Getting Results: Stories of Water Quality Improvements in Washington State

WASHINGTON STATE DEPARTMENT OF ECOLOGY

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Citizens of Washington Take Action for Clean Water

Washington State is working hard to determine if our strategies to improve water quality are effective. The state is just beginning to monitor programs to assess the effectiveness of nonpoint source controls, but we are still years away from making a final determination. However, in some places we can show that water quality is improving. Success stories are a great way to illustrate site-specific water quality improvements.

Nonpoint source pollution has often been characterized as a local land use issue, so it is not surprising that successful implementation for water pollution control efforts happen at the local level. Local governments, special purpose districts, tribes, businesses, nonprofits, and citizens are all participants in solving water quality problems. It is no wonder then that most of these successes are stories about local community efforts.

Technical, financial, and regulatory assistance are the types of programs that state and federal agencies offer to support local actions. Who do they assist? People in communities who put their time and effort on the ground. It is a great partnership and one that needs further care and attention.

Successfully controlling nonpoint source pollution does not happen overnight; these are not end-of-the-pipe fixes, rather, they are long term efforts on many fronts. Read the stories and see for yourselves the time and effort that goes into solving local problems. In almost all cases, projects have been ongoing for years, and the total cost of these projects, including funds from grants, local sources, assessments, and individual landowners, are not totally accounted for. Thus, we have identified the sources of funding for successful projects, but not the amounts.

The following success stories are samples of those that have been received through an active solicitation to local governments, tribes, and special purpose districts. These success stories were collected during 2002.

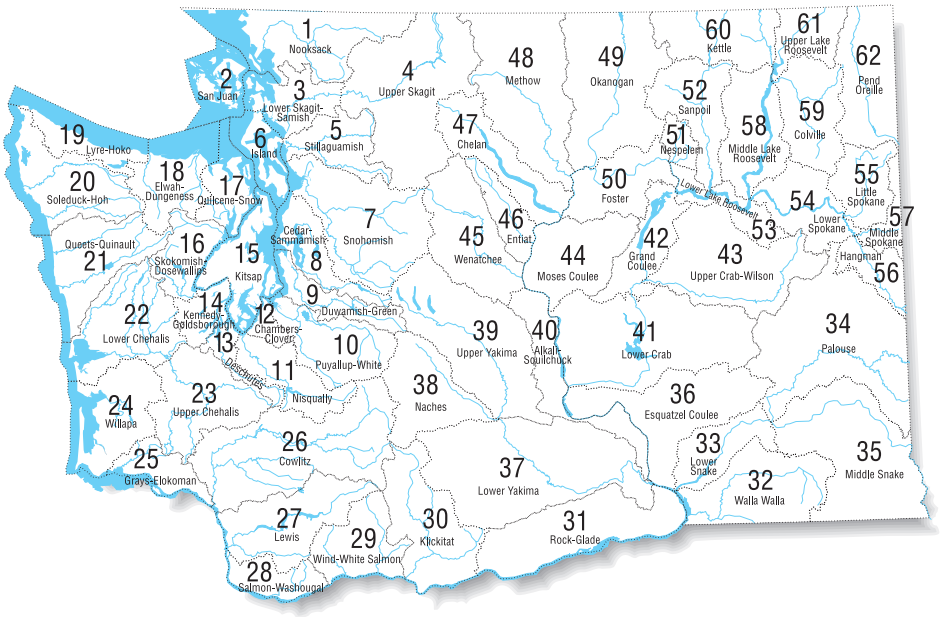
These 23 stories are categorized by type:

- *Education*: creating a generation of care
- *Partnerships*: working toward common goals
- *Restoration*: getting habitats back to where they belong
- *Technical Assistance*: supporting community actions

Each category plays an important part in solving the problem, and collectively putting the parts together is giving us the successes we are striving for.

Enjoy the stories.

Figure 1: Water resource inventory areas (WRIAs) or watersheds



Water Quality Education - Creating a Generation of Care

Environmental education is increasingly being utilized as a way to fight pollution. It isn't the engineering solution or the enforcement process which is often the quick fix, but it is the best way to improve environmental awareness over time.

Environmental education is simply a case of expanding people's knowledge of how their (and others') actions and behavior influence the world in which they live. Educating adults and convincing them that life-long habits may have an ill effect on the environment is a difficult endeavor, but educating children before habits become too ingrained is the theme of these stories.

The stories in this category are:

- Water Quality Education in the Schools
- Soils for Salmon Campaign
- Spokane River and Aquifer Open House
- Goose Creek Receiving Water Study
- Water on Wheels

Water Quality Education in the Schools

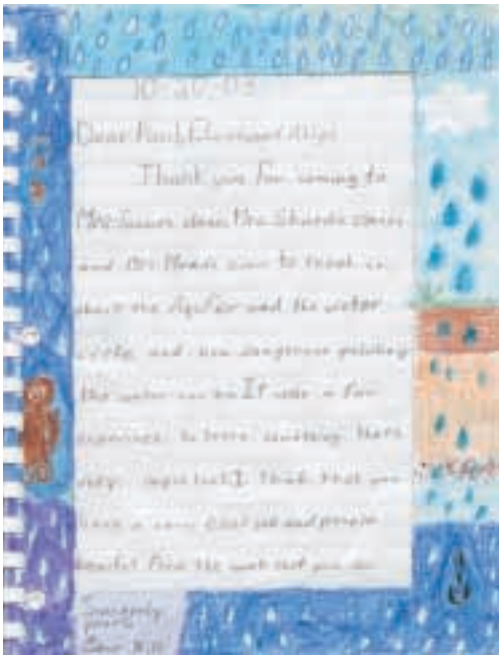
Starting young to teach people how they can protect water quality.

Project goal:

Teaching school-aged children about water quality has always had long lasting affects. Teaching them about the causes of dirty water and how to solve the problems has an even greater affect. When children realize they can help clean up water, there is hope for the future.

What was done?

Using an Enviroscape© Model and a Groundwater Model, students are taught about polluted runoff (nonpoint pollution). These models allow the students to see what happens to pollution on the ground – how it can get into rivers, lakes, and ground water. During these presentations, students discuss what they can do to prevent pollution from getting into our water. Students are also taught about the value of bugs in the water, how to measure dissolved oxygen, pH, and temperature and why those problems are important to the health of water. These presentations have been done in classrooms, at water festivals, in parks, and at a museum.



Ecology staff demonstrates a groundwater model.

Was it successful?

Students have fun and learn about water quality. One teacher asked us to create a test for the students to take after the presentations. The majority of the students received an A on this test.

How was success measured?

Success is also measured by the many "thank-you" letters we have received, the kids enthusiasm for the presentations, and the fact that we are invited back each year to some of the events.

Lead: Washington State Department of Ecology
Partners: Schools and organizations that invite Ecology to give presentations
Location: Eastern Washington
Funding source: U.S. Environmental Protection Agency's 319 grant
Timeline: Continuous
Contact: *Elaine Snouwaert*
Washington State Department of Ecology
509-329-3503
esno461@ecy.wa.gov

Soils for Salmon Campaign

Workshops showed the role of healthy soil in stormwater management.

Project goal:

Healthy soil increases infiltration, reduces toxicity of stormwater runoff through biofiltration and reduced need for landscape chemicals, and encourages vigorous plant cover. This project teaches planners, regulators, builders, engineers, designers, landscapers, and the general public how to care for and restore the soil in order to decrease stormwater runoff and improve water quality.

What was done?

In 1999 the Washington Organic Recycling Council (WORC) began to build regional awareness of the soil-water connection through a series of seminars for planners, scientists, engineers, industry, and regulators. The team has also created publications (including a manual for best management practice (BMP) implementation), demonstrations, a website (*www.soilsforsalmon.org*), and a training curriculum delivered to over 2000 landscape professionals around the region since 1999.

Workshop materials are available from WORC

In 2002-2003, with funding from the Puget Sound Action Team, WORC conducted seven day-long workshops around the Puget Sound basin to educate agency staff and the development community on the value of preserving native soils or restoring degraded soils with compost amendments. The workshops trained participants to implement the soil BMPs that were recently incorporated (with WORC's technical assistance) into the Stormwater Manual for Western Washington.

The Stormwater manual is available at http://www.ecy.wa.gov/pubs/9915.pdf pp. 101-102.

Was it successful?

2002-03 Workshop surveys show that 77 percent of respondents planned to incorporate what they learned into their own projects. Some municipal employees intended to submit reports that recommended the learned soil best management practices, and planned to propose the use of compost berms, socks, and blankets to manage stormwater runoff from construction sites. Landscapers indicated that they would recommend the soil practices to clients. Barriers to implementation by developers included lack of credit in the state stormwater model for soil BMPs, and incomplete data on costs and benefits of the practices. Despite good promotion (and packed attendance), relatively few developers attended the workshops.

The *Soils for Salmon Campaign* has built awareness of the soil-water connection among policy makers, planners, and government technical staff - leading to new state and local stormwater BMPs and extensive use of these practices in government projects. A small but growing number of private developers are also using the soil BMPs, and some professions (e.g., landscape contractors and landscape architects) are now well educated. The campaign has refocused for 2004 and beyond to reach out to developers, builders, and contractors, in collaboration with their professional organizations. This approach is being well-received by the industry.

How was success measured?

Soils for Salmon seminars, conferences, and workshops over the years have been evaluated through pre- and post-surveys of attendees. Overall impact of the campaign is best evaluated through changing regulations and industry practices around the Puget Sound region.

Lead: Washington Organic Recycling Council (WORC)
Partners: Snohomish County, King County, City of Seattle, Washington State Department of Ecology, Puget Sound Action Team
Location: Puget Sound region (Western Washington – has spawned similar efforts in Oregon, and elsewhere around the U.S. and Canada)
Funding source: City and county budgets, WORC, landscape industry, Puget Sound Action Team
Timeline: 1999-present (continuing initiative by partner agencies)
Contact: *Connie Allison*
Washington Organic Recycling Council
360-425-2999
info@compostwashington.org
www.soilsforsalmon.org

Spokane River and Aquifer Open House

"How does your water measure up?" Four agencies help local citizens understand how their water quality measures up.

Project goal:

Water quality education is a primary activity for water quality protection. The purpose of this project is to help educate the citizens of Spokane County about their local water resources, especially the Spokane Prairie/Rathdrum Aquifer, a sole source aquifer that provides drinking water for the city of Spokane.

What was done?

The Department of Ecology teamed up with the U.S. Geological Service (USGS), Spokane County Groundwater Program, and Spokane Aquifer Joint Board (SAJB) to host the Spokane River and Aquifer Open House. The theme was "How does your water measure up?" USGS staff demonstrated how they measure the flow of the Spokane River from a bridge. Spokane County staff showed people how they use an on-site well to measure various parameters in the aquifer. Ecology staff used a groundwater model and an Enviroscape© watershed model to demonstrate how the average citizen can unintentionally pollute rivers and ground water.

Do you drink ground water? How does your water measure up?

"Take that you fiend" Aquatic Duck fends off the evil Mr. Devoil.

This event was also used to promote National Water Monitoring Day (NWMD) - October 18. We talked with people interested in participating in NWMD and demonstrated how to use Hach kits to test dissolved oxygen and pH. Spokane Aquifer Joint Board's mascot Aqua Duck saved the day when he prevented the diabolical Mr. Devoil from polluting the Spokane River in a skit performed several times throughout the day.

Was it successful?

Conservative estimates yielded 120 visitors to the event. Local news covered the story.

How was success measured?

By the number of people attending and the appreciation they expressed for the event and the information they received.

Lead: Spokane County Groundwater Program
Partners: Washington State Department of Ecology, Spokane County Groundwater Program, Spokane Aquifer Joint Board, U. S. Geological Service.
Location: Centennial Trail off Barker Road alongside the Spokane River
Funding source: Each agency funded its own part
Timeline: September 2002
Contact: *Elaine Snouwaert* 509-329-3503 *Esno461@ecy.wa.gov*

Measuring pH.

Goose Creek Receiving Water Study

A grade-school teacher, a parent volunteer, and the Wilbur School District 200 received the state's top environmental honor for a study they conducted for the town of Wilbur.

Project goal:

The town of Wilbur's wastewater treatment facility discharges to Goose Creek. Water quality requirements for the effluent depend largely on how the creek is used so Ecology requested that the town study the creek to determine if trout are living in or have ever lived in upper Goose Creek. If so, the city's new permit would be written to ensure that the water remains healthy for the trout.

What was done?

Erin Utley, a teacher at the Wilbur School, volunteered to have her class conduct the sample collection every month, to not only help the city of Wilbur, but also to learn from the hands-on experience. Kayti Didricksen, who also works for the U.S. Bureau of Reclamation, volunteered many hours developing a quality-assurance project plan so that the students' data can meet a high enough standard to be useful to the city. She also has helped, along with Washington State Department of Ecology staff, Elaine Snouwaert and Karin Baldwin, to train the students and supervise the sample collection.

In the field, students measured dissolved oxygen concentrations, pH, temperature, alkalinity, and stream flow. The samples they collected for the laboratory were analyzed for nutrients, chloride, suspended solids, and fecal coliform bacteria. In addition, the students sampled macroinvertebrates (insects that live under water) and worked with the Washington Department of Fish and Wildlife to electroshock the creek to see what fish were present.

Was it successful?

Water quality data was collected on Goose Creek from April 2002 to March 2003 and will be used to establish a new National Pollutant Discharge Elimination System (NPDES) permit for the town's treatment facility. Two high school students were able to take responsibility for portions of the study to fulfill their senior project requirement. Three classes of students learned valuable lessons about water quality, science, and environmental stewardship.

How was success measured?

A partnership was formed. The town saved money by having the students do the study, instead of having to hire a consultant. Valuable data was collected on a stream that has not previously been studied. The students learned a lot about water quality and how easily *it* can be polluted.

Special notes:

The partnerships that were created were essential to the project's success.

Students from Eric Utley's Wilbur Grade School class accepting Environmental Excellence award Washington's highest environmental honor from the Washington State Department of Ecology.

Lead: Wilbur School District 200
Partners: Town of Wilbur, Washington State Department of Ecology, U.S. Bureau of Reclamation
Location: Wilbur, Washington
Funding source: Town of Wilbur
Timeline: Fall 2001 to January 2004
Contact: *Elaine Snouwaert*
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Water on Wheels

Franklin Conservation District provides water quality education to students from kindergarten through grade 12

Project goal:

To educate students in grades K-12, agricultural producers, and the general public about ground and surface water quality issues within Franklin County, with an emphasis on nonpoint source pollutants.

What was done?

The Franklin Conservation District (FCD), in collaboration with the Upper Grant Conservation District, developed a countywide education program in 2001 to teach students about water quality issues within Franklin County. Education activities are currently funded by the Columbia Basin Groundwater Management Area (GWMA), and the Washington Department of Ecology (Ecology). Water on Wheels (WOW) specifically aims to teach students the problems of soil erosion and how point and nonpoint source pollutants, especially nitrates, affect water quality. The education outreach program was matched with current Washington State Essential Academic Learning Requirements (EALRs) to reinforce the value of WOW within the classroom. Both classroom and field work are part of the WOW curriculum. In addition, the FCD created a webpage to reach the general public with information on local water quality issues. The webpage also provides agricultural producers with

A WOW classroom in action.

information on how their practices may affect ground and surface water quality, what can be done to address the problems, and what programs are available to improve their practices from an environmental standpoint.

Was it successful?

Public responses to all FCD water quality education programs have been extremely positive. Specifically, in Franklin County since 2001, WOW has taught over 10,000 students about watersheds, soils, ground water, and conservation.

How was success measured?

Project results are measured for WOW based on the number of students, teachers participating, and the number of classes taught each month. Evaluation forms given to teachers at the end of each lesson provide further feedback for the program. Success is measured for other programs through an increased awareness of the impact of human activities on county water quality.

Special notes: Currently the WOW educator reaches an average of 600 students each month. All public and private schools within Franklin County have been invited to participate. A majority of all lessons take place at the elementary school level; currently eleven lessons are offered through WOW. All agricultural producers and the general public have access to additional water quality education materials on the web, at local fairs, and at the FCD office in Pasco, Washington.

Lead: Franklin Conservation District
Partners: Washington State Department of Ecology, Columbia Basin Groundwater Management Area, Upper Grant Conservation District
Location: Franklin and Benton Counties
Funding source: Centennial Clean Water Fund from Washington State Department of Ecology, Columbia Basin Groundwater Management Area
Timeline: May 2002 to December 2005
Contact: *Pat Daly*
509-545-8546 ext. 3
pat-daly@wa.nacdnet.org

Partnerships - Working Toward Common Goals

When it comes to working together for a common cause, like environmental cleanup, groups in Washington State have a strong history of partnering.

What makes the Pacific Northwest so endearing to its citizens is the quality of the environment--clean air, clean water, and beautiful landscapes. This is the one issue that will make people of divergent backgrounds and lifestyles work together.

The stories in the category are:

- Washington State Nonpoint Workgroup
- "Tired" of Dirty Water
- North Fork Palouse River TMDLs: A Cooperative Effort
- Correcting Riparian Areas
- Americorps to the Rescue: Little Klickitat Basin Improvements
- Partnering Locally to Implement Agricultural Best Management Practices

Washington State Nonpoint Workgroup

Eleven State Agencies Work Together for Clean Water.

Project goal:

State participation in the management of Washington's nonpoint source pollution is the responsibility of several different state agencies. In order to effectively coordinate activities, it was important to convene a Washington State agency nonpoint workgroup. Together these agencies wrote a state nonpoint plan to improve water quality.

What was done?

In Washington State, there are eleven key agencies that have primary responsibility for programs to manage and control nonpoint water pollution. In order to control nonpoint sources of pollution, it was important to convene the agencies responsible for implementing nonpoint programs, coordinate activities, and determine collectively the effectiveness of the implementation activities, as outlined in the nonpoint plan. Thus, the Washington State Agency Nonpoint Workgroup was borne.

Nonpoint workgroup in action.

Was it successful?

In October of 1999, the Director of Ecology sent a letter to Washington State agencies inviting membership into the workgroup. The group meets twice a year to discuss special projects and to update each other on plan implementation activities. specific projects, funding decisions, etc. goals, role. It is expected that the role of this workgroup will expand as advanced planning and implementation of the state's nonpoint plan evolves.

Current Membership as of December 31, 2003

- Agriculture
- Conservation Commission
- Office of Community Development
- Cooperative Extension
- Ecology
- Fish and Wildlife
- Health
- Natural Resources
- Parks and Recreation Commission
- Puget Sound Action Team
- Transportation

How was success measured?

Participation in the workgroup has remained active and vital. Even though members have major responsibilities within their own agencies, they continue to participate in workgroup meetings, and respond when requests are made. Several collaborative projects have been undertaken when opportunities arise.

Lead: Washington State Department of Ecology
Partners: Eleven state natural resource agencies
Location: Statewide responsibility
Funding source: Workgroup support comes from U.S. Environmental Protection Agency's 319 grant.
Timeline: Workgroup has been active since 2000
Contact: *Bill Hashim*
Washington State Department of Ecology
bhas461@ecy.wa.gov
360-407-6551

"Tired" of Dirty Water

Cleaning up water sometimes means more than keeping it pollution free.

Project goal:

Several streams in the Wenatchee River watershed are listed on the state's list of polluted water bodies (the 303d list) for one or more of these problems: water temperature, instream flow, fecal coliform bacteria, dissolved oxygen, pH, toxins, and excess sedimentation. The purpose of this project, by the Chelan County Conservation District, was to develop a plan and organize education, awareness, and cleanup activities in order to improve water quality in the Wenatchee River watershed.

What was done?

In January 2002, the Chelan County Conservation District (CCCD) received $250,000 in a three-year grant. Through this grant, the CCCD provides key assistance to plan, coordinate, and implement the Water Cleanup Plan/TMDL process in this watershed.

The CCCD works closely with Ecology, EPA, area legislators, local government, landowners, stakeholders, the Wenatchee Watershed Planning Unit, Bonneville Power Administration, tribes, U.S. Fish and Wildlife, Washington Department of Fish and Wildlife, Army Corps of Engineers, Natural Resource Conservation Service, and local watershed groups to coordinate water cleanup efforts on a watershed level. With its local knowledge and neighbor-to-neighbor relationships, the CCCD is successful in bringing diverse groups and individuals together to resolve difficult and sometimes contentious issues.

Was it successful?

One example of a Water Cleanup Plan/TMDL early implementation project that the CCCD coordinated was a tire clean up in Peshastin Creek. Sixty-nine illegally dumped tires of various sizes were found while conducting water quality monitoring and later removed from Peshastin Creek. The CCCD coordinated a work crew from the Chelan County jail. The tires were recycled at Les Schwab Tires. Non-recyclable materials were taken to the East Wenatchee landfill.

Chelan County Jail work crew removes tires from the area.

How was success measured?

Partners show their commitment to clean water by their early actions to improve water quality and their participation in water cleanup planning. The CCCD will monitor independently and assist Ecology in monitoring the Wenatchee River mainstem and its tributaries to identify problems and to assess success of cleanup actions. Photo documentation will also be used to assess riparian improvements.

Special notes:

If the CCCD was not funded to be the "Local Lead," the Water Cleanup Plan/TMDL may get written, but most likely would not have local "buy-in." And, without local buy-in, the plan would be very difficult to implement.

Ecology's Dustin Bilhimer puts his back into it.

Lead: Mike Rickel, Chelan County Conservation District
Partners: Department of Ecology, U.S. Environmental Protection Agency, Wenatchee Watershed Planning Unit, area legislators, other federal and state agencies, local government, landowners, stakeholders, businesses, local watershed groups, and residents.
Location: Wenatchee, Washington
WRIA #: 45
Funding source: Washington State Department of Ecology Centennial Grant
Timeline: January 2002 – January 2005
Contact: *David Schneider*, Grant Manager
Department of Ecology
509-454-7894
dasc461@ecy.wa.gov

The Palouse River

North Fork Palouse River Water Cleanup Plan (TMDL): a cooperative effort

The Palouse Conservation District through combined funding from Ecology and the District are working with Ecology to finalize the North Fork Palouse TMDL for fecal coliform.

Project Goal:

The goal of the North Fork Palouse River Water Cleanup Plan was to have a group of local interests develop a plan that would lead to a reduction in the amount of bacteria in their river and to increase the public's understanding about water quality issues affecting their community.

What was done?

Developing Water Cleanup Plans (TMDLs) has primarily been the responsibility of the Department of Ecology. In 2000 the Washington State legislature directed funds to the Palouse Conservation District to form a local workgroup and develop a Water Cleanup Plan for fecal coliform bacteria on the North Fork of the Palouse River in Washington. With their local advisory committee, the District has successfully developed and concluded data collection, and a water quality improvement plan to reduce fecal coliform bacteria in the river. In 2003 the workgroup agreed to have the Department of Ecology analyze their data to determine how much the pollution needs to be reduced for the water body to remain healthy and set goals for different parts of the river and its tributaries. These were the final pieces missing from the required elements in a TMDL. Since this time, the workgroup and Ecology have been working together to finalize the report for the Environmental Protection Agency's approval.

Was it successful?

The workgroup developed a collaborative relationship with each other and with many technical advisors to put together a water quality improvement plan that would be accepted locally. The plan has been incorporated into the TMDL report and will be submitted to the Environmental Protection Agency.

How was success measured?

The advisory committee still meets and continues to be active on North Fork Palouse River issues. The ability to communicate and work together as local interest representatives, state government and the public was the true measure of success for this project. It required time, effort, dedication, and trust from all sides. The ultimate measure of success is that the hard work by local people will result in an approved TMDL which will be implemented by the local agencies and landowners resulting in cleaner water.

Special Notes:

This will be one of the first Water Cleanup Plans produced by a Conservation District in Eastern Washington. The community and the District put in many hours from their busy lives to make a difference in their watershed and produce a plan that was developed by the local people.

Lead: Palouse Conservation District
Partners: North Fork Palouse River Watershed Advisory Committee; Washington State Department of Ecology
Location: Eastern Region WRIA 34 North Fork Palouse River
Funding Source: Centennial Clean Water Fund
Timeline: 2000 - 2004
Contact: *Rob Buchert*
Palouse Conservation District Manager
(509) 332-4101 ,
Elaine Snouwaert, Washington State Department of Ecology, (509) 329-3503

Correcting Riparian (Streamside) Areas

Prisoners work off their judicial penalties by implementing stream restoration projects.

Project goal:

The goal of the project was to re-vegetate riparian areas of streams in lowland Whatcom County with native trees and shrubs to lower water temperatures, filter nutrients, and shade out reed canary grass. Whatcom County worked with local drainage improvement districts and Nooksack Salmon Enhancement Association to plan and coordinate the restoration effort, with labor provided by a low-cost community service worker program through the Whatcom County jail. The idea was to develop a low-cost program that could be replicated throughout the state.

What was done?

To accommodate agriculture, stream channels have been straightened, diked, dredged, vegetation removed, and animals have been allowed access.

Whatcom County Public Works contracted with the Nooksack Salmon Enhancement Association to coordinate the restoration activities. The Whatcom County Sheriff's Department alternative correction crew provided the labor force. To accomplish additional restoration work, Whatcom County also hired a Washington Conservation Corps crew.

Was it successful?

Twenty-five projects totaling 56,000 lineal feet (10.6 miles) of riparian restoration along rivers, streams, and other watercourses have been completed under this grant. Agreements were negotiated with each landowner and planting prescriptions (including site preparation, planting and maintenance details) were developed for each site. Twenty-five thousand (25,000) native plants were installed. Plant materials paid for by this grant were supplemented by additional plants purchased with Whatcom County special projects funds, donated plants, and plant materials harvested from donor sites.

The idea was to remove reed canary grass and excess sediment with dredging, and then discourage the reed canary grass from growing back by providing shade. In most cases, areas were planted a second year to achieve desired densities.

How was success measured?

Typically, projects were maintained once every 26 days during the growing season. Projects were monitored during regular maintenance, alerting the project managers of special needs, such as rodent proofing or increased watering or soil amendments that need to be considered. Vegetation surveys were conducted pre-restoration and post-restoration, with set photo-points and monitoring of plant survival.

Crews getting ready to plant saplings

Lead: Whatcom County Public Works, River Flood Section
Partners: Nooksack Salmon Enhancement Association, Whatcom County Public Works, Whatcom County Sheriff's Department, Whatcom Conservation District, Drainage Improvement Districts, Whatcom Land Trust, and numerous landowners.
Location: Bellingham, Whatcom County, Washington
Funding source: Centennial Clean Water Fund
Timeline: 2002 -2004
Contact: *Shannon Moore*, Project Coordinator, Nooksack Salmon Enhancement Association *info@n-sea.org*; 360-715-0283

Building a fence.

Planting native vegetation.

Americorps to the Rescue: Little Klickitat Basin Improvements

Hard working Americorps employees help improve riparian areas on the Little Klickitat River.

Project goal:

Keeping cattle out of sensitive areas, such as streams and wetlands of forested land in Klickitat County, will allow for restoration of the riparian areas, a reduction of sediment deposits into the streams, and reduction of the potential for bacterial contamination. With restored riparian vegetation, additional shade will be present to help keep water temperatures cooler. Increased shade is one of the goals of the Water Cleanup Plan/TMDL for the Little Klickitat River and its tributaries.

What was done?

The Little Klickitat River and most of its tributaries are on the state's list of impaired water bodies for elevated temperatures. There is a long history of timber harvest in the headwaters and agricultural use in the middle and lower reaches of all of the streams. Reduced riparian vegetation contributed to water quality degradation.

A Water Cleanup Plan (TMDL) is being developed for the Little Klickitat River and all of its 303(d) listed tributaries. The Central Klickitat Conservation District has an agreement with the Washington Department of Ecology to assist with this TMDL. Under the terms of the agreement, the Central Klickitat Conservation District assists with public involvement, project identification and implementation of restoration activities. The TMDL's technical report and summary implementation strategy identify reduced riparian vegetation and excessive sediments as contributing factors for elevated water temperatures.

The hard working (Americorps) Northwest Service Academy crew

The conservation district enlisted the help of Americorps to build fences to keep cattle away from the creek.

Was it successful?

Americorps members constructed approximately 16,000 feet of livestock exclusion/management fence, enlarged and rocked the banks of three ponds, replaced 200 feet of damaged or destroyed water pipe and five valves, and planted approximately 4,000 trees and shrubs in or adjacent to riparian areas.

How was success measured?

We will conduct photo documentation with a digital camera showing project areas before, during, and after the work.

Special notes:

"The conservation district's proposal goes a long way toward helping ranchers to better control their livestock and protect the area's water supplies," explained Jeff Lewis, a manager with Ecology's water quality program. "We challenged the ranchers in Klickitat County to identify the most effective livestock management practices for potential funding. They really stepped up to the mark and worked with the conservation district to craft a grant proposal that will protect water quality."

Lead: Dave Clayton, Central Klickitat Conservation District
Partners: Americorps, Boise Cascade Solutions, area cattle ranchers
Location: Klickitat County, Boise Cascade forested land WRIA #: 30
Funding Source: Washington State Department of Ecology Husseman grant
Timeline: March 2003 – December 2004
Contact: *David Schneider*
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Partnering Locally to Implement Agricultural Best Management Practices

A successful and unique approach to improving water quality and fish habitat in eastern Washington

Project goal:

Improving water quality requires implementing best management practices (BMPs) on private property using a variety of funding sources. With agricultural issues, this can mean fencing waterways, providing alternative water, relocating animal feeding areas, building livestock crossings, and creating riparian buffers. Riparian buffers are zones of protective native vegetation along streams that are necessary to keep water clean and provide quality habitat for fish.

What was done?

Ecology, local conservation districts, and landowners are successfully taking on pollution using a unique, collaborative approach. Two years ago, Ecology looked to achieve clean rivers and streams in a way that could also improve the relationship and build trust between Ecology and the rural public. Instead of the traditional regulatory process, Ecology *teamed* with conservation districts, local governments, and landowners throughout southeast Washington. The result of this partnership has been the implementation of BMPs at nearly 100 sites where water quality and fish habitat issues exist. Additional sites are in the planning stages. The partners are using a strategy that recognizes the economic importance of livestock operations, as well as the need to comply with state water quality law.

Was it successful?

As part of this effort, riparian buffers have been shown to:

- Slow bank erosion by holding soil in place during periods of high water.
- Reduce flood damage and sedimentation by slowing run-off and capturing the sediment that would otherwise be carried downstream.
- Help keep water cool in the summer by shading the stream and protecting fish habitat.
- Improve water quality by reducing sediment, nutrients, pesticides, pathogens, and other pollutants from reaching the stream.
- Create fish and wildlife habitat – a healthy riparian area improves habitat for fish and provides the space, food, water, and cover needed by wildlife.
- Enhance summer stream flow by improving water infiltration and storage.

Protecting riparian buffers.

Fencing waterways.

How was success measured?

Photo documentation has shown improvements in habitat. In many cases, actual water quality improvements have been documented through an active water quality monitoring program undertaken by program partners.

Before: Livestock have direct access to creek.

After: A healthy riparian buffer.

Special notes:

Ecology has combined resources with conservation districts in Spokane, Adams, Asotin, Whitman, and Garfield counties to fund a Washington Conservation Corp (WCC) crew. The WCC crews consist of five crew members and a crew supervisor. The members are between the ages of 18 and 25 and earn minimum wage while on the job. They receive college scholarships of $4,725 after completing a year in the program. Without the crew's assistance, many landowners would not be able to afford the labor necessary to implement the projects.

Lead: Washington State Department of Ecology
Partners: Asotin County Conservation District (CD), Pomeroy CD, Palouse CD, Whitman CD, Columbia CD, Adams CD, Spokane CD, livestock producers in these counties, others.
Location: Southeast Washington
Funding source: Federal 319 funds, State Centennial funds, federal U.S. Department of Agriculture Cost-Share programs, Federal Americorp funds, State Terry Husseman Shoreline Protection funds, State Conservation Commission funds, Bonneville Power Administration funds, other.
Timeline: 2001 – Present – Future
Contact: *Chad Atkins*
Washington State Department of Ecology
509-329-3499 *catk461@ecy.wa.gov*

Restoration – Getting Habitats Back to Where They Belong

Intact habitats provide a natural means of controlling stormwater runoff that carries nonpoint pollutants into our rivers and streams. Riparian zones perform a number of vital functions that affect water quality and the quality of aquatic ecosystems. Restoring forest road areas to more natural conditions leads to a dramatic decrease of soils and sediment into our waters. These are the types of actions that can restore a full range of water uses back to where they belong.

The following stories show how hard work pays off:

- Grouse Creek Road Drainage
- Early Implementation of Upper Yakima Sediment Water Cleanup Plan
- Implementing Agricultural Best Management Practices to Protect Riparian Corridor
- Stream Restoration and Water Quality Monitoring on Willapa Bay Rivers
- Increasing Dissolved Oxygen with Your Bare Hands
- Crab Creek Equipment Removal and Restoration

Grouse Creek Road Drainage

Cooperation among local and state agencies leads to a significant reduction in the potential for sediment to reach Grouse Creek.

Before: Water on the road delivers sediment to the creek.

Project goal:

Goose Creek Road was contributing a lot of sediment to Goose Creek. The Stevens County Conservation District (District) and the Stevens County Public Works Department decided to work together to improve road drainage. The district proposed designing and helping to fund a series of cross drains to get water off the road and onto the forest floor to reduce the potential of sediment delivery to the creek.

What was done?

In May 1999, the district, Stevens County Public Works Department, and Washington Department of Fish and Wildlife (WDFW) met on site to discuss the proposed project. Eight cross drains were planned, four on either side of the creek crossing. The district would provide spacing recommendations based upon the 25-year storm event, road slope, and erosion of the native material. The district would design ways to reduce erosion at the outfall of each culvert. WDFW made planting recommendations for the slopes leading from the road to the creek at the Grouse Creek crossing.

After drainage improvements.

Was it successful?

In June 1999, eight 18-inch culverts were installed at locations selected and marked by the district. Rock from road excavation work or a nearby borrow pit was placed below the mouth of each culvert and a slash filter windrow was established down slope of the rock. The rock spread out the energy of the falling water and the filter windrows trapped any sediment that made it through the rocked area. One culvert was relocated at the request of a landowner who wanted to establish access to his property from the Grouse Creek Road.

How was success measured?

District staff inspected the culverts on a regular basis during quarterly water quality monitoring trips to the watershed. The culverts were performing as designed throughout the length of the project.

Special notes:

In the Jump Off Joe Creek Watershed Management Plan, Grouse Creek Road was identified as a significant contributor of sediment due to steep slopes and poor road drainage.

Lead: Stevens County Conservation District (SCCD)
Partners: Stevens County, SCCD, Washington State Departments of Fish and Wildlife, and Ecology
Location: East of highway 395, SE of Chewelah, NE of Loon Lake WRIA #: 59
Funding source: Centennial Clean Water Fund from Washington State Department of Ecology
Timeline: 1998-2002
Contact: *Charlie Kessler*
Stevens County Conservation District
ckessler@co.stevens.wa.us

Early Implementation of Upper Yakima Sediment Water Cleanup Plan

Solving problems on irrigated farmland pays off

Project goal:

To reduce erosion from irrigated agricultural and forested lands, which are some of the major human-caused sources of suspended sediment in the upper Yakima River basin.

What was done?

The upper Yakima River, in central Washington, was identified as a priority for study and cleanup due to high levels of suspended sediment and resulting high turbidity, or cloudiness, in the water. Certain organochlorine pesticides (dieldrin and DDT) also exceeded state standards in the water and in fish tissue. Suspended sediment can carry these pesticides.

Irrigated agriculture makes up a significant portion of the economy in the upper Yakima Basin, which lies mainly in Kittitas County. Livestock grazing on range lands, and timber harvest and recreation in forested areas are the major land uses outside the irrigated areas.

The Kittitas County Conservation District (KCCD), the Natural Resources Conservation Service (NRCS), Kittitas County irrigation districts and companies, and many others took early action to improve and protect water quality in the upper Yakima watershed – in fact, many of these actions began well before the start of the sediment Water Cleanup Plan/TMDL for the upper Yakima basin. These groups were successfully working with Kittitas County irrigators to promote, through education and financial assistance, practices designed to reduce soil erosion from irrigated croplands.

Was it successful?

As a result of these agricultural improvements, local studies show that there is a trend of decreasing sediment levels in the Wipple Wasteway since 1993 (*see Figure 2*). The Wipple Wasteway is one of the main agricultural drains in the upper Yakima Basin.

Additionally, the Kittitas County Water Purveyors (KCWP), a consortium of Kittitas County irrigation districts, irrigation companies, and creek diverters, started a new self-monitoring program in 2003 in order to ensure compliance with turbidity targets for this TMDL.

This program includes water quality monitoring, outreach, best management practice (BMP) implementation, and resolution of water quality violations.

How was success measured?

Success can be measured by at least three methods in this project:

◆ *Water quality improvements*: The KCCD and Kittitas Reclamation District (KRD) collected water samples throughout the Kittitas Valley and analyzed them for turbidity and total suspended sediment. These analyses show a trend of improved water quality in key agricultural areas.

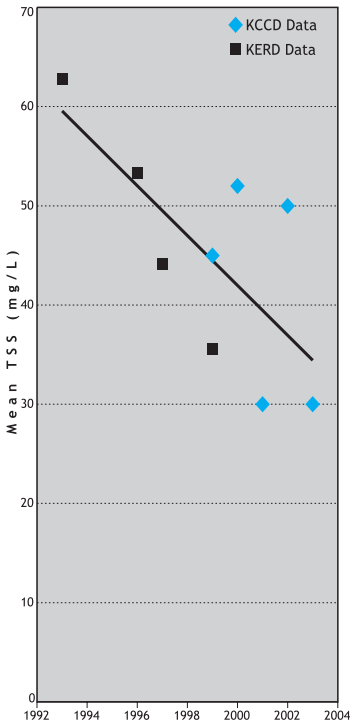
◆ *Continuous funding* each year for irrigation system upgrades and other improvements.

◆ *Social changes*, such as development and acceptance of the new KCWP water quality compliance policy.

Leads: Kittitas County Conservation District and Kittitas County Water Purveyors
Partners: Natural Resource Conservation Service, Kittitas County Irrigation Districts, Washington State Department of Ecology
Location: Upper Yakima Basin, WRIA #39
Funding sources:
KCCD 2003 Projects:
● PAM (Polyacrylamide - reduces sediment runoff) Cost Share (Funding Source: Kittitas County and Washington Conservation Commission)
● Irrigation System Improvement Projects: Irrigation Efficiencies Program, Salmon Recovery Funding Board, Bonneville Power Administration Teanaway Project, Washington Conservation Commission
NRCS 2003 Projects
Timeline: On-going
Contact: *Anna Lael*, KCCD, 509-925-7766, X4 or *Kathleen Satnik*, KCWP, 509-925-6158

Clear tailwater.

Figure 2: Mean Suspended Sediment Levels - Measured as Total Suspended Solids (TSS) - in Wipple Wateway



Implementing Agricultural Best Management Practices to Protect Riparian Corridor

A riparian restoration project along South Fork Crab Creek using agricultural best management practices.

Riparian restoration project.

Project goal:

To improve and protect the riparian area around a spring on South Fork Crab Creek that has suffered from years of heavy use by cattle. The water from the spring is the main water supply for a home located on the property, but is no longer used to supply drinking water. Another reason for implementing the project was to decrease sedimentation of the creek.

What was done?

A one-acre fenced enclosure was created around the spring. Trees and shrubs were planted within the enclosure to protect the streambanks and to rehabilitate the riparian corridor. Two metal water troughs were installed away from the creek to act as the primary water supply for grazing cattle. An armored water gap was also created as a backup source of water should the pumps to the troughs fail. The water gap allows the cattle to have limited access to the creek without trampling down the stream banks and stirring up sediment in the water. The water gap was designed so that cows could access it from either pasture, which is why it looks like a hardened crossing. Native grasses were seeded in the fall on those areas within the enclosure and grazed pasture where bare soil was exposed. In addition, debris from an old out building that had fallen across an intermittent portion of the creek was removed. A Hydraulic Project Approval from Washington State Department of Fish and Wildlife and a Shoreline Management Act exemption were obtained prior to commencing any work within the high water line of the creek.

One acre fenced enclosure around the spring.

Was it successful?

Approximately 900 feet of fence was installed and 128 trees and shrubs were planted. Up to one foot of sediment was removed before uncovering the original stream gravels from the location of the water gap, which has resulted in the restoration of a small section of the creek to its original form with riffles and a gravel streambed. The cattle in the southern pasture used the water troughs almost exclusively, since the troughs were closer than the creek. The landowner is happy with the project and believes it has turned out well.

How was success measured?

Project effectiveness will be monitored annually using photo documentation and survivability of trees and shrubs (plants will be replaced, if necessary). Periodic water monitoring for parameters such as fecal coliform bacteria, dissolved oxygen, and temperature will be conducted and compared to pre-project data to measure success. Water quality will likely improve since cattle have limited access to the creek, thereby reducing the amount of bacteria and sediment that enters the water. Moreover, the planted trees and shrubs, once established, will filter pollutants from any overland surface flow or flood water. The landowner's satisfaction with the project in itself is a huge success since the landowner was reluctant to install it!

Lead: Lincoln County Conservation District
Partners: Landowners Gilbert and Stanna White
Washington State Department of Ecology
Location: A small farm north of Ritzville, Washington along South Fork Crab Creek
Funding source: A 319 grant from Washington State Department of Ecology contributed $8515.00 and the landowner cost share portion was $6110.00, which together totaled $14,625.00.
Timeline: April through August 2003
Contact: *David Lundgren*, District Manager
PO Box 46, Davenport, WA 99122
509-725-4181 ext. 3

Stream Restoration and Water Quality Monitoring on Willapa Bay Rivers

Extended partnerships help improve water quality and salmon habitat

Project goal:

The Palix, Bear, and Ellsworth rivers are tributaries to Willapa Bay where shellfish, fisheries, and tourism rely on the quality of its waters. Water quality monitoring of these rivers indicated that Willapa Bay and the rivers flowing into the bay have levels of dissolved oxygen and bacteria that do not meet state water quality standards. Stream restoration projects were identified to improve water quality and salmon habitat.

What was done?

In 1999 on the Palix River, approximately 1000 logs (large woody debris [LWD]) were placed in various log structures to mimic natural log jams. These logs were delivered in all channel types covering ten miles of river.

Was it successful?

- Significant Large Woody Debris (LWD) mobility - downstream movement ranging between 5 and 2000 m - all LWD has remained in the project site.
- Important LWD additions
- More stable stream bed
- Created good fish habitat including pools and riffles above and below LWD.
- More use of floodplain, such as historic use.

How was success measured?

Restoration activities are monitored with stream gauging stations to quantify flows and support instream and riparian assessments. Flow was compared with visual assessment of log structure, pools, stream bed, sediment and LWD movement, and erosion of channels.

This project has greatly increased our knowledge of how placed wood functions compared to natural wood movement. All the wood placed, and naturally occurring wood, within the stream banks was marked and monitored through time with Geographic Information Services (GIS). Stream bed movement was also tracked through scour monitors, cross sectional data, and stream flow data.

Special notes:

The Nature Conservancy recently purchased almost the entire Ellsworth River system (approximately 5,200 acres). In addition, grants from Ecology purchased data loggers, thermal graphs, and continual monitoring flow gauges for Pacific Conservation District to perform road mapping of all forest roads in Ellsworth River basin in order to develop a forest road management plan.

A similar stream restoration project was undertaken on the Bear River. Approximately 1000 logs were placed on the mainstem and 6,000 feet of tributary streams. Ecology placed a flow station and temperature monitors on the mainstem Bear River that have assisted with evaluating the effectiveness of the placed wood structures on water quality and salmon habitat.

Lead: Pacific Conservation District
Partners: Governor's Salmon Recovery Program, US Fish and Wildlife Service Jobs in the Woods Program, Longview Fibre Co, Hampton Affiliates, Rayonier Timberland Operating Company, Weyerhaeuser, Columbia Pacific RCandD, Pacific Conservation District, the Nature Conservancy, University of Washington, Washington State Department of Natural Resource Jobs for the Environment Program, Washington Department of Fish and Wildlife
Location: Pacific County
Funding source: Washington State Department of Natural Resources Jobs for the Environment Program, U.S. Fish and Wildlife Service Jobs in the Woods Program, Salmon Recovery Fund, Terry Husseman Fund
Timeline: 1996 to the present
Contact: *Craig Graber*
Washington State Department of Ecology
cgra461@ecy.wa.gov
360-407-6299

Large woody debris.

Increasing Dissolved Oxygen with Your Bare Hands

The Thomason Creek project was a good example of getting out and getting the job done, even if it required a lot of hard work and sweat.

Project goal:

During water quality monitoring at the mouth of Thomason Creek in the summer of 1993, dissolved oxygen levels were often well below the state standard of 8.0 milligrams per liter for Class A waters. A dense growth of watercress was identified as the major cause of the reduced oxygen levels. The watercress was thick enough to completely cover the water surface during most of the year. The Chewelah Creek Watershed Management Committee (WMC) recommended that the watercress be harvested at periodic intervals to promote water flow and reduce the nutrient source caused by decaying vegetation.

What was done?

The Chewelah Creek Watershed Project was the result of recommendations made in the 1994 Chewelah Creek Watershed Management Plan. The plan was the second phase of the Colville River Watershed Ranking and Planning Project. Both projects were funded by the Washington Department of Ecology through its Centennial Clean Water Fund Grant program. The plan outlined 66 recommendations to protect, enhance, and maintain the water quality in the Chewelah Creek Watershed, including improving the water quality of Thomason Creek through the control of aquatic vegetation in order to improve fish habitat and to meet the Washington State water quality standards.

Was it successful?

In the fall of 1995, approximately one-third mile of the lower portion of Thomason Creek was treated by hand pulling of watercress. Hand pulling was used because use of equipment with the potential to dredge the channel was not permitted. Approximately 1200 pounds of dry material were removed from the creek. Water flow was improved and the channel bottom material changed from thick muck to a coarse sand/gravel mix. The stream condition was assessed during fall 1996, and it was determined that additional treatment was not essential at that time.

Chewalah Creek covered with watercress.

Extensive water quality monitoring was conducted from the headwaters to the mouth of Thomason Creek during the winter and spring of 1997. This information provided insight into potential sources of nutrients that could promote re-establishment of the watercress in the lower reaches of the stream. A part-time technician with the district prepared a paper considering various alternatives for dealing with the watercress issue in the future.

One recommendation was to change the time of treatment of the stream from the fall to the growing season, prior to watercress seed falling into the water. In the summer of 1998, the creek was again treated by hand pulling. The original treatment area was re-treated and pulling was conducted on an additional three-quarter of a mile of the creek.

How was success measured?

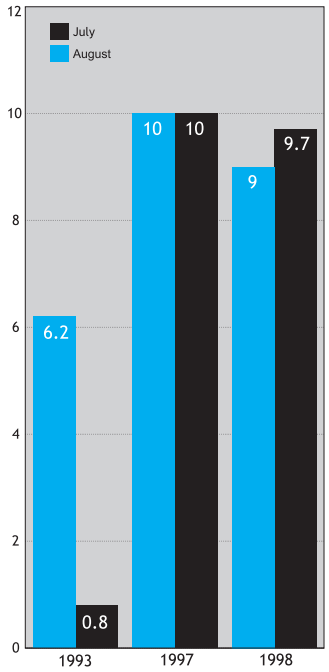
In July and August 1997 and 1998, water quality monitoring was conducted around sunrise and after noon on the same day. Results for dissolved oxygen (DO) and pH showed that the water at the mouth of the creek was now well above the state standard for these constituents.

Special notes:

Hand pulling of vegetation is time consuming and labor intensive, but the results, in this case, were dramatic. A once clogged stream was opened to allow fish passage, the muck channel bottom was converted to coarse material suitable for aquatic insects, and a stream that once violated the state's water quality standards was now in compliance with these standards.

Lead: Stevens Conservation District
Partners: Washington State Department of Ecology, Quartzite Mountain Nursery
Location: South of the city of Chewelah, tributary to Colville River; WRIA #: 59
Funding source: Centennial Clean Water Fund from Washington State Department of Ecology
Timeline: 1995-1999
Contact: *Charlie Kessler*, Stevens County Conservation District
ckessler@co.stevens.wa.us

Figure 3: Minimum Dissolved Oxygen Levels Measured in Thomason Creek



Hand pulling watercress.

Crab Creek Equipment Removal and Restoration

A project that removed old farm equipment and vehicles from along the creek, followed by stream bank rehabilitation.

Project goal:

After purchasing some property along Crab Creek, a landowner wanted to remove several old vehicles along approximately a half mile stretch of the creek. Not only were the old combines, trucks, and cars an eyesore, they also inhibited the creation of habitat for pheasants and grouse. The goals of the project were to remove the vehicle debris and replace it with native vegetation that stabilizes stream banks, increases upland game bird habitat, and improves streamside habitat.

What was done?

With the assistance of a couple grants received by the Lincoln County Conservation District, the project had three primary components: *1)* moving irrigation pipe and fencing farther away from the creek, *2)* removing the combines, trucks, and car bodies, and *3)* planting native vegetation along the creeks in order to protect the stream banks after the removal of the debris. A hydraulic project approval from the Washington Department of Fish and Wildlife was granted to take precautions against any engine fluid spills to the creek.

Both the irrigation pipe and fence were removed and reconstructed an average of fifty feet away from the edge of the creek along the length of the project. Contractors were solicited to remove the vehicles and equipment hulks from the banks of Crab Creek, as well as haul away the debris to a recycling facility. Prior to extracting the vehicles, absorbent booms were installed and absorbent pads were available to capture any engine fluid spills. Vegetation was planted and erosion control fabric installed along a few areas of the stream bank that were contoured in order for the excavator to access the vehicles. Vegetation was also planted along the entire length of the project.

Was it successful?

After two days of work, four combines, three pickup trucks, seven cars, and a set of drills (used to plant grain seed) were pulled from the banks and waters of Crab Creek. The amount of debris removed from the half mile stretch was almost double the amount anticipated to be removed. A total of 2,108 pounds of debris were disposed of at a recycling and disposal facility.

In addition, 550 trees and shrubs were planted and approximately 3,600 square feet of erosion cloth was installed over the newly seeded stream banks.

By removing the vehicles and replacing them with native vegetation, in the long term, this project will restore environmental, recreational, and aesthetic properties of Crab Creek. Without the debris, ecological relationships between vegetation, soil, and water will be re-established and the stream banks will become stable. Water quality will also be improved because the risk of engine fluid spills from the vehicles is removed, water temperature will be decreased with the vegetation

Crab Creek

shading the creek, and erosion and resulting sediment in the water will be reduced because the vegetation is filtering run off and stabilizing the stream banks.

How was success measured?

Although success will continue to be measured for many years to come, the amount of debris that was removed and taken to the recycling facility was the immediate measure of success. Another measure of success was the survival of the trees and shrubs planted at the project site. In the spring and summer of 2004, survival rates of the vegetation will be determined and any erosion from the contoured slopes will be monitored.

Lead: Lincoln County Conservation District
Partners: Washington State Department of Ecology: Section 319 grant and Terry Husseman grant and Joel Molander - Landowner
Location: A farm on Crab Creek north of Ritzville, Washington in Lincoln County
Funding source: Washington State Department of Ecology's Terry Husseman grant was teamed up with the district's Section 319 grant to fund the project. The landowner, Mr. Molander, also contributed cost share.
Timeline: March through September 2003
Contact: *David Lundgren*, District Manager, PO Box 46, Davenport, WA 99122
509-725-4181

Erosion control fabric.

Revegetation.

Debris removed from Crab Creek.

Technical Assistance: Supporting Community Actions to Clean Water

One major role of federal and state agencies is to support local efforts at improving water quality. Agency staff members are the experts at identifying water quality problems and knowing ways to solve them. Transferring that knowledge to others is the definition of technical assistance.

Sometimes technical assistance can be achieved through workshops, manuals, or reports. The better way is to provide assistance in the field as a cooperative venture with local implementers. These stories are about the later—agency technical staff working in the field to improve water quality.

Stories in this category are:

- Reining in the Rain
- Improving Wetland Mitigation in Washington State
- Teanaway Temperature Water Cleanup Plan
- Forest Road Maintenance and Abandonment Accomplishments from Washington Forest and Fish Agreement

Reining in the Rain

The city of Bellingham educated the community about Low Impact Development (LID) by hosting a workshop, installing two rain gardens, and modeling LID techniques as effective stormwater management tools.

Project goal:

The city of Bellingham conducted an education campaign to help integrate low impact development practices into projects and activities of local government, developers, homeowners, and private contractors to reduce the negative impacts from traditional stormwater management.

What was done?

Like many growing municipalities in the Puget Sound region, the city of Bellingham is struggling to reconcile increasing residential, commercial, and industrial development and protection of our marine and fresh waters. Inadequately treated stormwater runoff degrades water quality and harms fish and other wildlife and their habitat. These problems have led the city to seek ways to protect or restore water quality while accommodating development. Low impact development (LID) provided the city with a new approach to stormwater management. They realized that in order to utilize this new tool, they needed to educate city staff, the development community, and citizens. Puget Sound Action Team provided the city with funds from the Public Involvement and Education (PIE) program to hold an LID workshop, construct rain gardens in two parking lots, and write a case study of the rain garden retrofit.

Was it successful?

The workshop attracted over 120 people and featured the latest concepts, policies, and practical techniques for managing storm water. Presentations covered low impact solutions from site design to waste handling. Prior to the workshop, only a handful of city staff had knowledge about LID and virtually no one in the public did. As a result of this education project, city of Bellingham Public Works and Development staff have increased their awareness of LID techniques and are encouraging developers to consider LID practices during the permit review process. The city permit counters have seen more developers and builders inquire about incorporating LID into their projects. City staff installed rain gardens at the 60 stall parking lot at City Hall and the 80 stall parking lot at Bloedel Donovan Park adjacent to Lake Whatcom, which is the city's drinking water reservoir. They documented their experiences and described their monitoring plan for one of the rain gardens in a case study that will be published by the Puget Sound Action Team.

How was success measured?

City staff conducted evaluations of workshop participants. Before and after the workshop, participants were asked to evaluate their willingness to implement low impact development techniques. The city is monitoring the capacity of the rain garden to treat runoff from the parking lot at Bloedel Donovan Park.

Special notes:

Contact the Puget Sound Action Team at 360-407-7300 or the publications section of the Puget Sound Action Team website www.psat.wa.gov to obtain a copy of the case study documenting the City of Bellingham's rain garden projects.

Lead: City of Bellingham
Project partners: Port of Bellingham, Puget Sound Action Team, Washington State Department of Ecology
Location: Whatcom County
Funding sources: Public Involvement and Education (PIE) fund, City of Bellingham
Timeline: 2002 – 2003
Contact: *Renee La Croix*, (360) 676-6961

Planting a rain garden.

Improving Wetland Mitigation in Washington State

Tracking and compliance helps improve the effectiveness of wetland mitigation.

A compensation site in Cowlitz County.

Entering the mitigation site.

Project goal:

The Wetland Mitigation Evaluation Study (Phase 1 and 2) indicated that more than half of wetland mitigation or compensation projects in Washington State were not in compliance with permit requirements, not ecologically successful, and not compensating for the impacts. Based on these results, several recommendations were made to improve the overall effectiveness of wetland compensation projects. This project implemented one of the most significant recommendations: up dating/creating a database to track compensation projects and performing compliance monitoring and follow-up visits on existing wetland compensation projects.

What was done?

A useable database is necessary to effectively evaluate compliance with permit conditions and track decision-making and project follow-up activities. The database used by the Washington State Department of Ecology's (Ecology) Shorelands Environmental Assistance Program (SEA Program) was not meeting those needs.

With assistance from the U.S. Environmental Protection Agency, Ecology staff determined the alternatives for developing a more suitable database system. Some of the identified problems were that it was incomplete, partially used, too cumbersome and slow. A new database was created to track all 401permit and Coastal Zone Management (CZM) activities, including projects that impact wetlands and the associated mitigation requirements.

Site visits were conducted with regional wetland specialists to determine:

- Is the site in compliance with the basic requirements?
- What can we learn from this project to help us improve wetland mitigation projects?
- How should we revise the data collection form?

For each site visit a compliance monitoring form was filled out, photographs were taken, and the project site was discussed with the project applicant and/or consultant.

Was it successful?

A total of 38 sites were visited from March to September of 2002 in fifteen different counties throughout Washington State. The results of our visits helped to establish new protocols for both field evaluations and data management. The protocols have been developed into new wetland mitigation policy.

How was success measured?

The ultimate goal is to have wetland compensation or mitigation projects that effectively replace the wetland area and functions that are lost to development. Following up on mitigation projects not only ensures compliance but also provides valuable feedback. This project resulted in the development of a compliance tracking program, including field forms and a project tracking database.

Lead: Washington State Department of Ecology
Partners: Washington State Department of Ecology, U.S. Environmental Protection Agency, and 401 Water Quality Certificate (WQC) applicants
Location: Compensatory wetland mitigation sites across Washington State; WRIA #: Statewide
Funding source: U.S. Environmental Protection Agency's Wetland Program Development Grant, EPA's 319 funds, and matching funds from Washington State Department of Ecology.
Timeline: April 2002-December 2002
Contact: *Patricia Johnson*, 360-407-6140 or *Dana L. Mock*, 360-407-6947

Teanaway Temperature Water Cleanup Plan

Landowners are active in improving Teanaway River riparian areas.

Project goal:

The Teanaway River system, in Kittitas County, represents some of the highest quality streams and cold-water fish spawning and rearing areas in the Yakima River Basin. However, the Teanaway is on the Washington State list of impaired water bodies due to water temperatures that exceeded state standards.

What was done?

An advisory workgroup – composed of dedicated Teanaway landowners and others who have a strong interest in and history of caring for the river – formed in 2000 to advise and direct the Washington Department of Ecology (Ecology) in the development of a Water Cleanup Plan/total maximum daily load (TMDL) for temperature in the Teanaway. The Teanaway citizens' workgroup, in conjunction with Ecology, continues to be a main driver of all cleanup activities related to this TMDL.

Studies show lack of riparian shade, excessive sediment load, and low stream flow can increase stream temperature.

Was it successful?

Private landowners implemented irrigation upgrades on most of the farms in the lower Teanaway Valley. Grants from the Bonneville Power Administration (BPA) in recent years funded many of these irrigation upgrades. Some Teanaway landowners also paid for these improvements out of their own pockets. In 2003, thanks to many months of hard work by the Kittitas County Conservation District (KCCD), Natural Resources Conservation Service (NRCS) and local landowners, three more Teanaway Valley irrigators improved their irrigation systems.

The Yakima River Basin Water Enhancement Project (YRBWEP) recently purchased strategically-located Teanaway River property with its accompanying water rights; this water will also be used to increase river flow levels. All livestock along the main stem Teanaway River are now fenced away from the river to prevent damage to riparian areas. Additionally, the private timber companies have grazing programs and recreational use policies that will further protect riparian areas and prevent bank erosion in the upper Teanaway basin.

How was success measured?

As of late 2003, all water quality improvement activities identified in the Teanaway TMDL detailed implementation plan (DIP) are ahead of schedule. These include a public education program, road improvements by public and private timber managers, NRCS funding of irrigation improvements, riparian revegetation, and bank stablization. Further, the KCCD has been monitoring water (and air) temperatures, as well as sediment and turbidity levels, and flow levels at several Teanaway watershed locations since mid-2002. This monitoring data will be used to provide a baseline to assess successful reduction in water temperatures in the future.

Special notes:

There are many activities ongoing in the Teanaway River watershed. Improved irrigation practices increase stream flows in the basin. Riparian area protection projects include re-vegetation and livestock management.

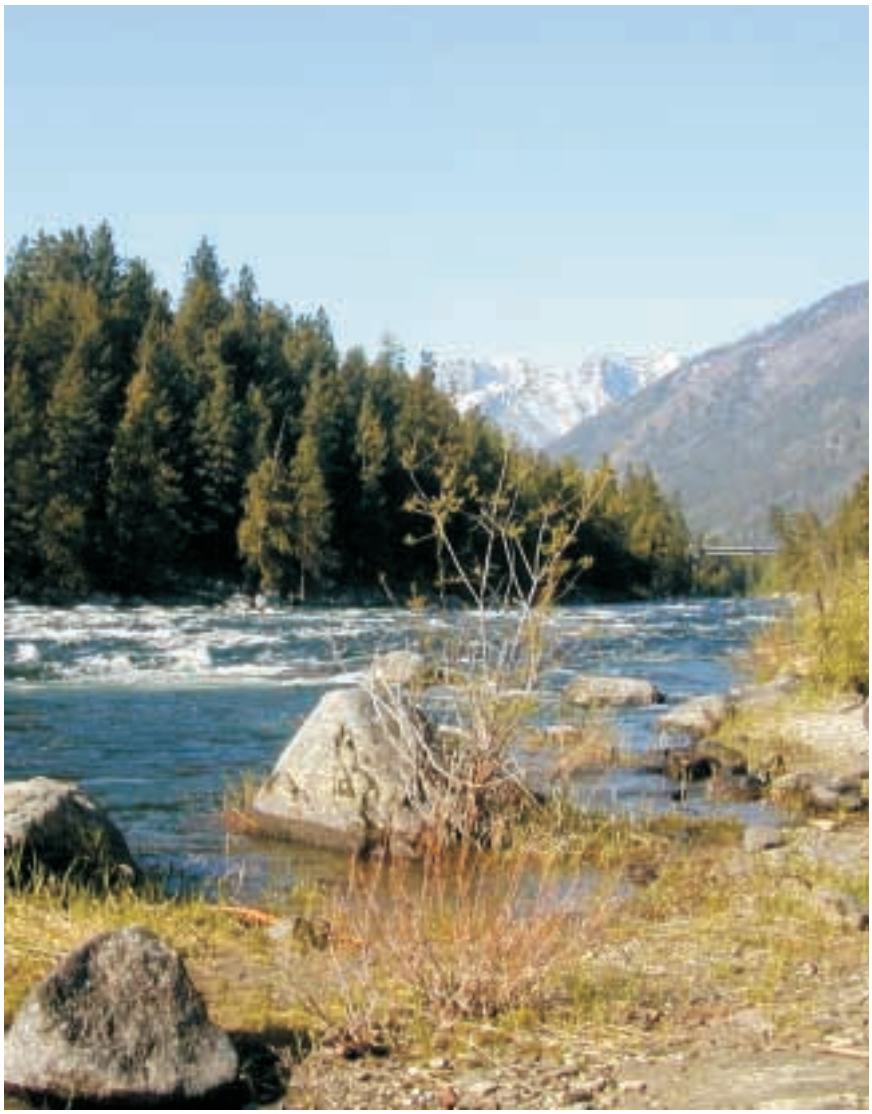
Lead: Kittitas County Conservation District
Partners: Natural Resources Conservation Service, landowners, Yakima River Basin Water Enhancement Project, Washington State Department of Ecology, Washington Conservation Corps, Americorps
Location: WRIA #38, Kittitas County
Funding source: Bonneville Power Administration, landowners, Washington State Department of Ecology, Environmental Quality Incentives Program
Timeline: 2002 to present
Contact: *Anna Lael*, Kittitas Conservation District, 509-925-7766

Forest Road Maintenance and Abandonment Accomplishments from Washington Forest and Fish Agreement

Washington State resource agency and tribal staff team up to review private and state forest landowner road upgrade plans to improve fish habitat and reduce pollution (sediment delivery, heating, and landslides) to state waters.

Project goal:

Modernize Washington forest practices to meet the federal Clean Water Act and Endangered Species Act. For forest road stream crossings, provide passage for fish at all life stages and passage of some woody debris to restore fish habitat. To improve water quality, forest road best management practices (BMPs) will control sediment delivery, protect stream bank stability, divert most road runoff to the forest floor, and reduce road density to what is needed to manage forest lands.



What was done?

Landowners inventory forest roads for compliance with new rules that improve water quality. Washington State departments of Ecology and Fish and Wildlife staff assist State Department of Natural Resources staff with reviewing the landowners' plans and recommending changes where needed.

Was it successful?

In the first two years of the forest road upgrade effort, 44,500 miles of forest road have been inventoried; 1,650 miles of forest road have been decommissioned; 400 fish blocking structures have been replaced or removed restoring an estimated 175 miles stream length to access by fish. Road inventories will be completed by 2006. Repairs are ongoing with roads scheduled to meet new standards by 2016. Fish habitat and water quality are being improved. Landowners may reduce road life cycle costs by preventing damage during catastrophic storms and reducing the number of roads requiring maintenance.

How was success measured?

Washington State Department of Natural Resources (DNR) staff track key indicators of the program such as number of fish blockages corrected and miles of road inventoried. DNR does not keep track of other improvements such as diverting road runoff from direct delivery to streams and upgrading undersized culverts that can cause large landslides during catastrophic storm events. These improvements are checked during field review by Ecology staff.

Special notes:

U.S. Forest Service has agreed to a similar program, but current funding for maintaining federal roads is not sufficient to provide minimal maintenance to the extensive federal forest road system in Washington.

Lead: Washington State Department of Natural Resources
Partners: Tribes, Washington State Departments of Fish and Wildlife, Natural Resources and Ecology, private forest landowners
Location: Statewide
Funding source: Various from the different agencies
Timeline: 2000 - 2015
Contact: *Jerry Shervey*, Department of Ecology, 425-649-7215

BEFORE – *Twin culverts block fish passage and modify stream hydrology. The drop from the culvert outlet and the water velocity in the pipes prevent fish passage between a large wetland and a lake on this trout stream.*

AFTER - *Person is standing where truck was parked in 'before' picture. Landowner removed culverts and placed some natural features in channel. One half mile of road was decommissioned, but can be reopened later when access is needed.*

Stories of Water Quality Improvements in Washington State

To view success stories or to submit *yours*, visit Ecology's web site at:
www.ecy.wa/programs/wq/nonpoint/success/index

Success stories are descriptive examples of projects well done. The success stories showcased in this website cover both small and large scale watershed recovery projects that specifically target nonpoint source pollution. These stories serve as both a tool and an inspiration for other people who wish to develop their own water quality improvement projects. Success stories reveal a wealth of information associated with novel project designs, funding ideas, and useful resource suggestions.

Who Should Submit a Success Story?
Anyone can submit a success story. Your story could contain valuable techniques and tactics that inspire the blue prints of someone else's water quality improvement project. Furthermore, reports of outstanding environmental stewardship are encouraging and fun to read.
Submittals will be posted on the website after approval.

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