United States Department of Agriculture
Forest Service
Pacific Northwest Region

FY 2010 Legacy Roads and Trails Accomplishment Report

Restoring Priority Watersheds

Road Decommissioning
Colville National Forest, Washington

Cover photos: Road Decommissioning Project on Colville National Forest, Washington

Report photos supplied by: Dave Heller, Bruce McCammon, David Saiget, , Upper Columbia Salmon Recovery Board and Partners, USDA Forest Service

Executive Summary

In 2010, the USDA Forest Service (FS) implemented the largest watershed restoration program in the Pacific Northwest Region in more than a decade. A significant portion of this program was supported by the Region's $20.2 million of Legacy Roads and Trails (LRT) funding. LRT-funded projects made major contributions toward completion of watershed-scale restoration in priority areas across the Region. LRT projects, along with other restoration and infrastructure work, improve water quality and aquatic habitat while making transportation systems safer, more sustainable, and more durable. The FY 2010 LRT program was successfully delivered on time and within budget. Program efficiency and effectiveness were increased through strategic planning and the application of lessons learned from prior years. Community involvement and partnerships continued to play major roles in successful implementation of LRT projects. Of the total LRT funding to the Region, 36% supported work on Washington forests (with 24% of the regional road mileage) and 64% went to Oregon forests (with 76% of the road mileage).

2010 Accomplishments

	OREGON	WASHINGTON	TOTAL
Road Decommissioning	222 Miles	42 Miles	264 Miles
Road Stormproofing/ Maintenance	598 Miles	788 Miles	1,386 Miles
Trail Maintenance/ Repair	1 Mile	2 Miles	3 Miles
Fish Passage Restoration	9 Sites (48.0 miles accessed)	5 Sites (12.2 miles accessed)	14 Sites (60.2 miles accessed)
Effectiveness Monitoring (2008-2010)	36 Sites	15 Sites	51 Sites

PROGRAM HIGHLIGHTS

- *Implementation of multi-year project selection that facilitates larger and more complex projects and improves coordination with partners.*
- *Completion of integrated restoration work at the watershed scale.*
- *Improved linkage of LRT restoration work with recovery plans for water quality and ESA-listed fish.*
- *More effective project design and implementation through application of "lessons learned".*
- *Initiation of Travel Analysis to identify the road system that meets access needs and is environmentally and financially sustainable.*

Background

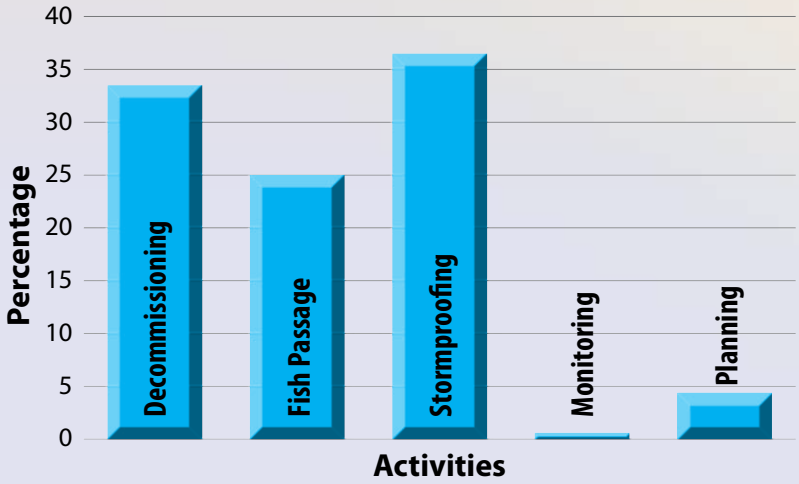
Deterioration of the Region's road and trail systems affects user safety and threatens environmental quality and effective forest management. More than 80% of the current road system was designed and constructed before 1980 to meet management objectives and environmental requirements, which have changed significantly. There are currently 90,600 miles of National Forest System roads in the Pacific Northwest Region. Of this total, 24% are in Washington and 76% in Oregon. In addition, there are 23,400 miles of system trails, of which 40% are in Washington and 60% in Oregon.

Legacy Roads and Trails (LRT) is an essential component of the Forest Service's renewed emphasis on forest and watershed restoration. Its focus is to make the Forest Service (FS) transportation network more responsive to today's environmental and access needs. LRT funding has enabled road and trail restoration activities including decommissioning, storm damage risk reduction (SDRR, also called stormproofing), maintenance repairs, fish passage restoration, project planning, and monitoring. Travel Analysis, a process to help identify a transportation system that better meets future management, resource, and funding needs, was initiated in FY 2010.

FY 2010 Funding by State

The Pacific Northwest Region (Region) received $20.2 million in FY 2010. Washington Forests received $7.9 million and Oregon Forests received $12.3 million. The Region continues to use its Aquatic Restoration Strategy (ARS) to guide allocation of these funds. This ensures completion of the most important work in the highest priority watersheds and helps to achieve the most efficient and effective use of funding

Funding by Road/Trail Restoration Activity Type



A mix of road restoration activities are used in the LRT program. These are carefully selected to respond to restoration needs and long term road management objectives.

Accomplishments

Benefits from the FY 2010 LRT program include cleaner water, improved fish habitat, a more sustainable road system, and jobs for local communities. A very ambitious program of work was organized and delivered on time and within budget. Important progress was made in reducing road and trail maintenance needs. There were also important contributions toward completion of watershed and aquatic restoration work for Priority Watersheds identified in the Region's Aquatic Restoration Strategy. Besides these impressive project accomplishments, Transportation Analysis techniques, critical in helping to identify future road system needs, were developed and applied on 9 National Forests. Effectiveness monitoring of projects designed to reduce erosion and sediment delivery and to restore fish passage continued.

LRT Accomplishments: FY 2010 and Cumulative FY 2008 – FY 2010

TREATMENT TYPE	FY 2010	FY 2008-2010
Road Stormproofing and/or Maintenance	**1,385 miles**	3,126 miles
Road Decommissioning	**265 miles**	571 miles
Trail Stormproofing and/or Maintenance	**3 miles**	226 miles
Fish Passage Restoration	**14 crossings**	44 crossings

LRT Outcomes: FY 2010 and Cumulative FY 2008-2010

OUTCOME	FY 2010	FY 2008-2010
Miles of Stream Accessed	**60**	208
Acres of Watershed Restored	**1,666**	4,816
Number of Jobs Created[1]	**323-485**	613-919
Reduced Annual Road and Trail Maintenance ($$/Year)[2]	**$174,000**	$592,700

[1]Numbers of jobs estimated using conversions in Nielsen-Pincus and Mosely, 2010. Economic and Employment Impacts of Forest and Watershed Restoration in Oregon. U of Oregon. Eugene, OR. 28pp
[2]Estimates from Regional Office Engineering.

Program Highlights

There were many achievements in the 2010 LRT program of work. The following deserve special attention.

Implementation of Multi-year Projects

Beginning in FY 2010, Forests were encouraged to develop and submit project proposals covering up to three years of project work for a given area. This was done to help provide a more even and predictable flow of work. Major benefits of this approach include improved flexibility to integrate road restoration with other restoration activities, more time to design and complete complex projects often not addressed with single-year funding, and better coordination and leveraging of funds with partners. The majority of FY 2010 projects were selected for multi-year funding.

Integrated Restoration at the Watershed Scale

Major progress is being made to complete watershed and aquatic restoration in Priority Watersheds. Integration of road restoration with other restoration activities is important for the most effective results. Since road-related treatments are often the single largest restoration need, completion of LRT projects is making an important contribution to long term, whole watershed restoration. Guided by the Region's Aquatic Restoration Strategy, work is being focused in Priority Watersheds and targeted on those actions identified as the highest priority for the restoration of aquatic resources. Partnerships play a critical role in completing restoration at the watershed scale. For many watersheds, restoration is needed on a mix of land ownerships. Without help from landowners and other partners, completion of this work would not be possible. In FY 2010, all priority road work was completed in 3 watersheds. Continued LRT funding will play a significant role in the completion of additional watersheds.

Improved Coordination of Restoration Work

Over the last 5 years, there has been improved coordination in the completion of Watershed Action Plans (WAP). These identify priority restoration activities, estimate costs, and develop initial schedules for project implementation. Effective coordination integrates key watershed restoration needs with objectives for Endangered Species Act and Clean Water Act recovery plans. Currently, 18 WAPs have been completed and more than 30 are in progress. This will continue to facilitate strong integration of Forest Service plans with the restoration needs identified by partners and other agencies and organizations.

More Effective Project Design and Implementation

FY 2010 marked the third year of LRT funding. From the start, there has been an emphasis on learning from experience and applying the "lessons learned" to improve work. Field reviews and project monitoring have been major contributors to this. Some improvements include adjustments in the design of road treatments to best meet resource and access objectives at the least cost, improvements in contract language to more clearly define work objectives and outcomes, more efficient dewatering techniques for fish passage projects, better methods for post-project erosion control and re-vegetation, and improved design of road drainage structures. The Pacific Northwest Regional Office is currently developing the Regional Guide for Road Treatments. This guide will be used to increase a road's resilience to storms, reducing the risk of storm damage (stormproofing).

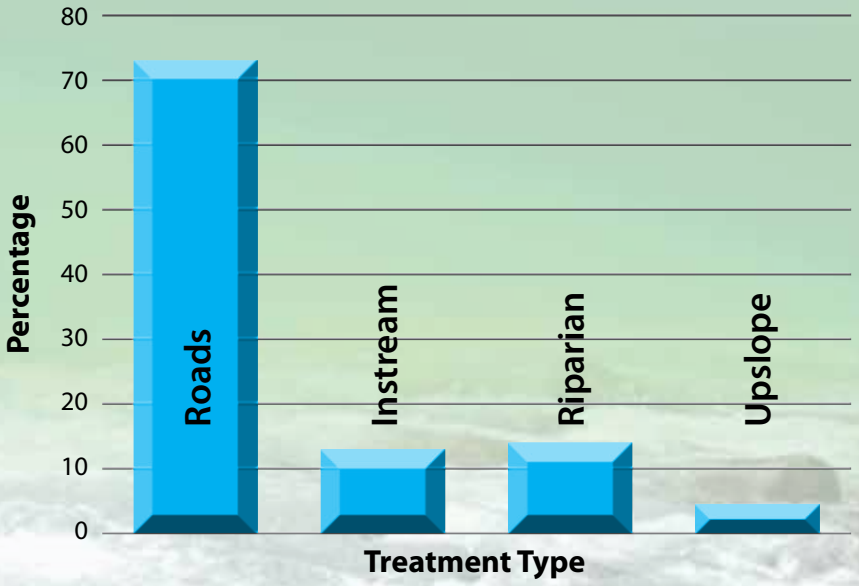
FEATURED

Lower Chewuch River

Forest/State:	Okanogan-Wenatchee NF, Washington
Major Partners:	Yakama Indian Nation, Bureau of Reclamation, Methow Salmon Recovery Foundation, Trout Unlimited, Okanogan County Conservation District, The Wilderness Society
Road:	550 mile
Stream:	163 miles
Fish Bearing:	115 miles
Fish Species:	Salmon and steelhead, resident trout, char, lamprey, non-game fish species. ESA-listed: Chinook salmon, steelhead, and bull trout
Water Uses:	Cold water aquatic habitat, domestic, irrigation

This is a major tributary to the Methow River and provides critical habitat for 3 ESA-listed fish species. A variety of management activities (water withdrawal, timber harvest, roading, grazing, and recreation) affected water quality and aquatic habitat. Restoration began in the mid 1990's and a Watershed Action Plan was completed in 2009 to prioritize and integrate remaining restoration needs. Primary restoration objectives are to reduce sediment delivery to streams, increase the complexity of stream and floodplain habitat, reduce summer stream temperatures, and improve the condition and function of the riparian area. Recovery plans for ESA-listed fish are underway. A diverse and active group of partners has improved fish passage and stream flows in much of the lower watershed. The major remaining restoration needs are tied to the road system and completion of Travel Analysis.

Restoration Needs by Treatment Type



WATERSHED

20%
Completion of Priority Restoration Actions

Transportation Analysis began in 2010 and will help inform decisions on the minimum road system needed to meet future Forest and resource management objectives and will clarify future restoration needs. Many partners have assisted in initial road assessment work and will continue to be very active. Significant fish passage restoration, stream flow improvements, and channel restoration have been completed in the lower watershed by the Bureau of Reclamation, landowners, and numerous cooperators. In the last 10 years, partners have provided nearly 90% of the funding for priority restoration work. Fish passage has been restored to 30 miles of the main river, much of this downstream of the National Forest boundary.

FY 2010 and Total Work Completed[1]

TREATMENT	FY 2010	TOTAL
Road Decommissioning/Closure	**1 mile**	35 miles
Road Stormproofing/Maintenance	**138 miles**	343 miles
Fish Passage Restoration	—	6 sites (30 miles accessed)[2]
Trail Maintenance/Repair	—	45 miles
Stream Restoration	**2 miles**	6 miles
Watershed Restoration	**5 acres**	15 acres
Jobs Created[3]	**2-3 jobs**	123-185 jobs[4]

[1] Work completed since 2001
[2] Includes passage restoration for 4 sites within and 2 sites downstream of National Forest boundary
[3] Nielsen-Pincus and Moseley. 2010. Economic and Employment Impacts of Forest and Watershed Restoration in Oregon. University of Oregon. Eugene, OR. 28pp.
[4] Includes: 112-168 jobs generated by restoration downstream of NFS lands by partner groups.

Before & After

A variety of road restoration treatments were completed in 2010, reducing road-related erosion and sediment delivery to streams. One mile of road was decommissioned and stormproofing treatments were completed on 138 miles of road. The stormproofing work was designed to provide more efficient road drainage, especially during major storm events. It included re-shaping the road surface, installation of 636 drainage dips, replacement/reconditioning of 520 culverts, and 40 miles of ditch cleaning.

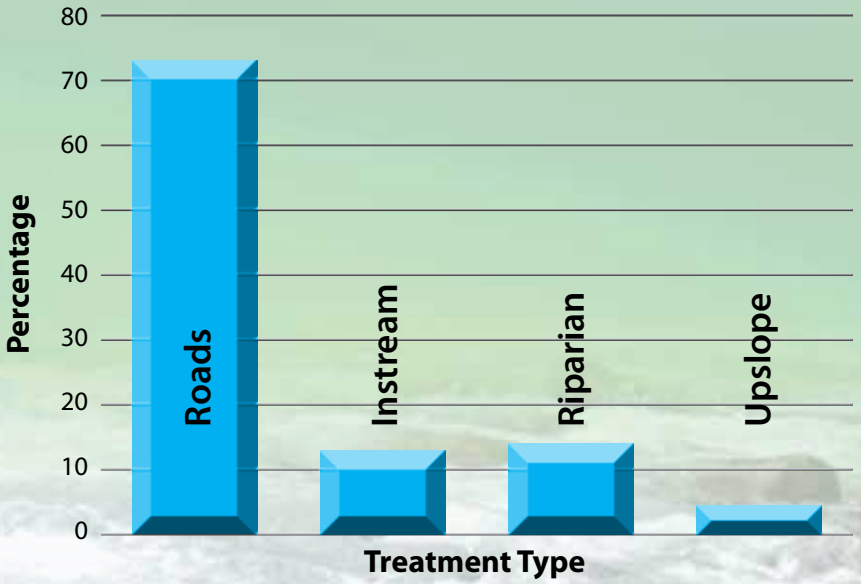
FEATURED

Upper Applegate River

The Applegate River is a major tributary to the upper Rogue River. Its waters provide important cold water habitat for fish and other aquatic resources, as well as flows for irrigation and domestic use. A variety of activities including roading, timber harvest, agriculture, and an upstream flood-control project all affect watershed and aquatic habitat conditions. Restoration is focusing on reducing sediment delivery to streams, lowering summer stream temperatures, improving riparian vegetation, and increasing the complexity of the aquatic habitat. A Water Quality Restoration Plan was completed in 2005 and a coho salmon recovery plan is in progress. A very active watershed council and numerous other partners continue to work cooperatively toward completion of restoration in this watershed.

Forest/State:	Rogue River-Siskyou NF, Oregon
Major Partners:	BLM-Medford District, Applegate Partnership / Watershed Council, Oregon Department of Fish and Wildlife, Rogue-Umpqua Resource Advisory Council
Road:	84 miles
Stream:	82 miles
Fish Bearing:	44 miles
Fish Species:	Salmon and steelhead, resident trout, lamprey, non-game fish. ESA-listed: coho salmon
Water Uses:	Cold water habitat, irrigation, domestic use

Restoration Needs by Treatment Type



WATERSHED

90%
Completion of Priority Restoration Actions

Priority road restoration work was largely completed in 2010 with LRT funding. Initial restoration work began in 1994 following completion of a Watershed Analysis. Guided by the 2007 Watershed Action Plan, a variety of additional restoration work has been completed. FY 2010 project work included road decommissioning/closure/ stormproofing, strategic placement of large wood in major tributary streams, treatment of invasive plants, and thinning in riparian areas. A feasibility study on spawning gravel augmentation downstream of Applegate dam was initiated.

FY 2010 and Total Work Completed[1]

TREATMENT	FY 2010	TOTAL
Road Decommissioning/ Closure	**35 miles**	52 miles
Road Stormproofing/ Maintenance	**54 miles**	65 miles
Fish Passage Restoration	–	3 sites (3 miles accessed)
Trail Maintenance/Repair	–	–
Stream Restoration	**2 miles**	2 miles
Watershed Restoration	**60 acres**	60 acres
Jobs Created[2]	**38-57 jobs**	48-72 jobs

[1]Since completion of Watershed Action Plan in 2007
[2] Nielsen-Pincus and Moseley. 2010. Economic and Employment Impacts of Forest and Watershed Restoration in Oregon. University of Oregon. Eugene, OR. 28pp.

Before & After

Road restoration represents 73% of the total priority restoration needs for this watershed. Treatments, including decommissioning, fish passage restoration, and stormproofing, were completed in 2010. Stream restoration and riparian thinning were also implemented. To date, whole watershed restoration for aquatic and riparian resources is 90% complete.

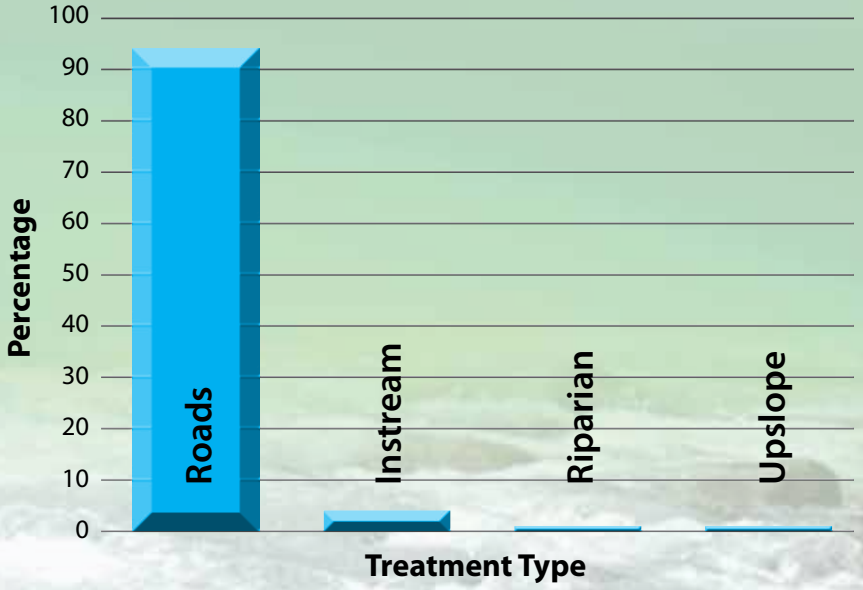
FEATURED

South Fork Skokomish River

Forest/State:	Olympic NF, Washington
Major Partners:	Skokomish Watershed Action Team (more than 2 dozen different groups), Skokomish Tribes, Washington Salmon Recovery Funding Board
Road:	193 miles
Stream:	234 miles
Fish Bearing:	65 miles
Fish Species:	Salmon and steelhead, resident trout, char, lamprey, non-game fish species. ESA-listed: Puget Sound Chinook, steelhead, bull trout, and Hood Canal chum
Water Uses:	Cold water aquatic habitat, domestic, agricultural use

The Skokomish River is the largest source of fresh water for Hood Canal, an arm of Puget Sound, and is the most frequently flooded river in Washington State. The South Fork Skokomish is a major tributary of the Skokomish River. This watershed has been extensively logged and there are farming and other land developments throughout the broad valley of the lower river. Initial restoration began in 1990's. In 2006, a major group of landowners, tribes, agencies, and conservation groups joined to form the Skokomish Watershed Action Team (SWAT). This group helped to complete the Skokomish Watershed Action Plan (2007). Primary restoration objectives include reducing the road system and associated sediment delivery to streams, improving the connectivity of stream and estuary habitat, and reducing summer stream temperatures. An ESA Recovery plan is completed for bull trout and one is in progress for Puget Sound Chinook salmon.

Restoration Needs by Treatment Type



WATERSHED

67%
Completion of Priority Restoration Actions

Cooperation and partnerships are drivers for restoration of this watershed. The 2007 Watershed Action Plan has provided a clear strategy for focusing the energy and enthusiasm of all involved. The Olympic NF has used a range of road restoration treatments, all designed to meet resource objectives while remaining cost effective. Restoration work is guided by a clear view of the road system needed to meet future uses. In FY 2010, large-scale stream and estuary restoration across land ownerships complimented the road-related restoration. Remaining restoration needs include road restoration and decommissioning, riparian forest thinning, and additional stream and estuary habitat improvements. To date, partners have contributed nearly $2 million of funding and in-kind services.

FY 2010 and Total Work Completed

TREATMENT	FY 2010	TOTAL
Road Decommissioning/Closure	**29.4 miles**	64.2 miles
Road Stormproofing/ Maintenance	**59.7 miles**	75.7 miles
Fish Passage Restoration	**1 site (0.5 miles accessed)**	1 site (0.5 miles accessed)
Trail Maintenance/Repair	**2.2 miles**	13.5 miles
Stream Restoration	**11 miles**	11 miles
Watershed Restoration	**132 acres**	132 acres
Jobs Created[1]	**58-86 jobs**	142-214 jobs[2]

[1] *Total work completed since 2005.*
[2] *Nielsen-Pincus and Moseley. 2010. Economic and Employment Impacts of Forest and Watershed Restoration in Oregon. University of Oregon. Eugene, OR. 28pp.*

Before & After

Improving fish passage and reducing road-related sediment inputs are important for restoring this watershed. A total of 140 miles of road have been treated. Additional restoration has focused on improving aquatic and estuarine habitat and increasing the growth and diversity of riparian vegetation. Cooperation and partnerships have been a driver of restoration in the Skokomish Watershed.

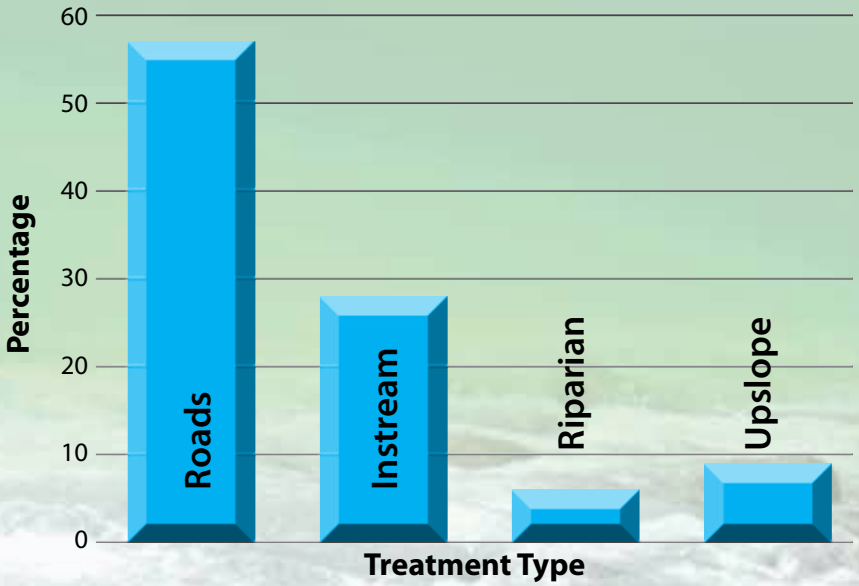
FEATURED

Boulder Creek

Boulder Creek is a major tributary to the South Umpqua River. Restoration needed for this watershed and its aquatic habitat is largely a consequence of roading and the removal of large wood from stream channels. Increased stream temperatures and aquatic habitat modification limit water quality in the stream. Restoration of the watershed started in 1992, Watershed Analysis was completed in 1997, and a Watershed Action Plan was finished in 2000. Major restoration objectives are to reduce/eliminate road impacts due to surface erosion and landslides, increase complexity of aquatic and riparian habitat, and reduce summer stream temperatures. A Water Quality Restoration Plan has been completed and the development of a recovery plan for ESA-listed coho salmon is underway. There continues to be strong community and partner support for completion of the remaining restoration work.

Forest/State:	Umpqua NF, Oregon
Major Partners:	Oregon Watershed Enhanced Board, South Umpqua Rural Community Partnership, Partnership of Umpqua Rivers
Road:	64 miles
Stream:	66 miles
Fish Bearing:	21 miles
Fish Species:	Salmon and steelhead, resident trout, lamprey, non-game fish species. ESA-listed: coho salmon.
Water Uses:	Cold water habitat, domestic, agricultural use

Restoration Needs by Treatment Type



WATERSHED

95%
Completion of Priority Restoration Actions

Legacy Roads and Trails has played a major role in the completion of critical restoration in this watershed. Work included road restoration and placement of over 1,700 pieces of large wood in the stream channel and floodplain. The response to the Tiller Complex fire in 2002 accelerated restoration work to address the increased erosion hazard following the fire. In FY 2010, the last major road restoration project was completed. Partners continue to play a key role in the success of whole watershed restoration. They have provided consistent cooperation, strong support, and nearly 15% of the total restoration funding.

FY 2010 and Total Work Completed[1]

TREATMENT	FY 2010	TOTAL
Road Decommissioning/Closure	**3.6 miles**	15.6 miles
Road Stormproofing/Maintenance	**12.8 miles**	16.5 miles
Fish Passage Restoration	—	2 sites (1 mile accessed)
Trail Maintenance/Repair	—	—
Stream Restoration	—	14.0 miles
Watershed Restoration	—	120 acres
Jobs Created	**3-5 jobs**	53-79 jobs[2]

[1]Total work completed since 2000
[2] Nielsen-Pincus and Moseley. 2010. Economic and Employment Impacts of Forest and Watershed Restoration in Oregon. University of Oregon. Eugene, OR. 28pp.

Before & After

A range of road restoration treatments was used to meet resource and transportation system objectives. Decommissioning and closure have reduced road densities from 4.5 to less than 2.0 miles/square mile. Additionally, fish passage was restored at 2 road-stream crossings and special wildlife forage seeding was applied on selected decommissioned roads. Other restoration included large wood additions to improve habitat on 14 miles of stream, riparian tree planting, and decompaction of erosion prone soils.

Effectiveness Monitoring

Erosion and Sediment-Delivery Reduction

Roads can be a significant major source of increased erosion and sediment delivery to streams. A principle objective of LRT is to reduce these impacts. Since 2008, the USDA Forest Service, Rocky Mountain Research Station, and Pacific Northwest Region have been monitoring the effectiveness of road decommissioning and stormproofing projects. Results of this monitoring will be used to ensure that the most effective project designs and treatments are used.

- ***Objectives:*** assess the effectiveness of road restoration treatments in reducing impacts and improve the future performance of road drainage systems.
- ***Accomplishments:*** pre-treatment assessment completed at 21 sites, post-treatment assessment at 18 sites, and post-storm assessment at 2 sites. These sites are located on 10 National Forests, 3 in Washington and 7 in Oregon.
- ***Findings:*** treatments appear effective in reducing most erosion and sediment delivery impacts and risks to aquatic ecosystems. There are some risks of redirecting drainage onto unstable areas and there is a need to develop refined treatment guidelines to minimize this.
- ***Application:*** results are being used to help develop road drainage guidelines in the Regional stormproofing handbook that is being developed.

Monitoring Sites for the effectiveness of Erosion/Sediment Delivery Reduction and Fish Passage Restoration

Fish Passage Restoration

Restoration of fish passage at road-stream crossings is critical for ensuring free movement of fish and other aquatic organisms to all parts of a watershed. The work is technically demanding and represents a large investment. Better understanding the effectiveness of current designs and installation techniques is important for continued success. This is a "pilot project" which was started in FY 2008.

- ***Objectives:*** evaluate effectiveness of passage restoration and develop a monitoring protocol for Regional use.
- ***Accomplishments:*** 29 sites have been evaluated with 22 of the sites located on 5 different Oregon Forests and 7 sites are on 2 Washington Forests.
- ***Findings:*** current designs and installation techniques are generally effective.
- ***Application:*** results are being used to improve the consistency of restored road-stream crossings performing like natural streams. This will ensure continued improvement in passage efficiency for fish and other aquatic organisms.

Travel Analysis

Each unit of the National Forest System (NFS) is to identify the minimum road system needed for safe and efficient travel and for the protection, management, and use of NFS lands. This system will be identified based on the results of Travel Analysis (TA). This process evaluates the need for access and the environmental risks and financial costs associated with that access. Completion of TA will inform future decisions critical to completing whole watershed restoration and developing a road system that is appropriately-sized, environmentally and financially sustainable, and responsive to ecological, economic, and social concerns. The Region began this process on 9 National Forests in 2010 and expects to complete it on all 17 National Forests by 2015.

Partnerships

The successful restoration of whole watersheds relies on partnerships and cooperation with a wide range of stakeholders. Partnerships not only provide valuable resources (technical skills, labor, local historic knowledge, and funding), they are essential for completing work on areas outside of Forest boundaries. Partners include federal, state, and county agencies, Tribal governments, communities, landowners, and a variety of non-governmental organizations. Partnerships such as the Whole Watershed Joint Venture and the Washington Watershed Restoration Initiative function at a Regional scale and include a mix of agencies and interest groups. Over the three years of Legacy Roads and Trails, the number and effectiveness of partners has increased steadily. Their assistance, support, and encouragement helped to make the 2010 program a success and are greatly appreciated.

Looking Ahead

Implementation of Legacy Roads and Trails will continue to improve. Ongoing application of "lessons learned" and monitoring results will increase project effectiveness and efficiency. Continued strengthening and development of existing and new partnerships will increase community ownership and support for this work. Transportation Analysis will guide future work to develop a sustainable road system. Refinements in the Aquatic Restoration Strategy will help to ensure funding and activities are fully integrated and that the most important work in Priority Watersheds is completed efficiently. This will continue to create jobs for local contractors and provide significant benefits to local communities and the environment.

Your interest in this important work is appreciated. If you have questions or would like additional information regarding Legacy Roads and Trails, please feel free to contact:

-Brian Staab, Regional Hydrologist, Natural Resources Department, (503) 808-2694.

-Jim Capurso, Regional Fisheries Program Leader, Natural Resources Department, (503) 808-2847.

-Sandra Wilson Musser, Regional Geotechnical Services, Engineering Department, (503) 808-2738.

-Rick Collins, Transportation Operations and Maintenance, Engineeering Department, (503) 808-2512.

-Gail Throop, Regional Trails and Travel Management, Recreation Department, (503) 808-2443.

"From our roadways to our waterways, partnerships are a centerpiece of Oregon's approach to watershed restoration across public-private boundaries."

Ken Bierly
Deputy Director,
Oregon Watershed Enhancement Board (OWEB)