Regional Focus on Water Quality

Rogue Basin Water Quality Status and Action Plan Summary 2012

From the northeastern flank of the Siskiyou Mountains to the western flanks of the Cascade Mountains, the rivers, lakes, streams and estuaries of the Rogue Basin in southwest Oregon provide economic and recreational resources for people who live inside and outside the area. These resources provide for commercial and recreational fishing in the river, estuaries and offshore, habitat for a wide variety of native salmon and other mammals, birds and fish and drinking water. We all have a stake in keeping the waters of the Rogue Basin healthy and clean.

With these facts in mind, the Oregon Department of Environmental Quality takes a holistic approach to monitoring the current condition of water bodies in the state and identifying specific actions we all can take to reduce pollution problems.

DEQ's "watershed approach" assesses all pollution sources in the interconnected water system of the Rogue Basin and proposes solutions to reduce pollution from each source. This document provides an overview of DEQ's work in the Rogue Basin, identifies pollutants posing the greatest risk to the environment and public health, and lists highlights of proposed solutions. The complete version of the Rogue Basin Status Report is available online at www.oregon.gov/DEQ/WQ/

This work includes input from DEQ staff and community partners. DEQ looks forward to continued input and interaction with stakeholders to revise and update this report in the future.

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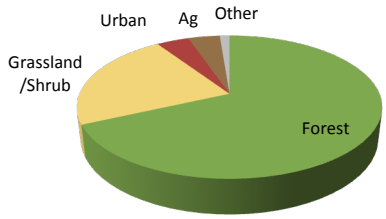
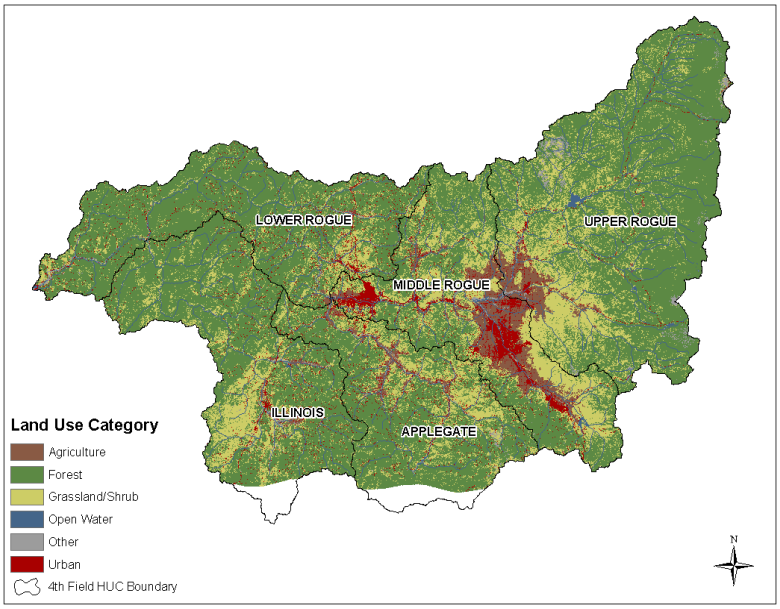
DEQ is a leader in restoring, maintaining and enhancing the quality of Oregon's air, land and water.

Rogue Basin Land Use



Basin Characteristics

The Rogue River Basin is located in southwestern Oregon and consists of five subbasins that drain to the Pacific Ocean: Lower Rogue River, Middle Rogue River, Upper Rogue River, Illinois and Applegate. The subbasins are located on the northeastern flank of the Siskiyou Mountains and the western flanks of the Cascade Mountains and in total contain 3,300,000 acres (5,156 square miles). Land use in the basin is 67 percent forest, 22 percent grassland/shrub, 4 percent agriculture and 4 percent urban (3 percent other) according to the USGS 2001 National Land Cover Database (NLCD).



Streams in this watershed provide habitat for a wide variety of cold-water species including coho salmon, spring chinook salmon, fall chinook salmon, summer and winter steelhead, multiple species of resident trout, amphibians and other fish including Pacific lamprey, green sturgeon, white sturgeon, Klamath smallscale sucker, speckled dace, prickly sculpin and others. The Rogue estuary provides important habitat for marine mammals, birds and a wide variety of fish.

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By: B Meyers
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Shellfish harvesting is not a commercial resource in the Rogue River Estuary. Commercial and recreational fishing in the river, estuary and offshore has been an important economic resource for generations.

Summary of Water Quality Concerns

There are various pollutants of concern affecting the rivers, lakes and streams in the Rogue Basin. The following tables summarize the status of surface and ground water in the Rogue Basin:

Surface Water	Bacteria	Biological Stressors Harmful Algae Blooms	Temperature	Dissolved Oxygen	Nutrients, pH Chlorophyll a	Altered Hydrology	Habitat Modification	Sediment / Turbidity	Toxics: Emerging Contaminants Pharmaceuticals, PCPs	Toxics: Metals	Toxics: Arsenic	Toxics: Mercury	Toxics: Pesticides
Upper Rogue													
Middle Rogue													
Lower Rogue													
Applegate Subbasin													
Illinois Subbasin													

Ground Water	General Quality	Quantity	Nitrate	Bacteria	Pesticides	Volatile and Synthetic Organic Compounds	Arsenic	Nickel	Lead	Fluoride
Upper Rogue										
Middle Rogue										
Lower Rogue										
Applegate Subbasin										
Illinois Subbasin										

Generally poor condition, **substantial** concern for water quality

Deteriorating condition, **moderate** concern for water quality

Generally good condition, **low** concern for water quality

Unknown condition or lack of data

Pollution Sources

Pollutants are considered to come from two sources: point sources and non-point sources. Point sources are from a defined source like a pipe or outfall, whereas nonpoint sources are landscape-wide – such as runoff from fields or roads.

Point sources in Oregon are regulated with wastewater discharge permits issued by DEQ. Depending on size and type of industry or operation either a federal National Pollution

Discharge Elimination System (NPDES) permit or a state Water Pollution Control Facilities (WPCF) permit is required

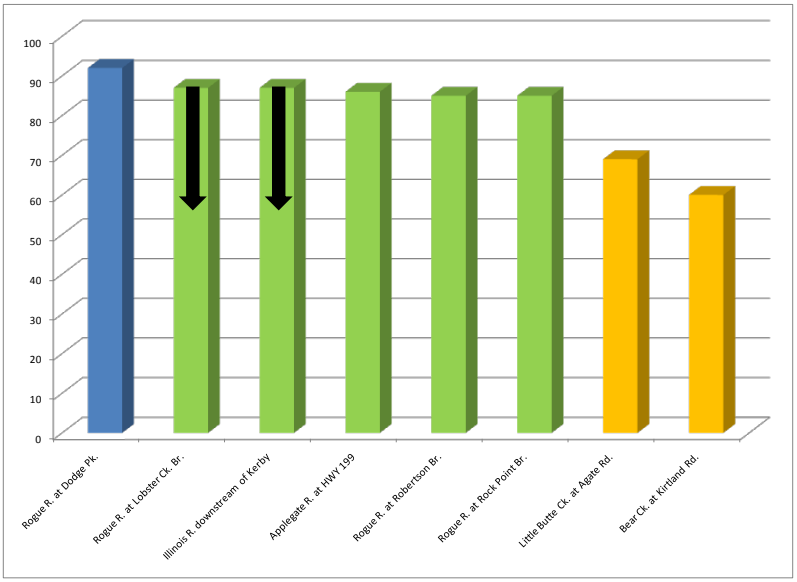
DEQ develops an *individual* NPDES permit to address discharges from a specific sewage or industrial wastewater treatment facility. Currently, there are 14 *individual* NPDES permits within the Rogue River Basin. Specifically, within the subbasins: 1 in Illinois, 1 in Applegate, 1 in Lower Rogue, 8 in Middle Rogue, 3 in Upper Rogue. Three of the Middle Rogue individual NPDES permits are stormwater permits.

In addition to individual permits here are 24 different types of *general* NPDES and WPCF permits. As of December 2010, there were 159 facilities covered under *general* permits within the Rogue Basin: 13 in Lower Rogue 4 in Illinois R, 123 in Middle Rogue and 19 in Upper Rogue.

Pollution from a wide variety of sources is known as non-point source pollution. When it rains, water washes over streets, lawns, agricultural lands, construction sites, and logging operations picking up soil, bacteria, toxics, and other pollutants. This runoff is a much larger source of pollution than from point sources in Oregon and is now the largest source of water quality impairment in the Rogue Basin. DEQ addresses non-point source pollution through the total maximum daily load, or "TMDL" process. A TMDL determines limits on how much pollution a waterbody can receive and still meet water quality standards. These limits are designed to restore the health of a watershed.

General Water Quality

Water quality in the Rogue Basin is generally considered good. Of the eight DEQ long-term ambient monitoring stations in the Rogue Basin, one recorded excellent conditions, five recorded good conditions, and two recorded poor conditions. Temperature and fine sediment have been identified as pollutant stressors that affect fish and other aquatic life throughout the basin. Dissolved oxygen and pH have also been identified as stressors, in some portions of the Rogue, such as Bear Creek. Elevated levels of fecal coliform and *E. coli* are found primarily in the rivers, streams and creeks in the Middle Rogue Subbasin and several waterbodies in the Upper and Lower Rogue Subbasin.



10-year mean Oregon Water Quality Index (OWQI) scores for Rogue basin sites. Blue = excellent, Green = Good, Yellow = Fair, Orange = Poor. Downward arrows indicate significantly declining trends in water quality condition.

Two of the Rogue Basin long-term ambient monitoring stations – at Lobster Point Bridge and on the Illinois River downstream of Kerby – showed declining trends in water quality.

Protecting Beneficial Uses and Pollutants of Concern

Beneficial uses describe the activities that a water body supports. Water quality standards are established to protect the most sensitive beneficial uses of the State's waters. Examples of beneficial uses include: domestic and industrial water supply, habitat for fish and aquatic life, fishing, boating, irrigation, and water contact recreation. The following is a summary of the most sensitive beneficial uses in the Rogue Basin and the pollutants of concern that may limit use or pose a risk to "beneficiaries" like fish, wildlife and people.

Fish and Aquatic Life

Temperature

All streams in the Rogue River Basin are designated as either core cold-water habitat or salmon and trout spawning and rearing and migration. Elevated stream temperatures have led to 148 individual temperature impairment listings in the Rogue Basin. Historical land use decisions and current management practices have led to non-point sources of thermal pollution including removal of streamside trees and other vegetation, channel modification, warm water discharges from dams and irrigation canals, and flow modification. Point sources are a small percent of the thermal loading and may consider water quality trading as a way of meeting permit requirements. TMDLs have been established for the Rogue Basin and require actions to limit thermal loading to the waterbodies. Reducing stream temperature is important because excessive summer water temperatures threaten the survival of fish and other aquatic organisms.

Sediment/Turbidity

Sedimentation is a concern throughout the Rogue Basin: 29 percent of wadeable streams surveyed were in fair condition and 29 percent were found to be in poor condition for fine sediment stress. Only 42 percent were in good condition. Sediment is a natural part of a healthy stream system with equilibrium between sediment input, transport, and in-stream storage. This balance is disrupted by human activity including construction, road building, stream bank stabilization and some forestry and agricultural practices.

High turbidity events in the Rogue River cause drinking water suppliers to experience periodic shutdowns. Reeder Reservoir on Ashland Creek in the Middle Rogue and Beaver Creek in the Applegate subbasin developed TMDLs to address sedimentation. DEQ is in the process of developing a statewide sedimentation assessment methodology that could be used for implementing the state's current narrative sedimentation standard.

Dissolved Oxygen/pH/Nutrients

Several stream reaches are water quality limited due to low dissolved oxygen concentrations and pH exceedances. Excess nutrients found in urban and agricultural runoff cause prolific algal growth. When algae decompose, oxygen is depleted. Low dissolved oxygen levels are harmful or fatal to aquatic life. Stream temperature also has a significant impact on the dissolved oxygen levels. As stream temperatures decrease, the amount of oxygen that can remain dissolved in water increases and as temperatures decrease the amount of oxygen consumed by biological processes decreases.

The dissolved oxygen, pH, and aquatic weeds or algae impairments in the Bear Creek watershed are being addressed through the Bear Creek TMDLs. In other areas of the Rogue Basin, there are currently insufficient data to address dissolved oxygen and pH listings through the TMDL process. However, DEQ does expect to see improvements to dissolved oxygen because the same actions needed to address temperature and bacteria will help improve dissolved oxygen levels.

Flow/Habitat

While flow and habitat modifications are not considered pollutants, they directly impact instream temperatures and fish and aquatic life. Currently there are over 6,898 approved surface water rights in the Rogue Basin and most of the basin has been closed to further appropriation since the late 1950s when it was determined that natural flow quantities were not adequate to satisfy all water rights. The regulation of flow is under the jurisdiction of the Oregon Water Resource Department. DEQ and OWRD are cooperating to develop strategies to address the influence of water quantity on water quality.

Contact Recreation

Bacteria

Fecal coliform bacteria, of which *E. coli* is a subset, are found in the feces of humans and other warm blooded animals like pets and livestock. High concentrations of bacteria in the Rogue Basin result from urban and agricultural runoff during storm events and irrigation practices in the summer months. Analysis indicates that 98 percent of the bacteria in Bear Creek and 96 percent of the bacteria in the Rogue River are due to nonpoint sources of pollution including: runoff from streets, lawns, agricultural lands, and others. Fecal coliform bacteria by themselves are not pathogenic. Pathogenic organisms include bacteria, viruses, and parasites that cause diseases and illnesses. A person swimming or in contact with waters with high counts of fecal bacteria has a greater chance of getting sick from disease causing organisms or pathogens. As of 2006 there were 46 waterways in the Rogue Basin identified as impaired do to fecal bacteria. Data indicated that the Illinois and Applegate Rivers are meeting bacteria water quality standards and are not significant bacteria sources.

Harmful Algae Blooms (HABs)

Harmful algae bloom advisories have been issued for Willow Lake, Lost Creek Lake, Whetstone Pond, Lake Selmac, and Fish Lake. Several lakes have been identified as being of potential concern for excessive aquatic growth that could include HABs: Agate Reservoir, Emigrant Reservoir, Horshoe Lake, and Indian Lake Reservoir. For these lakes, additional data are needed to determine their status. The occurrence of algal toxins is associated with a number of parameters such as nutrient loads, temperature and flow rates. DEQ is currently developing a HABs Strategy that describes priority actions to better address and respond to HABs.

Domestic Water Supply

Potential Human Health Related Impacts

In the Rogue basin there are 22 public water systems using surface water and 251 public water systems relying on groundwater. Public water systems periodically exceed drinking water standards for a number of parameters including toxics, nitrates, bacteria, and turbidity.

Groundwater

Groundwater is the main source of domestic water for rural residents. The primary water quality concerns in the basin are nitrate and bacteria in the valley and lowlands; arsenic, salts and minerals, fluoride and boron in the hills and mountain areas. Nitrate and bacteria are likely present due to human activities,. Groundwater quantity is also an increasing concern as regions within the basin are experiencing a rapidly dropping water table. Groundwater studies are needed to evaluate the distribution of water quality concerns.

Toxics

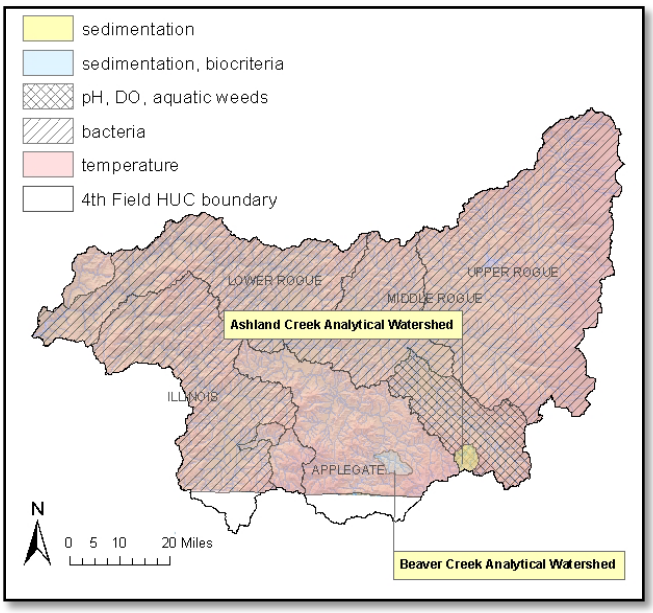
Toxics, including pesticides and pharmaceuticals from treatment plants, agricultural, and urban stormwater sources, have been identified as a potential concern in the basin that could affect

surface water as well as fish and aquatic life. Emigrant Reservoir has a fish consumption advisory for mercury. A number of toxic pollutants including PCBs and chlorinated pesticides have been detected in fish and water samples in the basin, and a number of potential sources have been identified. However, little is known about the occurrence of toxic pollutants in the waters and fish of the Rogue Basin. Monitoring within the basin will examine treatment plant effluent, water column and fish tissue as part of SB737 and the Toxics program. Better characterization of toxics will occur throughout 2012.

Watershed Planning and Implementation

TMDLs

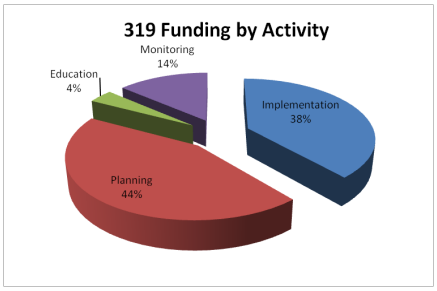
In the Rogue Basin, bacteria, temperature, sedimentation, pH, and dissolved oxygen have been identified as water quality impairments. TMDLs have been completed for the majority of water quality impairments. As a result designated management agencies (DMAs), those with jurisdiction over activities that may impact water quality, are required to submit implementation plans. These implementation plans describe timelines and the actions local agencies will take to reduce their impact on water quality. To date, the majority of the local water management agencies in the Rogue Basin have submitted and are actively implementing TMDL plans (23 plans submitted) which describe when and what actions will be undertaken to address water quality impairments in their jurisdiction. State and federal agencies are developing and implementing similar watershed management plans for nonpoint source pollution for lands under their jurisdiction.



Completed TMDLs and Water Quality issues of concern in the Rogue Basin

Implementation Highlights

Communities, organizations, agencies, and individuals are working to improve water quality through land use planning, on the ground restoration, changes in management practices, and education and outreach. These actions are leading to water quality improvements. State and local agencies, irrigation districts, local organizations, and landowners have collaborated on countless efforts and projects across the Rogue Basin. In Bear Creek, watershed-wide efforts have reduced levels of phosphorus in the creek leading to an acknowledgement by EPA that Bear Creek is '*making progress*'. Since 2004, four large dams have been removed in the Rogue Basin, providing salmon and steelhead with unobstructed access to over 333 miles of high-quality spawning habitat and improving water quality. In 2002, the City of Ashland upgraded its waste water treatment plant by adding a tertiary treatment phosphorus removal system resulting in water quality improvements in Ashland and Bear Creeks. Since 1998, ODEQ has targeted over $1 million in the form of 319 grant dollars within the Rogue Basin to support projects addressing nonpoint source pollution including education, planning, restoration and monitoring.



Future Project Goals, Needs and Priorities

It is expected that a greater portion of the non-point source section 319 funds will be spent on projects that directly address water quality problems including implementing temperature, bacteria, and sediment control strategies to meet TMDLs. Below is a summary of identified implementation activities for the Rogue Basin.

Urban Areas

- Onsite infiltration, treatment, or retention of stormwater
- Limit fertilizer use on lawns to eliminate nutrient run-off
- Improvement to storm sewer infrastructure
- Protection of sensitive areas from future development
- Sediment controls at construction sites
- Development and protection of urban forests

Other Areas as Applicable

- Implement culvert removal/upgrades
- Ensure on-site septic systems to ensure proper function with no discharge
- Develop ordinances to protect resources of riparian, wetland, and in-stream habitat
- Education and outreach to landowners to address TMDL parameters
- Investigate and manage bacteria sources
- Purchase riparian easements

Forest Lands

- Restore and maintain riparian buffers
- Improve harvest management practices
- Stabilize and decommission roads
- Calculate fertilizer and pesticide application rates
- Protection of sensitive riparian and steep slope areas

Agricultural Areas

- Implement voluntary farm management plans
- Restore riparian buffers with plantings and fencing
- Control livestock access to streams
- Manure application and storage management projects
- Calculated fertilizer and pesticide application
- Seek conservation easements
- Support projects that conserve irrigation water including the installation of sprinklers and pressure systems as an alternative to flood irrigation