Oregon Environmental Council

Cleaner Rivers for Oregon

Why Our Rivers Need Our Help

A Water Quality Progress Report by the Oregon Environmental Council

2007

Columbia

Deschutes

Grande Ronde

John Day

Malheur

Owyhee

Rogue

Snake

Umpqua

Willamette

Cleaner Rivers for Oregon
Why Our Rivers Need Our Help

By Teresa Huntsinger

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The Oregon Environmental Council safeguards what Oregonians love about Oregon – clean air and water, an unpolluted landscape and healthy food produced by local farmers. For 40 years we've been a champion for solutions to protect the health of every Oregonian and the health of the place we call home. We work to create innovative change on three levels: we help individuals live green, we help businesses – including agriculture and health care – thrive with sustainable practices, and we help elected officials create practical policy. Our vision for Oregon includes ending global warming, building sustainable economies, protecting kids from toxins, cleaning up our rivers and ensuring healthy foods and local farms. We offer a variety of resources and events to help people make changes at home, at work and across the state. Join thousands of Oregonians by becoming a member today at www.oeconline.org.

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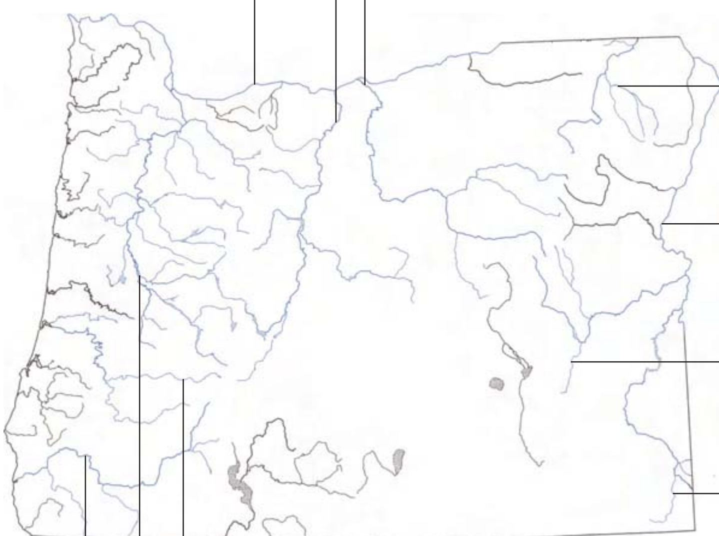
Ten Oregon Rivers



7

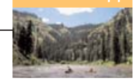
COLUMBIA RED ALERT
306 miles long
Basin area approximately 50,000 square miles

9

DESCHUTES YELLOW ALERT
245 miles long
Basin area approximately 10,700 square miles

13

JOHN DAY YELLOW ALERT
284 miles long
Basin area approximately 8,000 square miles



11

GRANDE RONDE YELLOW ALERT
174 miles long
Basin area approximately 3,700 square miles

21

SNAKE ORANGE ALERT
270 miles long
Basin area approximately 16,900 square miles

15

MALHEUR ORANGE ALERT
190 miles long
Basin area approximately 4,700 square miles

17

OWYHEE ORANGE ALERT
186 miles long
Basin area approximately 6,000 square miles

23

UMPQUA YELLOW ALERT
112 miles long
Basin area approximately 5,000 square miles

25

WILLAMETTE RED ALERT
187 miles long
Basin area approximately 11,400 square miles

19

ROGUE YELLOW ALERT
215 miles long
Basin area approximately 5,000 square miles

Cleaner Rivers for O

We Oregonians love our rivers, and they need our help. From the Willamette to the Owyhee, every major river in Oregon is violating Clean Water Act standards. This report seeks to make information about the health of our rivers more accessible to Oregonians. Learn which pollutants are impacting the rivers you live nearby, play on, or even get your drinking water from, and what can be done to clean them up.

In this report you'll find examples of the great work that is happening around the state to clean up Oregon's rivers. Each of these projects makes a difference, and by working together we can turn around the fate of our rivers. The Oregon Environmental Council (OEC) is working to ensure that state policies protect water quality and support these local efforts, and we're helping people find out what they can do to make sure our rivers are safe places for Oregonians to swim, play and fish.

No matter where you are at this moment, you are in a watershed. When a drop of water hits the ground, if it is not absorbed by plants or allowed to soak into the soil, it will eventually make its way downhill into a river, bringing with it any pollutants it picks up along the way. Our actions impact water quality even when we are not right next to a stream. You can help clean up Oregon's rivers by using the tips in this report, and additional tips are available in OEC's booklet "50 Ways to Love Your River," available at www.oeconline.org.

ALERT LEVELS

Red Alert

Columbia and Willamette

These rivers have serious water quality problems, including toxics that are dangerous to human and aquatic health.

Orange Alert

Malheur, Owyhee and Snake

These rivers have significant water quality problems, often including toxics and bacteria.

Yellow Alert

Deschutes, Grande Ronde, John Day, Rogue and Umpqua

These rivers have some water quality problems, but they do not violate standards for toxics and they have some stretches that are in relatively good condition.

Green Alert

No major Oregon rivers

These rivers have good water quality and they do not violate Clean Water Act standards.

Sources of information

Our data comes from a government report called the 303(d) list. Every two years, Oregon's Department of Environmental Quality (DEQ) develops a list of streams and rivers that do not meet minimum water quality standards (named the 303(d) list after the section of the Federal Clean Water Act that requires it). We used the most recent version, which is the 2004/2006 303(d) list. You can find the 303(d) list at www.deq.state.or.us/wq/assessment/rpt0406/search.asp. Each time the list is updated, additional miles of rivers are added if they are found to be exceeding pollution limits. Rivers are removed from the list when water quality improves, or when a plan is developed to manage the culprit pollutants. The process of developing such a plan can take several years. Every single one of Oregon's major rivers is on the 303(d) list for one pollutant or another, most for many pollutants. OEC is especially concerned about listings for bacteria and toxics because of the dangers they pose to human health.

The challenge we face in interpreting the 303(d) list is that it is based on numerous data sources gathered in an ad-hoc way, and water quality monitoring is not consistent from river to river. In some cases a river segment may be listed for a pollutant because it tested positive at one location several years ago, but it has not been tested since, and other rivers have never been tested for that pollutant. Federal and state funding for implementing the Clean Water Act and monitoring Oregon's waters is woefully inadequate, leading to these data gaps. We supplemented the information in the 303(d) list by contacting local watershed groups and reviewing scientific watershed assessments.

It is important to note that the state of water quality in Oregon's largest rivers is greatly impacted by the tributaries that feed into them. In most cases, water quality declines as you move from a headwaters stream down a river to its mouth, because pollutants are added and surrounding lands change from forested to agricultural and urban. But in some cases smaller streams have unique water quality problems that become diluted once they reach a major river. Taking action to protect and restore streams and uplands throughout a watershed can improve the conditions of our major rivers and provide important habitat for fish and wildlife. Water quality is impacted not only by pollution, but also by water flow, streamside vegetation, and changes to the stream channel, and these factors are important for overall stream health.

What is polluting Oregon's rivers?

Arsenic
In Oregon, the principle source of arsenic in surface water and groundwater is believed to be native rocks and soil. Arsenic residues also come from industrial processes, paints and pesticides. Arsenic has been used as a poison for centuries, and at low levels over a long period of time it can cause cancer.

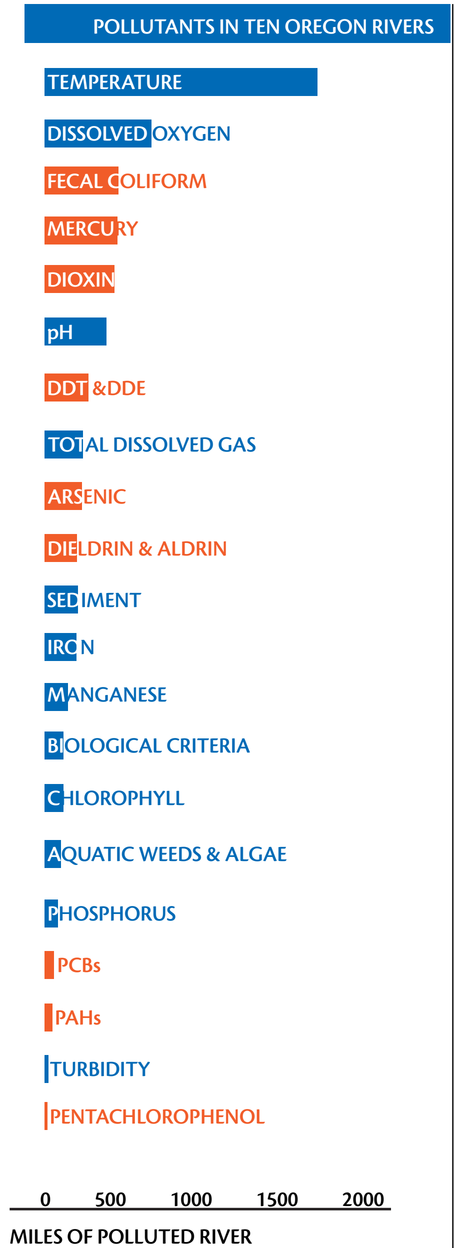
Aquatic Weeds & Algae
Weeds or algae can be so rampant that they interfere with using a stream or significantly reduce its surface area. Excessive algae can also contribute to other water quality impairments, such as pH or dissolved oxygen.

Biological Criteria
Rivers are listed for biological criteria when there is significant damage to fish and it is suspected that the cause is pollution-related. For example, sections of the Willamette River are listed due to skeletal deformities in fish.

Chlorophyll
Chlorophyll is a green pigment found in plants. It absorbs sunlight and converts it to sugar during photosynthesis. High chlorophyll levels indicate the excessive growth of algae. While chlorophyll levels naturally fluctuate over time, long-term persistence of high chlorophyll levels can indicate poor water quality and excess nutrient levels.

Dioxin
Dioxins are some of the most toxic and carcinogenic compounds known. In addition to causing cancer, they act like a hormone in the body, disrupting the endocrine system (the glands that produce hormones) and suppressing the immune system. Dioxins break down very slowly, so they tend to accumulate in aquatic life, from algae to fish. Dioxins are produced as a byproduct from the manufacture of chlorinated herbicides, the combustion of domestic and industrial wastes, and chlorine bleaching of wood pulp and paper.

Dissolved Oxygen (DO)
Just like it sounds, this is the amount of oxygen dissolved in water. Dissolved oxygen (DO) is not a pollutant; on the contrary, fish need oxygen to breathe through their gills. Streams are listed when dissolved oxygen levels are dangerously low. A number of factors impact dissolved oxygen levels. Aquatic plants produce oxygen through photosynthesis, and it is removed from the water by plant and animal respiration and decomposition of organic material. Cold, fast-flowing water holds more oxygen than warm, still water. Wastewater from sewage treatment plants, storm water runoff, and failing septic systems can cause low DO levels.



Each bar on this graph shows the number of miles on the mainstems of Oregon's ten longest rivers that violate water quality standards for each pollutant, according to DEQ. Pollutants of greater concern for human health are in red. Added together, these ten rivers make up 2,169 river miles.

Glossary

Anadromous
Anadromous fish such as salmon and steelhead hatch in streams, swim to sea when they are young, and return years later to their freshwater streams to spawn and die.

Basin
A basin is the area that a river drains. Generally the word "basin" is used for larger rivers that have multiple tributaries, and the word "watershed" is used for smaller rivers and streams, but both words convey the same concept.

Floodplain
The floodplain is the area alongside a stream or river that is usually dry but becomes inundated at least once a century when the river floods. Floodplains are often flat and highly fertile due to the sediments deposited there by the river.

Instream water rights
Instream water rights establish flow levels to remain in a stream and they have the same status as other water rights. Instream water rights are not guarantees that a certain quantity of water will be present in the stream because they do not have priority over other water rights that were established before them.

Riparian
Riparian areas are the areas immediately adjacent to streams and rivers. They can also be called streamside areas. Although they occupy a fairly small percentage of any watershed, riparian areas have large impacts on fish and wildlife. Their vegetation controls water temperatures and screens out pollutants.

Total Maximum Daily Load (TMDL)
Total Maximum Daily Loads are plans DEQ develops for reducing pollution in "impaired" bodies of water that violate water quality standards. They include an assessment of the amount of pollution coming from various sources and an analysis of how much each source needs to be reduced by in order to meet water quality standards. They are sometimes called clean water plans.

Upland
Uplands are lands at higher elevation than riparian areas and flodplains. Land management practices in upland areas can have a substantial impact on streams and rivers, even though they may seem far away.

Watershed
A watershed is defined as the area of land where all precipitation drains to a common water body. Since water flows downhill, the boundaries of a watershed are determined by the contours of the land around it.

Fecal Coliform

Fecal coliform is a type of bacteria, including E. coli, which is found in the intestines of mammals. Its presence indicates that feces is in the water, so it is used as an indicator of pathogens dangerous to human health. DEQ had been testing for fecal coliform in general, and it is now switching to testing specifically for E. coli as a bacteria indicator. Most strains of E. coli do not cause serious illness, but when E. coli is detected it may indicate the presence of more harmful bacteria, such as salmonella or giardia. Sources of E. coli and other fecal coliform include the fecal matter of birds and wildlife, domestic dogs and cats, livestock, and sewer overflows.

Iron & Manganese

Iron and manganese are natural minerals dissolved from rocks. They can affect the taste, odor, color, and staining properties of water, but do not cause illness or hazards to aquatic life.

Legacy Toxics (PCBs, DDT & DDE, Dieldrin & Aldrin)

DDT and its byproduct DDE, and aldrin and its byproduct dieldrin are pesticides that were banned in the 1970s and can still be found in river sediments. They have toxic effects on wildlife, take a long time to break down, and can have harmful effects on human health. These legacy pesticides are washed into rivers from agricultural soils where they were once used. PCBs were widely used as coolants and lubricants until they were banned in the 1970s. Consumer products that may contain PCBs include old fluorescent lighting fixtures, electrical devices or appliances containing PCB capacitors, and hydraulic fluids. DDT, DDE, PCBs, dieldrin and aldrin persist in the environment for long periods of time and become concentrated as they move up the food chain. Fish advisories have been issued for PCBs in the Willamette and Columbia rivers.

Mercury

Mercury is a naturally occurring element that has many industrial commercial uses. However, it is highly toxic, persists for years in the environment and can accumulate to higher concentrations as it moves up the food chain. Mercury is a neurotoxin that can slow fetal and child development and cause irreversible deficits in brain function. People are exposed to mercury primarily through fish consumption, and mercury is the number one reason for fish consumption advisories in Oregon and nationwide. A significant amount of mercury enters Oregon's waterways from global air deposition and erosion of native soil. It also comes from abandoned mines, mercury-added products (such as thermostats and automotive switches) and dental amalgam. Industrial sources such as cement plants and coal-fired power plants emit mercury into the air, which eventually is deposited on the ground and picked up by runoff water.

Nutrients (Phosphorous & Ammonia)

Phosphorous is an essential nutrient for plant and animal growth, but too much phosphorous (or phosphate) can cause accelerated plant growth, algae blooms, low dissolved oxygen, and the death of certain aquatic organisms.

Ammonia is one form of nitrogen, which is also an essential nutrient for plant growth. Like phosphorous, nitrogen can cause excessive plant growth and other associated water quality problems. Excessive nutrients can come from wastewater treatment plants, fertilizer runoff, faulty septic systems, livestock confinement areas or manure storage facilities and phosphate-containing detergents.

PAHs

Polycyclic aromatic hydrocarbons (PAHs) come from vehicle emissions, the smoke and soot from power plants, or material left behind by tires. They also can leach from asphalt-based and coal tar-based sealants used on paved lots. PAHs are suspected carcinogens and they have adverse ecological effects on aquatic organisms.

Pentachlorophenol

Pentachlorophenol is a pesticide and wood preservative. Since 1984, the purchase and use of pentachlorophenol has been restricted to certified applicators. It is no longer available to the general public, but it is still used industrially as a wood preservative for utility poles, railroad ties, and wharf pilings. Pentachlorophenol can cause cancer, damage to the central nervous system, reproductive effects and damage to liver and kidneys.

pH

pH is a measure of acidity or alkalinity on a scale from 0 to 14, with low numbers being more acidic and 7 being neutral. Exposure to very low or high pH may cause death or reproductive problems for fish and other aquatic life. Dissolved minerals from rocks and soil contribute to pH, as do photosynthesis and respiration of plants. Sources of abnormal pH levels include mine drainage, industrial effluent, acid rain, sewage, and livestock containment areas. Fertilizers can indirectly lead to high pH levels by causing excessive plant growth.

Sediment

Sedimentation is the formation of significant bottom or sludge deposits. Some sediment is natural, but high sediment levels are harmful to macroinvertebrates (such as crustaceans and water insects) and to fish because sediment can smother fish eggs. In addition, sediment can bind with a number of persistent, toxic pollutants. Soil erosion contributes to sediment, and common sources include exposed streambanks, roads, agricultural and forestry practices, construction and urban runoff.

Temperature

The most common impairment in Oregon rivers is temperature. High water temperatures can be deadly to fish and other river critters, even though warm water may not sound scary if you're planning to take a swim. High water temperatures are often caused by the removal of shade-providing streamside trees and vegetation. Warm water can also enter streams from industrial processes and urban stormwater runoff. Dam-created reservoirs can increase river temperatures by holding water in place and allowing it to be warmed by the sun more than it would if it were flowing naturally. However, some deeper reservoirs discharge from the bottom and can be a source of cool water.

Total Dissolved Gas

Extreme aeration of the river under certain types of spillways on dams can lead to supersaturation of dissolved gasses that can be harmful to fish.

Turbidity

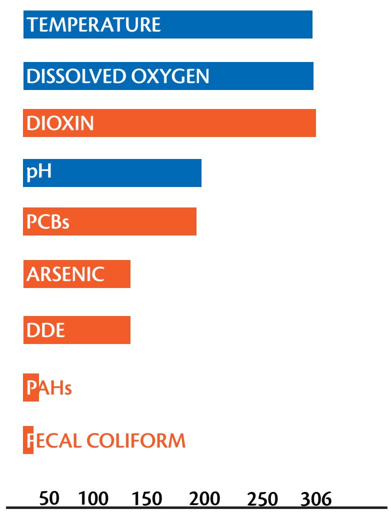
Turbidity is a measure of how clear the water is. Suspended particles such as soil, algae, plankton and microbes contribute to turbidity. High turbidity levels may increase temperatures, lower dissolved oxygen levels, reduce photosynthesis, clog gills, and smother fish eggs and macroinvertebrates.

COLUMBIA

RED ALERT

The Columbia is one of Oregon's most polluted rivers, second only to the Willamette. Stretches of the Columbia are contaminated with toxics such as dioxin and PCBs, and the river has problems with high temperatures and numerous other pollutants.

POLLUTANTS IN THE RIVER



MILES OF POLLUTED RIVER

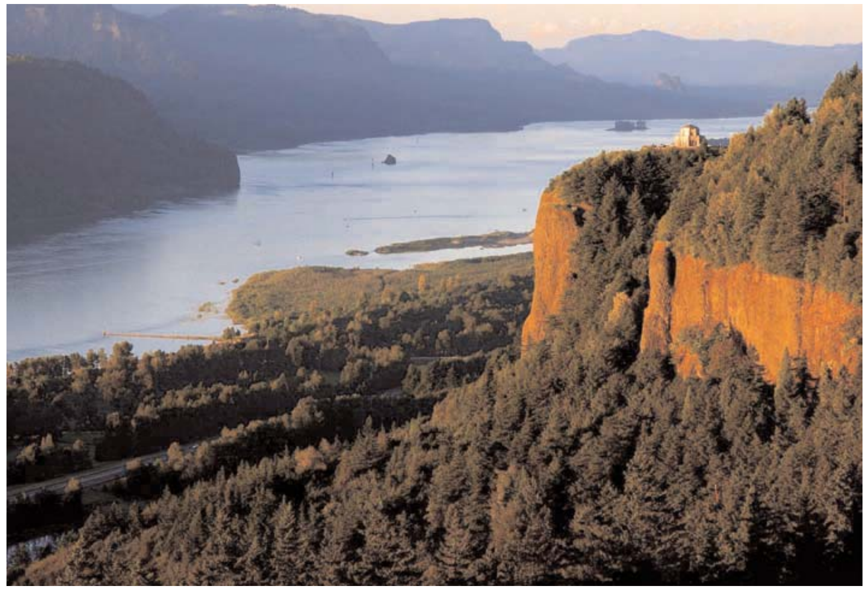
Each bar on this graph shows the number of miles in the Columbia River that violate water quality standards for each pollutant, according to DEQ. Pollutants of greater concern for human health are in red.

LOCAL RESOURCES

Columbia Riverkeeper (Hood River)
(541) 387-3030
www.columbiariverkeeper.org

Columbia River Inter-Tribal Fish Commission (Portland)
(503) 238-0667
www.critfc.org

Lower Columbia River Estuary Partnership (Portland)
(503) 226-1565
www.lcrep.org



The River

The mighty Columbia is one of the largest rivers in North America. It drains a 259,000 square-mile basin that encompasses parts of seven states (Oregon, Washington, Idaho, Montana, Nevada, Wyoming, and Utah) and British Columbia. The Columbia begins in Canada and flows through eastern Washington before forming the border between Oregon and Washington, and eventually reaching the Pacific Ocean. It cuts through the Cascade Mountains, creating the 100-mile-long and 3,000-foot-deep Columbia River Gorge. Many of Oregon's other major rivers flow into the Columbia, including the Deschutes, John Day, Snake, Umatilla and Willamette. There are eleven major dams on the mainstem of the Columbia, four of which are on the section bordering Oregon. The hydroelectric dams are the foundation of the Northwest's power supply, but they harm endangered salmon and significantly impact water quality. The lower 146 miles of the river, up to Bonneville dam, are influenced by ocean tides, and this entire area is considered to be an estuary.

A Closer Look

The federal Environmental Protection Agency (EPA) has identified the Columbia as one of its top water priorities and has named it one of the Nation's Great Water Bodies. Because the Columbia and its tributaries drain an area about the size of France, "legacy pollutants" - chemicals banned in the 1970s such as PCBs, DDT and its derivative DDE - still flush into the river from farms, roads,

10 Ways to Love Your River

Buy Organic Foods and Unbleached Paper Products: By supporting farmers who use sustainable or organic practices, you are reducing pesticide use. Look for the USDA organic label, Food Alliance, or Salmon Safe certifications. When you need paper products, look for unbleached or chlorine-free products. Bleaching paper with chlorine can release a highly toxic chemical called dioxin into rivers.

construction sites and stormwater systems. These toxins are primarily found in sediment and fish tissues, and they accumulate in fish at some of the highest levels in the Northwest. The EPA has suggested that for some Native Americans, who eat up to eleven times more fish than other Americans, the risk of cancer from toxins in Columbia River fish may be as high as 1 in 50 for sturgeon and 7 in 10,000 for salmon. According to the EPA, pollutants are generally of concern if they exceed a "one in a million" risk of cancer. Newer chemicals for which water quality standards have not yet been established are found at increasing levels in the Columbia, such as certain pesticides and flame retardants.

Dioxins, some of the most carcinogenic substances in the world, are also present in the Columbia River. They come from the chlorine bleaching of paper at pulp and paper mills along the river's shores. A plan has been developed for reducing Columbia River dioxins, but no testing has been done yet to see if it is working.

Water temperatures in the Columbia have been slowly climbing over the last 65 years, and temperatures are highest in August and September. Large reservoirs behind the Columbia's dams absorb the sun's heat and make temperatures warmer than the natural snowmelt waters fish are adapted to. The Columbia's dams also contribute to the river's high dissolved gas levels due to the turbulence caused by their spillways. The loss of streamside vegetation on tributary streams and the impacts of stormwater runoff from developed areas also harm the river.

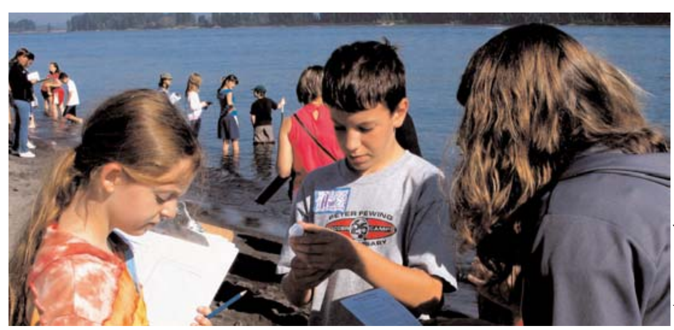
Clean Water Plans, known as Total Maximum Daily Loads, have been completed by the Oregon Department of Environmental Quality for dioxin and total dissolved gas in the Columbia River. Efforts are underway to develop clean water plans for temperature and toxics.

Filling in the Data Gaps

In 2001, there were only five ongoing water quality monitoring sites on the mainstem of the lower Columbia River between Bonneville Dam and the river's mouth. Four were monitored by DEQ and one by the U.S. Geological Survey (USGS). Although these sites provided a great deal of water quality data, the condition of this 146 mile stretch of river could not be adequately characterized and there was not enough data to identify localized problems. To help fill some of the gaps and educate and involve students and the public in water quality issues and monitoring, the Lower Columbia River Estuary Partnership began organizing an annual Water Quality Monitoring Event. Each September the event engages hundreds of students and volunteers in monitoring water quality on the lower Columbia River and its tributaries.

In 2003, the Estuary Partnership was awarded funding through Bonneville Power Administration's Fish and Wildlife Program to expand monitoring on the lower river. They worked with USGS to collect and analyze water quality samples that will provide detailed data on over 130 emerging contaminants such as pharmaceuticals, estrogen compounds, and personal care products; over 180 pesticides; nearly 20 trace elements including chromium, copper, and lead; and more than 25 suspended organic contaminants. This data will be available August 2007.

These important monitoring efforts will help all organizations working in the lower Columbia Basin focus their restoration and pollution prevention efforts where they are most needed to protect the environment and human health.



© Lower Columbia River Estuary Partnership

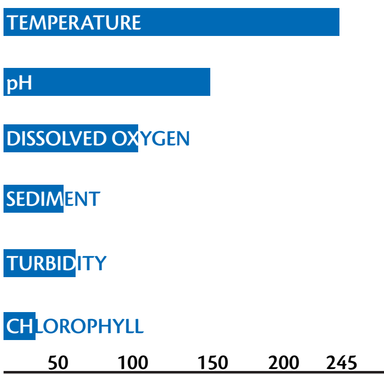
Staff and middle school students from Whitford Elementary School in Beaverton, Oregon monitored water quality at Sauvie Island in September 2006. During the two-week event, 1,088 students and 46 volunteers monitored water quality at 61 sites along the lower Columbia River and its tributaries.

Deschutes

YELLOW ALERT

While parts of the Deschutes are relatively clean and healthy, and it is not known to be contaminated with toxics or bacteria, sections of the river are severely impacted by low water levels. Water quality in the Crooked River is generally worse than in the rest of the Deschutes Basin.

POLLUTANTS IN THE RIVER



MILES OF POLLUTED RIVER

Each bar on this graph shows the number of miles in the Deschutes River that violate water quality standards for each pollutant, according to DEQ. Pollutants of greater concern for human health are in red.

LOCAL RESOURCES

Crook County Soil and Water Conservation District (Prineville)
(541) 447-3548

Crooked River Watershed Council
(Prineville)
(541) 447-3548

Deschutes Basin Land Trust (Bend)
(541) 330-0017 www.deschuteslandtrust.org

Deschutes River Conservancy (Bend)
(541) 382-4077 www.deschutesriver.org

Jefferson Soil and Water Conservation District (Redmond)
(541) 923-4358 ext. 101

Upper Deschutes Watershed Council
(Bend)
(541) 382-6102
ww.restorethedeschutes.org

© Bruce Jackson

The River

In the early 1800s, the Deschutes River was known by French fur traders as the "Riviere des Chutes" - the "river of falls." Today the Deschutes is known for its rugged scenery, and it is a popular destination for whitewater rafting, hiking and sportfishing for steelhead and trout. Much of the Deschutes River is designated as a National Wild and Scenic River.

The Deschutes flows through Central Oregon and is a major tributary to the Columbia River. The Deschutes Basin encompasses roughly 10,000 miles, making it the second largest river basin in the state. The Deschutes begins in Little Lava Lake in the Cascade Mountains, flows through two reservoirs and the city of Bend, and heads north through a deep gorge. The river forms Lake Billy Chinook at the Pelton Round Butte Dam Complex, where it is joined by the Metolius River and the Crooked River. Natural flows in the lower Deschutes have less seasonal variation than most U.S. rivers because much of the lower river's water comes from groundwater. It passes through the Warm Springs Indian reservation, and a popular whitewater stretch near the city of Maupin, before ending at its confluence with the Columbia.

A Closer Look

Water quality on the Deschutes is highly variable from one part of the river to another, from season to season, and from year to year. The most significant factor contributing to degraded water quality in

Stay Engaged in the Political Process: Vote. Research candidates before elections and support those with proven commitments to a healthy environment. Let your national, state and local representatives know that you care about our rivers. Write, call, or email them about proposals you think they should support or oppose.

the Deschutes is low streamflows. Downstream of Bend in the summer, nearly 98% of the river's waters are diverted for irrigation. This leaves very little water in the middle Deschutes River in the summer months, resulting in significant water quality problems and habitat degradation. In the winter, streamflows are low in the upper Deschutes, defined as the reach from below Wickiup Reservoir to Bend, because water is being held in the reservoir for irrigation season.

Central Oregon is experiencing rapid urban growth and changes in lifestyle and land uses. Population in Central Oregon grew by 20% in the last five years. More and more farmland is being converted to urban uses or hobby farms. These land use changes will undoubtedly impact the Deschutes River, and whether those impacts are positive or negative depends on choices being made today. As demand for irrigation water decreases, there is the possibility of transferring that water to urban uses or leaving it in the river for fish. Urban stormwater runoff and agriculture can both negatively impact water quality if improperly managed. But they can also create opportunities for restoration and water quality protection when done right.

Noteworthy steps are being taken to restore watershed health in the Deschutes Basin. Soil and water conservation districts, watershed councils and others are working with landowners to improve farming and conservation practices, and water users are allocating significant energy and funds toward water conservation and efficiency. The City of Bend has become a leader in water conservation and stewardship. Through an aggressive program of water metering, conservation incentives and partnerships, and public education, the city maintained the same peak summer demand in 2003 as compared to 2002, despite 1,000 new service connections. In addition, the Oregon Department of Environmental Quality is working with local partners to develop a Total Maximum Daily Load for the Deschutes River.

Returning Water to the River

Rivers need water. This fact seems obvious, yet Oregon water law permits landowners and irrigators to own rights to more water than our rivers actually carry, causing parts of the Deschutes and many other rivers to nearly run dry during the summer months. The Deschutes River Conservancy (DRC), a non-profit organization in Central Oregon, is working to address this issue. The DRC Leasing Program pays water rights holders who are not using all of their water to lease the water back into the river, or to permanently purchase the water for in-stream water rights. This can provide an incentive for water conservation and irrigation efficiency projects. To date, the DRC has restored 111 cubic feet per second (cfs) of stream flow through conservation, 6 cfs through water transfers, and in 2006 they restored 93 cfs of stream flow to the Deschutes and its tributaries through water leases. Of course, buying water rights requires funding, and grants from the Columbia Basin Water Transactions Program and the federal government have been critical to the DRC's success.

© Deschutes River Conservancy

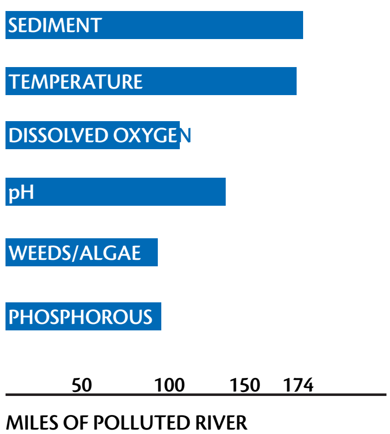
Jim and Deb Marshall sold their Central Oregon Irrigation District water rights to the DRC, keeping 0.5 cfs of water in the middle Deschutes during the peak summer months. They participated in the first permanent water right transfer between the DRC and an irrigation district, laying the groundwork for future agreements.

Grande Ronde

YELLOW ALERT

The Grande Ronde has some serious water quality problems, but it is not known to be polluted by toxics.

POLLUTANTS IN THE RIVER



Each bar on this graph shows the number of miles in the Grande Ronde River that violate water quality standards for each pollutant, according to DEQ. Pollutants of greater concern for human health are in red.

LOCAL RESOURCES

Grande Ronde Model Watershed
(La Grande)
(541) 663-0570
www.grmw.org

Union Soil and Water Conservation District (La Grande)
(541) 963-0724 ext. 109

Wallowa Soil and Water Conservation District (Enterprise)
(541) 426-4588 ext. 3

© Thomas O'Keefe

The River

The Grande Ronde River, in northeastern Oregon, drains parts of the Blue Mountains and the Wallowas. Major streams flowing into the Grande Ronde are Catherine and Joseph creeks and the Wallowa and Wenaha rivers. The river flows through the agricultural Grande Ronde Valley in its middle course and through a series of scenic canyons in its lower course. The last approximately 38 miles of the river are in Washington, where it joins the Snake River. On a map the river traces the pattern of a large circle, hence the name Grande Ronde. 44 miles of this river are designated as part of the National Wild and Scenic Rivers system. The Grande Ronde Basin is sparsely populated, and agriculture, livestock production, and forestry play significant roles in the local economy. Until the mid-1800s, the Grande Ronde Basin was inhabited solely by the Cayuse, Umatilla, Walla Walla and Nez Perce tribes, and the tribes retain treaty rights to harvesting salmon and other resources on their former lands. The Grande Ronde is host to threatened Chinook salmon, steelhead and bull trout.

A Closer Look

The relatively low elevation (7,700 ft.) of the Blue Mountains can result in early snowmelt, which leads to low flows in the Grande Ronde River in late summer. These low flows significantly impact water quality. Elevated water temperatures are a significant problem, and improved streamside vegetation along tributary streams could

10 Ways to Love Your River

Keep Your Car In Good Condition: Drips of oil and other automotive fluids are washed into rivers with each rain. Remember to fix any leaks promptly. To find an automotive shop in your area that is committed to pollution prevention, visit www.ecobiz.org/autolist.htm. If your auto mechanic is not on the list, encourage them to join the program.

dramatically reduce the river's temperature, reduce erosion, improve water quality, and increase wildlife habitat. A Total Maximum Daily Load (TMDL) plan to reduce water temperatures has been developed. Improperly managed livestock grazing, cumulative effects of timber harvest and road building, water withdrawals for irrigation, and agricultural activities impact water quality. The Grande Ronde has had problems with fecal coliform in the past, but it currently meets the standard.

Restoration on a Working Ranch

Water quality and fish habitat were the key drivers of a large, multi-year project to restore wetlands and stream channels in Longley Meadows, along the upper Grande Ronde River. Historically the wet meadow held and slowly released the cold, clear waters of Bear Creek, providing habitat for summer steelhead and spring Chinook salmon. Since early settlement, land management activities such as converting the meandering creek to a straightened ditch, constructing roads and railroads, and replacing native vegetation with livestock forage had altered the meadow, disconnected it from the river, and increased water temperatures. It no longer provided viable habitat for salmon and steelhead.

The restoration project, initiated in 1999 and completed in 2003, involved a diverse group of partners, including Alta Cunha Ranches (the landowners), the Confederated Tribes of the Umatilla Indian Reservation, Oregon Department of Fish and Wildlife, the Grande Ronde Model Watershed and the Natural Resources Conservation Service. The project partners established conservation easements to permanently protect more than five miles of creeks and the river, and built a fence to keep livestock out. They reconstructed a meandering channel for Bear Creek, planted more than 50,000 native plants, and placed large woody debris to improve fish habitat. Two new wells, ten water troughs and 9,800 feet of pipe provide water for livestock on the upland portion of the site, eliminating the need for the cattle to access the creek and improving the utility of the ranch.

In 2006, Eastern Oregon University professor Karen Antell began involving her biology students in monitoring improvements on the site. As vegetation grows and water quality improves over time, they should begin to see changes in the aquatic insect species composition. “This is a perfect project because students are learning how to follow specific sampling protocols and collect field data while providing a service to the watershed and the landowners,” said Antell.

© Karen Antell

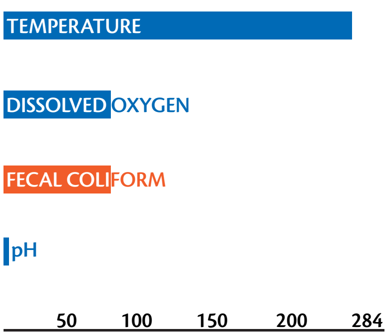
Eastern Oregon University students in Karen Antell's Principles of Biology class collect samples in Bear Creek at Longley Meadows to help monitor water quality as the restoration project progresses.

JOHN DAY

YELLOW ALERT

The John Day is one of Oregon's cleanest major rivers, but it suffers some water quality problems that need attention.

POLLUTANTS IN THE RIVER



MILES OF POLLUTED RIVER

Each bar on this graph shows the number of miles in the John Day River that violate water quality standards for each pollutant, according to DEQ. Pollutants of greater concern for human health are in red.

LOCAL RESOURCES

Gilliam County Soil and Water Conservation District (Condon)
(541) 384-2672

Gilliam - East John Day Watershed Council
(Condon)
(541) 384-2281 ext. 111

Grant Soil & Water Conservation District
(John Day)
(541) 575-0135 ext. 3

Mid-John Day Watershed Council and Wheeler Soil & Water Conservation District
(Fossil)
(541) 468-2990 www.oregonwatersheds.org/

Monument Soil & Water Conservation District (Monument)
(541) 934-2141

North Fork John Day Watershed Council
(Monument)
(541) 934-2188
www.oregonwatersheds.org/

© Angela Stark

The River

Undammed along its entire 284-mile length, the John Day is the second longest free-flowing river in the United States. It drains the Strawberry Mountains, flows through the town of John Day, across sparsely populated parts of northeastern Oregon, through exceptionally scenic canyons, including the John Day Fossil Beds National Monument, and finally enters the Columbia River east of the Columbia Gorge. Major tributaries flowing into the mainstem are the North Fork, Middle Fork, and South Fork John Day rivers. The John Day provides excellent habitat for diverse fish species, including salmon, steelhead, bass, redband trout, bull trout, and cutthroat trout.

Historically, the John Day Basin was used by Native Americans, fur trappers and homesteaders. Gold mining fueled settlement starting in the late 1850s, and mining continued as a significant activity into the early 20th century. Today over 95% of the lands within the John Day Basin are zoned for agriculture and forestry. Cattle and sheep ranching, and hay and wheat farming are the primary agricultural uses, and water from the river is used for cropland irrigation on ranches in the basin. Timber production in the area has significantly decreased over the last fifteen years, and many communities have been hard hit by sawmill closures and the decline in forestry jobs. Tourism and recreation are growing industries. Parts of the John Day are designated as a National Wild and Scenic River, and it is an excellent destination for steelhead and bass fishing and whitewater rafting.

10 Ways to Love Your River

If You Have Leftovers: Have leftover paint, pesticides, prescription drugs, or other chemicals? Always dispose of them safely. Dumping chemicals or drugs down the drain or toilet is not a safe option. Throwing full bottles of potentially hazardous substances into the garbage is dangerous as well. To find out about pick-up days for leftover hazardous chemicals in communities around the state, call 1-800-732-9253.

A Closer Look

The John Day's water is fairly clean, but water quality is reduced in the summer when water temperatures are higher, there is less water in the river, and pollutants become more concentrated. Disturbance of streamside areas causes the greatest damage to the river. These areas are typically managed as part of agricultural operations, and many streamside areas have been altered from their natural state by water diversions, channelization, and vegetation changes. Runoff from improper agricultural and forestry practices reduces water quality because it carries sediments, fertilizers, and manure. Wastewater treatment plants, faulty septic systems, and urban runoff also impact the river. Historical mining also contributes to water quality problems.

Efforts have been taken to restore streamside areas and improve agricultural practices, which has improved water quality. A number of cooperative projects and landowner initiatives have improved the river's health, and existing efforts should be expanded upon. They include successful incentive programs using federal and state funds. The Oregon Department of Environmental Quality (DEQ) is currently developing a Total Maximum Daily Load (TMDL) plan for the John Day River.

Healing Historic Wounds

In Clear Creek, located in the headwaters of the North Fork John Day River, historic dredge mining activity had destroyed the floodplain and made the creek virtually uninhabitable for fish. The dredge mining left piles of river rock over ten feet high in some places and hundreds of feet wide at some points. The consolidated rock has been unmovable by creek flows for over a half century and it constricted about a mile of the channel and made it unnaturally straight. The rock piles were devoid of soil and have remained unvegetated for decades, leaving the creek unshaded. Water velocities were high in the constrained channel, flushing silt and gravels through the reach and making it nearly uninhabitable for fish.

In 2006 the Grant Soil and Water Conservation District (SWCD) began a project to restore Clear Creek's floodplain. They are re-creating a functioning floodplain by progressively redistributing the historic dredge tailings back from the stream banks. This will allow the creek to overflow its banks when the water is high and deposit silt in the floodplain, creating soil so that vegetation can re-establish itself. Three John Deere 230 excavators, one Caterpillar D8 dozer and three dump trucks redistribute the tailings rock.

Phase I of the project was completed this year, which included redistribution and shaping of 168,640 cubic yards of rock along 0.75 miles of Clear Creek and Beaver Creek. Planned work for 2007 will relocate 93,000 cubic yards of dredge tailings and restore an additional 2,100 linear feet of stream-floodplain reconnection. When completed, the project will have moved an estimated 261,500 cubic yards of dredge tailings to restore just under 1.2 miles of stream.

Additional partners in the project include the Umatilla National Forest, the Confederated Tribes of the Umatilla Indian Reservation, the Oregon Watershed Enhancement Board, U.S. Fish and Wildlife Service and three private landowners.

© Grant Soil and Water Conservation District

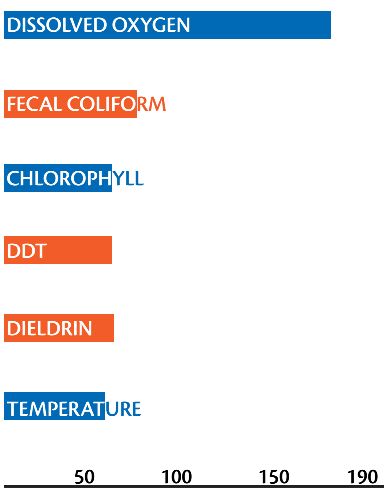
Grant SWCD Hydrologist Ed Calame assesses a stretch of Clear Creek before beginning a project to reshape the rock piles left behind by historic mining operations.

MALHEUR

ORANGE ALERT

The Malheur River suffers from low levels of dissolved oxygen throughout, bacteria and legacy pesticide contamination in its lower reaches, and high summer water temperatures in the upper stretches.

POLLUTANTS IN THE RIVER



MILES OF POLLUTED RIVER

Each bar on this graph shows the number of miles in the Malheur River that violate water quality standards for each pollutant, according to DEQ. Pollutants of greater concern for human health are in red.

LOCAL RESOURCES

Malheur Watershed Council (Ontario)
(541) 881-1417
www.oregonwatersheds.org/oregoncouncils/malheur

Malheur Soil and Water Conservation District (Ontario)
(541) 889-2588

© *Watershed Professionals Network*

The River

Malheur means "bad fortune" or "unhappiness" in French. The river was named in 1826 by fur trappers who lost a stash of furs they had cached along the river. It drains a high desert plateau region south of the Blue Mountains and is a tributary of the Snake River. Despite the similar name, the Malheur River does not flow from or to Malheur Lake, which is located in an enclosed basin to the southwest and is fed by small streams. Property in the Malheur River Basin is primarily publicly owned, with almost half managed by the Federal Bureau of Land Management, and only 35% of property in private ownership. Livestock and agricultural production and processing are the primary economic activities within the basin. Residential and commercial/industrial areas make up only 0.1% of the entire Malheur Basin. The climate is semi-arid, and the river is fed by winter and spring snowmelt and occasional intense thunderstorms in the summer.

A Closer Look

The most distressed stretch of the river in terms of water quality is the lower 67 miles, where it is impacted by agricultural runoff. Multiple dams and reservoirs significantly alter the river, at some points diverting all of its water for irrigation or storage. Stream flows below the reservoirs are now extremely low from fall through spring and unnaturally high during the summer irrigation season. The primary method of irrigation is flood irrigation through ditch

10 Ways to Love Your River

Landscape for Healthy Rivers: Instead of growing grass and exotic plants, consider landscaping with native plants, which require less water and chemicals. If you prefer grass, remember that a lawn needs only 1 1/2 inches of water each week (that's only as deep as a tuna can). Remember to water in the morning or the evening and not in the middle of the day when water evaporates quickly.

systems, which can be highly inefficient. Some instream water rights to protect water for fish exist. But because most of the river's water has been appropriated for other uses with earlier priority dates on their water rights, the instream water rights are not usually met. High water temperatures are likely caused by the arid desert climate and a lack of riparian vegetation. The Oregon Department of Environmental Quality is working with local partners to develop a clean water plan for the Malheur River.

Additionally, the lower portion of the Malheur Basin is designated as a Groundwater Management Area due to nitrate contamination.

Helping Farmers Help the River

Willow Creek, a tributary of the Malheur River, was placed on the DEQ 303(d) list in 2002 for violating water quality standards for chlorophyll and bacteria. Excessive chlorophyll can indicate that the water has high levels of nutrients, particularly phosphorous, which can be brought to the creek through irrigation-induced erosion. Runoff from irrigated pastures and animal feeding operations is also a likely source of bacteria contamination.

To address these problems, the Malheur Watershed Council helped 22 farmers convert from flood irrigation to sprinklers, eliminating nutrient-heavy irrigation return flow from more than 2,000 acres. They also worked with the Vale Oregon Irrigation District to bury 38,872 feet of pipe in farms and animal feedlots, eliminating animal access to surface water and preventing bacteria contamination. The irrigation pipes also reduce seepage and evaporation from open ditches, saving over 2,500 acre feet of water per year. Weekly water quality monitoring will enable the partners to document the positive impacts of the project.

All of the involved landowners, with assistance from the Lower Willow Creek Working Group, have made substantial personal and financial commitments to the project, demonstrating their desire to be good watershed stewards. This project's success is inspiring still more progress. The Lower Willow Creek Working Group was recently awarded a $1.9 million grant from Oregon Watershed Enhancement Board (OWEB) for comprehensive restoration of the watershed, and the irrigation district continues work on piping irrigation canals.

The Vale Oregon Irrigation District and the Malheur Watershed Council worked with local farmers to install 38,872 feet of irrigation pipe on local farms. The elimination of seepage and evaporation from open ditches resulted in a water savings of over 2,500 acre feet per year.

OWYHEE

ORANGE ALERT

The Owyhee has some significant toxic pollution, including arsenic, mercury, bacteria and legacy pesticides, in addition to high temperatures.

POLLUTANTS IN THE RIVER

MILES OF POLLUTED RIVER

Each bar on this graph shows the number of miles in the Owyhee River that violate water quality standards for each pollutant, according to DEQ. Pollutants of greater concern for human health are in red.

LOCAL RESOURCES

Owyhee Watershed Council (Adrian)
(541) 372-5782
www.owyheewatershed.com

Malheur Soil & Water Conservation District (Ontario)
(541) 889-2588

© Jim Labbe

The River

The Owyhee River was named in the 1800s for three Hawaiian fur trappers. It drains 11,049 square miles in Nevada, Idaho, and Oregon. The Owyhee begins at its headwaters in Nevada, flows through Idaho, and crosses into southeastern Oregon, where it eventually flows into the Snake River. From the Oregon/Idaho border to the Owyhee Reservoir (formed by the Owyhee Dam), the river flows through deeply incised canyons in a remote, arid and almost unpopulated area. The Owyhee is classified as a National Wild and Scenic River. Recreational use is increasing despite the difficulty of access. The desert canyons of the Owyhee basin support an ecologically significant and unique diversity of wildlife and plant species, including large populations of California bighorn sheep and sage grouse. Currently, 49 species of fish inhabit the Owyhee subbasin, including 25 native and 11 sensitive species. Anadromous fish (such as salmon) have been extinct in the Owyhee since the Owyhee Dam was completed in 1933. The area downriver of the dam supports irrigated agriculture. Ranching is a primary economic activity in the basin.

A Closer Look

Water quality impairment on the Owyhee can be linked to historic and present land use activities as well as to the natural geology of the area. The arid climate, sudden storm events and cyclic drought cycles lead to natural erosion, which is compounded when cattle and

Plant a Tree: Participate in tree plantings in local neighborhoods, parks and riverbanks. Trees and shrubs always help filter water and clean the air. Along rivers, they also stabilize the banks with their roots, provide habitat for wildlife and provide much-needed shade to cool waters for fish.

wildlife concentrate in riparian areas and around seeps and springs. Improper management of livestock grazing and agricultural activities have impacted water quality and resulted in the removal of riparian vegetation. Historic mining operations still impact the river today through elevated concentrations of heavy metals, such as mercury, in sediments. The state has issued fish consumption advisories for the Owyhee Reservoir due to high concentrations of mercury. Legacy pesticides and their breakdown products have been detected at sites along the Owyhee River below irrigated farmland and in drain water return canals.


© Owyhee Watershed Council

This riparian area was once the site of a feedlot. With assistance from numerous organizations and government agencies, Jesse and Pam White moved their feedlot away from the Owyhee River and restored the riverbank.

Landowners Leading the Way

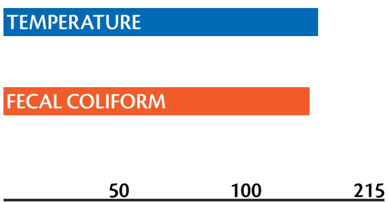
Jesse and Pam White are cattle ranchers who took an interest in the way their cattle operation affects the environment. The Whites came to Oregon Watershed Enhancement Board (OWEB) in 2001 with $69,000 of their own money to invest in a project to move their feedlot a mile away from the banks of the Owyhee River. The project would allow the Whites to restore the riverbank and reduce the risk of nitrates and bacteria entering the river. OWEB provided a $91,000 grant. The Whites, with the assistance of the Owyhee Watershed Council, the Malheur Soil and Water Conservation District, state and federal agency personnel, and the Boy Scouts, relocated their feedlot and installed piping to deliver stockwater to troughs at the new location. The Whites then fenced off the riparian area along the river, including the old feedlot, and reseeded the land with native grasses and willow trees to filter sediment, utilize nutrients, control erosion, provide shade, and retain water in the soils. Revegetating the stream bank will not only improve water quality in the Owyhee River and help implement the Agricultural Water Quality Management Area Plan, but also restore fish and wildlife habitat. People like the Whites are leaders in their community, and by restoring their own land they demonstrate to their neighbors that successful ranching operations can contribute to good stewardship of the valuable natural resources in the Owyhee Basin.

Rogue

YELLOW ALERT

Aside from some problems with bacteria and high temperatures, the Rogue River is fairly clean.

POLLUTANTS IN THE RIVER



MILES OF POLLUTED RIVER

Each bar on this graph shows the number of miles in the Rogue River that violate water quality standards for each pollutant, according to DEQ. Pollutants of greater concern for human health are in red.

LOCAL RESOURCES

Curry County Soil and Water Conservation District (Gold Beach)
(541) 247-2755

Jackson Soil and Water Conservation District (Medford)
(541) 734-3143 Ext. 3
www.jswcd.org

Josephine Soil and Water Conservation District (Grants Pass)
(541) 474-6840

Lower Rogue Watershed Council (Gold Beach)
(541) 247-2755
www.currywatersheds.org

Middle Rogue Watershed Council (Grants Pass)
(541) 474-6799

Rogue Basin Coordinating Council (Central Point)
(541) 890-3107
www.restoretherogue.org

Upper Rogue Watershed Council (Shady Cove)
(541) 878-3710
www.upper-rogue.org

The River

The Rogue River's headwaters begin at Crater Lake in the Cascade Mountains, and the river runs through Grants Pass and numerous small towns before cutting through the Coast Range and reaching the Pacific Ocean at Gold Beach. It drains the relatively populated Medford-Ashland area with its orchards and irrigated agriculture. Mining and forestry are also significant economic sectors in the basin. The river provides habitat for Chinook and Coho salmon, steelhead, brown trout, cutthroat, golden trout, catfish and sturgeon. 84 miles of the Rogue is a designated National Wild and Scenic River, and its exciting class IV rapids are popular among white-water rafters; it is also heavily used by jet boats. Both are regulated, with a permit system in place for rafters. French fur trappers called this area the "Riviere aux Coquins," or Rogue River, after the Native Americans who lived along its shores.

A Closer Look

The Rogue is the cleanest river of its size in the state of Oregon. Even so, sections of the Rogue River violate standards for temperature and fecal coliform bacteria. Parts of the river have violated pH standards in the past, but in 2006 the pH was within acceptable levels. The upper Rogue watershed is largely undeveloped and has very good water quality. Other parts of the watershed are impacted by agriculture and urban uses. Agricultural practices in floodplain areas have led to over-allocation of water, increases in water temperature and the input of chemical and biological wastes to streams. Urban runoff and wastewater from the cities of Medford, Ashland and Grants Pass also contribute to the river's water quality problems. The Oregon Department of Environmental Quality is working with partners to develop a clean water plan for the Rogue River. All anadromous fish species in the Rogue are listed or being considered under the Endangered Species Act.

The Power of One

Landowner Joan Kostelnik was concerned about the erosion occurring along Cooksie Gulch, which runs through the middle of her property and directly into the Rogue River. She was also having a heck of a time managing the invasive blackberry growing along the edges of the creek. So she contacted the Middle Rogue Watershed Council, and they helped her develop a restoration plan and obtain a small grant from the Oregon Watershed Enhancement Board.

The restoration plan called for eradicating the blackberry, bioengineering to reduce erosion, and planting native grasses, trees and shrubs along the edges of the creek to provide shade and stabilize the streambanks. One year has passed since Joan began working on the project in early 2006, and she has used some creative techniques to make it successful. She hired local school youth to eradicate the blackberries (providing them with job skills and a few extra bucks). She used heavy black landscaping fabric to prevent re-growth of the blackberries, and through online research she discovered coconut fiber matting for erosion control. She worked with local nurseries and grass seed banks to identify native riparian grasses, trees and shrubs. And she even kept the birds from eating the native grass seeds by trying out the concept of "Fukuoka balls." She mixed the seeds with mud, rolled them into golf ball sized balls, and threw them into the area where she wanted the grass to grow. Amazingly, it has worked wonders!

The initial project is nearly complete, and the creek is well on its way to being restored to natural conditions. Through her own efforts, research, and never say die spirit, Joan Kostelnik is proving that one person can make a difference to improve our rivers.

© Middle Rogue Watershed Council

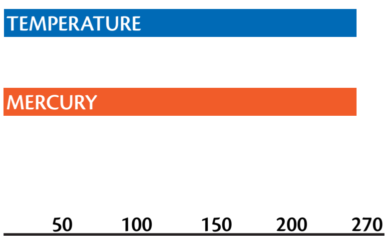
Property owner Joan Kostelnik proudly displays some large blackberry roots she removed while restoring the creek on her land.

Snake

ORANGE ALERT

The Snake River is troubled by two major problems throughout its length in Oregon: toxic mercury and high water temperatures. The river also violates numerous other water quality standards according to the state of Idaho.

POLLUTANTS IN THE RIVER



MILES OF POLLUTED RIVER

Each bar on this graph shows the number of miles in the Snake River that violate water quality standards for each pollutant, according to DEQ. Pollutants of greater concern for human health are in red.

LOCAL RESOURCES

Baker Valley Soil and Water Conservation District (Baker City)
(541) 523-7121 ext. 100

Malheur County Soil and Water Conservation District (Ontario)
(541) 889-2588

Wallowa Soil and Water Conservation District (Enterprise)
(541) 426-4588 ext. 3

The River

The Snake River is the 10th longest river system in the United States, extending over 1,000 miles from its headwaters in Yellowstone National Park, Wyoming, to its confluence with the Columbia River near Pasco, Washington. Oregon's Grande Ronde, Powder, Malheur and Owyhee rivers are tributaries of the Snake, and it is the Columbia River's largest tributary. About 270 miles of the river forms the border between Oregon and Idaho, where it flows through Hell's Canyon, one of the deepest gorges in the world. Hell's Canyon has been inhabited by Native Americans for the last 7,100 to 10,000 years, and the Nez Perce tribe maintains treaty rights to fish and other natural resources. Many competing demands are placed on the river, including agriculture irrigation, hydroelectric power generation, water-based recreation, and fish and wildlife habitat.

A Closer Look

Flow on the Snake River is heavily controlled by dams, distributing water volume more evenly throughout the year than would naturally occur. The dams impact water quality because pollutants accumulate in sediments behind dams (which can reduce pollutant concentrations downstream). They also impact water temperatures when slow moving water is warmed by the sun, and cool water gathers at the bottom of deep reservoirs.

The state has issued fish consumption advisories for the Snake River due to high concentrations of mercury in fish tissues. The

10 Ways to Love Your River

Consider Upgrading Your Boat To A Four-Stroke Engine: Two-stroke engines, commonly used in boats, are inefficient and cause unnecessary pollution. In addition to contributing to water pollution, operating a typical 50 horsepower two-stroke outboard engine for one hour causes air pollution equal to driving a new car over 8,500 miles.

primary sources of mercury are air deposition, legacy mining activities and natural geologic materials. Air deposition of mercury comes from cement plants, coal-fired power plants, and is blown in from places as far away as China. Reducing erosion can help control mercury that is transported to the river in sediment.

In addition to mercury and temperature, the state of Idaho lists the Hells Canyon portion of the Snake River, which borders Oregon, for bacteria, dissolved oxygen, nutrients, pH, sediment, DDT and dieldrin. In 2004, the two states developed a Total Maximum Daily Load (TMDL) for all these parameters except mercury. Practices in both states need to be managed in order for the river to achieve water quality standards.

Putting Nature to Work

In 2004, the Malheur County Soil and Water Conservation District partnered with landowners, local, county, state and federal organizations to create a 12.8-acre, 5-pond constructed wetland to filter the agricultural drain water from 850 acres of irrigated farm land. The five ponds were specially designed to filter sediment, nitrates, phosphates and bacteria from the agricultural drain water before returning it to the Malheur River. Monitoring has demonstrated that the constructed wetlands are effective at cleaning the water and will help achieve water quality targets in the Malheur and Snake rivers. In two years, the project treated an estimated 310 million gallons of water. In addition, wildlife such as migratory birds, quail, pheasants, mule deer and pelicans are making use of the new wetlands.

Malheur County landowners have been working for years to reduce the water quality impacts of agricultural drains. Due to the economic struggles today's farmers face and the limited availability of funding, only 5-10% of landowners in the county have been able to convert to more efficient sprinkler irrigation systems. While the cost of converting to a sprinkler system is about $700-1,200 per acre, the cost of installing the constructed wetland was $294 per acre, creating a more cost-effective solution. The success of this project led the Malheur Soil and Water Conservation District to plan five other constructed wetlands in the Snake and Malheur basins, which are in varying stages of completion today. The constructed wetlands are a new best management practice for water quality in Eastern Oregon.

© Malheur County Soil and Water Conservation District

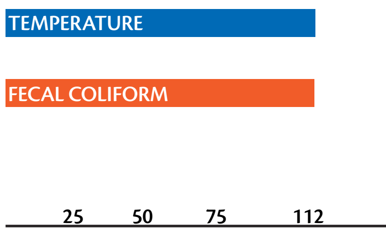
When the Malheur County Soil and Water Conservation District constructed a wetland to improve water quality from agricultural drains, they found that it provided additional environmental benefits. Within weeks of its initial filling, pelicans began using the new wetland.

Umpqua

YELLOW ALERT

Almost the entire length of the Umpqua River has high water temperatures and bacteria contamination.

POLLUTANTS IN THE RIVER



MILES OF POLLUTED RIVER

Each bar on this graph shows the number of miles in the Umpqua River that violate water quality standards for each pollutant, according to DEQ. Pollutants of greater concern for human health are in red.

LOCAL RESOURCES

Partnership for the Umpqua Rivers (Roseburg)
(541) 673-5756
www.ubwc.org

Douglas Soil and Water Conservation District (Roseburg)
(541) 957-5061
www.douglasswcd.org

© Gary Sharp

The River

One of the principal rivers of the Oregon coast, the Umpqua drains an expansive network of valleys west of the Cascade Range and south of the Willamette Valley. It is one of only two Oregon rivers (the Rogue is the other one) that begin in the Cascades and cut through the Coast Range to the Pacific Ocean. The Umpqua Basin is a timber-producing area, and 90% of the basin is federal, state and private forestland. "Umpqua" is the native name for the country around the river and it became used as a word for both the river and local tribes. The river provides habitat for a number of species of anadromous fish, including coho salmon, fall and spring chinook salmon, summer and winter steelhead, and seagoing and resident cutthroat trout. A major tributary, the North Umpqua River, is world-famous for salmon fishing.

A Closer Look

Temperature and fecal coliform bacteria are the primary water quality problems on the Umpqua River. High stream temperatures typically occur during mid to late summer. The removal of streamside vegetation in some areas contributes to warmer temperatures. In addition, stream flow has been modified by straightening, diking, and constriction due to management and diversion structures. Studies by DEQ indicate that sources of fecal coliform bacteria in the Umpqua may include wildlife, livestock wastes, failing residential septic systems, wastewater treatment

Get To Know Your Watershed Council or Conservation District: There are 64 volunteer watershed councils in Oregon and 45 Soil and Water Conservation Districts. They provide technical assistance to landowners, and could use your help with stream restoration and education projects. Visit www.oregonwatersheds.org and www.oacd.org to find your local groups.

plant malfunctions, and stormwater runoff.

While the Umpqua's water quality is fairly good, its tributaries - the North and South Umpqua rivers, Elk Creek and Calapooya Creek - have more water quality problems. For example, the Umpqua Basin is home to the abandoned Formosa and Bonanza mines, which leach mercury and arsenic into tributary creeks and create fish-killing acidic waters. Additional pollution problems in the tributaries include sediment, phosphorous, chlorine, chlorophyll, weeds and algae, plus fecal coliform and temperature. The Department of Environmental Quality (DEQ) is currently developing a Total Maximum Daily Load (TMDL) plan to reduce pollution in the Umpqua Basin.

Water for Fish and Farms

In 2000, a diversion structure was removed from South Myrtle Creek, a tributary of the South Umpqua River, allowing passage of salmon and trout to a stream that had been blocked for nearly a century. The dam spanned the entire creek and was fourteen feet high in the summer, diverting water into a 2-1/2 mile irrigation ditch. It contributed to the creek's high stream temperatures and low flows.

The project was initiated by a landowner who contacted the Oregon Water Resources Department and recruited all the other landowners who used water from the diversion. The Umpqua Basin Watershed Council received funding for the project from numerous sources including DEQ, Oregon Watershed Enhancement Board, U.S. Fish & Wildlife Service and the Umpqua Fisheries Enhancement Derby. All the landowners contributed to the project, donating services and supplies. They worked with the watershed council to remove the dam, install a more efficient sprinkler system with individual pumps drawing from the stream instead of the ditch, and plant vegetation alongside the stream. The improved irrigation efficiency removes less water from the creek during the summer, which helps with flows and water temperatures.

The landowners discovered that by working together and mobilizing available resources, they were able to restore their local creek, improve water quality and fish habitat, and continue to irrigate their lands.

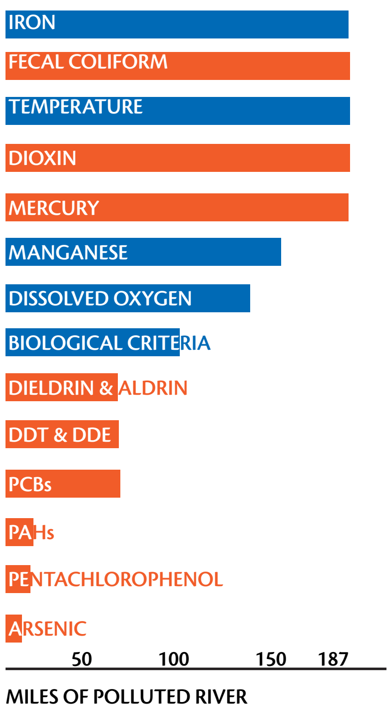
Mike Danielle, landowner of the site, stands proudly on the spot where a local irrigation dam had once blocked South Myrtle Creek.

WILLAMETTE

RED ALERT

The Willamette is a river in crisis. The river touches many Oregonians' lives and is worthy of renewed efforts to restore it.

POLLUTANTS IN THE RIVER



Each bar on this graph shows the number of miles in the Willamette River that violate water quality standards for each pollutant, according to DEQ. Pollutants of greater concern for human health are in red.

LOCAL RESOURCES

Willamette Riverkeeper (Portland)
(503) 223-6418
www.willamette-riverkeeper.org

Willamette Basin Explorer
www.willametteexplorer.info

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The River

The Willamette River is the 13th largest river by volume in the United States. The Willamette Basin is more than 11,000 square miles in area, and it is home to more than 70% of all Oregonians. The Willamette begins in the Cascade Mountains, and flows through Eugene, Corvallis, and Salem, before ending in Portland at its confluence with the Columbia River. The river's flow is modified by some 13 dams on its tributaries, 11 of which produce hydropower. The Willamette Valley has some of the richest farmland in the nation and produces about half of Oregon's yearly farm sales. Population in the Willamette Basin is expected to double to nearly 4.0 million by 2050.

A Closer Look

Over the past 80 years the Willamette River has been polluted by industry, agriculture, and cities. In the late 1960s Governor Tom McCall led a cleanup effort that reduced industrial pollution. The river is significantly cleaner today than it was then, but it still has a long way to go. In 2006 American Rivers listed the Willamette as the third most endangered river in the United States. Industries continue to discharge wastes into the river under authorized permits. Attention is being drawn to permits that allow “mixing zones” - areas where pollution is allowed to exceed water quality standards until it mixes with the receiving stream and becomes diluted. A six-mile stretch of the river in the Portland harbor is now

Minimize Pavement: Pavement covers 50% to 75% of most urban areas, and it has a huge impact on rivers and streams. Everywhere you have any influence such as at home, at work, and in neighborhood parks, advocate for porous alternatives. Pervious asphalt and concrete are available, and bricks and pavers allow water to seep into the ground around them.

a federal Superfund site. This area is highly polluted with toxins, heavy metals and other substances, and the cleanup will likely take a decade.

Human uses have dramatically altered land in the Willamette Basin from its natural state, removing forests, grasslands, prairies, and wetlands, and converting them to agricultural and urban uses, including nearly four miles of road for every square mile of land in the basin. The stream channel has been altered and confined by Army Corps of Engineers projects designed to control flooding, which has destroyed fish and wildlife habitat. Spring chinook and steelhead, the Willamette's native salmonids, are listed as threatened under the federal Endangered Species Act. The state advises against eating any species of resident fish due to mercury and PCB contamination. Resident fish include most fish except salmon, lamprey and sturgeon, which leave the river for the ocean during much of their lifespan.

Runoff from agricultural land and urban areas contributes more to the Willamette's pollution than industrial sources. There is a need to reduce pollution from agricultural runoff throughout the basin, and a portion of the Southern Willamette Valley is designated as a Groundwater Management Area due to nitrate contamination. Urban runoff is a particular problem in the Portland area because of the city's Combined Sewer Overflow (CSO) system. Parts of the city have an old sewer system where water that enters storm drains is mixed into the same pipe with raw sewage as it all makes its way to the treatment plant. When it rains, there is too much water for the pipe to hold and it overflows, sending raw sewage into the Willamette. The City of Portland is addressing this problem by investing in a "big pipe" project so overflows will occur much less frequently. But the pipe will still have limited capacity, so the City must continue to promote downspout disconnects and other techniques that keep rainwater from entering the sewer system.

DEQ has recently completed a Total Maximum Daily Load (TMDL) assessment for temperature, bacteria, and mercury in the Willamette Basin. The TMDL is an important step in the implementation of the Clean Water Act because it codifies how much pollution is too much for the river, and where the pollutants are coming from. The TMDL does not prescribe a specific plan for cleaning up the river. Instead, it includes general ideas and requires local government agencies to develop implementation plans by next year. The DEQ estimates it will take 20 years before the Willamette meets water quality standards for bacteria, 20 to 50 years to reduce instream temperatures to make them cold enough for endangered salmon, and 50 to 100 years to reduce mercury to low enough levels that resident fish are no longer hazardous to eat.

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Greener Cities for Cleaner Rivers

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The Willamette River is more severely impacted by urban stormwater runoff than any other Oregon river because so much of the land in its basin is urbanized. When rainwater hits impervious surfaces such as streets, sidewalks, and roofs, it flows overland instead of soaking into the ground as it would in a natural area. Most stormwater systems were not designed with water quality in mind. They send untreated stormwater directly into streams or pump it underground at high volume and velocity, carrying all the pollutants picked up along the way. Common stormwater pollutants include eroded soil, oil, metals, bacteria, pesticides and fertilizers. Urban runoff can change stream flows, increase flooding, scour out stream banks and channels, and destroy fish habitat.

Today, builders are using new techniques to reduce impervious surface and filter stormwater before it ends up in our rivers. These "low impact development" techniques use soil and plants to filter and slow down rainwater, creating an urban system that functions more like a natural one. You can now find examples of pervious pavement, ecoroofs, raingardens, vegetated swales, and stormwater planters in cities around the state. They can be used in commercial and residential developments and on streets to change stormwater from a problem into an amenity and create attractive landscapes. Rainwater can also be harvested in rain barrels or cisterns and used for irrigation. Many of Oregon's local governments are leading the way in promoting low impact development and river-friendly cities. The Oregon Environmental Council is working to build upon these efforts to make sustainable stormwater management standard practice in cities and towns around the state.

© Pringle Creek Community

Pervious Pavement (Pringle Creek Community, Salem)

Water filters through the pervious asphalt installed on all the roads in Salem's Pringle Creek Community, reducing the streets' impact on the nearby creek.

© SeQuential Biofuels

Green Roof (SeQuential Biofuels, Eugene)

The SeQuential Biofuels retail station, located just off Interstate 5 in Eugene, was built with a "living roof" containing thousands of plants and five inches of soil to help to control rainwater runoff and cool the convenience store during the summer.

© Environmental Services, City of Portland

Stormwater Curb Extension (NE Siskiyou St, Portland)

Street runoff flows into these curb extensions on NE Siskiyou Street in Portland. They are landscaped with plants to filter pollutants, improve water quality, reduce stormwater flow, and look great.

Helping our rivers

Clean, healthy rivers are necessary for our survival. Rivers provide water for drinking and irrigation, help sustain our economy, provide essential habitat for fish and wildlife, and offer opportunities for recreation. Healthy rivers are an integral part of the environment that supports human life.

This report provides tips on how you can help our rivers. The collective impact of our individual actions can make a huge difference. But it is imperative that we also have strong policies in place to protect our rivers, that private and governmental institutions work together effectively to improve watershed health, and that we use our resources wisely.

State agencies that work to protect and restore our rivers include the Oregon Watershed Enhancement Board (OWEB), the Oregon Department of Environmental Quality (DEQ), the Oregon Department of Agriculture (ODA), the Oregon Department of Fish and Wildlife, the Oregon Department of State Lands, and the Oregon Department of Forestry. Soil and water conservation districts, watershed councils, and independent nonprofit organizations such as riverkeepers groups, "friends of the creek" groups, and the Oregon Environmental Council help clean up our rivers as well.

The Federal Clean Water Act, which requires DEQ to track water quality, develop Total Maximum Daily Loads (TMDLs), and issue stormwater permits for cities, and Oregon's Senate Bill 1010, which requires the ODA to develop Water Quality Agricultural Management Plans, are key tools in the effort to protect and clean up our rivers. Citizens need to get involved in these efforts to make sure these agencies are doing their job well, and that they are receiving adequate funding.

Federal and state funding for natural resource protection agencies has been declining steadily. DEQ does not currently have adequate staffing levels to issue water quality permits, update standards based on current scientific data, or monitor our rivers for water quality problems. DEQ's budget is a very small portion of the entire state budget; making increases to bring the agency's budget back up to at least 2003 levels would make a significant difference for Oregon's rivers. Watershed councils and soil and water conservation districts, which bring local communities together to protect and restore watersheds, are critical leaders in efforts to clean up Oregon's rivers. They rely on funding from the state of Oregon and need adequate support for their important work to continue.

In addition to the information included in this report, many chemicals are entering our rivers that are not currently being tracked for the 303(d) list. These emerging concerns include several pesticides, pharmaceutical products, endocrine disruptors, and toxic flame retardants. We are releasing thousands of chemicals into the environment every day with very little knowledge of their impacts on human health or aquatic ecosystems. We must do a much better job of monitoring water quality and preventing pollution from entering our rivers in the first place.

This report focuses on Oregon's longest ten rivers, all of which need help. Even those with fewer pollution problems still violate Clean Water Act standards. All Oregon's rivers need people, businesses, and governments to care about them and take steps to make them clean and healthy for people and fish.

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