priority restoration work, not shown in the tables below may or may not be completed in the future depending on funds available and partners willing to help finance this work. Hydrologist, fish biologist and other specialist input to future projects will ensure that the processes restored with watershed restoration remain relatively intact while providing for natural events such as wind storms, floods and fires. Using the riparian

example above, future projects during the recovery period will be planned to ensure that the riparian forest remains in a condition where trees may become large, decadent and attrition of the stand causes wood to enter the stream channel or fall in the floodplain.

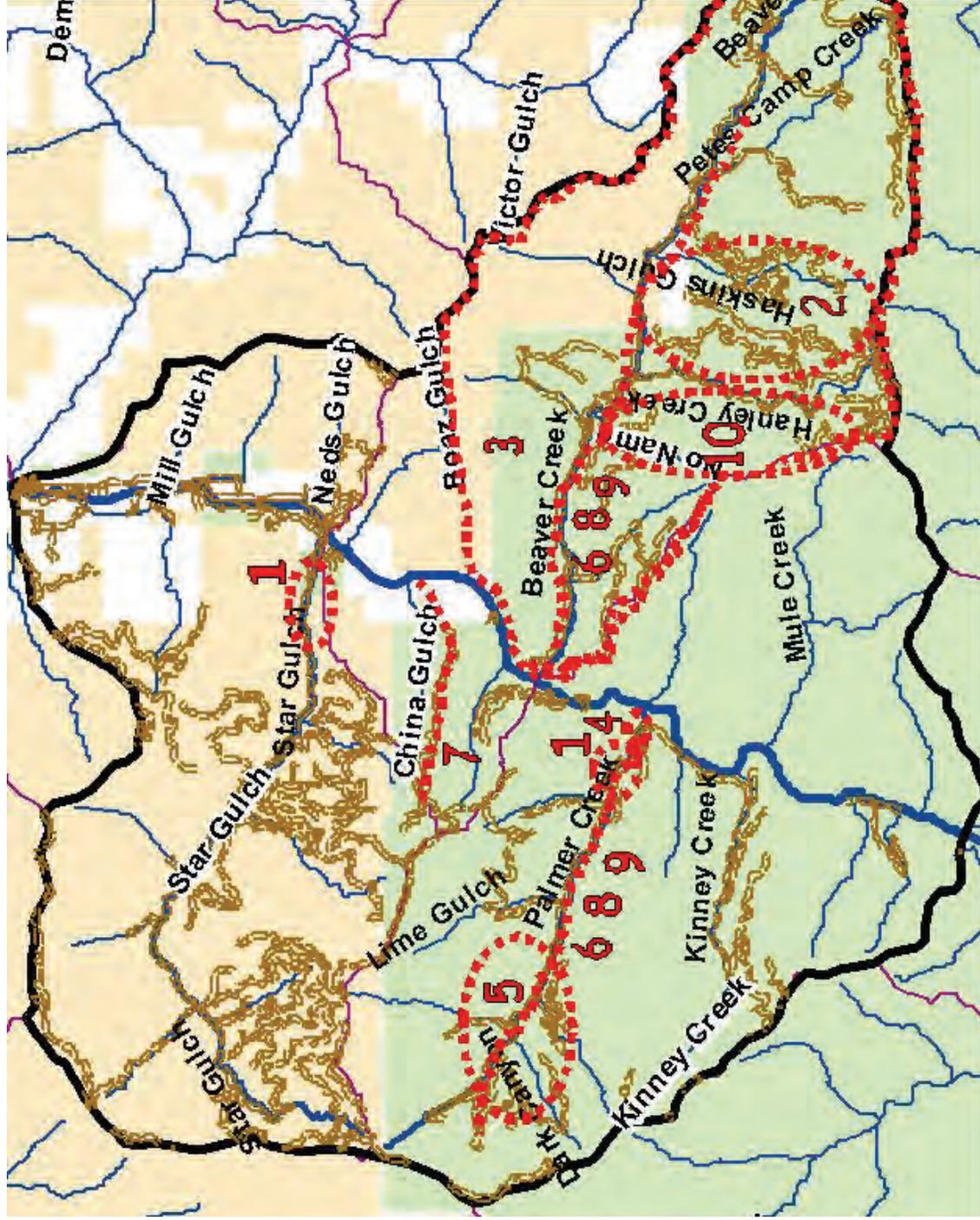
V. Restoration Priority Table and Map

Table 1. Proposed Aquatic - Active Restoration Activities on NFSL

Overall 5th Field Priority	Limiting Factors	Project Area	Existing Condition	Aquatic Health Risk	Proposed Restoration	Estimated Cost	Years to Recovery
1	Fish Habitat	Palmer Creek (adj. to FSR 1095-300) and Star Gulch (NFSL)	Historic mining site and low water ford that has altered the stream channel	<ul style="list-style-type: none"> Loss of fish habitat & outmigration due to subsurface flow. Unstable streambanks; Stream heating from excessive channel width and water withdrawal 	<ul style="list-style-type: none"> Restore channel/ bank configuration 	\$80,000 Palmer Ck, \$90,000 Star Gulch = \$170,000	5 years to recovery after treatment
2	Water Quality	Beaver Creek (Haskins Gulch est. 2-4 miles)	High Road Density	<ul style="list-style-type: none"> Degradation of Habitat from sediment 	<ul style="list-style-type: none"> Refine with field surveys Decommission and stabilize roads and/or improve road surface 	\$36,000/mile (est. 4 miles - \$144,000)	5
3	Water Quality	Beaver Creek	Unidentified sediment sources	<ul style="list-style-type: none"> Degradation of habitat from sediment 	<ul style="list-style-type: none"> Identify and repair sediment producing sites 	\$36,000/ mile (estimated 6 miles = \$216,000)	5
4	Fish Habitat	Palmer	Water Diversion	<ul style="list-style-type: none"> Partial fish barrier during spawning. Barrier during low flows 	<ul style="list-style-type: none"> Work with private landowner and OWT for possible water transfer to Applegate River and remove water diversion and existing fish screen Or...Replace water diversion with fish friendly diversion. 	\$12,000	Following spawning season after treatment
5	Water Quality	Palmer	Illegal mining violations	<ul style="list-style-type: none"> Degradation of streambanks and habitat from sediment 	<ul style="list-style-type: none"> Monitor and enforce illegal mining violations Require miners to submit a plan of operation 	\$1,600/year for 1st year, \$750 per year for 4 years = \$4,600	5

Overall 5th Field Priority	Limiting Factors	Project Area	Existing Condition	Aquatic Health Risk	Proposed Restoration	Estimated Cost	Years to Recovery
6	Fish Habitat	<i>Coho critical habitat</i> Star Gulch Palmer <i>Steelhead habitat</i> Beaver and Palmer	Lack of instream large wood	<ul style="list-style-type: none"> Lack of fish habitat diversity Loss of hiding cover Loss of pool forming structure Loss of sediment storage capacity 	<ul style="list-style-type: none"> Instream large wood placement 	Coho Habitat Star Gulch (\$65,000), Palmer (\$100,000), Steelhead Habitat Beaver (\$100,000), Palmer (\$100,000) = \$440,000	5 years or after a major storm event
7	Water Quality	China Gulch	Road gulying on closed road	<ul style="list-style-type: none"> Degradation of downstream habitat from sediment 	<ul style="list-style-type: none"> Repair closed road 	\$36,000/mile; est. 2 miles = \$72,000	7
8	Riparian	Coho critical habitat, than steelhead habitat Beaver Palmer	Riparian Reserves in poor vegetation condition	<ul style="list-style-type: none"> Slows recovery of developing future large wood recruitment Increased likelihood of stand replacement fire 	<ul style="list-style-type: none"> Reduce vegetation density by thinning Clear under story vegetation Limb up 8 feet Prescribed burning 	Range of \$50,000-\$200,000 within each 6th field watershed (maximum, 3 sub-watersheds @ \$600,000)	50 years after treatment
9	Riparian	Beaver, Palmer, Star Gulch, and Applegate River within coho critical habitat, than steelhead habitat	Encroachment on native species	<ul style="list-style-type: none"> Prevent new growth of trees (future large wood recruitment) 	<ul style="list-style-type: none"> Remove nonnative species blackberries 	\$10,000 over a 5 year period for coho and similar for steelhead habitat = \$50,000	5 years. Treat periodically after 5 years, when needed.
10	Water Quality	Hanley Gulch	High road density	<ul style="list-style-type: none"> Degradation of habitat from sediment 	<ul style="list-style-type: none"> Decommission roads 	\$36,000/mile; est. 3 miles = \$108,000	5
TOTAL						\$1,816,600	

Figure 4. Proposed Aquatic -Active Restoration Activities on NFSL (priority numbers from Table 6 coincides with numbers below)



VI. Restoration Monitoring Measures

Table 2 Proposed Aquatic Monitoring for Active Restoration on NFSL

Project / Activity	Parameters to be Monitored	How will they Be monitored?	Frequency	Approximate Cost	Resource	Opportunities for monitoring integration
Restore channel and surface flow in Palmer Creek and Star Gulch	Number of linear feet of stream channel in Palmer Creek and Star Gulch where surface flow is restored during the period of fish outmigration.	Fish bio and hydrologist WI T Database	Post project	\$1,800	Aquatic	
Decommission/stabilize roads and surface erosion and mining violations	Number of miles of road or acres of sediment sources stabilized to prevent sediment delivery to the stream system.	Engineering and hydrology INFRA Database	Annually	\$900/yr for 6 years = \$5,400	Aquatic	
Removal/replacement of partial fish barriers in Palmer Creek	Number of miles of habitat opened to year-round fish migration by repair of human-caused partial or total barriers to fish migration.	Fish biologist WI T Database	Post project	\$900	Aquatic	
Instream large wood placement (all subwatersheds)	Miles of fish-bearing streams of large wood replacement to enhance and rehabilitate to move the habitat toward reference conditions	Fish biologist WI T Database	Annually	\$900/yr for 6 years = \$5,400	Aquatic	
Riparian thinning and prescribed burning (all subwatersheds)	Acres of riparian area receiving treatments to promote future large wood recruitment and reduce fire hazard.	Fish bio and hydrologist WI T Database	Annually	\$900/yr for 4 years = \$3,600	Aquatic	Fire Fuels, Forest Health, Terrestrial Wildlife

Appendices

Removed August 17, 2007

Literature Cited

D'Aoust, S. D. 2000. *To ballast or not to ballast*. Streamline 5(3): 1-2.\

[ODF and ODFW] Oregon Department of Forestry and Oregon Department of Fish and Wildlife. 1995. *A guide to placing large wood in streams*. Available from Oregon Department of Fish and Wildlife, 3406 Cherry St NE, Salem, OR 97303.

ODFW, Budziak, Personnel communication, 1992.

ONHIC 2004. (http://oregonstate.edu/ornhic/2004_t&e_book.pdf).

{ODEQ} Oregon Department of Environmental Quality, 2003. *Applegate Subbasin Total Maximum Daily Loads*, Medford, Oregon.

Rodgers, J.D. 2000. *Abundance of Juvenile Coho Salmon in Oregon Coastal Streams, 1998 and 1999*. Monitoring Program Report number OPSW-ODFW-2000-1, Oregon Department of Fish and Wildlife, Portland, Oregon

Tioga Resources, Nawa, Richard K. 1999. *1998 Beaver Creek Level II Stream Survey for Rogue River-Siskiyou National Forest*, Applegate Ranger District, Jacksonville,, Oregon.

Tioga Resources, Nawa, Richard K. 2001. *2000 Palmer Creek Level II Stream Survey for Rogue River-Siskiyou National Forest*, Applegate Ranger District, Jacksonville, Oregon.

USDA Forest Service, Regional Office. 1999. *Region 6 Regional Sensitive Species List*, Portland Oregon.

USDA Forest Service, Rogue River-Siskiyou National Forest. 1990. *1990 Beaver Creek Level II Stream Survey*, Applegate Ranger District, Jacksonville, Oregon.

USDA Forest Service, Rogue River-Siskiyou National Forest. 1990. *1990 Palmer Creek Level II Stream Survey*, Applegate Ranger District, Jacksonville, Oregon.

USDA Forest Service, Rogue River-Siskiyou National Forest. 1994. *Beaver Palmer Watershed Analysis*, Applegate Ranger District, Jacksonville, Oregon.

USDA Forest Service, Rogue River-Siskiyou National Forest. 1998. *1998 Palmer Creek Level II Stream Survey*, Applegate Ranger District, Jacksonville, Oregon.

USDA, Forest Service. Rogue River-Siskiyou National Forest, Reid, I. 2004. *Beaver Creek structure monitoring case study final report*. Submitted to San Dimas Technology and Development Center, USDA Forest Service. Applegate Ranger District, 6941 Upper Applegate Rd., Jacksonville, OR 97530. 16 p.

USDA, Forest Service, Rogue River-Siskiyou National Forest, Reid, I. 2005. *Steelhead and coho salmon spawning abundance data*. Applegate Ranger District, 6941 Upper Applegate Rd., Jacksonville, OR 97530.

USDA Forest Service and USDI Bureau of Land Management, 1995. *Applegate River Watershed Assessment*. Applegate Ranger District, Jacksonville, Oregon.

USDI Bureau of Land Management and USDA Forest Service. January 2005. *Water Quality Restoration Plan. Southern Oregon Coastal Basin*, Applegate Subbasin. January 2005. 59 pg., Medford, Oregon

USDI , Bureau of Land Management, Medford District, Ashland Resource Area. 2001 and 2004. Unpublished data, *Coho Salmon Spawning Surveys*. Medford, Oregon

USDI , Bureau of Land Management, Medford District, Ashland Resource Area. 2005. Unpublished data, *Juvenile Coho Snorkels Surveys*. Medford, Oregon

USDI , Bureau of Land Management, Medford District, Ashland Resource Area. 2005. Unpublished data, *Steelhead Spawning Surveys*. Medford, Oregon