The Columbia River Basin:
Progress Report on the 2006 - 2011 EPA Strategic Plan

March 2009

As part of a required organizational learning experience for the Master of Public Administration program at Portland State University in Portland, OR, this report was prepared in collaboration with the United States Environmental Protection Agency, Region 10 Oregon Operations Office. The organizational experience provided an opportunity to learn about current policy issues in toxics reduction in the northwest United States, as well as, document progress on EPA's *2006-2011 Strategic Plan* targets for the Columbia River Basin.

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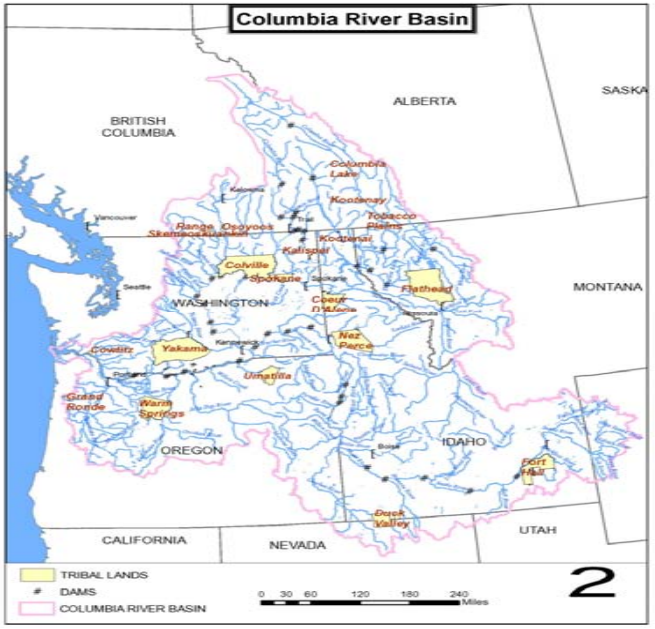
Columbia River Strategic Plan

The U.S. Environmental Protection Agency (EPA) has had a long history in the Columbia River Basin. Some major efforts include the Superfund work in Upper Columbia, Hanford and Portland Harbor, water quality improvement efforts through the development and implementation of total maximum daily loads, and the designation of the Lower Columbia into EPA's National Estuary Program.



In 1992, an EPA national survey of contaminants in fish in the United States alerted EPA and others to a potential health threat to tribal and other people who eat fish from the Columbia River Basin. The Columbia River Inter-Tribal Fish Commission (CRITFC) and its four member tribes—the Confederated Tribes of the Warm Springs Reservation of Oregon, the Confederated Tribes and Bands of the Yakama Nation, the Confederated Tribes of the Umatilla Indian Reservation, and Nez Perce Tribe—were concerned for their tribal members who consume fish.

To evaluate the likelihood that tribal people may be exposed to high levels of contaminants in fish, EPA funded the CRITFC tribes to conduct a Columbia River Basin tribal fish consumption survey, which was then followed by an EPA and tribal study of contaminant levels in fish caught at traditional tribal fishing sites. The consumption survey showed that tribal members were eating six to eleven times more fish than EPA's estimated national average at that time of 6.5 grams per day, which was used to calculate permit limits. The fish contaminant study showed the presence of 92 contaminants in fish consumed by CRITFC tribal members and other people in the Columbia River Basin. Some of these contaminant levels were above the levels of concerns for aquatic life or human health. Contaminants targeted in Columbia River fish included polychlorinated biphenyls (PCBs), dioxins, furans, arsenic, dieldrin, DDE – a breakdown product of dichloro-diphenyl-trichloroethane **(**DDT), and mercury.

EPA decided that leadership was needed in the Columbia River Basin to coordinate ongoing toxic reduction efforts, increase understanding toxics contamination and increase toxics reduction actions. EPA created the Columbia River Toxics Reduction Strategy to coordinate entities and work efforts in the Columbia River.

The Columbia River Basin goal states:
"By 2011, prevent water pollution and improve and protect water quality and ecosystems in the Columbia River Basin to reduce risks to human health and the environment."

The focus of the *2006-2011 Strategic Plan* was achieving more measurable environmental results. Working with state, tribal, and local partners, we selected the following strategic targets for the Columbia River Basin:

- By 2011, protect, enhance, or restore 13,000 acres of wetland habitat and 3,000 acres of upland habitat in the Lower Columbia River watershed. (SP-52)
- By 2011, clean up 150 acres of known highly contaminated sediments in the Lower Columbia River Basin, including Portland Harbor. (SP-53)
- By 2011, demonstrate a 10 percent reduction in mean concentration of contaminants of concern found in water and fish tissue. Contaminants of concern include chlorpyrifos and azinphos methyl in the Little Walla Walla River, DDT in the Walla Walla and Yakima Rivers, and DDT and PCBs in the mainstem. (SP-54)

In September 2006, EPA formally designated the Columbia River as a priority Large Aquatic Ecosystem in EPA's *2006-2011 Strategic Plan*. The Columbia River Basin was identified a part of Goal 4, Healthy Communities and Ecosystems with six other large ecosystems such as the Chesapeake Bay, Great Lakes and Puget Sound. Working with federal, state and tribal partners, EPA identified a goal to protect public health and the environment by reducing toxics loads in fish, water, and sediment of the Columbia River Basin and three measurable environmental targets for 2011 to track progress in wetland restoration, sediment cleanup and toxics reduction in fish and water.

These targets were selected because historical data was available and each target represented measurable outcomes for reduction of toxics in the Basin. Meeting these targets and the overarching goal depends on the states, tribes, local governments, federal government, and nongovernmental agencies working together.

This report is an attempt to record the success to date as of January 2009/December 2008 on meeting these targets and the overall goal. This report discusses each target, provides background information on the actions to achieve the target and describes the accomplishments to date. This information can be used to understand some of the important accomplishments in reducing toxics in the Columbia River Basin.

SP-52 Strategic Plan Target:

"By 2011, prevent, enhance, or restore 13,000 acres of wetland habitat and 3,000 acres of upland habitat in the Lower Columbia River watershed."

Background on Target SP-52

The purpose of this target is to show that 16,000 acres of habitat will be restored by 2011. The Lower Columbia River Estuary Partnership (LCREP) is the lead organization for this target and has the responsibility for coordinating and monitoring the efforts. 96,770 acres of wetland and upland habitat were identified by LCREP in 2005 to be available for protection, enhancement, or restoration. Scientists believe that restoring the habitat will improve the habitat thereby reducing toxics.

Area of Focus for LCREP

Upland and riparian habitat restoration below Bonneville Dam.

Project Summary

LCREP is a part of EPA's National Estuary Program and implements many work efforts to restore and protect the Lower Columbia River Estuary including wetland restoration.

Progress and Update

By 2008, 13,050 acres were restored. Many projects are completed or on-going, while others are still in the design phase.

SP-52 Progress Towards Targets as of January 2009

Year	Target Acres Restored	Actual Acres Restored
2006	2086	2086
2007	5086	4204
2008	8000	13,050
2009	10,000	--
2010	14,250	--
2011	**16,000**	**--**

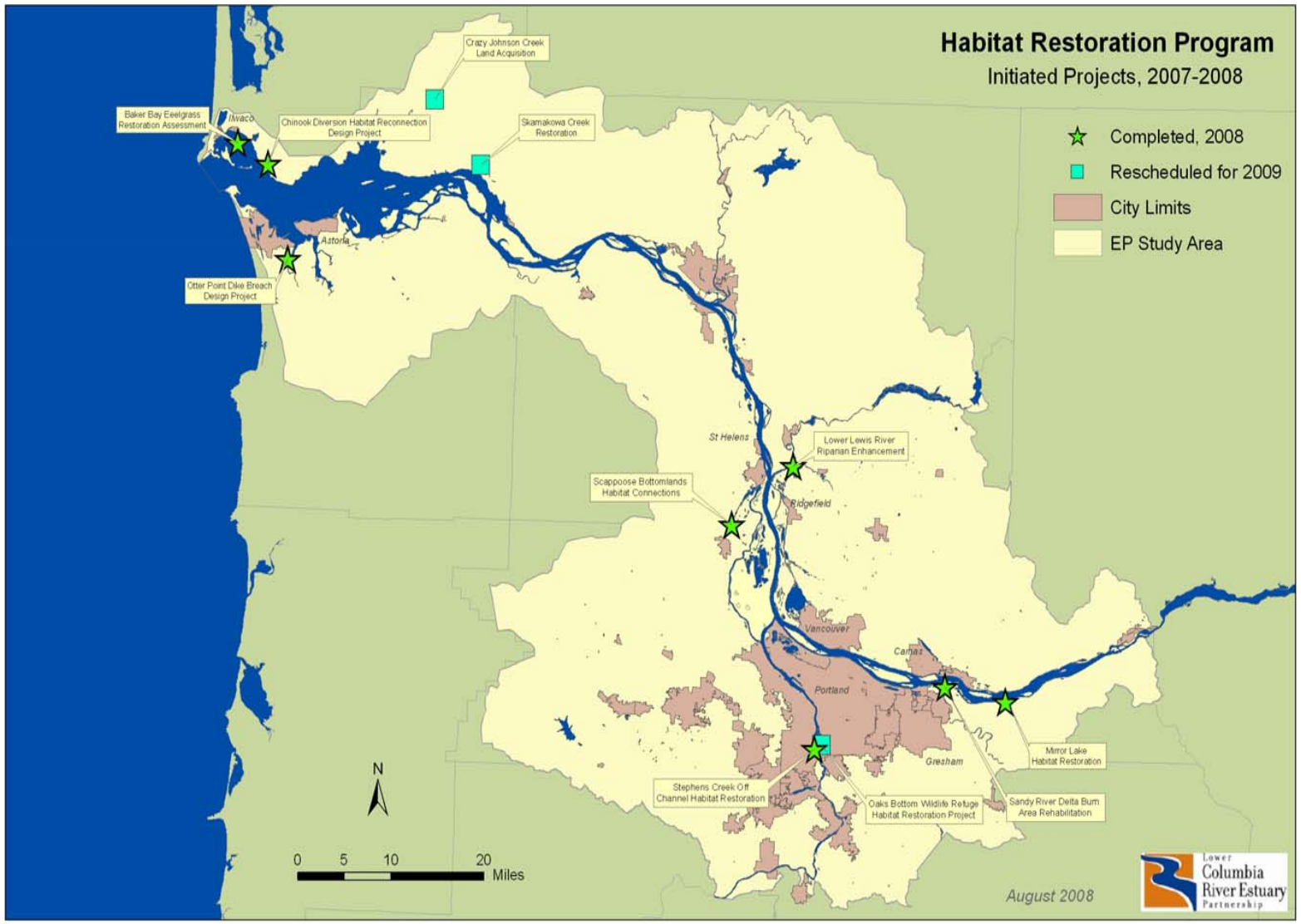


Photo courtesy of Lower Columbia River Estuary Partnership

The Lower Columbia River and Estuary Description

> "The Lower Columbia River and estuary extends from the mouth of the Columbia River at the Pacific Ocean 146 miles upstream to the Bonneville Dam. The estuary has been degraded and disrupted due to heavy human activity over the last 120 years. Three quarters of the tidal swamps that formerly existed in the estuary have disappeared, along with many marshes and other wetlands, leaving the remaining habitat in fragments. River flow has been directed in many areas to a single channel, water and sediments are contaminated with toxins, and invasive plant and animal species have taken up residence in the estuary. Consequently, many populations of native fish and wildlife have declined—many have been listed as threatened or endangered." –Lower Columbia Estuary Partnership

Current Restoration Site Descriptions & Updates

As part of its efforts to restore habitat in the Lower Columbia River and estuary, LCREP has implemented the following projects. Information on these sites is current as of August 2008.

Crazy Johnson Creek - Columbia Land Trust; 326 acres.

This project will permanently protect 326 acres in the Grays River watershed, WA. This will protect habitat for chum, fall chinook, winter steelhead, and coho. This project is expected to be completed in 2009.

Lower Lewis River Riparian Enhancement - Cowlitz Indian Tribe; ~5,000 linear feet.

The project will enhance riparian areas on riverbanks, sandbars, and small islands in the Lower Lewis River, within four miles of its confluence with the Columbia River. The proposed work will enhance riparian function and preserve scarce off-channel habitat for various salmonid species, especially Endangered Species Act (ESA)-listed anadromous salmonids, and will assist fish recovery and reintroduction of anadromous and other native fish throughout the Lewis River basin. This project began in September 2008.

Chinook Diversion Habitat Reconnection - CREST; 1.5 miles.

Some restoration plans include culvert removal and bridge construction to allow fish passage
Photo courtesy of Lower Columbia River Estuary Partnership

This project will restore salmonid access to substantial amounts of high quality isolated habitat by removing an artificial barrier on the Chinook River and replacing it with a low maintenance diversion system. The new diversion will open approximately 1.5 miles of spawning and rearing habitat for chum, coho, chinook, steelhead, and cutthroat salmon. This restoration project is on-going.

Mirror Lake Restoration Project - Parametrix, Inc.; 28.4 acres (revegetation); 0.5 miles (large wood installation).

The project will restore native riparian forests, increase instream habitat diversity, and improve anadromous fish passage at a 400 acre site at Rooster Rock State Park, located in the Columbia River Gorge. Specific activities include replanting 28.4 acres of a previously forested riparian area, installing large wood structures in Young Creek, a salmon bearing stream, replacing rip-rap with natural substrate materials, and installing fish passage baffles and/or weirs in a concrete culvert. In September 2006, a concrete culvert in Young Creek was removed after a feasibility study revealed that the hydrological modifications created by the culvert hindered fish habitat. Instead, a bridge on abutments was erected which allows for better fish passage. In addition, the bridge opened adjacent lands for restoration. Revegetation activities other project elements were completed in 2008.

Large wood installation at the Mirror Lake Restoration Project
Photo courtesy of Lower Columbia River Estuary Partnership

Oaks Bottom Wildlife Refuge Habitat Restoration Project - City of Portland; 24 acres.

This project will improve habitat for anadromous fish, as well as waterfowl and migratory birds, at the Oaks Bottom Wildlife Refuge by reclaiming the hydrologic connection between the Willamette River and its remnant floodplain, increasing the amount of available habitat, and enhancing the quality of off-channel rearing and refuge habitat. This project is still in its design phase. A feasibility study is currently underway for this project.

Otter Point Dike Breach - Young's Bay Watershed Council; 33.5 acres.

This phase will complete an engineering feasibility study to develop a restoration design to improve the estuarine habitat connectivity between the Lewis & Clark River and 33.5 acres of diked pasture located on Lewis and Clark National Historic Park property. This project is still in its design phase. A feasibility study is currently underway for this project.

Scappoose Bottomlands Habitat Connections Project - Scappoose Bay Watershed Council; 3 miles; 32 acres.

The project is focused on part of a larger restoration site that includes a three-mile section of Scappoose Creek between the confluence of the North and South Scappoose Creeks and 100 acres of herbaceous and scrub-shrub wetland complex. The Scappoose Bay Watershed Council enhanced critical habitat connections between Scappoose Bay and salmon refugia habitat in the upper watershed through the control of invasive plant species, fencing along the creek to exclude livestock, and planting native trees and shrubs. This project is on-going.

Stephens Creek Off-Channel Habitat Restoration - City of Portland; 5 acres.

This project is part of a 35-acre complex of publicly-owned natural areas known collectively as the South Portland Riverbank. The Stephens Creek confluence is an important off channel habitat area for salmon within the City of Portland, Oregon. It provides critical rearing and refuge habitat for native, ESA-listed chinook and coho salmon and steelhead trout; rainbow and cutthroat trout; and Pacific and brook lamprey. This project will improve off-channel rearing and spawning habitat for salmonids at the confluence of Stephens Creek and the Willamette River. This project is ongoing.

Historic Skamokawa Creek Restoration - Wahkiakum Conservation District; 2.5 miles.

The project will re-establish tidal-fluvial hydrology to historic Skamokawa Creek through the installation of a freshwater intake structure, replacement of two tide gates, interior culvert retrofits, and channel enhancements; the current phase of the project deals with the installation of the freshwater inlet structure. This project is ongoing.

Combined sewer overflow pipe removal at Stephens Creek confluence improves floodplain habitat
Photo courtesy of Jennifer Goodridge, Bureau of Environmental Services, Portland, OR

Sandy River Delta Burn Area Rehab - Ash Creek Forest Management LLC; 10 acres.

The project entailed replanting a previously restored portion of the Sandy River Delta. A wildfire in August 2007 burned through approximately 10 acres; replanting will allow continued restoration of the site to ash-cottonwood forest. This project was completed in early 2008.

Eelgrass Restoration Assessment - Pacific Northwest National Laboratory (PNNL).

PNNL assessed the potential for eelgrass restoration in Baker Bay, WA by identifying potential restoration sites and mapping existing eelgrass beds. This project was completed in early 2008.

SP-53 Strategic Plan Target:
"By 2011, cleanup 150 acres of known highly contaminated sediments."

Cleanup Progress Towards Targets as of January 2009

Site	Actual acres	Target acres
Portland Harbor	5	80
WA Sites	1	4*
Bradford Island	1	1
Lower Columbia River/slough	--	20*
Lower Willamette	--	45*
TOTAL	**7**	**150**

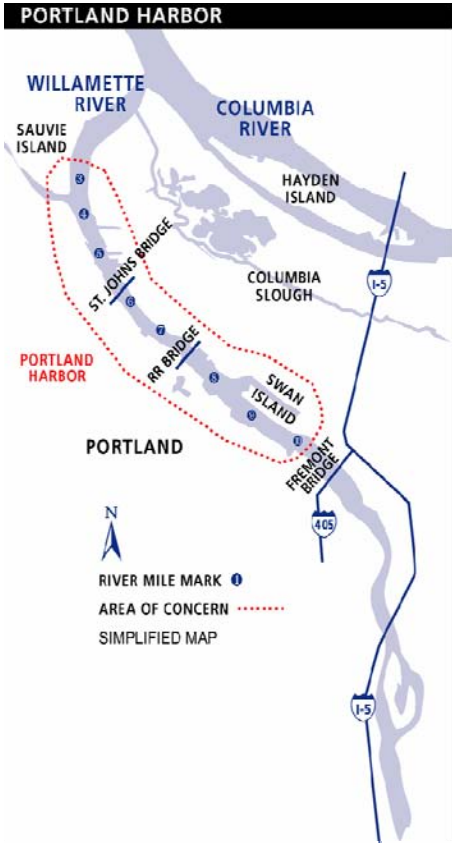
*Targets adjusted for confidence

Background on Target SP-53

The cleanup of toxics in the Columbia River Basin depends on the successful remediation of several cleanup sites located along the River. EPA, states and tribes are working jointly to investigate and cleanup contamination in the Columbia River. Portland Harbor and upland sites, Bradford Island, and Alcoa Smelter in Vancouver, WA represent current cleanup sites where action or successful remediation has taken place.

This target is primarily for the Portland Harbor Superfund Site on the Lower Willamette River near the Columbia River which is co-managed by EPA Region 10 and the Oregon Department of Environmental Quality (ODEQ). Since this target was identified in the 2006-2011 EPA Strategic Plan, it has taken more time than anticipated to finish critical sediment data collection due to the size and complexity. There has been progress with four contaminated acres remediated; however, the bulk of the remediation is expected to begin in 2013.

In-stream Willamette River clean -up by EPA at Portland Harbor



Project Summary

Ten potentially responsible parties are conducting a remedial investigation and feasibility study of the Portland Harbor area of the Lower Willamette River. Round 1 of fish tissue sampling took place in 2001 and 2002. After completion of a detailed project work plan in 2004, Round 2 sampling took place in 2004 and 2005. Major sampling efforts focused on sediment, surface water, groundwater and benthic (mud-dwelling organism) tissue. Round 3 included filling data gaps for storm water, sediment and fish tissue. The results and evaluation of all three rounds of data collection will be presented in the Remedial Investigation and Risk Assessment Reports in spring of 2009. A Feasibility Study, which will evaluate cleanup options, will be completed in 2010. These reports will provide the basis for EPA's Proposed Plan for cleanup, which will be released for public comment, and subsequent Record of Decision in 2011. In the meantime, two early cleanup actions were completed.

Progress and Update

EPA is the lead agency responsible for investigating and cleaning up contaminated sediments in the river itself, and ODEQ is the lead agency for investigating and cleaning up contamination on upland sites (sites on the riverbank) and working with individual property owners in Portland Harbor. Investigation and initial cleanup at Portland Harbor have made steady progress over the last ten years although there have been some challenges and setbacks. Significant resources and intense cooperation are required to identify the sites and kinds of contaminants in the water, tissue, and sediments. The acreage baseline for SP-53 was determined through an internal EPA database which found 400 acres of known highly contaminated sediments in the mainstem of Columbia River and Lower Willamette River. Due to increased understanding of the comprehensive cleanup effort required and the legal processes which delegate cleanup responsibility, additional areas have been found. Consequently, cleanup is now anticipated in 2012**.**

History of Portland Harbor

Portland Harbor is the generic term for a 5.5 mile section of river that stretches from Swan Island to Sauvie Island on the Lower Willamette River in Portland, Oregon. Portland Harbor has been a major point of shipping and industry for more than one hundred years. Before there were environmental protection laws, industry was able to manufacture and dispose chemicals without

regulation. As a result, many chemicals washed down to the river and deposited in the riverbed and shoreline sediment. Many of these chemicals are known today to pose serious threats to human, fish, and wildlife health.

In addition to these historic contaminants, current conditions contribute to the Harbor's pollution levels. Storm water outfalls drain into the Willamette River at Portland Harbor. Storm water carries contaminants from streets and residential gardens and lawns to streams and rivers. In addition, atmospheric deposition deposits toxic contaminants directly into the Willamette River and all of its tributaries. Upstream contamination from pulp mills, agricultural irrigation and run-off, bring contaminated water to the Portland Harbor as the Willamette flows toward the Columbia River on its way to the ocean. Contaminants from many sources travel to Portland Harbor with the river current, some of which are deposited into the sediment. Their presence and level of toxicity is dependent on composition, structure, differing affinity of the chemicals to attach to organic matter.

For these reasons, riverbank and riverbed sediment contamination varies in the Portland Harbor. The investigation has identified up to 30 initial areas of concern that may require sediment cleanup. For example, near the old Arkema facility (River Miles 7.2 through 6.8), which previously manufactured legacy pesticides such as DDT, an area identified in both square acres and in depth (feet) for sediment cleanup includes shoreline and sediment in the mainstem of the Willamette River. The recommended cleanup strategy for the old Arkema site (and potential responsible cleanup parties) will differ from the area offshore of the old GASCO facility downstream (River Mile 6.2), which has high levels of polycyclic aromatic hydrocarbons (PAHs)-contaminated sediment. Depending on the specific location of upland facilities, and previous and current activities on the site, the degree of site contamination and contaminants at sites vary.

Assessing the extent of contamination at Portland Harbor takes a lot of time and effort. In the middle of the 1990's, there was recognition for systematic testing along the Willamette River, which led to funding for site investigation by ODEQ and EPA. The two agencies collected 130 samples in 1997. Through a scoring system used to determine eligibility for the Superfund National Listing, under the Comprehensive Environmental Recovery, Cleanup and Liability Act (CERCLA), the Willamette River's sampling results at the Portland Harbor had it placed on the Superfund List.

The CERCLA Superfund process involves several steps: identify the type and extent of contamination (Remedial Investigation (RI)), risk assessments to human health and the environment (RA), develop cleanup alternatives (Feasibility Study (FS)), select a course of action (Record of Decision (ROD)), and take action to clean the multiple contaminated sites up. The cleanup of Portland Harbor is following the same process and was broken into three Rounds for planning and coordination.

EPA initially identified 69 potentially responsible parties (PRPs) as having potential responsibility for cleanup at the Portland Harbor. In 2001, ten parties voluntarily agreed to begin work on a Remedial Investigation and Feasibility Study (RI/FS). By signing the Administrative Order on Consent (consent order), the ten PRPs legally agreed to details about how the RI/FS would be conducted.

The parties that signed the consent order, and four additional parties that contributing funding to group, are collectively called the Lower Willamette Group (LWG).

Round 1 data gathering focused on the physical system and levels of contamination in fish tissue. Round 2 included comprehensive sampling of surface and subsurface riverbed sediments, and benthic toxicity evaluations. To date, the LWG has funded over $60 million dollars for testing and modeling of sediment, river flows, and tissue sampling of wildlife, fish and benthic organisms to see exactly what the contaminants are, where they are located and where they come from. LWG has conducted many sample collections and analyses, including collection of 1800 subsurface sediment chemistry samples and 2000 individual fish and invertebrate samples.

These analyses revealed the following contaminants in Portland Harbor: polychlorinated biphenyls (PCBs), copper, PAHs, metals (including zinc, lead, mercury, chromium, and nickel), phthalates, dioxins/furans, DDT and its breakdown products DDE and DDD. Not all of these contaminants pose harmful effects for humans at the levels existing in the Portland Harbor. However, other organisms seem to be sensitive to metals like copper and zinc, and at the levels that are in the sediment and water in the Harbor are contaminants of concern. Also, endangered or threatened species of fish require federal agencies to be concerned with contaminants that pose risks to fish but not to humans.

Round 3 for Portland Harbor focused on investigating filling in data gaps. This includes determining recontamination potential (from storm water outfalls, current industry, precipitation deposition, stream flow deposition), background and/or ambient conditions, boundaries of any new contaminated sites. Round 3 methodology includes: using a sediment sampling grid (in the Willamette River mainstem), sediment sampling in depositional areas (in the Multnomah Channel), and surface water sampling. The results of the overall investigation will be summarized in the RI Report scheduled for spring 2009, including an evaluation of the human health and ecological risks associated with the contamination, which will be provided in the Baseline Risk Assessment Report. These reports will provide the basis for a detailed evaluation of cleanup alternatives (Feasibility Study). EPA will then prepare a Proposed Plan to describe the agency's recommended options for cleanup. Following public review and comment, EPA will issue a Record of Decision to document the agency's selection of cleanup areas and methods.

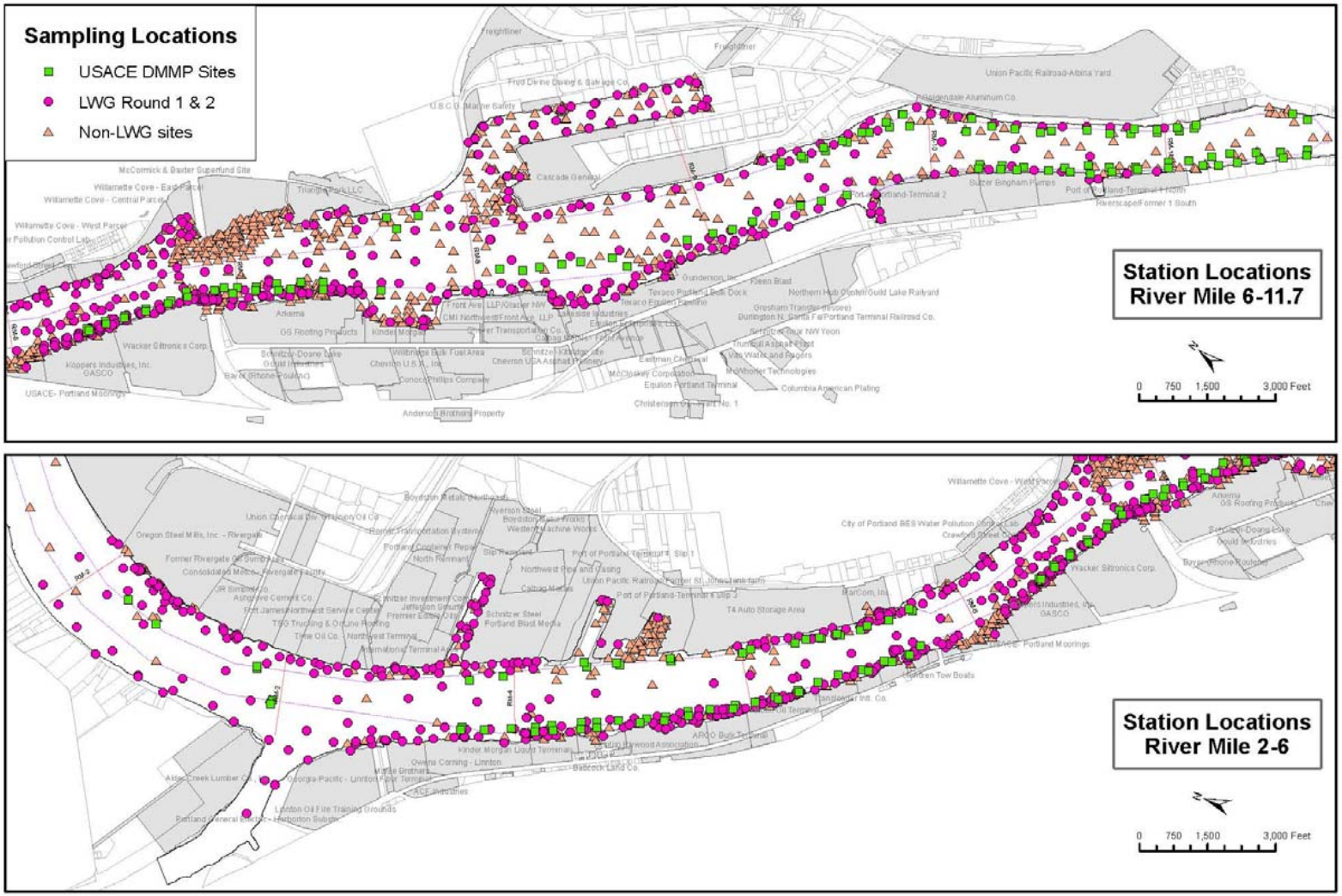
Early Action Sites

Early Action Sites are site-specific contamination removals within an overall Superfund Site that can be conducted on an expedited schedule. Two LWG members have signed orders with EPA to conduct Early Actions within the Portland Harbor and a third is working with EPA to define another. Additional early removal actions will be negotiated as the opportunity or need arises. In addition, cleanup work continues at the McCormick & Baxter Site which is a separate Superfund Site within the Portland Harbor Site.

In 2005, two acres of tar from near shore sediments were removed from the GASCO site. A thin-layer cap of clean material was placed over the excavation area. This cap is being monitored for effectiveness.

Another early action site is Terminal 4 (T-4), one of many terminals in the Port of Portland. The Port of Portland completed the in-water investigation at T-4 and will use the investigation data and EPA-required criteria to develop cleanup alternatives. The cleanup alternatives were presented in an Engineering and Cost Analysis (EE/CA) and EPA selected the cleanup method in 2006. Phase 1 included dredging 12,819 cubic yards of contaminated sediment from Slip 3 (a slip is a man-made, off-channel ship docking area). A barge transported the dredged sediment, which was contaminated with petroleum, metals and PAHs, to a disposal facility located near The Dalles, Oregon. After dredging, the disturbed area was covered with a protective cap of organoclay-sand mix. At Wheeler Bay, a derelict dock was removed and the shoreline was restored to a natural contour and revegetated. The second phase of the T-4 project includes additional dredging, capping and monitored natural recovery, as well as the construction of a Confined Disposal Facility (CDF) to hold dredged sediment.

Terminal 4
Portland Harbor



Total In-stream Sampling Sites in Portland Harbor

ODEQ & Upland Sediment Sites at Portland Harbor

The highest contamination levels appear to be along the river (upland sites) and are contaminated with various toxic compounds, including metals, PAHs, PCBs, chlorinated pesticides and dioxin.

As of September 2008, ODEQ is working with several companies to determine sources of upland sediment contaminants, select a source control target, and design the selected control target. Some sites have completed source control targets, such as the Arco/BP site which had part of the riverbank and near-shore source control action completed in 2007. ODEQ has categorized many sites into categories for additional investigation or for source control in order to prioritize work efforts. This will help remediate high priority sites and reduce significant amounts of contaminants sooner. Finally, ODEQ also evaluated a number of upland sites in Portland Harbor and determined that many sites do not threaten the river.

Bradford Island and PCBs remediation

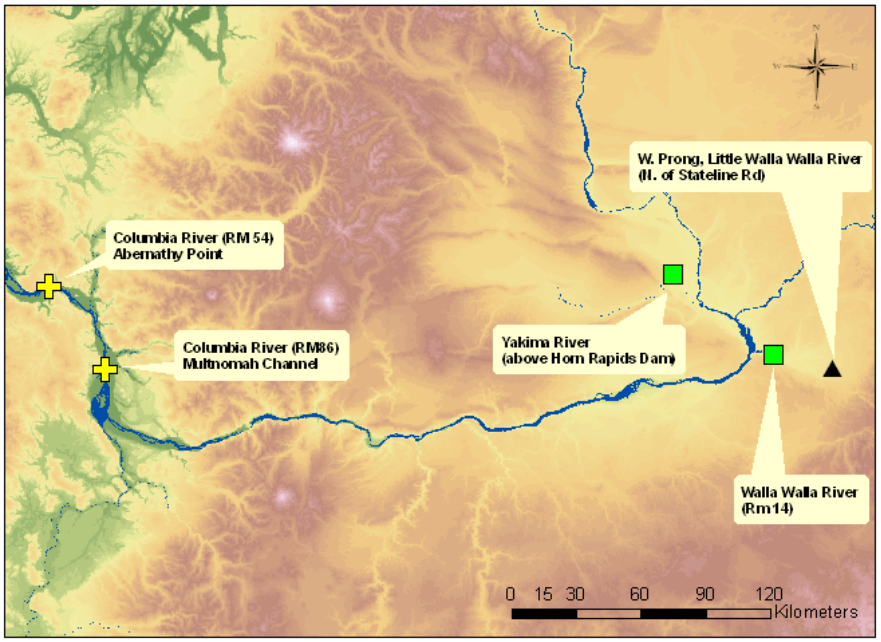
Bradford Island is part of the Bonneville Lock and Dam complex, near Cascade Locks, OR. PCB contamination from historical waste disposal caused concerns for human health, wildlife and fish. In 2002, electrical equipment containing PCBs that remained from when the island was a waste disposal site were removed from the river. A removal action in 2007 led by the U.S. Army Corps of Engineers resulted in the successful remediation of PCB-contaminated sediments from a mile along the Bradford Island shoreline that was estimated to contain over 90 percent of the PCB-contamination at Bradford Island. The 2007 remediation effort involved suctioning 2.2 million gallons of water and sediment from the river bottom and filtering it to remove contaminants. The filtered water with no detectable PCBs was returned to the river. The captured contaminated sediment was taken to a licensed landfill. The Corps continues to work with ODEQ to complete a RI/FS to determine the remaining extent of contamination along the island and in the river.

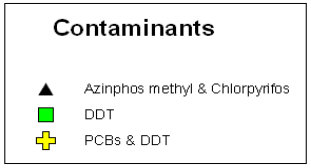
Washington Ecology and the Alcoa Aluminum Smelter

The Alcoa Vancouver site (considered the “Washington sites” for EPA Strategic Plan) is located in Clark County on the Columbia River approximately three miles northwest of downtown Vancouver, Washington. Alcoa constructed an aluminum smelter on the western portion of the site in 1940. In 1985, Alcoa closed the facility and sold the smelter VANALCO, which was then later sold to Evergreen Aluminum. The cleanup at Alcoa began in 1990 and a total $42 million has been spent on cleanup. Approximately $34 million has been spent on controlling the sources of PCBs and stopping the flow of contaminants to the Columbia River. To date, one acre of PCB-contaminated sediment was removed. Further investigation of potential contamination is planned.

SP-54 Strategic Plan Target:

"By 2011, demonstrate a 10 percent reduction in mean concentration of contaminants of concern found in water and fish tissue."





Background on Target SP-54

This measure was intended to show progress in actual toxics reduction in the Columbia River Basin. EPA worked with partners, including ODEQ and Washington Department of Ecology (WA Ecology), to identify locations where historical data was available and where work was underway that could show actual toxic reductions. Five sites were selected based on TMDL implementation, agricultural partnerships, anticipated clean-up work and expected legacy toxic reduction over time. The progress on this measure is reported by the three lead agencies on their work efforts for reducing toxics: ODEQ, WA Ecology and EPA.

LEGEND:

= EPA monitoring sites

= WA Ecology TMDL implementation

▲= ODEQ monitoring

Oregon Department of Environmental Quality

Area of Focus for ODEQ

ODEQ documented chlorpyrifos and azinphos methyl levels in the Little Walla Walla River, and targeted DDT to reduce levels in the Walla Walla and Yakima Rivers. An overall trend analysis in mainstem for PCBs and DDT will be developed. On the map, the black triangle icon indicates ODEQ's area of focus (black triangle on map is West Prong on Little Walla River).

Project Summary

ODEQ will be contributing to target reduction by the implementation of the Pesticide Stewardship Partnership (PSP) for the Walla Walla Basin. Oregon State University Extension and grower groups provide assistance and outreach to teach farmers about riparian buffer zones, recalibrating pesticide spray nozzles to reduce droplet size and other best management practices (BMPs) which reduce unnecessary pesticide application. Either through direct application or run-off, excess pesticides degrade stream quality. Monitoring water quality for contaminants of concern will provide on-going feedback of the success of pesticide reduction efforts. In addition, collecting unused pesticides helps protect stream quality. In the Walla Walla Basin, Oregon's PSP collected over 92,000 lbs of pesticide waste in 2006 and 2007.

Progress and Update

Preliminary results show dramatic improvements in chlorpyrifos and azinphos methyl levels in the streams and rivers that feed into the Walla Walla. In addition, thousands of pounds of waste pesticides have been collected from farmers for safe disposal.

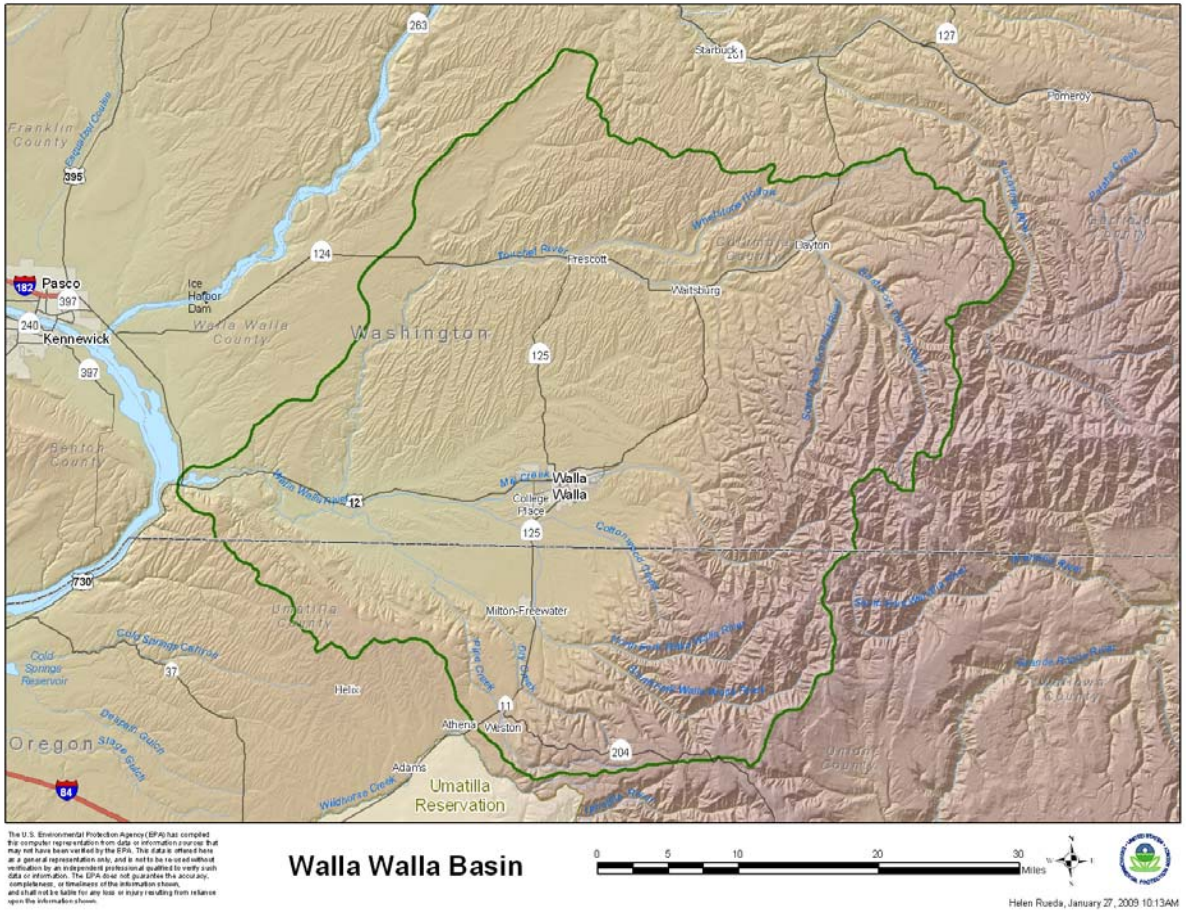
Pesticide Stewardship Partnership Overview

For almost ten years, ODEQ has been using the collaborative approach of PSPs to identify problems and improve water quality associated with pesticide use at the local level. The PSP approach uses local expertise in combination with water quality sampling and toxicology expertise of ODEQ to encourage and support voluntary changes that cause measurable environmental improvements. As a part of the PSP, ODEQ partners with Oregon State University Extension Service, grower groups, Oregon Department of Agriculture, Soil and Water Conservation Districts, Watershed Councils and Agricultural Product Suppliers. The graph on page 20 depicts monitoring results from Lower Neal Creek in the Hood River Basin and illustrates the success of one the two pilot PSP projects. For both of these projects, decreases in average, median and maximum concentrations of the insecticide chlorpyrifos were observed at the stream monitoring locations after BMPs were implemented.

The Walla Walla River Basin

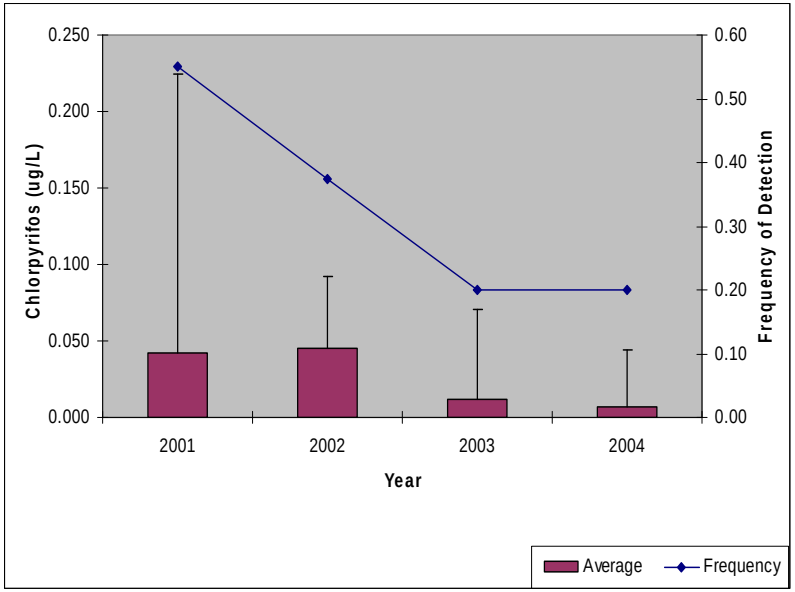
Basin Description

Most of the Walla Walla Basin is in Washington State. However, the headwaters for both North Fork and the South Fork of the Walla Walla River are east of the City of Milton-Freewater, Oregon, in Umatilla County. The Walla Walla Basin on the Oregon side is one of the most agriculturally productive regions in the state, producing some significant crops such as: wheat, asparagus, spinach, potatoes, green peas, fruit orchards and wine grapes.



Walla Walla Pesticide Monitoring Methodology

In 2005, ODEQ began pesticide monitoring in the Walla Walla Basin. ODEQ focused water quality sampling on streams near fruit orchards. Using grab samples with one liter jars, six monitoring locations in the Walla Walla basin are routinely assessed for organophosphate insecticides, such as azinphos methyl, chlorpyrifos, diazinon, dimethoate, as well as two triazine herbicides: simazine and atrazine. Sampling for water quality occurs in the spring, when the most intensive level of pesticide application occurs for tree fruits to mitigate the highest potential for pest damage to crops. Initial monitoring in 2005 showed high concentrations of



Monitoring: Lower Neal Creek 2000-2004
Source: ODEQ

organophosphate insecticides in tributaries of the Little Walla Walla River near orchard areas. In response, two additional monitoring locations were established along those tributaries in 2006. The 2006 monitoring results for these new sites also indicated levels of chlorpyrifos and other organophosates that exceeded in-stream water quality criteria.

Walla Walla Pesticide Stewardship Actions

At the beginning of 2007, ODEQ shared the first two years of monitoring results with local fruit growers association (Blue Mountain Horticultural Society), OSU Extension Service and the Walla Walla Basin Watershed Council. In response to the data showing elevated levels of pesticides in streams, the partner groups discussed possible strategies for conducting technical assistance to growers on BMPs that would reduce drift and runoff of pesticides. In March 2007, a Spray Calibration Workshop was held by OSU Extension Service. This training demonstrated ways to improve spray practices and reduce drift into neighboring streams. The workshop also instructed farmers to calibrate their spray nozzles to optimize droplet size to reduce pesticide waste. Other low-tech spray application techniques were emphasized, such as turning the ground sprayers off when the applicators are on the outside edge of an orchard near a stream. These practices not only reduce pesticide drift, but save the farmer money by reducing the quantity of pesticides used.

The partnership group also promoted the use of less toxic insecticides and pest control alternatives such as biological controls that would reduce reliance on pesticides. For instance, a coddling moth mating disruption program has been established in the Walla Walla Valley to reduce the outbreak of coddling moths before the growing season begins. One-on-one training was also conducted to ensure that the applicators conducting spray operations understood all of the practices discussed at the Spray Calibration Workshop, and to reduce spills and misapplication, both of which contribute to unnecessary pesticides entering waterways. Farmers were also encouraged to increase the use of buffer strips along streams and reduce erosion, create fish habitat, and trap pollutants before they enter the water.

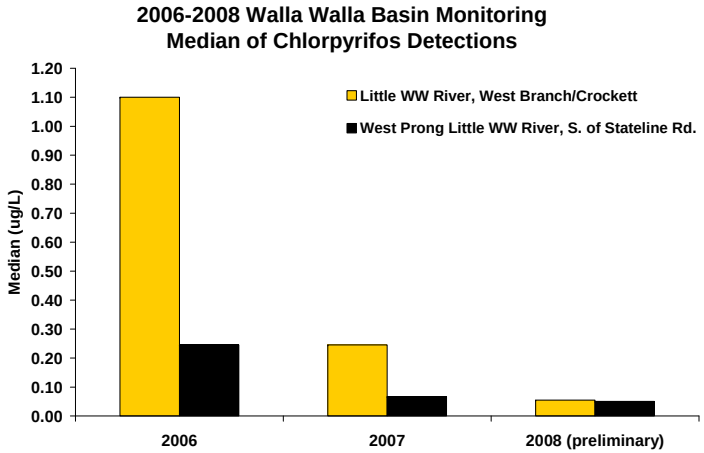
In addition, ODEQ provided the watershed council with an EPA Clean Water Act 319 grant to install weather stations in the Valley which help farmers evaluate wind and barometric conditions to assist them in making informed pesticide application decisions. Both heat and wind contribute to pesticide drift. If farmers know the weather conditions, and can spray on days when conditions are

optimal, the number of applications of pesticides needed for crops is reduced, ultimately saving the farmer money and reducing unintended pesticide drift into streams. These kinds of individualized modifications for farmers' spray applications help the environment and help the farmer save the money, and increase their willingness to participate in the PSP and look for other pesticide reduction techniques.

Finally, "Smart Sprayers" are available, which are electronically calibrated and computerized sprayers. Smart Sprayers spray only the exact amount for the crop and pest based on their programming and adjusts the nozzle size according to crop and conditions. Smart Sprayers also can be programmed to be timed to only spray trees, which substantially reduce spray waste. Unfortunately, Smart Sprayers are costly and only a few farmers use them. The Walla Walla partnership group is looking into possible incentives from the federal National Resource Conservation Service to make such sprayers more economical.

Environmental Results

After the trainings and best management practices were implemented in 2007 and 2008, the detection frequencies and concentrations of organophosphate insecticides in the Little Walla Walla River tributaries decreased significantly. The monitoring site that is included in this Columbia River Toxics Reduction Strategic plan is West Prong of the Little Walla Walla River, South of Stateline Road. The graph above shows the median concentrations of all detections of chlorpyrifos at the Stateline Road site and another tributary monitoring site between 2006 and 2008.



Source: ODEQ

Specifically, the median concentrations of chlorpyrifos detections at the Stateline Road site have dropped 79% between 2006 (baseline) year and 2008.* There was a 73% decrease between 2006 and 2007, and another 24% reduction between 2007 and 2008. With regard to azinphos methyl, several detections were recorded in 2005 and 2006 at the Stateline Road site, but none were detected in 2007 or 2008. ** Similarly, in 2005 and 2006 there were multiple detections of diazinon and dimethoate at various tributary monitoring locations, but these compounds have only been detected once in each of the last two years of monitoring.

** 2008 data is still preliminary. Also, the detection limit for chlorpyrifos dropped from 0.025 ug/l to 0.01 ug/l in 2008. The 2008 figure only includes detections above 0.025 ug/l to ensure consistent comparisons. If all detections above 0.01 were included, the median would be even lower.*
*** 2008 data is preliminary. Although the detection limit for azinphos methyl dropped to 0.01 ug/l in 2008, no detections were observed.*

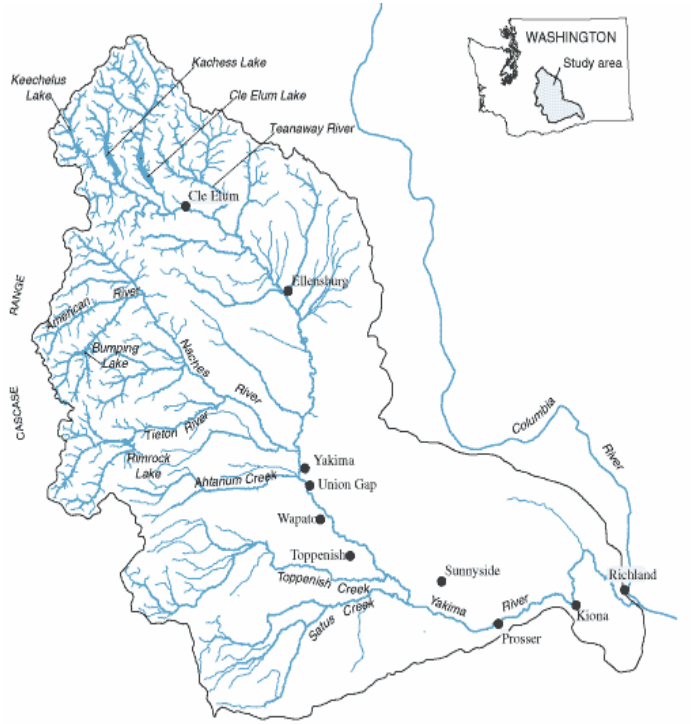
Future Expansion of the ODEQ Pesticide Stewardship Partnership

The Partnership group is hoping to build on past PSP efforts by offering Spanish translation of their Spray Calibration Workshops and one-on-one applicator trainings, since many applicators on farms tend to be Spanish-speaking workers. Also, ODEQ will be expanding the list of pesticides tested and monitored to include phenoxy herbicides, carbamates, and fungicides. Finally, the ODEQ anticipates similar kinds of success stories as they implement their PSP in the Clackamas, Yamhill, and Pudding River Basins.

Washington Department of Ecology

Area of Focus for WA Dept. of Ecology

TMDL implementation on tributaries in the Yakima River and Walla Walla River Basins (on the SP-54 Target map on page 18, the green boxes indicate the area of focus for WA Ecology). Water Quality Improvement Projects, or TMDLs (Total Maximum Daily Loads) are the amounts of pollutant loading that a given water body (river, marine water, wetland, stream, or lake) can receive and still meet water quality standards. TMDLs are implemented through Waste Load Allocations, inserted as pollutant limits in permits to point source dischargers, and through Load Allocations and non-regulatory programs for nonpoint sources.



Yakima River Basin
Source: USGS

Project Summary

Studies indicated that DDT levels in suspended sediment posed a significant threat to wildlife and fish health. Reducing sediment in streams feeding the Yakima and Walla Walla Rivers would reduce

total DDT levels in suspended sediment.

Project Update and Progress

Monitoring efforts continue to identify sources of DDT and PCBs in the upper Yakima River. Preliminary results indicate DDT levels are reduced by 80 percent. Final interpretations of data are expected in 2009. In addition, a similar implementation effort is anticipated in the Walla Walla River Basin in the near future.

Unhealthy riparian area
Source: WA Ecology

The Yakima River Basin

Basin description

The Yakima River flows 215 miles out of Keechelus Lake in the Central Washington Cascades to the Columbia River, draining an area of 6,155 square miles. Mean annual precipitation ranges from 140 inches in the mountains to less than 10 inches in the eastern regions. The western basin is mostly forested, while the eastern uplands are dominated by sagebrush and grass. The lowlands are farmed and intensively irrigated. The Upper Yakima Basin includes the Kittitas Valley, an area around Ellensburg devoted primarily to hay, cereal crops, and irrigated pasture. The Lower Yakima Basin is downstream of the Naches River confluence at River Mile 116.3. The Lower Yakima Valley produces fruit, vegetables, grapes, other specialty crops such as hops and mint, dairy products, and beef. The upper and Lower Yakima basins are separated by the Yakima River Canyon, an arid 20-mile reach between the Kittitas and Yakima Valleys. The canyon is generally considered to be part of the upper river.

Healthy riparian areas
Source: WA Ecology

2006 Fish Study

Due to the existing TMDLs and to determine areas of needed research, WA Ecology conducted a survey in 2006 of chlorinated pesticides, PCB, and dioxin levels in resident fish species throughout the Yakima River. The report from the study indicated that levels of chlorinated pesticides in Yakima River fish have decreased since the suspended sediment TMDLS were implemented. The upper Yakima River fish met current levels of human health criteria for several contaminants, including DDT and dioxin; however, levels of PCBs and other contaminants in fish from the lower river exceed human health criteria.

Sulphur Creek is a tributary of the Yakima River and receives runoff from about 41, 500 acres of agricultural land. Photo taken before BMP implementation.
Source: WA Ecology

After implementation of BMPs total suspended solids were decreased up to 86 percent in Sulphur Creek.
Source: WA Ecology

Current Studies Underway in the Yakima River Basin

Water quality testing was conducted between April 2007 and March 2008. Chlorinated pesticides and PCBs are being monitored due to the elevated levels found in 2006 fish samples. The monitoring study was done for a number of reasons, including assessing the effectiveness of implemented TDMLs and identifying current sources of chlorinated pesticides and PCBs. Results of the study are anticipated in 2009. Currently, dioxin levels are low throughout the Yakima River and are not under analysis. Monitoring efforts continue to identify sources of PCBs in the upper Yakima River, as well as to assess progress towards meeting 2007 TDML targets. Monitoring efforts are focusing on Cherry Creek and Wipple Wasteway, streams feeding into the Yakima River.

Best Practices Methodology and Training

WA Ecology, Yakima Valley growers, water purveyors, local conservation districts, and the Yakama Nation are working together to implement BMPs to reduce DDT and other pesticides by modifying irrigation practices to reduce the amount of soil carried to the river by irrigation returns. To assist farmers and ranchers in reducing stream pollution from agricultural runoff and livestock, farmers and ranchers are shown a variety of ways to make improvements that are feasible and appropriate for their particular situation. Through trainings, pamphlets, and on-site visits, farmers are encouraged to slow bank erosion by planting vegetation along stream beds. Improved riparian areas mitigate flood damage, sedimentation, and captures soil that would be otherwise washed out and carried downstream. Farmers and landowners are shown how to improve riparian buffer zones along streams to improve fish habitat, and implement integrated pest management, which is strategic and planned pest management systems that use less toxic pest control alternatives before using toxic chemical interventions. For ranchers, WA Ecology educates about the hazards posed by cattle disturbing stream beds critical to fish and wildlife habitat, introducing mud and contaminants to streams, and exacerbating erosion.

Walla Walla River Basin in Washington

Similar testing and monitoring methods used in the Yakima River Basin are expected to be implemented in the northern Walla Walla River Basin in the near future. Part of this basin is located in Oregon and progress on toxics reduction targets are discussed in the ODEQ section of this report.

EPA Columbia River Mainstem Monitoring

Area of Focus for EPA

EPA identified two sites in the Columbia River where historic data was available, as well as, clean up work and historic legacy toxic reduction could show a quantifiable measurement in legacy toxics, specifically PCBs and DDT. The first site, Abernathy Point at River Mile 54, is adjacent to Crim's Island and downstream of Longview, WA, the location of numerous industrial sites. The second site, Multnomah Channel is approximately 15 miles downstream of the mouth of the Willamette River, downstream from the City of Portland and one mile downstream of the Lewis River, WA.

Project Summary

Monitoring the Columbia River provides a measurable way to assess other restoration efforts. However, many factors contribute to the health of Columbia River and monitoring efforts are inconsistent at best. Comprehensive, long term trend monitoring is needed throughout the Columbia River Basin to really understand status and trends of toxics in the river and tributaries. These sites were identified since there was data available and measurable reductions were anticipated by 2011.

Project Update and Progress

EPA took responsibility for the Lower Columbia River mainstem sites and EPA expected to see reductions in PCBs and DDT in the mainstem Columbia River by 2011. Expectations were based on reductions in legacy and banned pollutants such as DDT and PCBs would naturally occur over time. EPA also expected that other cleanup efforts, such as Bradford Island PCB cleanup, which occurred in 2007 or the cleanup of the Portland Harbor Superfund, would also cause reductions in overall toxic levels.

EPA Monitoring in the Columbia River

Lower Columbia River Targets

EPA also conducted testing on two sites in the Lower Columbia River and is comparing results with a study done in 2003-2004 by Washington State's Department of Ecology for Pesticides, PCBs, and PAHs. Semi-permeable membrane devices (SPMDs) were used to collect information about toxic levels. Interpretation of the data collected is still underway.

Mid-Columbia River Monitoring Sediment Study

In addition to the Lower Columbia River monitoring work conducted by EPA, additional sampling work in the Mid-Columbia, although not part of the *2006-2011 Strategic Plan,* will help establish a better understanding of the kinds and amount of toxics in the Columbia River.

In 2004, as a follow-up to the 2002 EPA Fish Contaminant Study, EPA launched the Mid-Columbia River Sediment Chemical Contaminants Study to spatially characterize the distribution of the contaminants of concern identified through the Fish Contaminant Survey. Understanding the distribution of contaminants will help EPA identify and evaluate potential sources of contamination. Analyses are completed for the sediment study and a data report is in preparation and is expected to be completed by the end of 2009.

Sampling occurred from Bonneville Dam to Grand Coulee Dam in the summer of 2008 and will resume during the summer of 2009. 19 sites in Washington were selected and approximately 20 sites in Oregon for approximately 30 sites in Oregon. The probability survey will gather data from fish tissue, water chemistry and habitat from all the sites. The sites in Oregon will also have SPMDs deployed as well. For the targeted sites in Oregon, SPMDs will be utilized.

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Photo credit for Yakima Basin picture: USGS (http://wa.water.usgs.gov/projects/yakimawarsmp/maps.htm)

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