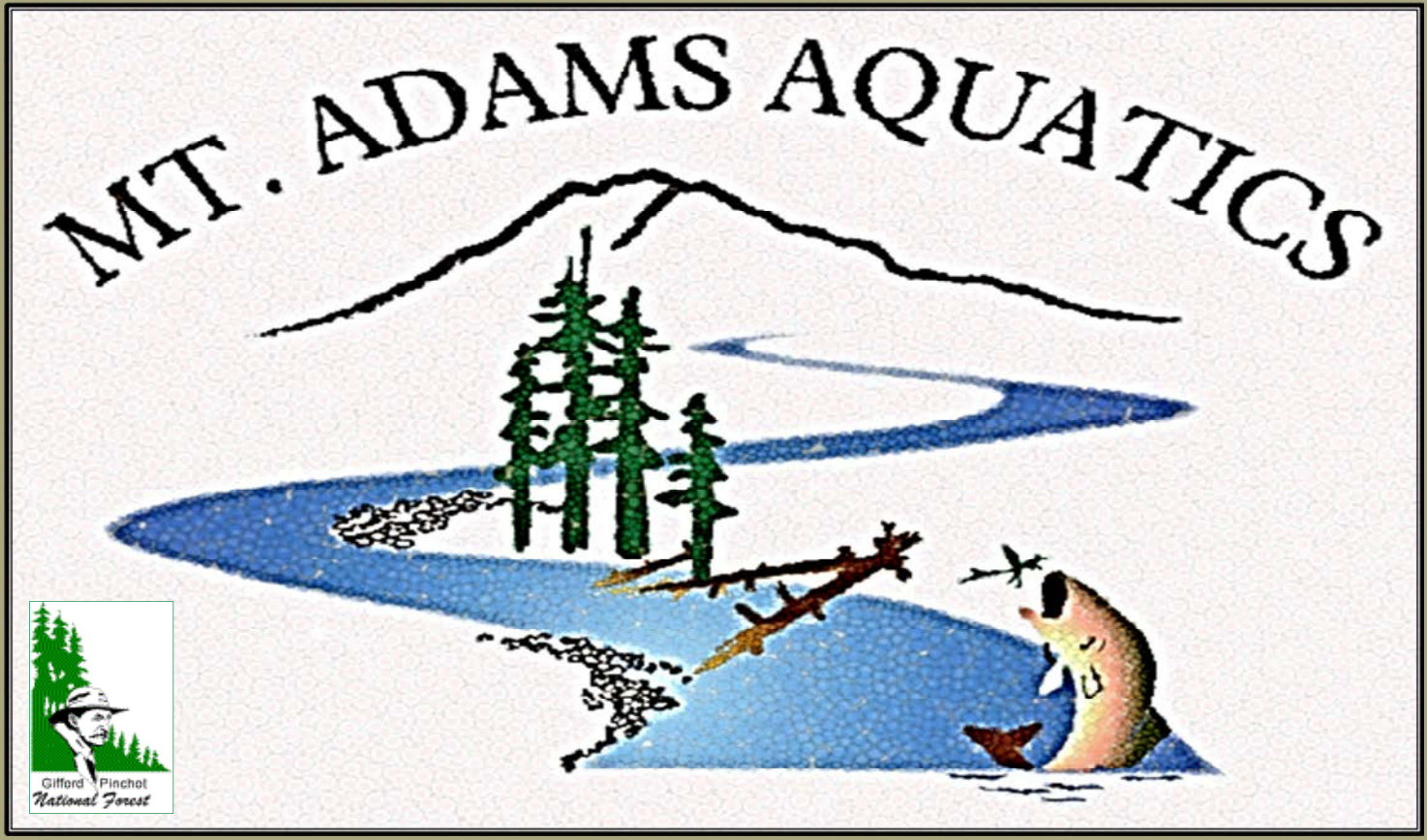
Fiscal Year 2011 Accomplishment Report



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This report summarizes accomplishments of the Mt. Adams Ranger District Aquatics Program for fiscal year 2011. We've organized this report to provide some basic information about our program focus and scope, starting with this abstract. We then list, by major program area, the projects we've worked on this year. Following that are a few highlighted projects that illustrate in more detail some important work that the Mt. Adams Aquatics Program has led this year.

In a nutshell, our main efforts this year went to:

PROGRAM MANAGEMENT:

- Continuing to ramp down agreements with partners and complete work associated with the ***Hemlock Dam Removal Project***. Planned completion of the monitoring and site rehabilitation work in FY 2012.

HABITAT RESTORATION--IMPLEMENTATION

- ***Upper Wind River Road Decommission***--completed this project which included the removal of 3 miles of Forest Service roads from high aquatic risk locations and the elimination of three fish passage barriers on two streams. This project opened up an additional 2.5 river miles of habitat for ESA-listed (*threatened*) Lower Columbia River steelhead trout.

HABITAT RESTORATION—PLANNING

- ***Martha Creek Dam Removal***--completed the EA and the ESA consultation with NOAA. Implementation is planned for summer 2012.
- ***Layout Creek Culvert Upgrade Project***--completed hydrology and fisheries field surveys for this fish passage improvement project that is scheduled for implementation in FY 2013-14.

HABITAT MONITORING

- ***Hemlock Dam Removal monitoring***--completed year two of post-project monitoring for a range of biological and physical parameters. The site is performing well and riparian vegetation is growing rapidly. natural escapement of summer steelhead to the Wind River and Trout Creek in 2011 was the highest on record (1989 is the first year for which WDFW has this monitoring data available).

ENIVRONMENTAL EDUCATION

- ***Fish Education Day at Trout Lake***--the ranger district hosted this event that encourages youth to practice responsible resource stewardship and to get outdoors and have fun fishing. We were supported by over 50 volunteers and organizations who contributed to this educational event. Over 300 kids aged 12 and under, approximately 300 more kids aged 13-18, plus their families enjoyed the day.
- ***Water Jam at Mid-Columbia River Gorge***--We provided support and staffing to this environmental education event that is held annually in the gorge. Water Jam is hosted each year by approximately fifteen federal, state, tribal, county, and non-profit organizations who use games and storytelling to teach kids about salmonids, wildlife, Native American culture, and more. Over 400 kids in 4th-6th grade from 10 different schools in the Columbia River Gorge participated in this event.

SUPPORT TO OTHER FOREST SERVICE PROGRAMS AND PROJECTS

- ***Timber sale planning***--completed initial fieldwork for the approximately 5000 acre Coyote Thin Sale and identified aquatic habitat restoration opportunities in the project area.

SUPPORT TO EXTERNAL PARTNERS

- ***Condit Dam Removal***--worked with US Fish and Wildlife Service and other federal, state, and tribal agencies to monitor listed salmonids during the pre-implementation phase, salvage and transport salmonids in the 3 miles below the dam, and plan the monitoring efforts for the post-dam removal phase.

Mt Adams Aquatics Program Philosophy:

- *With limited budgets, emphasize developing and maintaining partnerships with other FS program areas and external organizations to leverage funding.*

- *Improving our understanding of aquatic resources requires constant learning by testing, quantifying, experimenting.*

- *Education and advocacy for aquatic resources are critical to achieving longlasting improvements and to developing a shared appreciation for the importance of forest aquatic systems.*

- *On the ground, our focus is on protection of existing habitats and restoration of those that have been lost due to physical blockages or degradation.*

- *The Wind River is our focal watershed and we also cover the White Salmon River and Little White Salmon River 5th-field watersheds.*

2011 Highlights

- *2-person permanent staff covering watershed and fisheries resources*
- *1 engineering technician (STEP program) providing technical support*
- *Over 30% of funding for 2011 staff salary provided by partner contributions*
- *Over $100,000 in partnership funds used on-the-ground this year to accomplish priority NEPA, ESA, monitoring and habitat implementation*

Summary of 2011 work:

Active Restoration Project Partnerships in 2011 and Related FS Accomplishments

Partner	Habitat Restoration Project	Partner Funds Received for the Project	Activity and Accomplishment in 2011
Bonneville Power Administration	Hemlock Dam Removal	$2 million	Final report **completed**, (Agreement closed out)
Yakama Nation	Hemlock Dam Removal	$50,000	Final report **completed**, (Agreement closed out)
American Rivers/NOAA	Hemlock Dam Removal	$75,000	Final report **completed**, (Agreement closed out)
Salmon Recovery Funding Board	Hemlock Dam Removal	$246,000	Agreement **extended** (for final site rehab)
US Fish and Wildlife Service	Hemlock Dam Removal	$250,000	Agreement **extended** (site rehab and monitoring)
Bonneville Power Administration	Upper Wind River Road Decommission	$64,000	Project **completed** (described below)
FS Legacy Roads Program	Upper Wind River Road Decommission	$50,000	Project **completed** (described below)
Bonneville Power Administration	Martha Creek Dam Removal	$16,000	NEPA,ESA **completed**
Ecotrust/NOAA Fisheries	Martha Creek Dam Removal	$40,000	NEPA, ESA **completed**
Bonneville Power Administration	Layout/43 Road Culvert Upgrade	$12,000	NEPA, Designs **initiated**

Program Management in 2011

- Grants and agreements administration
- Watershed Condition Framework assessments
- Mt. Adams Collaborative Group support
- White Salmon River Watershed Management Committee & Technical Advisory Group support
- White Salmon Working Group support—fisheries work and monitoring associated with the Condit Dam Removal Project
- American Fisheries Society (National and Washington-British Columbia Chapter) support – *Nat'l AFS Conference*: presentation given, USFS recruitment at Student Career Fair, USFS outreach at Trade Show
  WA-BC Chapter: Newsletter Editor, assist Communications Officer, created printed program for annual conference

Internal Project Support and Involvement in 2011

- Coyote Thin Timber Sale--planning
- Bear Creek Thin Timber Sale--planning
- PepperCat Thin Timber Sale--planning and consultation
- Win Thin Timber Sale--implementation
- Cave Bear Collaborative Restoration--planning
- Mt. Adams Grazing Allotment --planning
- Falls Creek Trailhead--planning
- Fossil Creek Trail Ford Removal--planning
- GMS Dam Removal -- planning
- Wind River Mine Rehab --planning
- Nat'l Environmental Observatory Network (NEON) --planning
- Forest Road Maintenance review & consultation
- Invasive Plant Treatment review & consultation
- Special Use Permit reviews
- Support to District Civil Rights Program, Green Team, and Employee Association

Monitoring Activities in 2011

- Long-term water temperature monitoring—15 sites monitored District-wide
- Stream surveys (physical habitat parameters) at Trout Creek, including the Hemlock Dam project site
- Temperature and turbidity monitoring at Hemlock/Trout Creek
- Macroinvertebrate monitoring at Hemlock/Trout Creek
- Steelhead redd surveys at Hemlock/Trout Creek
- Fish presence, identification, and abundance at Upper Wind River road decommission sites
- Fish salvage and monitoring for Condit Dam Removal—support to White Salmon Working Group (USFWS, Yakama Nation, USGS, WDFW, PacifiCorp, NOAA, USFS)
- Wind River adult steelhead snorkel survey—support to WDFW

Support to External Partners in our Watersheds

- White Salmon River Watershed Management Committee meetings and Technical Advisory Group meetings
- White Salmon Steelheaders - Fish Education Day partner
- USGS, WDFW, USFWS, BPA, NOAA, Yakama Nation, PacifiCorp - White Salmon Working Group partners
- Environmental Education Program partners – Mid-Columbia Fisheries Enhancement Group, USGS, WDFW, USFWS, US Army Corps of Engineers, USFS-CRGNSA, NOAA, Skamania County, Klickitat County, Underwood Conservation District, Columbia Gorge Ecology Institute, Skamania County Youth for Success, Yakama Nation, 10 Columbia Gorge area elementary schools, 15 local-area businesses in Washington and Oregon

Environmental Education in 2011

- Fish Education Day
- Columbia Gorge Water Jam
- Hemlock Dam Project tours and presentations
- Wind River Middle School Monitoring Program at Hemlock/Trout Creek
- National Get Outdoors Day
- Kids Night Out in Nature presentation
- Environmental Education Program partners:
  - Mid-Columbia Fisheries Enhancement Group
  - USGS
  - WDFW
  - USFWS
  - US Army Corps of Engineers
  - USFS – CRGNSA
  - NOAA
  - Skamania County
  - Klickitat County
  - Underwood Conservation District
  - Columbia Gorge Ecology Institute
  - Skamania County Youth for Success
  - Yakama Nation
  - White Salmon Steelheaders
  - 10 Columbia Gorge area elementary schools
  - 15 local-area businesses in Washington and Oregon

Upper Wind River Road Decommission—Implementing Habitat Restoration

Background

This project decommissioned two roads in the vicinity of Oldman Pass in the upper Wind River watershed. The three miles of now-decommissioned road were constructed decades ago to support timber harvest in the area. The roads crossed several tributaries to the Wind River, the largest being Oldman and Youngman Creeks. The roads cross Oldman Creek once, Youngman Creek twice, and a major fork of Youngman Creek once.

Oldman Creek near Road 3056 crossing

Surveys of Oldman and Youngman Creeks in the past identified them as containing Lower Columbia River steelhead in addition to resident rainbow trout. While visual surveys conducted in spring 2010 identified several juvenile and adult rainbow trout (*Oncorhynchus mykiss)* in Oldman Creek, electrofishing surveys completed as part of this project in summer 2011 at and near the stream crossings on Oldman Creek and Youngman Creek tentatively identified: 1) juvenile *O. mykiss*, 2) juvenile cutthroat trout (*Oncorhynchus clarkii)*, and 3) possible rainbow/cutthroat trout hybrids. Because visual identification of juvenile-phase *O. mykiss, O. clarkii*, and hybrids are subject to error, and because we would like to determine the relationship between the sympatric rainbow trout and steelhead trout population within this watershed, we will be exploring the possibility of using otolith microchemistry and/or genetic comparisons in the near future.

Stream-form trout common to both Oldman and Youngman Creeks

Perched and undersized culvert outlet at Road 3056 crossing of Oldman Creek

The four culvert crossings on these perennial streams were undersized for the streams they served, and had outlets that were elevated above the stream, creating a waterfall at each culvert outlet. As a result, the culverts did not provide upstream passage for steelhead and other native fish.

In addition to blocking fish migration, Forest Road 3056 had drainage problems that for years caused large volumes of sediment to be

delivered to Oldman and Youngman Creeks through both chronic and episodic erosion processes.

USFS road survey records indicate that washouts and slumps along this road during the past two decades contributed hundreds of cubic yards of sediment to the aquatic environment.

Fillslope failure on Road 3056

Decommissioning these roads was intended to improve water quality in streams crossed by the roads and to restore upstream migration for fish and other aquatic organisms in Oldman and Youngman Creeks.

Implementation

Woodland Constructors, from Woodland, Washington was awarded the contract to complete this decommission project. The contractor began work on the project September 6, 2011, completed all instream work on September 30, and final erosion control work on October 10, 2011. Follow-up tree planting on the project was completed by October 25, 2011 by a private contractor, Rick Brandenberg of Carson, Washington, who has two decades of experience with riparian and upland tree planting for the USFS.

Over the one month period of work on the project, the contractor employed a total of three excavators, one dump truck, and a dozer (with operators for each) to complete the work. In addition to the equipment operators, they hired two laborers, and a larger labor crew to spread native grass seed and weed-free straw mulch on the disturbed project area.

Forest Service personnel met with the contractor prior to initiation of work activities to discuss the project, review contract requirements, and discuss work schedules. Once work began, FS personnel were on-site daily with the contractor to ensure compliance with contract requirements and to provide guidance where necessary on technical aspects of the work such as:

- Excavators were used to decompact and scarify the entire length of the road surface to a depth of 18 inches for the purpose of encouraging water infiltration and to facilitate revegetation of the highly compacted roadway.

- Waterbars were constructed along the roadway to ensure that any surface water reaching the scarified road surface would be routed downslope and off of the road to prevent gully erosion.

Excavator and dumptruck working to remove roadfill and culvert. Culvert inlet can be seen at lower right of photo.

- All culverts were removed to eliminate future risk of plugging and failure and to allow streams to be reconnected and reconstructed where they cross the road prism.

- Several thousand yards of earth fill that had been placed on top of and around the culverts was removed from the stream area. The removed fill was placed in stable locations elsewhere along the roadway where it was blended into the existing topography.

Decompaction of the roadbed to facilitate water infiltration and revegetation

- Streams that had been forced into undersized culverts were re-established to their full width and fish passage barriers that had been created by the culverts were removed.

- Woody debris was added to the reconstructed stream reaches and the slopes on either side to provide hydraulic diversity in the channels and cover on the slopes.

Excavators working in tandem to remove roadfill and culvert, and preparing to reconstruct Oldman Creek where it has been buried and forced through an undersized culvert on Road 3056. Culvert outlet can be seen at right side of the photo.

- An impassable berm was created at the entrance to each road to prevent any future vehicular travel on the decommissioned roads.After all heavy equipment work was completed, the entire project area was seeded using a locally collected and produced grass seed mix including: Blue Wildrye (*Elymus glaucus*), Slender Hairgrass (*Deschampsia elongatus*), and California Brome (*Bromus carinatus*).

- Following application of the grass seed, certified weed-free straw was applied to the entire project area to provide erosion control and a mulch to help protect the grass seed and promote vegetative growth.

- Beginning on October 17, 2011, trees were planted at all major stream crossings to accelerate revegetation and reforestation of those riparian sites. Trees were also planted along other areas of ground-disturbance, such as on the cut-slopes and along the newly-scarified road surface. Tree species used on the project included Western red cedar, Grand fir, Black cottonwood, and Willow. In addition to using local contractors for

labor, we also purchased our trees from local nurseries who collected the tree seed and hardwood clippings so the genetic integrity of the trees at this project site was maintained.

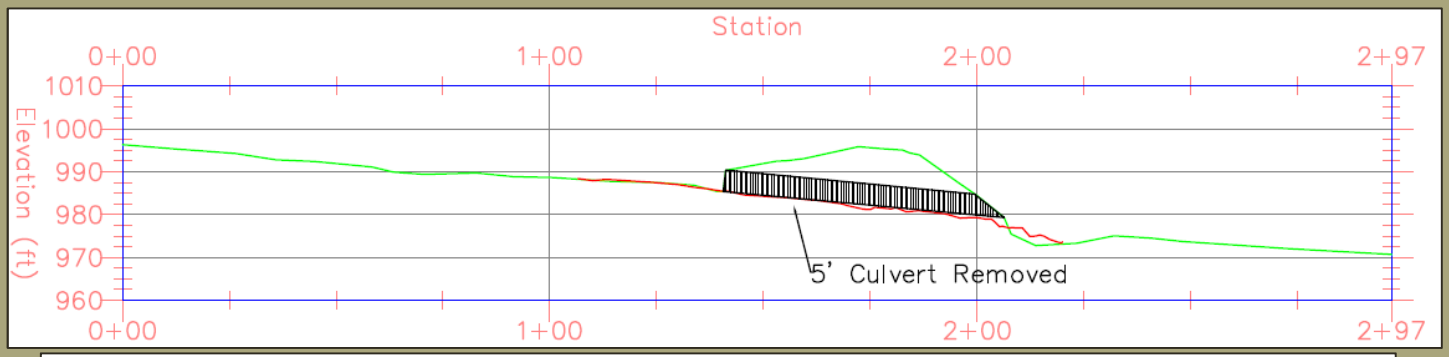
Post-project surveys and monitoring have been initiated but not yet completed. In October 2011, the Forest Service re-surveyed the main stream crossing sites to establish "as-built" conditions. These surveys confirm that the fish passage barriers that had been established at the culverts were no longer present, and that the channels were once again continuous and accessible by fish and other aquatic organisms.

"Before" photo taken of Oldman Creek where it necks down to enter a culvert on Road 30

For reference, note large moss-covered boulder which remains in place in both photos.

"After" photo taken of Oldman Creek at same location as previous figure. Road and culvert have been removed and the channel has been restored to its full cross sectional area by excavating and removing a large earth fill.

Straw mulch applied over the top of scarified road surface



Surveyed stream slope and topography at a culvert crossing before and after the project. Green line is the ground surface before the project, showing the large earth fill covering the culvert and stream area. Red line is the post-project ground surface/streambed after fill is removed. Note the difference in slope at the culvert outlet where the stream no longer has a free fall.

Topographic surveys of the channels will be repeated in summer 2012 to evaluate the performance of these newly reconstructed stream reaches after they have been exposed to one winter of increased streamflows. Fish identification and abundance monitoring will also be conducted in summer 2012, both upstream and downstream of the main culvert crossings on Youngman Creek and Oldman Creek, in order to measure the success of this fish passage and road decommissioning project.

Project Accounting

Project Partners:

- BPA
- Ecotrust
- NOAA Fish Restoration Center
- FS Legacy Roads

Project Cost:

- Partners = $64,000
- USFS = $50,000
- *Total Cost = $114,000*

Key Accomplishments:

- 2.9 miles of road decommissioned
- 31 culverts removed
- 4 perennial fish-bearing streams reconnected
- Estimated 5,000 yards of earth fill removed from active stream areas

Martha Creek Dam Removal—Planning for Habitat Restoration

Background

Martha Creek Dam is located at river mile 1.5 on Martha Creek, a tributary to Trout Creek, in the Wind River watershed. The dam is approximately 40 feet across by a maximum of seven feet high. It was constructed of concrete with steel reinforcement, and includes a water diversion structure.

Martha Creek Dam 2011

The dam was built in 1924 to serve as an intake for the Wind River Nursery water system. It continued to supply domestic water to the administrative site at least until 1948 and was abandoned in the 1950s.

Since its abandonment, the dam has continued to affect downstream movement of river rock and other materials. Currently the area upstream of the dam that once impounded water is full of coarse gravel and cobble material that has accumulated up to the elevation of the dam crest.

Martha Creek Dam pre-1990

The dam has also continued to form a passage barrier to aquatic organisms, including resident trout and ESA-listed Lower Columbia River (LCR) steelhead. In addition, Martha Creek is designated as Critical Habitat for LCR steelhead and provides high-quality spawning, rearing, and migratory habitat. In 2010, the Mt. Adams Ranger District began planning to remove the dam in order to re-open the upper reaches of this tributary to fish.

On February 15, 2011, the Ranger District released a preliminary Environmental Assessment for the Martha Creek Dam Removal project. The assessment provided an opportunity to share the project with the public, agencies, and organizations, as well as to solicit comments. The proposed action was to remove Martha Creek Dam by use of explosives.

Martha Creek immediately upstream of the dam

On February 28, 2011, the FS submitted a Fisheries Biological Assessment for the dam removal project and requested formal consultation with NOAA Fisheries under Section 7 of the Endangered Species Act. NOAA Fisheries responded with a Biological Opinion supporting the project on August 25, 2011.

Receipt of the Biological Opinion was a pre-requisite to the District Ranger being able to sign a Decision Notice on the project NEPA, as well as for acquiring the necessary permits for the project to be implemented. The decision and final permits are scheduled to be completed in spring and early summer of 2012.

The District began its preparation of the blasting plan for dam demolition and will be developing a contract to have materials and supplies brought into and out of the remote site by helicopter. A fish removal and water quality plan will be completed in early summer 2012, and USFS personnel will conduct a fish and amphibian removal effort prior to any instream work occurring. Dam removal is currently scheduled to occur in August 2012 and the actual removal is expected to be completed within a one week period.

Project Accounting

Project Partners:

- BPA
- Ecotrust
- NOAA Fish Restoration Center

Key Accomplishments:

- Completed an Environmental Assessment and all associated surveys and reports
- Completed required consultations for Heritage and ESA

To Be Done:

- Develop plans for fish removal, water monitoring and blasting
- Receive permits from US Army Corps of Engineers and Dept of Ecology
- Contract for helicopter services
- Prepare for and remove d an Environmental Assessment and all associated surveys and reports
- Completed required consultations for Heritage and ESA

Hemlock Dam Removal—Monitoring Habitat Restoration

Background

Hemlock Dam was a 26-foot tall concrete dam located on Trout Creek in the Wind River watershed. The Forest Service-owned dam was built in 1935 for hydropower production, was later retrofitted to provide irrigation storage, and by 1997 no longer served either purpose. Because the dam continued to affect water quality, habitat and passage for Lower Columbia River steelhead, the Mt Adams Ranger District removed the dam in 2009.

Methods

The Mt Adams District and Pacific Northwest Research Station began monitoring physical habitat parameters and macroinvertebrates in the vicinity of the dam prior to its removal, and are scheduled to continue annual monitoring through 2012. After the 2012 field season, monitoring will be significantly reduced and would occur at 3-5 year intervals. Washington Department of Fish and Wildlife and US Geological Survey have been monitoring adult steelhead returns to Trout Creek since the mid 1990's and have continued this work after dam removal.

Monitoring parameters include topographic surveys of the channel and floodplain, assessments of water temperature, turbidity, substrate, pools, instream wood, and macroinvertebrates. Figure 1 is a plan view of the project area showing locations of all fixed cross sections established for topographic monitoring, along with pebble count sites. Topographic surveys were completed for the entire site including upstream and downstream reaches of Trout Creek, and photo points were established around the perimeter of the former reservoir to provide a visual representation of the changes during and after the project occurred.

Monitoring Results

One of the best ways to visualize how the site has changed as a result of the project is through photopoint analysis. Several photopoints are located around the project area that allow us to see the same perspective year after year and to evaluate change through visual observations. Figure 2 includes photos taken from the County bridge looking upstream at the Hemlock project site at three points in time. The top photo is of the reservoir prior to project work; second is the new Trout Creek channel immediately after rewatering; and the third photo was taken one year after the project was completed from the same location.

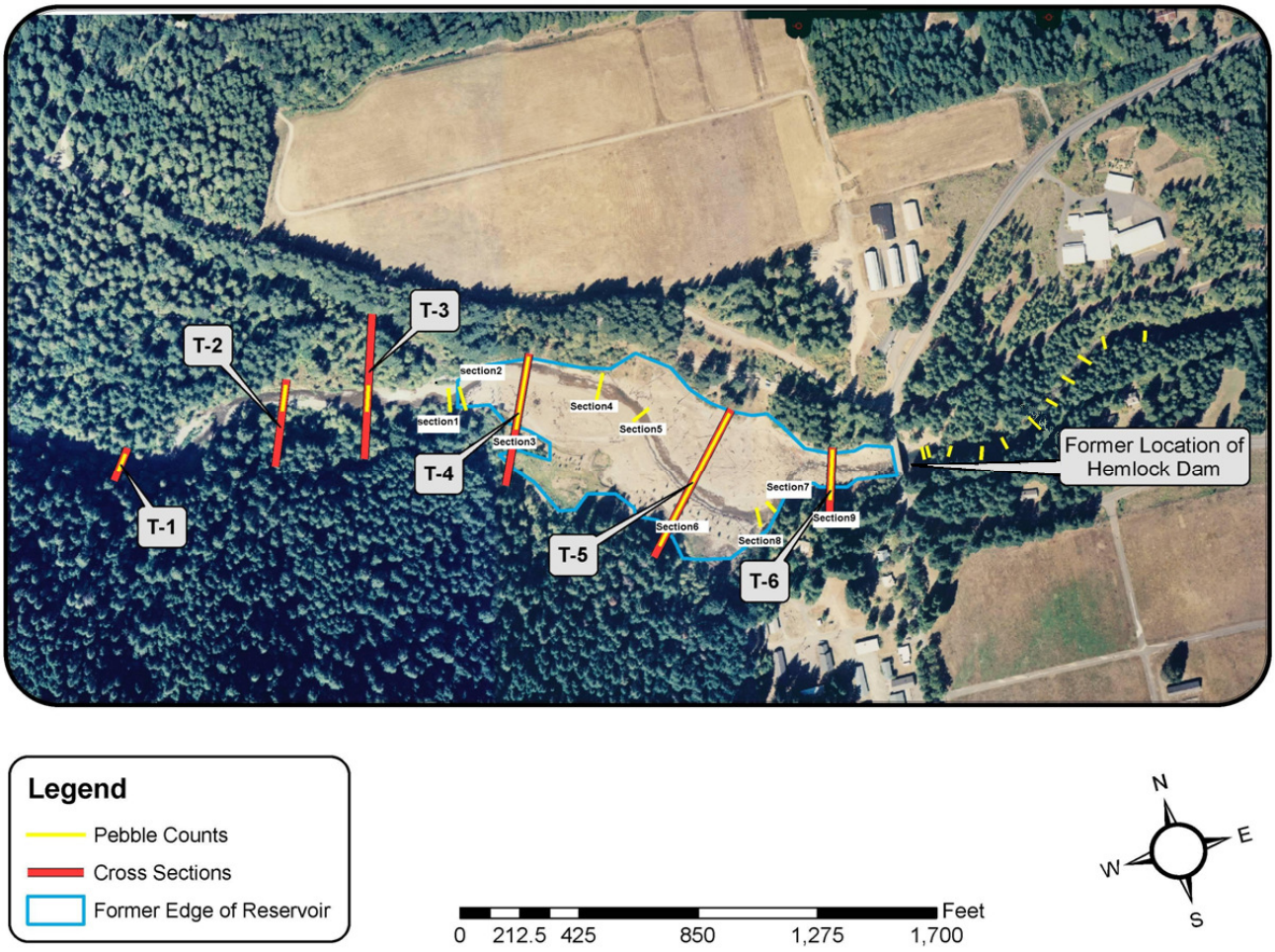
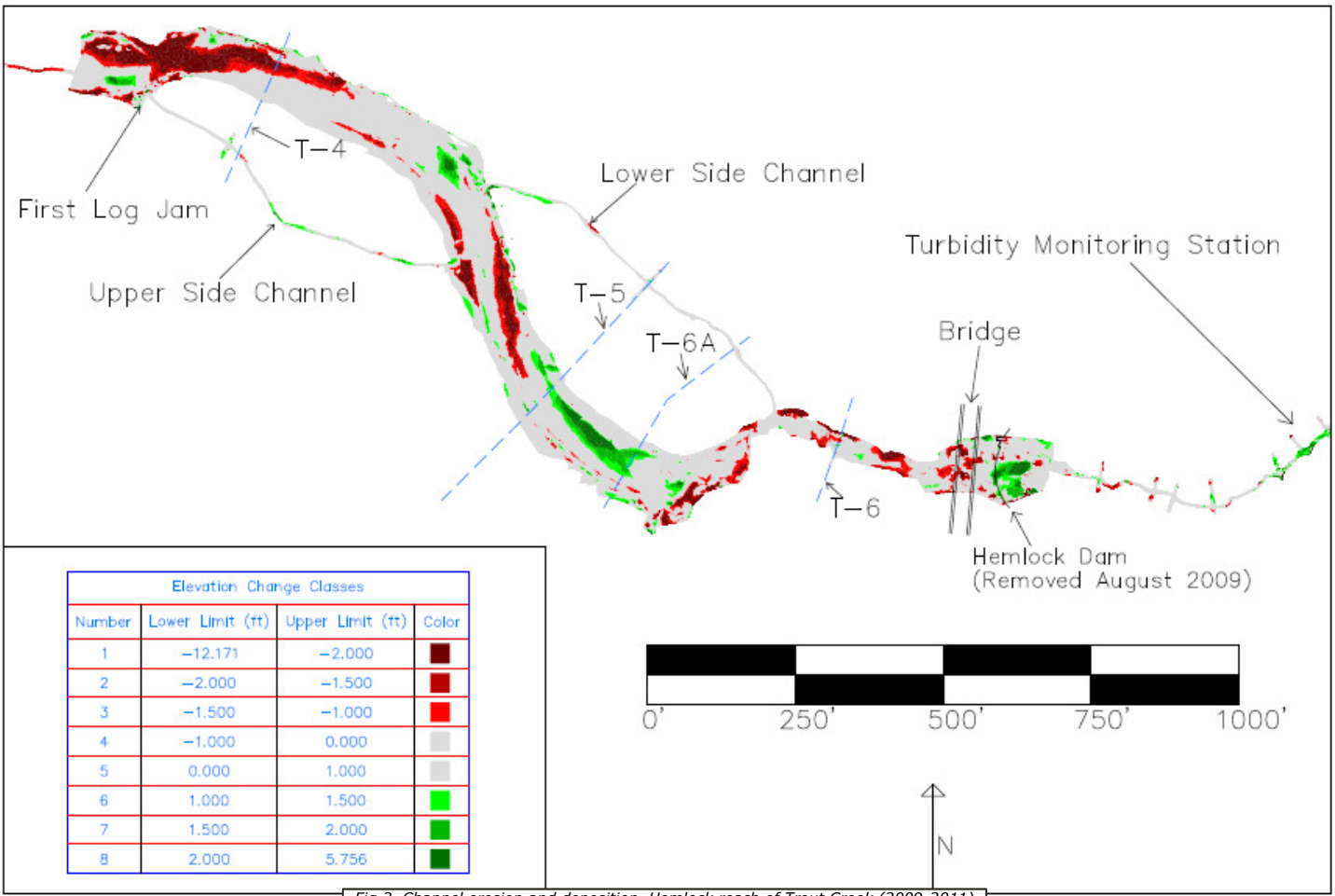


Fig 1. Monitoring at the Hemlock/Lower Trout Creek restoration site

Fig 2. Three panes showing Hemlock restoration site:1) before dam removal (left), 2) immediately after dam removal (middle), and 3) one year later (right)

Topographic measurements at the site before and after the project was completed provide more quantitative and detailed analysis of the changes that occurred in the two years since dam removal. Figure 3 shows the project reach in plan view with monitoring cross sections labeled. Color coding indicates the amount of change that has occurred in the channel due to erosion and deposition of river materials from 2009 to 2011. Red areas indicate areas of erosion and green areas are areas of sediment accumulation in the channel. The intensity of the color indicates the depth of erosion or accumulation as shown in the figure legend.



Elevation Change Classes			
Number	Lower Limit (ft)	Upper Limit (ft)	Color
1	−12.171	−2.000	
2	−2.000	−1.500	
3	−1.500	−1.000	
4	−1.000	0.000	
5	0.000	1.000	
6	1.000	1.500	
7	1.500	2.000	
8	2.000	5.756	

Fig 3. Channel erosion and deposition, Hemlock reach of Trout Creek (2009-2011)

Topographic monitoring of the site and modeling of streamflows in Trout Creek allows us to see how streamflows occupy the main channel, side channels and floodplain at a range of flow conditions. Figure 4 includes two plan view images of the project area. Blue represents wetted areas of varying depths during a bankfull streamflow event (left image), and shows how the depth and areal extent of the wetted area expand during a projected 100-year flood on the site (right image).

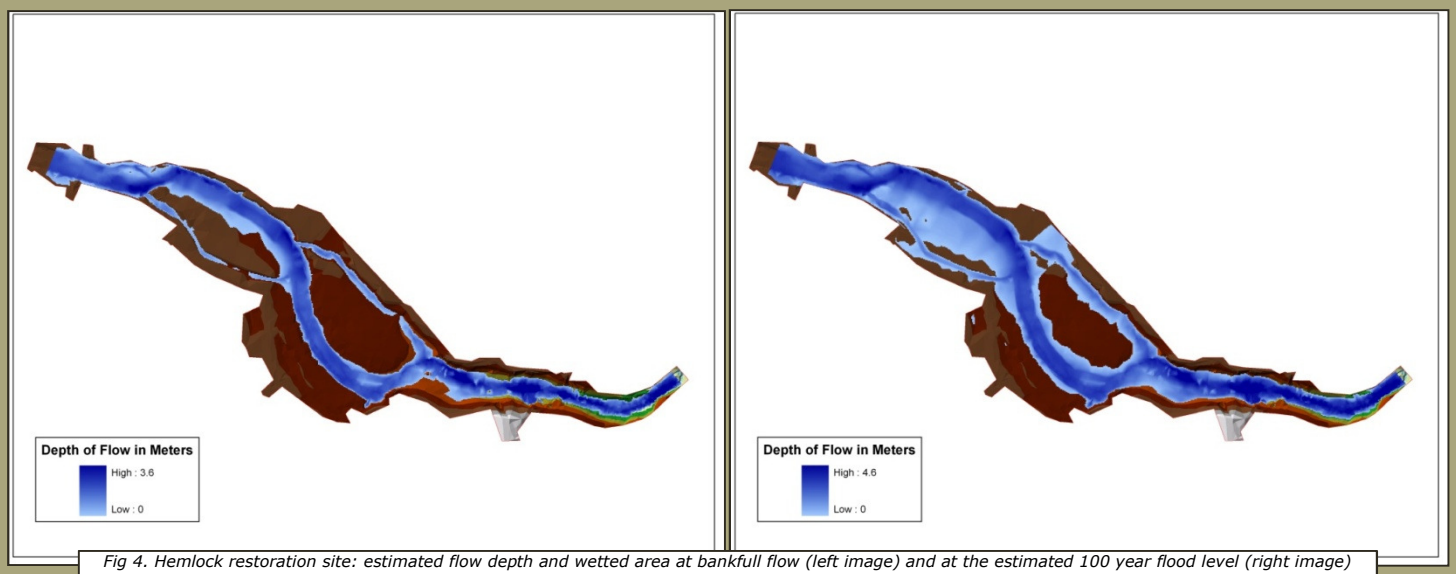


Fig 4. Hemlock restoration site: estimated flow depth and wetted area at bankfull flow (left image) and at the estimated 100 year flood level (right image)

As the site changes over the course of the next few years through scour, deposition and accumulation or loss of woody debris, we will monitor how the projected floodable areas adjust.

Instream habitat has also changed as a result of this project. The reservoir was once a large shallow pool with very little woody debris or diversity of habitat. The restoration project brought in a total of 1200 whole trees and logs to construct the channel, and to provide a diversity of hydraulic characteristics and habitats for fish and other aquatic organisms. Since completion of the project, natural processes of woody debris accumulation have begun to operate and further diversify the project reach. One example of this is shown in Figure 5 in which a whole tree has floated down into the project reach and become established in a full channel spanning orientation. It has begun to cause an accumulation of small woody debris on either side of the channel where its ends are lodged. Through processes like this, the stream will over time become more dynamic and we anticipate natural adjustments and movement of the channel due to these kinds of stochastic processes.

Fig 5. Woody debris accumulating in project reach

Following removal of Hemlock Dam and construction of the channel, the entire site was planted with more than 20,000 trees and shrubs to accelerate revegetation of the site. One of the primary reasons for the heavy planting was to occupy the site with desireable native species before it could become colonized by invasives such as reed canary grass, which was already the dominant vegetative cover in much of the area surrounding the former reservoir.

Trees planted in the area included red alder, bigleaf maple, douglas-fir, western redcedar, western hemlock, grand fir, red osier dogwood and red elderberry. The plants were irrigated the first two summers after planting, and since that time have become well established and have grown to in some cases over 7-feet tall. Monitoring in 2011 found survival of 93% for planted trees. Figure 6 shows the heavy growth of planted alder and other hardwoods on the lower side channel, with a rich and dense cover of native sedges that have come in voluntarily in the bottom of that channel.

Monitoring at the site continues into 2012, and subsequent reports will include summaries of findings for other monitoring parameters including water temperature, substrate, and macroinvertebrates.

Robust growth of planted alder at the Hemlock restoration site. Native sedges in foreground (August 2011)

Mt. Adams Ranger District's Fish Education Day—Environmental Education

The Mt. Adams Ranger District hosted the annual Fish Education Day event on June 18th, 2011 at the Guler-Mt. Adams County Park in Trout Lake, Washington. Washington Department of Fish and Wildlife and its Goldendale Fish Hatchery once again donated over 1000 rainbow trout to this event, and the Klickitat County Parks and Recreation Department again allowed the use of this park for this large event. There were over 300 children aged 12 and under, approximately another 300 youth aged 13-18, as well as many family members who enjoyed a morning of free fishing, fish fry, storytelling, children's costume parades, face-painting, fish printing, boat safety lessons in the Skamania County Sheriff's boat, visits with Smokey Bear and Frank Fish, and many other fun educational games.

Salmon tent used for storytelling

In addition to the enthusiastic participation of USFS employees, the 2011 Fish Education Day also owed its success to its many partners, donors, and volunteers (over 50) which included: Washington Department of Fish and Wildlife, White Salmon Steelheaders, U.S. Fish and Wildlife Service, USFS-National Volcanic Monument, Underwood Conservation District, Skamania County Sheriff's Department, Skamania County Noxious Weed Program, Klickitat County Parks and Recreation Department, Northwest Service Academy, Trout Lake School, Trout Lake Grocery, U.S. Army Corps of Engineers, Andy's Valley Service, Franz Bakery, Les Schwab Tires, Little Mountain Hardware, Angel's Bakery, Beneventi's Pizza, Eagles Club of Bingen, McDonalds, Subway, Hi-School Pharmacy, Thriftways Grocery, Gorge Fly Shop, Miller's Sport Shop, and 14 local residents.

Invasive plant and animal education co-hosted by the USFS and Skamania County Noxious Weed Control Program

Water Jam—Environmental Education

There were over 400 4th-6th graders from 10 Columbia River Gorge-area schools who participated in the annual Water Jam in 2011 in Underwood, Washington. Twelve separate federal, state, tribal, county, and non-profit agencies join together each year to spend two days teaching local area youth from 10 schools about responsible aquatic resource stewardship through fun outdoor games and storytelling. This event provides the agencies and school teachers with an opportunity to learn environmental education methods and resources, and it also enables the agencies to reach several hundred area youth at one time with their environmental message.

Recycle Man giving a concert (and singing about salmon, clean water, recycling) at Water Jam 2011

Students, meantime, get to learn from Yakama Nation storytellers and play games that teach about salmonids, wildlife, macroinvertebrates, plants and trees, water quality, recycling, and composting.

These fun outdoors games review and reinforce the many aquatic and environmental education lessons the students have learned during the past school year through programs such as Salmon in the Classroom. There were many partners and donors who contributed to making the 2011 Water Jam a success. These include: U.S. Fish and Wildlife Service, US Bureau of Reclamation, Underwood Conservation District, Mid-Columbia Regional Fisheries Enhancement Group, Washington Department of Fish and Wildlife, Washington Department of Natural Resources, Yakama Nation, Skamania County, Klickitat County, Columbia Gorge Ecology Institute, National Marine Fisheries Service, Insitu, and more.

Wind River Middle School Monitoring Project—Environmental Education

This ongoing monitoring effort at the site of the Hemlock Dam Removal project is led by the District and supported by partners including US Fish and Wildlife Service, Underwood Conservation District, US Army Corps of Engineers, and Columbia Gorge Ecology Institute. The project involves both classroom instruction and fieldwork with science students from the Wind River Middle School. Classes learn about the recent dam removal project and then participate in monitoring of its effects.

Many of the students in these classes have been directly impacted by dam removal because they grew up in the community, and enjoyed recreating in the reservoir formed by the dam. These same students often come into the class unaware of the importance of Trout Creek to the native steelhead run, and that the dam had negative impacts to those fish.

We provide students with background on the watershed, native fish, habitat requirements, and the Hemlock project site itself. The restoration site makes an excellent outdoor classroom. Students come to the site in the fall and spring, and collect a range of environmental data to help document the results of this restoration project. Classes collect data on water quality, aquatic insects, channel geometry, substrate and vegetation. We help them to analyze their own data and produce presentations for sharing in the classroom or at local watershed council meetings. The project began prior to removal of the dam and continues annually.

White Salmon Working Group – Condit Dam Removal Project

The White Salmon Working Group (WSWG) was formed to create fish salvage and anadromous salmonid restoration plans in preparation for the restoration of fish passage to the White Salmon River, Washington, following the removal of the PacifiCorp-owned Condit Dam at river mile (RM) 3.2. Members of this collaborative group, which formally started meeting in February 2007, included staff from: U.S. Geological Survey (USGS), Yakama Nation (YN), U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), Washington Department of Fish and Wildlife (WDFW), U.S. Forest Service (USFS), and PacifiCorp. The Fisheries Biologist for the Mt. Adams Ranger District was asked to join WSWG in spring 2010 and has since provided support, mainly by assisting with fish monitoring in 2010 and 2011, fish salvage efforts prior to the breaching of the dam in fall 2011, and reviewing and providing input to plans and reports.

Condit Dam prior to breaching in October 2011

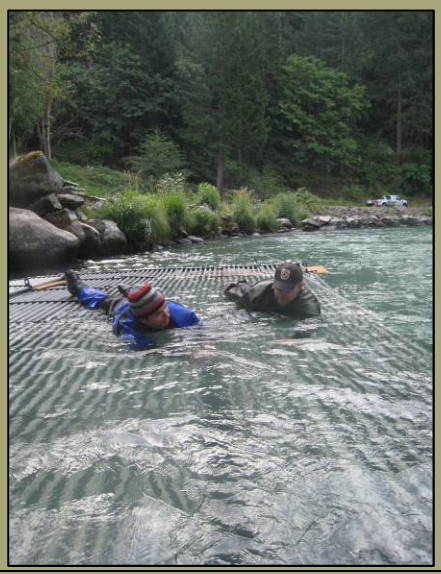
Fish populations originally considered for the salvage and recolonization efforts associated with the removal of Condit Dam were: spring and fall Chinook salmon (*Oncorhynchus tshawytscha*), summer and winter steelhead (*O. mykiss*), coho salmon (*O. kisutch*), chum salmon (*O. keta*), bull trout (*Salvelinus confluentus*), and Pacific lamprey (*Lampetra tridentate*). Results of previous collaborative research projects in the White Salmon River were used to guide the recolonization and management plans to meet goals for each of the various species. These projects included fish assessments, fall Chinook escapement estimates, Ecosystem Diagnosis and Treatment modeling, assessments on adult straying, bull trout and lamprey presence-absence surveys, and genetic assessments of salmonid populations from nearby watersheds. As a result of consensus among

Pit-tagging fish during pre-dam removal monitoring study

WSWG members, native fall Chinook salmon were transported upstream of Condit Dam in 2011, which resulted in successful natural spawning prior to the start of Condit Dam removal. A range of management options for each species were considered (i.e. natural recolonization, introduction of a neighboring stock, hatchery production use, monitoring natural recolonization before assessing need for hatchery production). Recommended options for salmonid reintroductions from the WSWG were incorporated into NMFS's Endangered Species Act recovery plans for steelhead, Chinook, coho, and chum salmon. The WSWG is currently evaluating opportunities for monitoring fish response to the dam

removal. These will include steelhead spawner and carcass surveys, tule fall Chinook passage and spawning distribution surveys, a continuation of the bathymetry survey measuring changes to fall Chinook spawning habitat, juvenile lamprey presence surveys, creel surveys, spring and fall Chinook spawning surveys, and additional carcass surveys.

Brady Allen of USGS during pre-dam removal monitoring study

Transporting salmonids from below to above Condit Dam in 2010 and 2011

Carrie Munz of USGS operating a smolt trap below Condit Dam