The Health of Oregon Waters

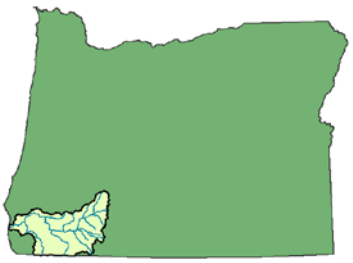
DEQ

State of Oregon
Department of
Environmental
Quality

Water Quality Status and Action Plan:

Rogue Basin

September 2011



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Executive Summary

The Rogue Basin Watershed Approach Status Report summarizes the Oregon Department of Environmental Quality's (DEQ's) current knowledge of the water quality conditions for the five subbasins that collectively comprise the 5,156 square mile Rogue River Basin: the Lower Rogue River, Middle Rogue River, Upper Rogue River, Illinois and Applegate. This Status Report will be used in conjunction with an Action Plan to help guide DEQ's actions for the next five years, 2011-2015. The document is organized to describe general water quality conditions, potential human health related impacts, potential impacts to fish and aquatic life and water quality project implementation highlights.

General Water Quality

Surface water quality in the basin is generally considered good. Of the eight DEQ river monitoring stations in the Rogue Basin, one site was in excellent condition, five sites were in good condition, and two sites were in poor condition. Sampling by DEQ showed 30% of the sites tested in the Rogue to be in poor condition for macroinvertebrates. Temperature and fine sediment have been identified as pollutant stressors that affect fish and other aquatic life throughout the basin. In some portions of the Rogue such as Bear Creek, dissolved oxygen and pH have also been identified as stressors. Elevated levels of fecal coliform and *E. coli* are mainly in the Middle Rogue Subbasin and several waterbodies in the Upper and Lower Rogue Subbasin.

Groundwater quality in the basin is potentially impaired in many areas of the basin based on the results of the Department of Human Services, Health Division real estate transaction testing results. Nitrate levels over the 7 mg/L action level have been reported for more wells in Jackson County than in any other county in Oregon. Please note that this report does not attempt to report on site specific groundwater or surface water conditions. Those data are available on the DEQ website at: http://www.deq.state.or.us/lab/lasar.htm. In addition information about permitted discharges to ground and surface water bodies is available at: http://www.deq.state.or.us/wq/sisdata/sisdata.asp.

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 – in whole or in part. Public water systems periodically exceed drinking water standards for a number of parameters including: selected toxics, nitrates, bacteria and turbidity. There are currently 48 streams or sections of streams identified as impaired for fecal coliform bacteria. Analysis indicates that 98% of the bacteria in Bear Creek and 96% of the bacteria in the Rogue River are due to nonpoint sources of pollution including: runoff from streets, lawns, agricultural lands, and others. Five lakes in the basin have had health advisories posted due to Harmful Algae Blooms (HABs) (cyanobacteria or blue-green algae) and several others potentially have these blooms. These blooms can affect the suitability of water for water contact recreation and for drinking water. Mercury may be an emerging issue. There is currently a fish consumption advisory for mercury at Emigrant Reservoir.

Potential Impacts to Fish and Aquatic Life

Coho Salmon in the Rogue River Basin have been listed as threatened by NOAA's National Marine Fisheries Service in 1997. Spring Chinook Salmon have been identified as being potentially at risk by the Oregon Department of Fish and Wildlife. Macroinvertebrate sampling of wadeable streams in the basin found 62% of sites to be in least disturbed conditions, 8% in

moderately disturbed conditions, and 30% of sites were in most disturbed conditions. There are 148 individual temperature impairment listings on the 2004/06 Assessment in the Rogue Basin. Some streams may have more than one temperature listing. Sedimentation is a concern throughout the Rogue Basin: 42% of wadeable streams surveyed were in good condition for fine sediment stress, 29% in fair condition, 29% in poor condition. Dissolved oxygen & pH exceedances have been documented in the Rogue Basin with 3 pH and 20 dissolved oxygen impairments currently on the draft 2010 Assessment list identified as needing a TMDL. Bear Creek has a DO and pH TMDL in place. The Coastal Environmental Monitoring and Assessment Program sampled the Rogue estuary in 1999, 2001 and 2004. Water column temperature, pH, and DO met water quality criteria. The DEQ Toxics program plans to collect fish tissue and water column samples in spring of 2011. Sediments and fish tissues were sampled for toxics in 2010 and results are expected in 2011.

Water Quality Project Implementation Highlights

This status report highlights some of the progress and key activities taking place in the basin. Since 1998 DEQ has targeted over $1 million in the form of 319 grant dollars within the Rogue Basin to support nonpoint source projects including education, planning, restoration projects and monitoring. An ongoing collaboration of state and local agencies, irrigation districts, and landowners has reduced levels of phosphorus in Bear Creek by over 90% in the past 14 year and is the subject of an EPA success story. The cities, counties, and irrigation districts within the Rogue Basin have been designated as management agencies (DMAs) as per the TMDL program and have been submitting water quality implementation plans since 2008. Twenty two plans have been submitted to date. These DMAs are actively implementing their plans which describe when and what actions will be undertaken to address a jurisdiction's water quality impairments. State and federal agencies are developing and implementing similar statewide or watershed management plans for nonpoint source pollution. Beginning in 2004, four dams have been removed in the Rogue Basin providing salmon and steelhead with unobstructed access to an additional 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. Monitoring within the basin will be examining treatment plant effluent, water column and fish tissue as part of SB737 and the toxics program. DEQ and OWRD are working collaboratively to develop an integrated water resources strategy to address the impacts of water withdrawals and usage across the state. Attempts to secure funding to further define, investigate, and address nitrate contamination in groundwater are underway.

Water Quality Status Report

Purpose

The Department of Environmental Quality (DEQ) is undertaking a Watershed Approach (WA) to assist in managing water quality in the State of Oregon. This new approach will provide a broad assessment of the status of water quality and other environmental indicators within a basin and will further augment the efforts of the TMDL program to guide implementation actions to address the region's water quality issues. In addition the WA will provide greater opportunities for internal DEQ sub-program alignment, stakeholder involvement, and interagency collaboration. It is intended that the WA process will eventually be implemented state-wide. It is currently envisioned that each DEQ region (Eastern, Western and Northwest Oregon) will complete a WA for one basin each year. There are approximately 15 basins within the state. This would allow the findings of the WA to be revisited and updated on a 5 year basis.

The Rogue Basin WA Plan consists of a Status Report and an Action Plan. The Status Report summarizes the DEQ's current knowledge of the water quality conditions for the five subbasins that collectively comprise Rogue River Basin while the Action Plan identifies priority actions and sets the stage for strategic implementation. Implementation of the action items identified in the action plan is highly dependent upon both current and future resources, however, together the Status Report and Action Plan will allow for the adaptive management of water quality in the Rogue Basin.

The Rogue Basin Watershed Approach is a work in progress. The Status Report and Action Plan are not the final products of the Rogue Basin WA process and will be revised and updated through continued input and interaction from DEQ staff, affected agencies, and stakeholders. This plan is a first version only and should not be viewed as a static document. This document builds on previous studies and assessments and attempts to summarize available information in a way that is useful for planning and identifying future actions. This report will be updated in 2015 but new information will be utilized on a continual basis.

Note that this report does not attempt to report groundwater or surface water conditions related to spills, industrial sites, underground tanks or other site specific pollution sources. Data on individual sites is available on the DEQ website as part of the Laboratory Analytical Storage and Retrieval Database (LASAR).

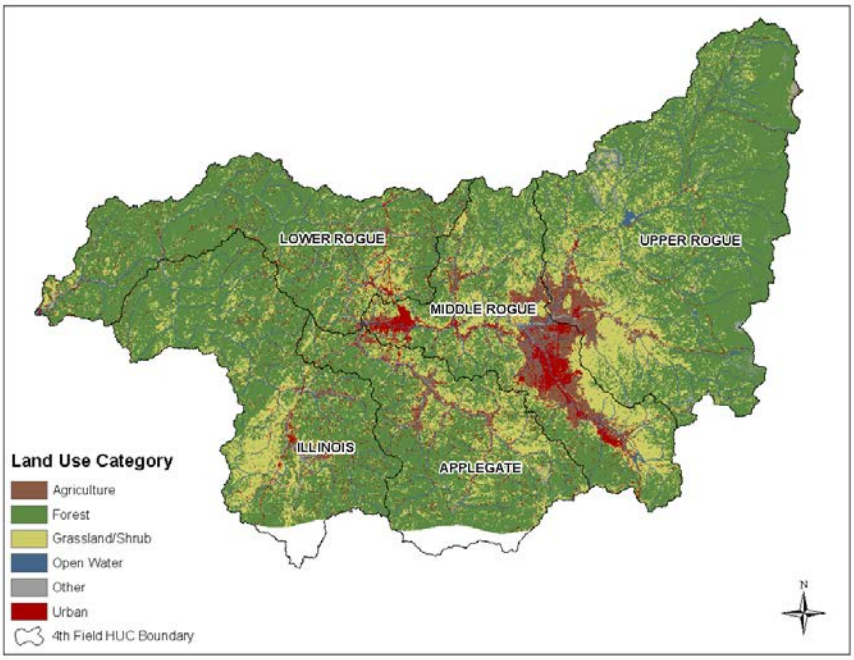
Setting

The Rogue River Basin is located in southwestern Oregon and consists of five subbasins: 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). This is one of the most biologically, botanically, and geologically diverse areas in the country. It is steep and rugged, ranging in elevation from 0 feet to 9,485 feet at the summit of Mount McLoughlin.

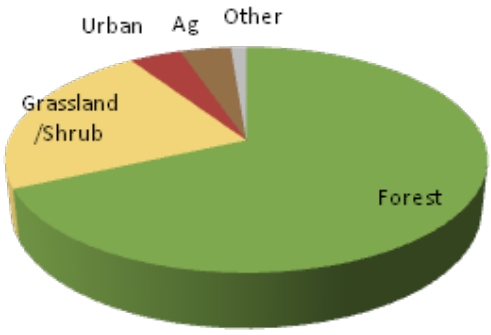
The Rogue River Basin is located in a transitional area between four very different climate zones: Pacific Maritime on the Coast, Oregon High Desert to the east, California Mediterranean to the south, and Northern Temperate to the north. The fluctuating boundary between these four zones results in highly unpredictable weather and large annual fluctuations in precipitation and temperature within longer climatic cycles. Rainfall ranges from 20 inches in the interior

valleys to over 120 inches on the coast. Significant snowfall occurs at higher elevations in the interior.

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 residential 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. Shellfish harvesting is not a commercial resource in the Rogue River Estuary. Commercial and recreational fishing and boating in the river, estuary and offshore has been an important economic resource for generations. The basin also contains a number of lakes which provide numerous fishing, boating, swimming and other recreational opportunities.



Land use in the basin is 67% forest, 22% grassland/shrub, 4% agriculture, 4% urban and 3% other(USGS 2001 National Land Cover Database (NLCD) Land Cover GIS layer). Agriculture and urban land use occurs mostly on the valley floors with the majority of the urbanized areas located in the Middle Rogue Subbasin. Approximately 60% (1,980,000 acres) of the Rogue River Basin is publicly owned and managed by the US Forest Service, Bureau of Land Management, and US Bureau of Reclamation.



Rogue Basin Land Use

Water Rights

At the time of this writing there are 6898 approved surface water rights in the Rogue Basin, many of them are very senior rights. Over 170 water rights pre-date Oregon statehood in 1859. Most of the basin has been closed to further appropriation since the late 1950s when it was determined that natural flow amounts were not adequate to satisfy all water rights. Stream flows in the Rogue Basin are allocated for irrigation, mining, and domestic use. As stream flows recede, those users with junior rights are the first required to curtail their water use. Senior water right holders are allowed to continue using water, even in dry years and low flow conditions, as long as water is

available to meet demand under their priority date. Water withdrawals have the potential to greatly impact surface water quality including temperatures, dissolved oxygen, and pH in addition to direct impacts on fish and aquatic life habitat. Table 1 shows some examples of how water withdrawals can impact stream temperatures (DEQ, 2008).

Groundwater is a critical natural resource providing domestic, industrial and agricultural water supply, baseflow for rivers, lakes, streams and wetlands, and other beneficial uses. Seventy percent of Oregon's people depend on groundwater for their daily water needs via private, public and industrial water wells. Groundwater can travel very slowly, and once contaminated, can be very difficult or nearly impossible to clean up. Private domestic wells do not require a water right for water extraction. In areas where groundwater supply wells are hydraulically connected to surface water bodies, groundwater extraction can impact surface water resources.

Current management of water withdrawals falls under the jurisdiction of the Oregon Water Resources Department (OWRD). DEQ is currently working with OWRD, Oregon Department of Fish and Wildlife and Oregon Department of Agriculture to develop an integrated water resources strategy for the Oregon Legislature by 2012 which will form the foundation of an integrated strategy to address the impacts of water withdrawals.

Table 1. Modeled Impact of Water Withdrawals on Temperature

Waterbody	Flow at mouth (cfs)*		Predicted temperature increase due to decreased flow (°C)**
	Current	Without withdrawals	
Little Butte Creek	17.5	56.2	5.7
North Fork Little Butte Creek	13.7	36.1	3.2
Antelope Creek	6.4	8.9	1.4
Elk Creek	3.2	7.2	1.6
Rogue River Mainstem	1957	2370	0.9
Evans Creek	3.0	8.7	0.5
South Fork Little Butte Creek	9.2	12.8	0.5

*Flows are from August 1 of the applicable model year and temperatures based on average changes to the portion of the stream modeled (i.e. not predicted change at the mouth).
**Impact of water withdrawals on maximum 7-DADM temperatures for various waterbodies as predicted by water quality modeling.

Wastewater Permits

DEQ's wastewater management program regulates and minimizes adverse impacts of pollution of Oregon's waters from point sources of pollution. Point sources in Oregon are regulated through Federal National Pollutant Discharge Elimination System (NPDES) permits or state Water Pollution Control Facilities (WPCF) permits issued by DEQ. NPDES and WPCF permits are classified as general or individual. A general permit is used to cover a category of similar discharges. Individual permits cover a specific site. DEQ may issue a general permit when there are several minor sources or activities involved in similar operations that may be adequately regulated with a standard set of conditions.

General permits expire in five years, WPCF permits are generally valid for 10 years. DEQ currently utilizes 24 different types of general WPCF and NPDES permits. As of December 2010, there were 159 facilities covered under general permits within the Rogue Basin: 13 in

Lower Rogue River Subbasin, 4 in Illinois River Subbasin, 123 in Middle Rogue River Subbasin, and 19 in Upper Rogue River Subbasin (Table 2).

Table 2. Rogue River Basin – NPDES General Permits

Permit Type	Permit Description	Count
GEN01	Industrial Wastewater; NPDES cooling water	10
GEN02	Industrial Wastewater; NPDES filter backwash	4
GEN03	Industrial Wastewater; NPDES fish hatcheries	1
GEN04	Industrial Wastewater; NPDES log ponds	4
GEN12A	Stormwater; NPDES sand and gravel mining	15
GEN12C	Stormwater; NPDES construction more than 1 acre	56
GEN12CN	Stormwater; NPDES government agency construction, >1 acre	1
GEN12Z	Stormwater; NPDES specific SIC codes	58
GEN15A	Industrial Wastewater; NPDES petroleum hydrocarbon cleanup	2
GEN17A	Industrial Wastewater; NPDES wash water	8
	Total	159

Note: Other general permits that are issued in the Rogue that are not required to provide locations include:700PM - Suction dredges.

An individual NPDES permit is site-specific, developed to address discharges from a specific sewage or industrial wastewater treatment facility. Individual NPDES permits are issued for a period not to exceed five years. Individually permitted sources have the potential to impact surface waters and require frequent monitoring by the permittee to ensure that permit limits are met and water quality is adequately protected. There are 14 individual NPDES permits within the Rogue River Basin TMDL area: 1 in Illinois, 1 in Applegate, 1 in Lower Rogue, 8 in Middle Rogue, and 3 in Upper Rogue (Table 3). There are also 3 individual NPDES MS4 stormwater permits in the basin.

Table 3. Rogue Basin Individual Permits

Permit ID	Permittee Name	Class	Renewal Year	Status
101609	ASHLAND WWTP	MAJOR	2011	WLA developed
101552	BUTTE FALLS WWTP	minor	2010	No WLA needed
102305	CASCADE WOOD PRODUCTS	minor	2014	WLA developed
102610	CAVE JUNCTION WWTP	minor	2013	WLA developed
101990	COUNTRY VIEW MOBILE HOME EST	minor	2014	WLA developed
102578	FLEMING MIDDLE SCHOOL WWTP	minor	2010	No WLA needed
102494	GOLD HILL WWTP	minor	2010	WLA Incorporated
101985	GRANTS PASS WWTP	MAJOR	2010	WLA Incorporated
100985	MEDFORD WWTP	MAJOR	2011	WLA developed
101475	RIVIERA MOBILE PARK	minor	2014	WLA developed
102588	ROGUE RIVER WWTP	minor	2014	WLA developed
100998	SHADY COVE WWTP	minor	2010	WLA Incorporated
102034	TRUEGUARD	minor	2010	No WLA needed
102221	HIDDEN VALLEY HIGH SCHOOL	minor	2012	No WLA needed
102898	CITY OF MEDFORD	MS4 Stormwater	2012	WLA developed
102897	CITY OF ASHLAND	MS4 Stormwater	2012	WLA developed
102899	ROGUE VALLEY SEWER SERVICES	MS4 Stormwater	2012	WLA developed

Beneficial Uses and Water Quality Pollutants of Concern

Surface water quality standards have been developed to protect the following beneficial uses in the Rogue Basin (OAR 340-41-0271): public and private domestic water supply, industrial water supply, irrigation, livestock watering, fish and aquatic life, wildlife and hunting, fishing, boating, water contact recreation, and aesthetic quality, hydropower, and commercial navigation and transportation. Groundwater quality standards are published in OAR 340-40-020, Tables 1-3 and OAR 340-40-090, Table 4-6. In practice water quality standards are set at a level to protect the most sensitive beneficial uses.

The beneficial uses which are most sensitive to water quality impairments are typically fish and aquatic life, public and private drinking water supply (both groundwater and surface water), and water contact recreation. Temperature, dissolved oxygen, pH, sediment and pesticides are examples of pollutants which directly affect fish and aquatic life. Bacteria, nitrates, turbidity, radon, and toxics are examples of pollutants which directly affect human health. The affects of these and other pollutants on beneficial uses will be discussed in more detail in the following sections.

Coho Salmon in the Rogue River Basin have been listed as threatened by the National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service in 1997. Spring Chinook Salmon have been identified as being potentially at risk by ODFW. Sampling by DEQ showed 30% of the sampled sites to be in poor condition for macroinvertebrates. Temperature and fine sediment have been identified as pollutant stressors that affect fish and other aquatic

life throughout the basin. In some portions of the Rogue Basin such as Bear Creek, dissolved oxygen and pH have also been identified as stressors. Habitat and flow modification, while not technically considered pollutants are also of concern and impact 87 stream segments within the Rogue Basin.

Water contact recreation in areas that drain urban and agricultural lands is often affected by bacterial contamination. Public health advisories are periodically posted during the summer recreation season in the Bear Creek, Evans Creek, and Little Butte watersheds due to high bacteria counts. Additionally, five lakes in the basin have had health advisories posted due to Harmful Algae Blooms (HABs) and several other lakes in the area potentially have these blooms. These blooms of cyanobacteria or blue-green algae can affect the suitability of water for water contact recreation and for drinking water. One lake, Emigrant Reservoir, has a fish consumption advisory for Mercury.

Selected public and private water supplies periodically exceed Drinking Water Standards for a number of parameters including: selected toxics, nitrates, bacteria and turbidity.

DEQ has developed TMDLs that address temperature basinwide, bacteria for most of the basin, nutrients and biochemical oxygen demand (BOD) in the Bear Creek watershed and sediments in several small watersheds. Plans have been developed by various partners in the basin and are being implemented. Improving trends in water quality have been observed in the basin including phosphorus improvements in the Bear Creek watershed.

Water Quality Status and Trends

The following sections discuss the status of water quality as it relates to the specific beneficial uses of human health, and fish and aquatic life beneficial use and by the pollutant(s) identified as responsible for the water quality impairment. Water quality trending for these uses and pollutants will also be discussed where the data are available.

Multiple Uses: General Surface Water Quality Conditions/Trends Oregon Water Quality Index (OWQI), Status 1999 to 2009

Surface water quality conditions in the Rogue Basin were examined using data from DEQ's OWQI. This index provides a general assessment of water quality at a site by combining information from eight different sub-indices: temperature (T), dissolved oxygen (DO), pH, biochemical oxygen demand (BOD), total solids (TS), nutrients (nitrogen (N) and phosphorus (P)) and bacteria (BACT). The index scores are classified into five condition classes from excellent to very poor. Eight monitoring stations in the Rogue are included in DEQ's long-term ambient WQ monitoring program. One site was in excellent condition, five sites were in good condition, and two sites were in poor condition (Figure 1 and Map 2). Downward arrows indicate significantly declining trends in water quality condition at two Rogue Basin sites. Rogue River at Lobster Point bridge showed a decrease of 2.4 OWQI units from 1999 – 2009 due to changes in the BOD and total solids sub-indexes. The Illinois River downstream of Kerby site showed significantly declining trends in water quality of approximately 3.0 OWQI units largely due to a decline in the BOD sub-index, although the nitrogen sub-index showed a significantly improving trend (Table 4).

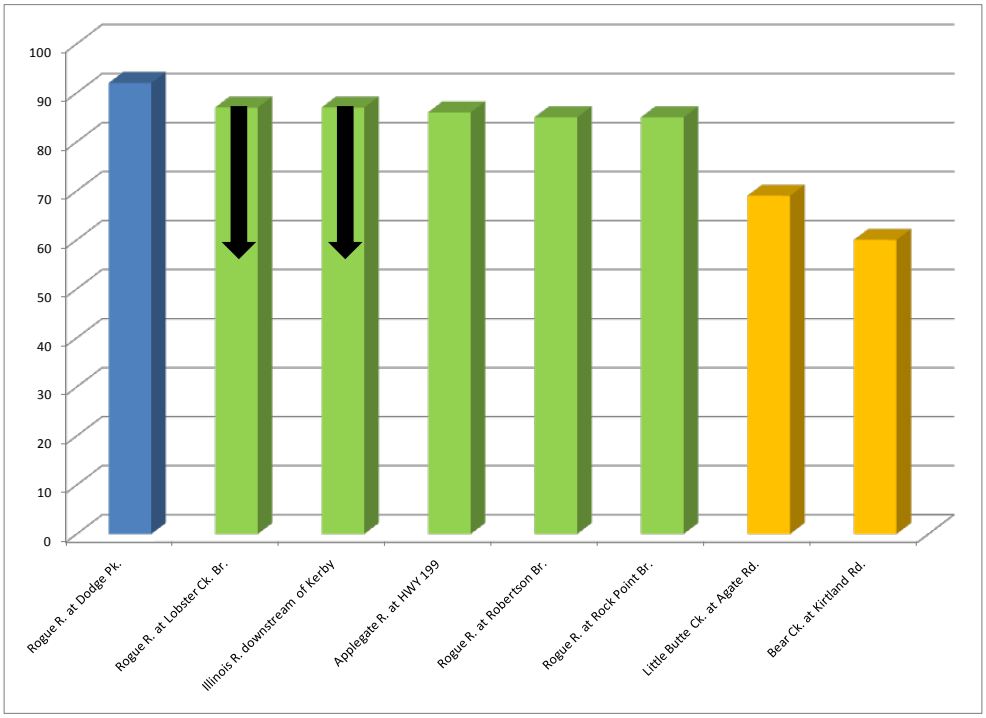
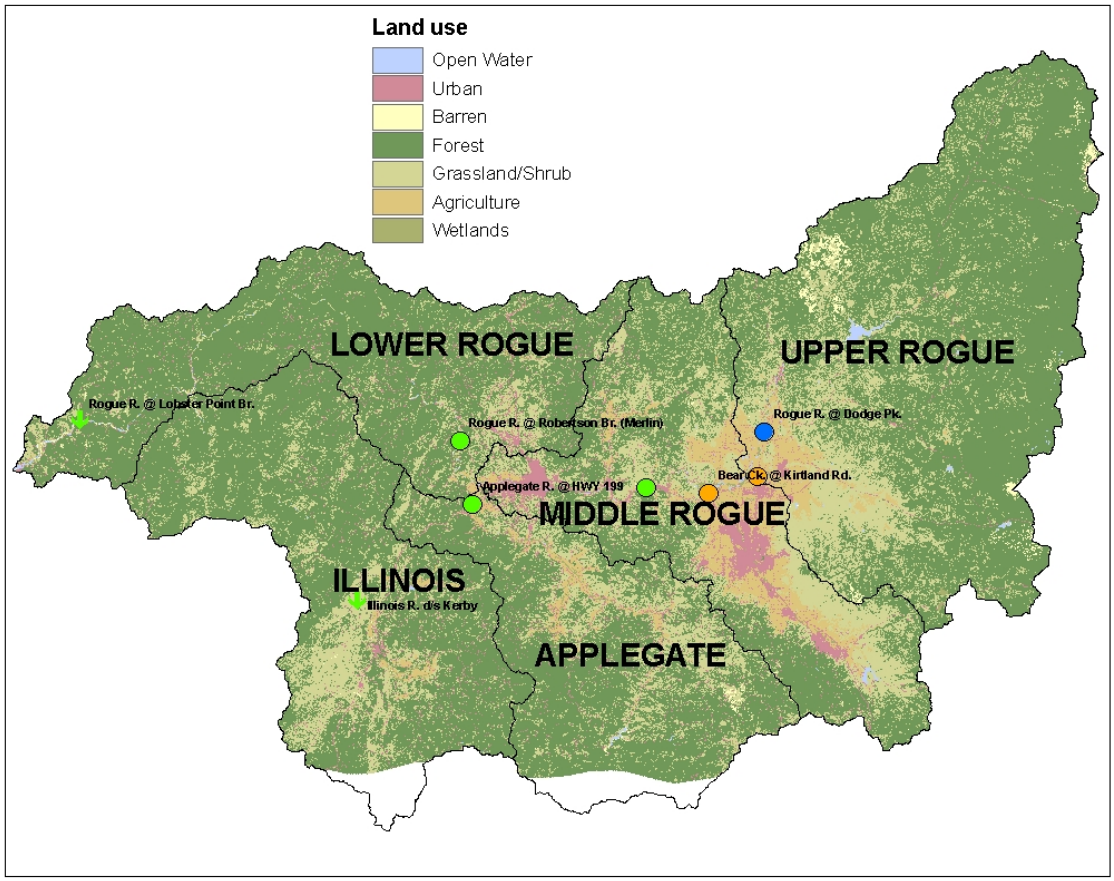


Figure 1. 10-year mean Oregon Water Quality Index (OWQI) scores for Rogue Basin sites. Blue = excellent, Green = Good, Yellow = Fair, Orange = Poor. Downward arrows indicate significantly declining trends in water quality condition

Map 2. Oregon Water Quality Index conditions at eight ambient monitoring stations in the Rogue Basin



Note: Colors indicate quality (blue = excellent, green = good, yellow = fair, red = very poor) and arrows indicate significant trends in OWQI scores over the last ten year period. Up arrows indicate improving trends, down arrows indicate declining trends.

Table 4. Pollutant trends at Rogue Basin OWQI Monitoring Sites

Site #	Site	Significant Sub-Index Trends*
1	Rogue R. at Lobster Ck. Br.	↓ BOD, ↓TS
2	Illinois R. downstream of Kerby	↑ N; ↓ BOD
3	Rogue R. at Robertson Br.	--
4	Applegate R. at HWY 199	↓ BOD
5	Rogue R. at Rock Point Br.	↓ BOD, ↓TS
6	Bear Ck. at Kirtland Rd.	↑ DO, ↓P
7	Little Butte Ck. at Agate Rd.	↑ DO; ↓ BACT
8	Rogue R. at Dodge Pk.	--

* dissolved oxygen (DO), biochemical oxygen demand (BOD), total solids (TS), nitrogen (N), phosphorus (P)) and bacteria (BACT).

Human Health Related Data

Water Contact Recreation

CONCERN: *E. coli,* and other pathogens. Water contact recreation and public and private drinking water supply are the beneficial uses most sensitive to pathogenic organisms, including bacteria. In Oregon, *Escherichia coli (E. coli)*, Fecal coliform and Enterococcus bacteria are used as indicator organisms for assessing impairment in fresh, estuary, and marine waters respectively.

There were 46 fecal bacteria impairment listings for water contact recreation on the 2004/06 303(d) list, mainly in the Middle Rogue Subbasin and several waterbodies in the Upper and Lower Rogue Subbasin (Map 3). Some streams may have more than one fecal bacteria listing. For example, Little Butte Creek in the Upper Rogue River subbasin is listed for exceeding the bacteria water quality standard during two seasons. Waters in the Illinois and Applegate subbasins are generally meeting bacteria water quality standards.

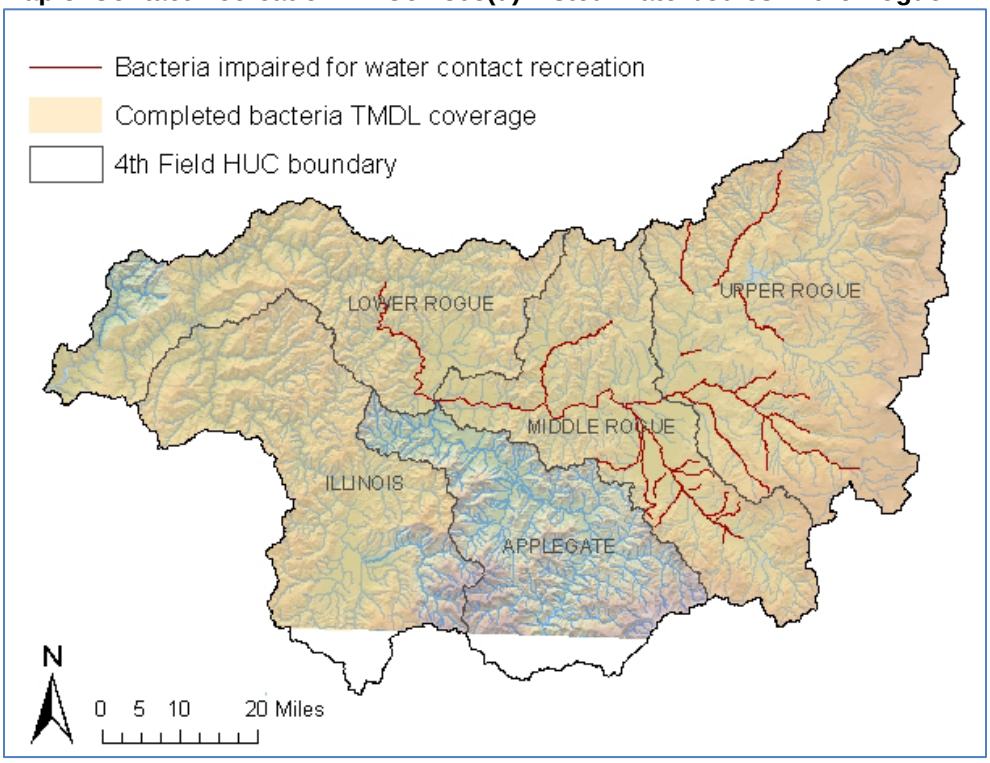
RESPONSE: Total Maximum Daily Loads (TMDLs) have been developed to address bacteria listings within the Rogue Basin (Bear Creek Watershed, 2007, Rogue Basin, 2008). Analysis indicates that nonpoint sources are responsible for the majority of fecal bacteria loading in the Rogue Basin. Analysis indicates that over 98% of the fecal bacteria in Bear Creek and 96% of the fecal bacteria in the Rogue River are from nonpoint sources including; urban, rural residential, and agricultural sources. In both the Rogue Basin and Bear Creek TMDLs, stream flow based loading capacities were developed and percent reduction targets were determined for each of 5 stream flow ranges. Percent reduction targets varied from 0% to over 85% depending on flow (Table 5). DEQ is working with key partners to reduce nonpoint source bacteria loading through implementation of best management practices (BMPs), monitoring, and education and outreach. Implementation projects include on-farm irrigation upgrades, correction of cross connections between sanitary sewers and stormwater sewers, installation of stormwater control facilities, and the development of an education program focused on pet owners and streamside landowners and others.

Table 5. Examples of the percent reduction needed to meet 406 *E. coli* per 100 ml standard at different flows

River	High Flow	Transitional	Typical	Dry Flow	Low Flow
Rogue River (RM 102.1)	71%	13%	57%	67%	0%
Evans Creek (RM 0)	0%	0%	54%	84%	74%
Little Butte Creek (RM 0)	73%	78%	69%	82%	83%
Bear Creek (RM 11)**	60%	79%	85%	65%	20%

** Note Bear Creek percent reductions based on meeting a 200 colony forming units (CFU) Fecal Coliform bacteria standard

Map 3. Contact Recreation: E. Coli 303(d) Listed Waterbodies in the Rogue River Basin



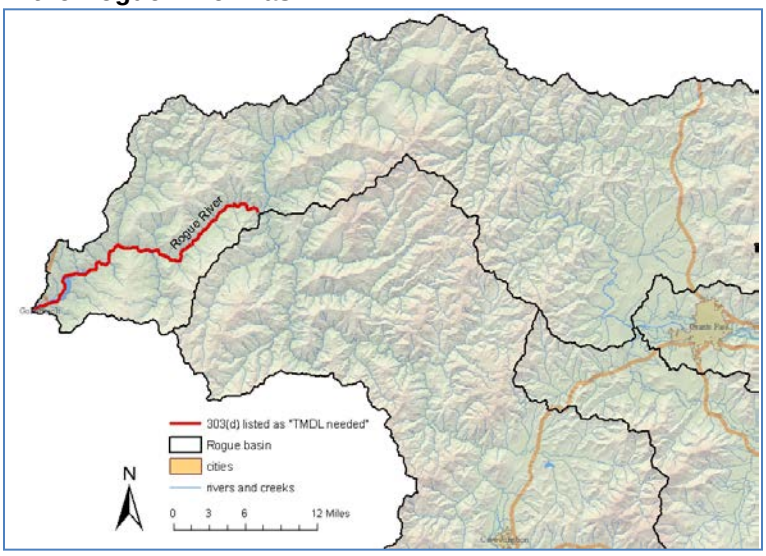
Shellfish Consumption

CONCERN: Fecal Coliform

There is one river segment in the Rogue River Basin on the draft 2010 Assessment listed as impaired for exceeding the fecal coliform criteria for shellfish growing waters (Map 4). This parameter addresses the water quality standard designed to protect humans from disease when consuming shellfish. As part of the Rogue Basin TMDL development process in 2008, it was found that the actual shellfish growing waters probably extended from the mouth only 5 miles upstream. DEQ does not currently have sufficient bacteria data to determine if there is an exceedance of the fecal coliform shellfish criteria in the known estuary.

RESPONSE: DEQ will determine the extent of the estuary and collect data to characterize if there is a shellfish bacteria impairment at some point in the future. However, although commercial and recreational fishing and boating in the estuary has been an important economic resource for generations, there is no commercial shellfish harvesting currently in the Rogue estuary and little indication that recreational harvesting is occurring. As such data collection is not likely to be a high priority at any time in the near future.

Map 4. Shellfish Criteria: Fecal Coliform 303(d) Listed Waterbodies in the Rogue River Basin



Fish Consumption

CONCERN: Toxics

Little is currently known about the occurrence of toxic pollutants in the waters and fish of the Rogue Basin. There is currently one fish consumption advisory in the Rogue Basin for mercury. A number of toxic pollutants including PCBs and chlorinated pesticides have been detected in fish and or in water samples in the basin and a number of potential sources have been identified.

Mercury: Mercury is a naturally occurring element found in cinnabar deposits and areas of geothermal activity. In the Rogue Basin, mercury was mined commercially and used extensively in gold and silver amalgamation (Map 5, DOGAMI, 1943). In addition mercury has been used historically in fungicide formulations and can still be found in many commercial products including fluorescent lights, thermometers, automobile switches and dental amalgam. Mercury is also naturally present in trees and fossil fuels such as coal, natural gas, diesel fuel and heating oil. The mercury present in these fuel sources is released into the atmosphere upon combustion. This atmospheric mercury can be transported great distances and is known to be deposited on the landscape via either wet or dry deposition (Sweet *et al*., 1999, 2003).

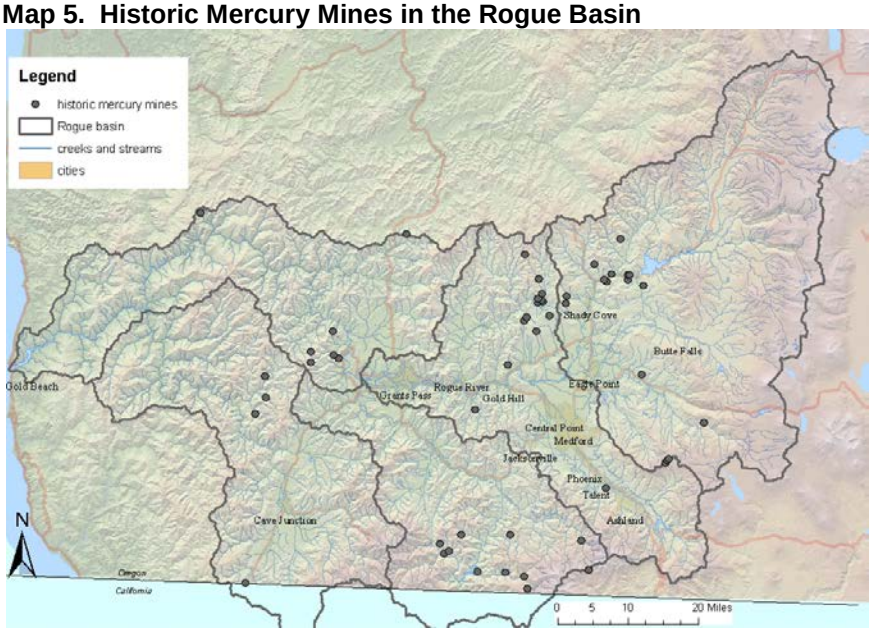
In the Rogue Basin only Emigrant Lake has a fish consumption advisory for mercury due to elevated concentrations found in smallmouth bass filets. Within the Rogue Basin, limited testing has been done for mercury in fish tissues and indicates that there may be mercury issues in Agate Lake and Squaw Lake however more data is needed (Table 6).

Table 6. Mercury Concentration in Lakes

Site Name – Fish Species	Status	Sample Dates	Hg Concentration mg/kg Wet Tissue*
Emigrant Lake: Small Mouth Bass, Middle Rogue Subbasin	Fish consumption advisory. 2010 303(d) list TMDL needed	8/31/2005	.82 mg/kg wet
Agate Lake: Large Mouth Bass, Middle Rogue Subbasin	Fish consumption advisory may be warranted	9/12/2005	.29 mg/kg wet
Squaw Lake: Bass, Applegate Subbasin	Evidence of problem – more data needed	1990's	.406 mg/kg wet

* Applicable Standard: 0.35mg/kg wet tissue is the fish consumption advisory as per the Oregon Department of Health Services.

Map 5. Historic Mercury Mines in the Rogue Basin

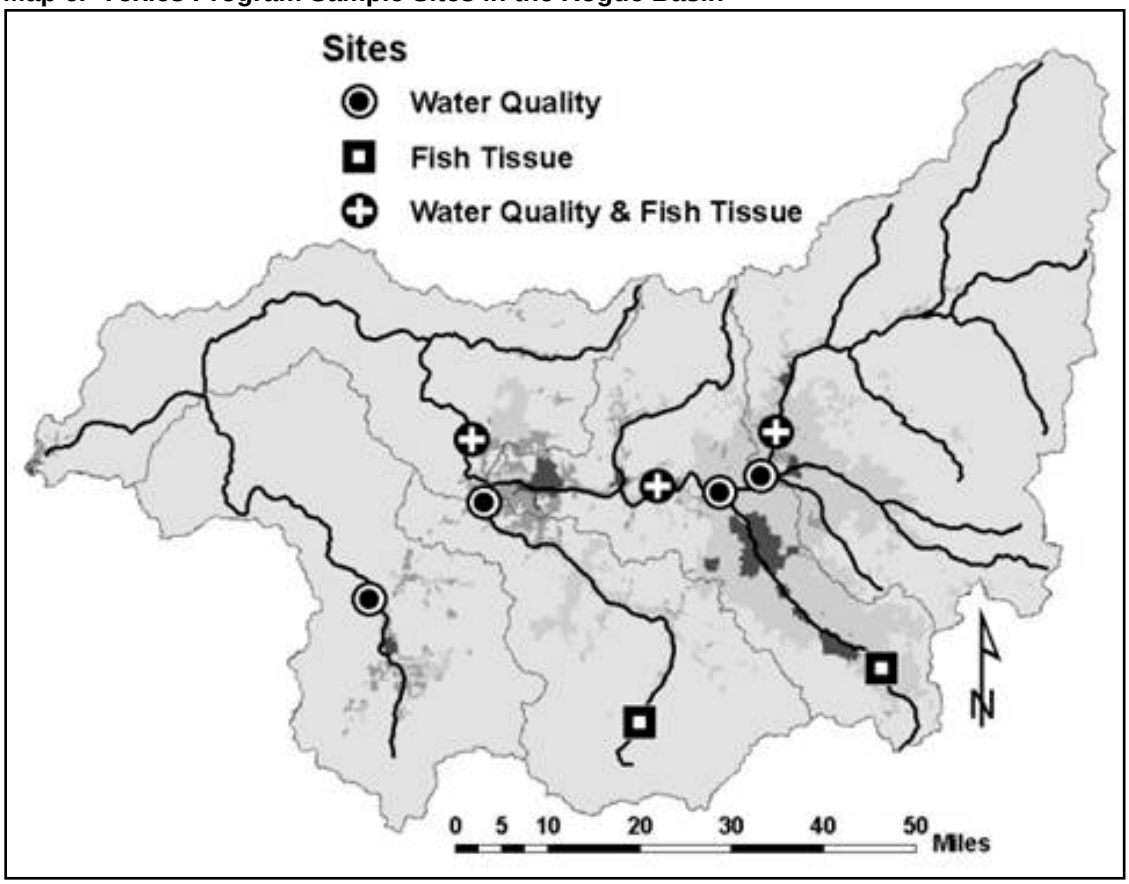


RESPONSE: Current and Future Toxics Monitoring Work

In 2010, effluent samples were collected twice from the three major waste water treatment facilities in the Rogue Basin (Grants Pass, Medford, Ashland) and are being analyzed for 119 persistent priority pollutants pursuant to Senate Bill 737. As of March 2011 results indicate that all facilities tested in Rogue Basin had cholesterol and coprostanol above Plan Initiation Level (PIL). At its February 2011 meeting, the Environmental Quality Commission passed a temporary rule to suspend municipalities' requirement to develop reduction plans for cholesterol and coprostanol, after considering the following: 1) Pollution Prevention is the primary focus of SB 737. These pollutants are naturally-occurring byproducts of human digestion and are not amenable to pollution prevention. 2) Toxicity estimates used to set plan initiation levels are not corroborated by scientific literature, 3) DEQ also considered treatment, and determined that it is not cost-effective for cholesterol or coprostanol.

In early 2010, DEQ collected water samples at all ambient river monitoring locations in the Rogue Basin and analyzed these samples for total recoverable concentrations of 19 metals (Little Butte Creek at Agate Road, Rogue River at Dodge Park, Rogue River at Gold Hill, Applegate River at Highway 199, Rogue River at Robertson Bridge, Rogue River at Lobster Creek Bridge, Illinois River downstream of Kerby, Bear Creek at Kirtland Road (Map 6)). In the summer of 2010, following several public outreach meetings held to obtain local input, DEQ's Toxics Monitoring Program collected resident fresh water fish from 4 sites in the basin including two sites on the Rogue River (behind Gold Ray Dam, and downstream of Robertson Bridge) along with Applegate Reservoir and Emigrant Lake. Bass were collected from behind Gold Ray dam in conjunction with Oregon Department of Fish and Wildlife's fish salvage efforts just prior to the scheduled removal of the dam. Fillets (the edible portion of the fish) will be analyzed for over one hundred toxic pollutants (including mercury) that tend to accumulate in living organisms (bio-concentrate). Results for those samples are pending as of December 2010. In 2011, DEQ's Toxics Monitoring Program plans to conduct additional local outreach meetings and select up to 8 locations throughout the basin in the spring and fall of 2011 and analyze them for over 270 organic chemicals.

Map 6. Toxics Program Sample Sites in the Rogue Basin



Public Water Supply – Surface and Ground Water

CONCERN: Toxics/Bacteria/Turbidity/Nitrates

There are 22 public water systems in the Rogue Basin using surface water. These water systems serve over 196,000 people. In the basin there are 479 public water systems relying on groundwater either in whole or in part. These systems serve a total population of almost 186,000 residents. Of the 250 systems that are currently mapped, 112 are within a quarter mile of surface waters and 160 are within a half mile of surface waters. Note that this section only addresses drinking water issues identified for public water systems. There are also 467 private domestic water rights in the Rogue Basin (based on a 2010 query of the Oregon Water Resource Department Water Rights Database).

Safe Drinking Water Act monitoring data indicates that two public water systems served by surface water (City of Rogue River and Jackson County Parks at Emigrant Lake) have had detections of compounds (nickel and antimony) above the action level in finished water. In addition, two systems (Galice Resort and Latgawa Methodist Church Camp) had coliform bacteria in their finished water.

As part of the Safe Drinking Water Act requirements, a number of public drinking water systems with intakes in the Rogue Basin were required to conduct up to two years of *E.coli* monitoring to determine if they are at risk from cryptosporidium or other pathogenic microorganisms entering the drinking water supply. Eight public water systems using surface water in the Rogue Basin reported *E. coli* counts over 100 per 100mL during the two-year period. In addition, low levels of pharmaceuticals (sulfamethoxazole, carbamazepine, and diphenhydramine), steroids and

hormones (coprostanol and cholesterol), and pesticides (DEET, atrazine, diuron, fluometuron, and carbaryl) were found in Gold Hill's drinking water as part of DEQ's Drinking Water Source Monitoring Project.

Turbidity is also a periodic issue in the basin. Elevated turbidity often results in increased backflushing and additional chemicals in the treatment process, thus increasing overall treatment costs to the public water systems and communities. Contaminants adsorbed to the surface of entrained particles in turbid water can also pose a threat. In addition, high turbidity due to organic matter in raw water is associated with the formation of disinfection byproducts during the drinking water treatment process. Grants Pass, as an example, which has an intake on the Rogue River, has received numerous Department of Human Services alerts over the years for high levels of trihalomethanes and haloacetic acids in their source water.

In the Rogue Basin 27 public water supply systems within a half-mile of surface water have experienced groundwater contamination problems. Contaminants of concern include volatile organic compounds (4 systems), metals such as nickel, antimony, barium and beryllium (5 systems), arsenic (12 systems), nitrate (10 systems), turbidity (1 system), and bacteria (62 water systems). This may provide important insights into the potential influence from groundwater to surface waters in the Rogue Basin.

As documented in Source Water Assessment reports for community public water systems in the Rogue Basin, the following are potential sources of contamination identified within drinking water source areas that pose the greatest risk to source water:

Agricultural-related activities including : CAFOs, grazing animals, chemical applications associated with irrigated and non-irrigated crops
Transportation-related activities including: stream crossings, high use roadways and corridors, railroads, and runoff from parking lots
Stormwater detention ponds and outfalls from urban residential, commercial and industrial sources
Mining, industrial and manufacturing activities
Dump sites and landfills
Forest management activities including roads and harvesting
Wastewater treatment plants and septic systems

RESPONSE: Current and Future Toxics Monitoring Work for Drinking Water
DEQ is currently implementing a Drinking Water Source Monitoring Project that includes collecting groundwater and surface water samples from high-risk public drinking water sources. DEQ Laboratory staff are collecting the samples above surface water intakes and at wells. The scope of the project is limited. The list of analytes includes Oregon-specific herbicides, insecticides, pharmaceuticals, volatile organic compounds, fire retardants, PAHs, and plasticizers. The purpose of the Source Monitoring is to collect data from multiple contaminant sources to assist in determining priorities for technical assistance and prevention, and to collect screening level data on whether there are potential human health risks beyond those routinely monitored within the Safe Drinking Water Act regulations. Sampling upstream of Gold Hill's intake on the Rogue River occurred in the fall and spring of 2008, and sampling upstream of the intake for Grants Pass occurred in fall 2010. While data for Gold Hill did not reveal any high concentrations of contaminants, it confirmed the presence of low levels of pharmaceuticals, steroids and hormones, and pesticides in the drinking water source. These results provide a basis for prioritizing pollutant reduction strategies for drinking water in the basin, but more data will be needed to identify the source of these contaminants and develop specific technical assistance and management strategies. The results for the fall 2010 monitoring are expected by spring 2011.

DEQ's Toxics Monitoring Program has proposed water quality sampling in the Rogue Basin in the spring and summer of 2011. This effort will yield important data on the presence of toxins in untreated drinking water in the Basin. However, there may be remaining data gaps for locations upstream of drinking water intakes that are not selected as sampling sites.

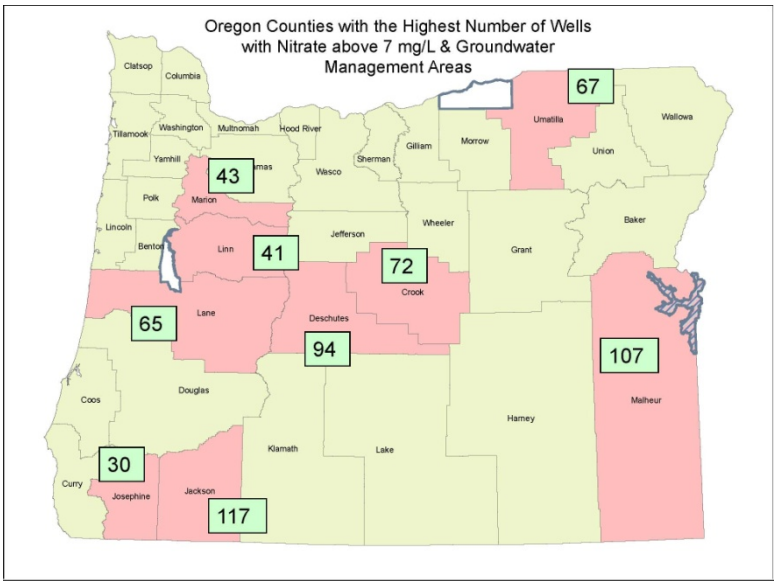
A number of public water systems have continuous turbidity monitoring equipment yielding high quality data on turbidity levels of untreated drinking water. A plan for installing this equipment at public water systems throughout the Basin would be a major benefit for assessing impacts. DEQ will continue coordination with partnering agencies to share research results, monitoring data, and mapping.

Private Water Supply – Groundwater

CONCERN: Nitrate, bacteria, metals: arsenic, boron, fluoride, mercury
Groundwater is the main source of domestic water for the majority of rural residents. Although groundwater water rights are still being granted, groundwater quantity is a growing concern. Regions within the basin are experiencing a rapidly dropping water table. With decreasing recharge and increasing rural population, this trend is likely to continue and broaden. Many areas do not have a viable second aquifer to tap, leaving residents with few alternatives. In addition to water levels dropping, some bedrock 'aquifers' are not capable of providing even 1 gpm.

Many areas of the Rogue Basin have poor groundwater quantity and quality. The primary groundwater 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 in groundwater due to human activities; arsenic, salts & minerals, fluoride and boron are most likely present in groundwater due to naturally occurring sources in the bedrock. The basin may meet the requirements for declaring it a Groundwater Management Area (GWMA). The documented number and levels of nitrate contamination of private wells has the potential to rival or exceed those areas that already have Groundwater Management Area (GWMA) designation. Groundwater test data from the Real Estate Transaction (RET) database show nitrate levels over the 7 mg/L action level in more wells tested in Jackson County than reported for any of the counties with a GWMA including an area of Deschutes County with known groundwater concerns (S. Deschutes/N. Klamath Groundwater area formerly known as the LaPine Groundwater area) (Map 7). The use of some Rogue Valley groundwater presents a real human health issue that has not yet been addressed by any agency.

RESPONSE: There is a need to correlate the RET results with current well water use areas and provide public information to residents whose wells may be impacted. In addition, research on well logs, geology, and agricultural use within Jackson and Josephine Counties is needed to more precisely identify areas at risk for high nitrates in groundwater. This information can be used to target rural residential assistance programs operated by OSU Extension and the Jackson Soil and Water Conservation District.



Map 7. Oregon Counties and the Number of Wells Containing over 7 mg/L Nitrate

Water Contact Recreation/Public Water Supply

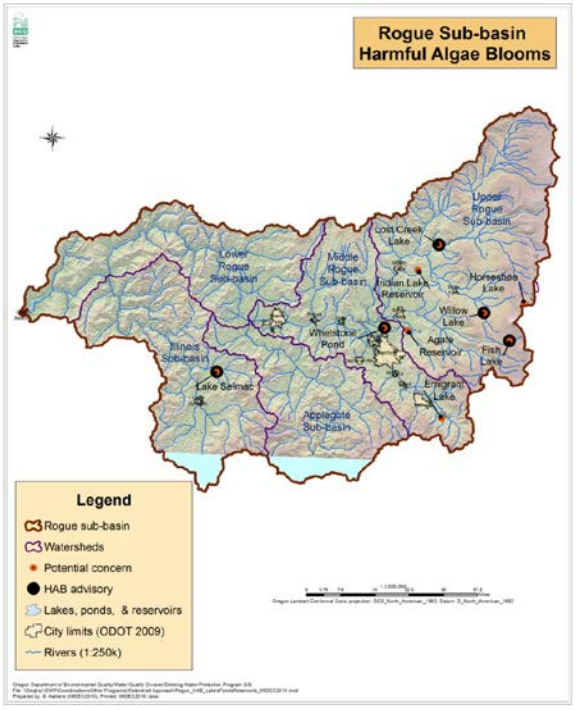
CONCERN: Harmful Algal Blooms (HABs)
Some species of algae, such as cyanobacteria or blue-green algae, can produce toxins or poisons that can cause serious illness or death in pets, livestock, wildlife, and humans. There are multiple beneficial uses affected by harmful algal blooms. These include: aesthetics, livestock watering, fishing, water contact recreation, and drinking water supply.

RESPONSE: The Oregon Department of Human Services runs the Harmful Algae Bloom Surveillance (HABS) program which tracks blue-green algae health advisories: http://www.oregon.gov/DHS/ph/hab/. Health advisories are generally posted if the cell density of blue-green algae equals or exceeds 100,000 cells/ml (DHS, 2009 http://www.oregon.gov/DHS/ph/hab/docs/DHS_GUIDANCE_on_HAB.pdf; Stone and Bress, 2007). Health advisories have been posted since the HABs program began in 2004 (Table 7). Note that Fish Lake had a notice posted in 2002 but an advisory was not issued. The posting criterion used in 2004 was 15,000 cells/ml. Selmac Lake was posted that year, but it exceeded 100,000 cells/ml and had toxins present that forced the closing of a public drinking water system for the campground. The table also indicates the proposed listing designations in the draft 2010 Water Quality Assessment.

Table 7. Harmful Algal Blooms in the Rogue Basin

Lake	Proposed Listing of Impairment*	Years with Health Advisories Notices					
Lost Creek Reservoir	Category 5 (303d list)	2010	2009	2008	2007	2006	
Whetstone Pond	Category 5 (303d list)	2010	2009				
Fish Lake	Category 5 (303d list)	2010					2002
Willow Lake	Category 5 (303d list)	2010					
Selmac Lake	Category 5 (303d list)	2004					

*Note: Category 5 indicates that "Water is water quality limited and a TMDL is needed."

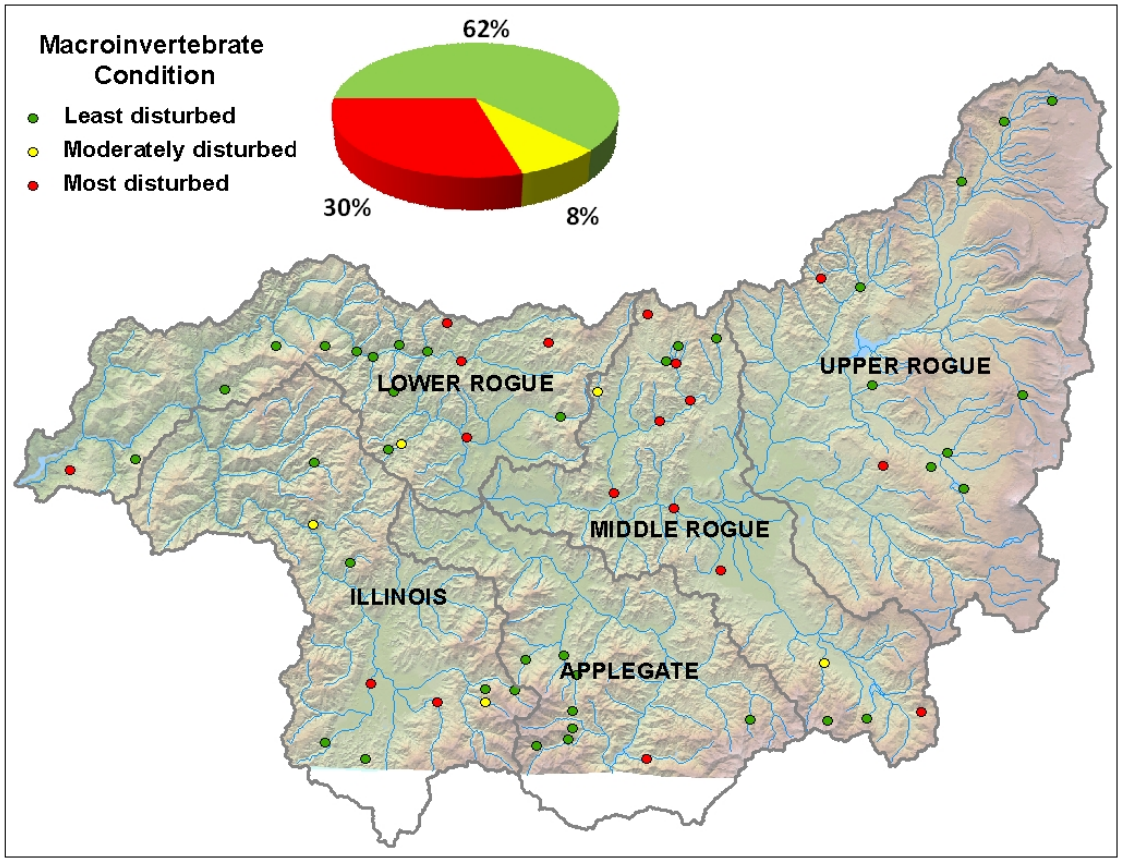


Lakes with potential HABs issues include Agate and Emigrant Lakes based on information in Johnson et al, 1985 and Sweet, 1985 that shows that blue-green algae have been a dominant species. Spectral analysis based on LandSat satellite data indicates that blooms have been occurring in Horseshoe Lake and Indian Lake Reservoir (Turner, 2010). Additional data is needed to determine the status of these lakes.

Fish and Aquatic Life

CONCERN: Macroinvertebrate Assemblage

Biological Condition. In the Rogue Basin, macroinvertebrate samples were collected at 62 sites on smaller wadeable streams from 2000 – 2008 (Map 8). Using DEQ's predictive models to assess biological condition, we observed 62% of sites to be in least disturbed conditions. Eight percent of sites were in moderately disturbed conditions, and 30% of sites were in most disturbed conditions (Figure 2).

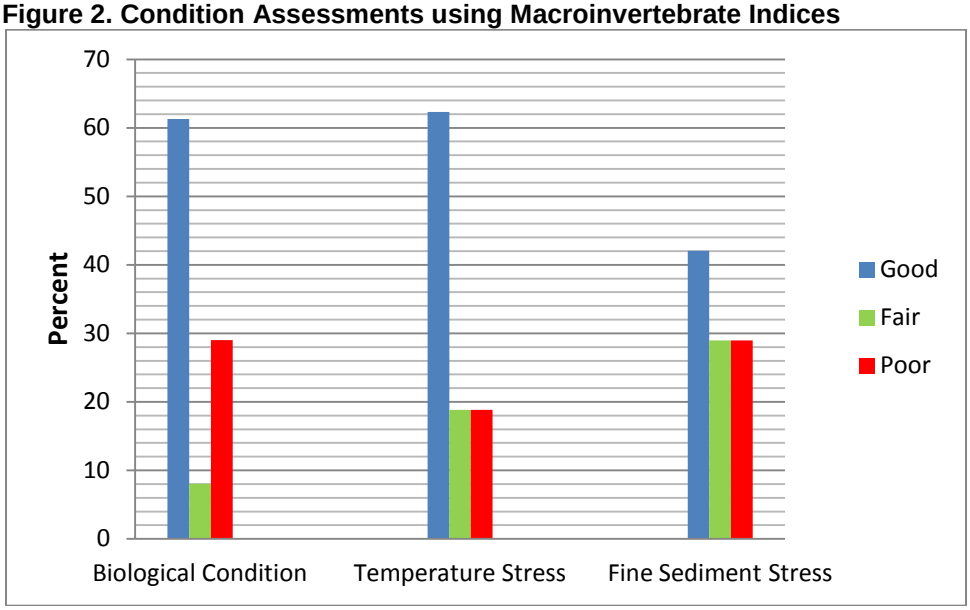


Map 8. Locations and Condition Classes of Macroinvertebrate Assemblages at 62 Wadeable Stream Sites in the Rogue basin

Temperature stress. Sixty-nine samples were assessed in the Rogue Basin from 2000-2008. Most sites (62%) in the Rogue showed good condition for temperature stress. Nineteen percent of sites were in fair condition. About 19% of sites in the Rogue Basin showed poor conditions for temperature stress (Figure 2).

Fine sediment stress. Sixty-nine samples were assessed in the Rogue Basin from 2000-2008. Higher levels of stress were observed for fine sediments than temperatures. Forty-two percent of Rogue sites were in good condition for fine sediment stress and 29% of sites were in fair condition. Twenty-nine percent of sites were in poor condition. This was 10% higher than was observed for temperature stress (Figure 2).

Figure 2. Condition Assessments using Macroinvertebrate Indices



Fish and Aquatic Life

CONCERN: Temperature

Salmonids, and some amphibians are highly sensitive to temperature. In particular, Chinook salmon (Oncorhynchus tshawytscha) and coho salmon (Oncorhynchus kisutch) are among the most temperature sensitive of the cold water fish species in the Rogue River subbasins (DEQ, 1995). Oregon's water temperature criteria employ a logic that relies on using salmonids' life cycles as the indicator. Temperatures which protect these indicator species will also protect other species. Excessive summer water temperatures reduce the quality of rearing and spawning habitat for chinook and coho salmon, steelhead and resident rainbow trout. Potential thermal pollutants identified include human-caused increases in solar radiation due to changes in riparian vegetation, warm water discharges due to dams, waste water treatment facilities, flow modification and irrigation district management.

RESPONSE: There were 148 individual temperature impairment listings on the 2004/06 Water Quality Assessment in the Rogue Basin (Map 9). Some streams may have more than one temperature listing. For example, Deer Creek in the Illinois River subbasin is listed for exceeding the rearing criteria *and* the spawning criteria.

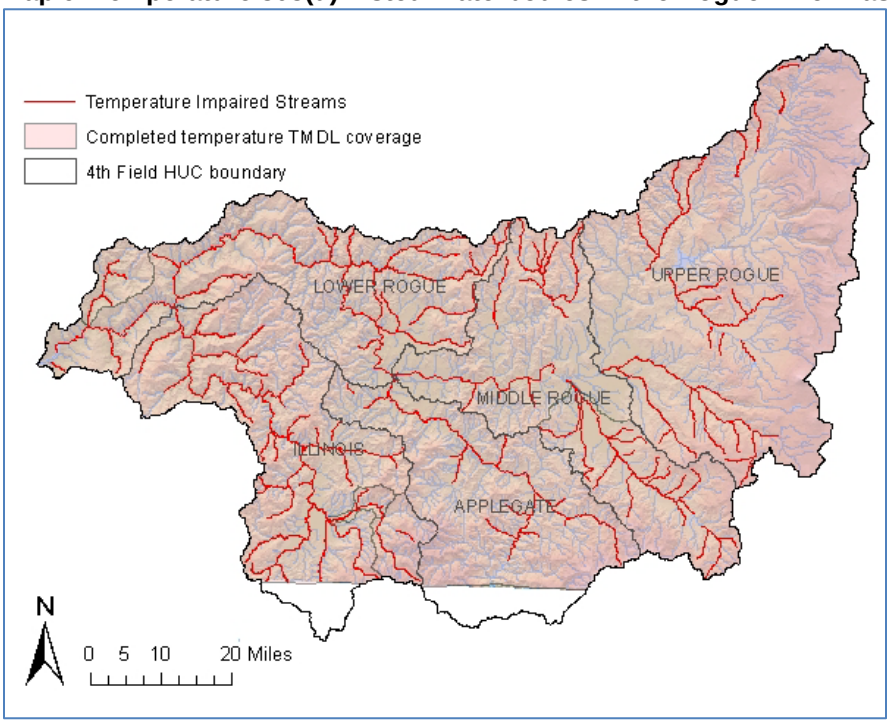
Temperature TMDLs have been written for every watershed in the Rogue Basin and apply to all perennial and intermittent streams within the Rogue Basin. The TMDLs require actions to limit thermal loading to surface waterbodies. In general, TMDL loading capacities are expressed as pollutant loading limits plus a Human Use Allowance (HUA) for both point and nonpoint sources of pollution. The TMDL allocations take the form of numeric loads as well as percent effective shade targets, with limits on temperature changes and hyporheic exchange targets for identified watershed sources (Table 8).

Table 8. Example TMDL Shade Targets for the Rogue River and Selected Tributaries

Water Body	Percent Effective Shade (August 1)		Shade Deficit	Predicted Temperature Increase Due to Decreased Shading* (°C)
	Current	System Potential	(% shade)	
Antelope Creek	41	82	41	5.7
South Fork Little Butte Creek	39	74	35	5.7
Evans & West Fork Evans Creek	29	78	48	5.3
Little Butte Creek	29	69	40	5.0
Elk Creek	44	80	36	4.4
North Fork Little Butte Creek	62	91	29	1.8
Bear Creek	15	54	39	7.7**
Rogue River Mainstem	8	17	9	.05

*Temperature impacts are the average increase to the 7 day average daily maximum for the modeled reach.
**Bear Creek Temperatures are based on natural conditions shade as natural conditions flow

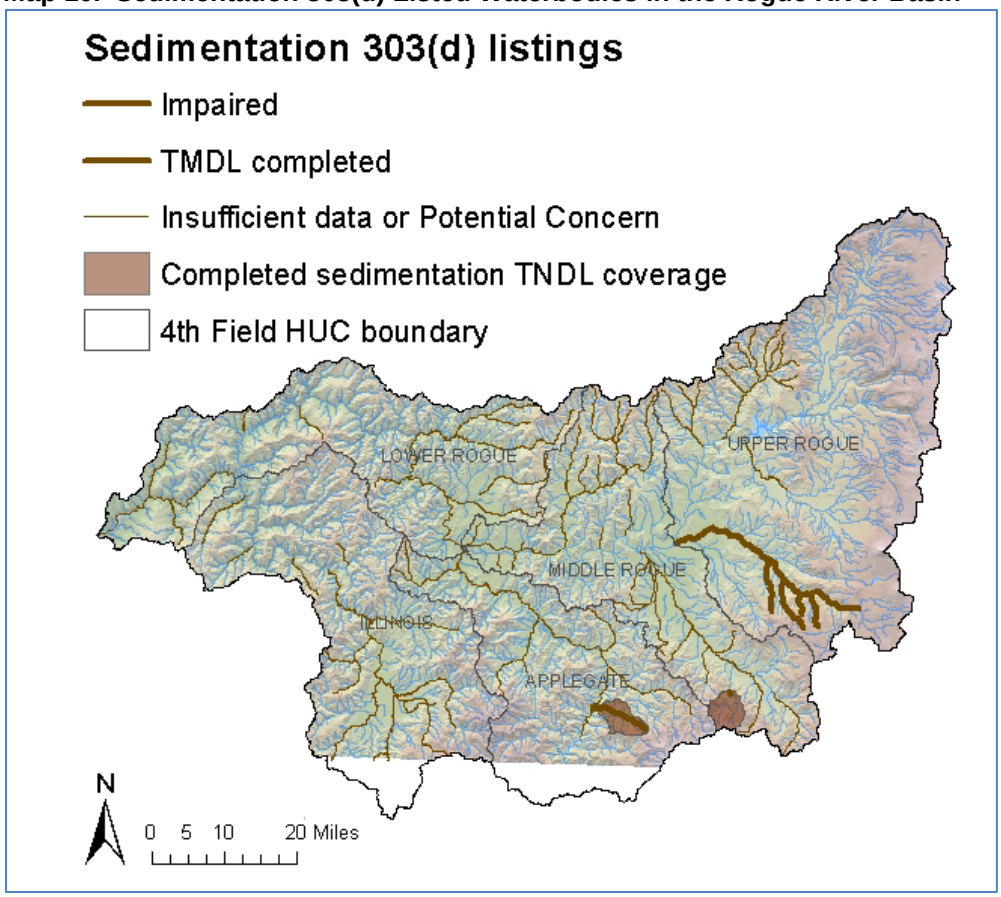
Map 9. Temperature 303(d) Listed Waterbodies in the Rogue River Basin



Fish and Aquatic Life

CONCERN: Sedimentation/Turbidity
There are 7 segments and one reservoir identified on the 2004/2006 Water Quality Assessment as impaired for sedimentation (Map 10). The impairments were determined based on Oregon Department of Fish and Wildlife (ODFW) reporting that a high percentage of fine sediment was measured in most reaches during a 1994 survey. Sedimentation is a concern throughout the Rogue Basin. As noted in the previous macroinvertebrate section: 42% of wadeable streams surveyed were in good condition for fine sediment stress, 29% in fair condition, 29% in poor condition. At the time of the writing of this TMDL, DEQ is in the process of developing a sedimentation assessment methodology that could be used for implementing the narrative sedimentation standard. When the methodology and associated guidance is completed, the agency will establish sedimentation TMDLs for those waterways on the 303(d) list.

Map 10. Sedimentation 303(d) Listed Waterbodies in the Rogue River Basin



Note: "Insufficient data" is a category of the Water Quality Assessment database identifying segments where more data is needed in order to make a determination of water quality impairment. In the Rogue Basin, all the sedimentation segments categorized as "Insufficient data" were based on DEQ's 1988 Nonpoint Source Assessment. The NPS Assessment established that there were moderate or severe observed impairments, but the supporting data needed to be collected or obtained from partners.

RESPONSE: Several localized TMDLs have been developed to address sedimentation: Reeder Reservoir on Ashland Creek in the Middle Rogue Subbasin, and Beaver Creek in the Applegate Subbasin as part of the Applegate and Bear Creek TMDLs, respectively. The Reeder Reservoir listing was based on a 1995 USFS watershed analysis that confirmed excessive sedimentation was requiring periodic sluicing of the reservoir and the Beaver Creek

listing was determined after an analysis of macroinvertebrate populations indicated impairment due to excessive fine sediments (Schroeder, P.C., 2002, USFS, 1994).

When the methodology and associated sedimentation guidance is completed, the DEQ will establish sedimentation TMDLs for those waterways on the 303(d) list that have yet to be addressed via the TMDL process. In the meantime DEQ expects decreases in sedimentation to result from the implementation of temperature TMDLs in the Rogue Basin. Wide mature riparian vegetation buffers filter sediment from upslope sources as well as stabilize stream banks from erosion as well as provide stream shade.

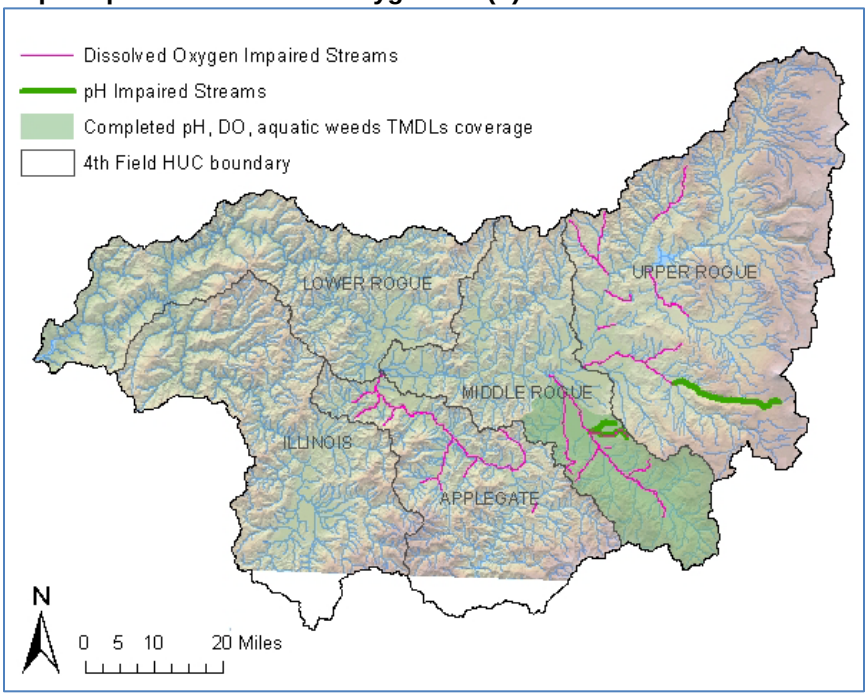
There are currently no known turbidity impairments in the Rogue Basin. DEQ is currently revising the turbidity water quality standard which will lead to new assessment criteria.

Fish and Aquatic Life

CONCERN: Dissolved Oxygen/pH/Nutrients
Dissolved oxygen & pH exceedances have been documented in the Rogue Basin. There are 3 pH and 20 dissolved oxygen impairments currently on the draft 2010 Water Quality Assessment list identified as needing a TMDL (Map 11).

RESPONSE: A DO and pH TMDL was developed for Bear Creek in 1992. Allocations were established for phosphorus, ammonia, biochemical oxygen demand, and nitrogenous plus carbonaceous oxygen demand and are currently considered sufficient. DO and pH listings elsewhere in the Rogue Basin are the result of nonpoint sources. There are no permitted point source inputs on the any of the effected waterways. There are currently insufficient data to address these dissolved oxygen and pH listings through the TMDL process however DEQ does expect to see improvements as a result of implementing the Temperature TMDLs. Stream temperature has a significant impact on the dissolved oxygen level in a stream in two ways. 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. Preventing large shifts in DO throughout the day will stabilize pH as well.

Map 11. pH and Dissolved Oxygen 303(d) Listed Waterbodies in the Rogue River Basin



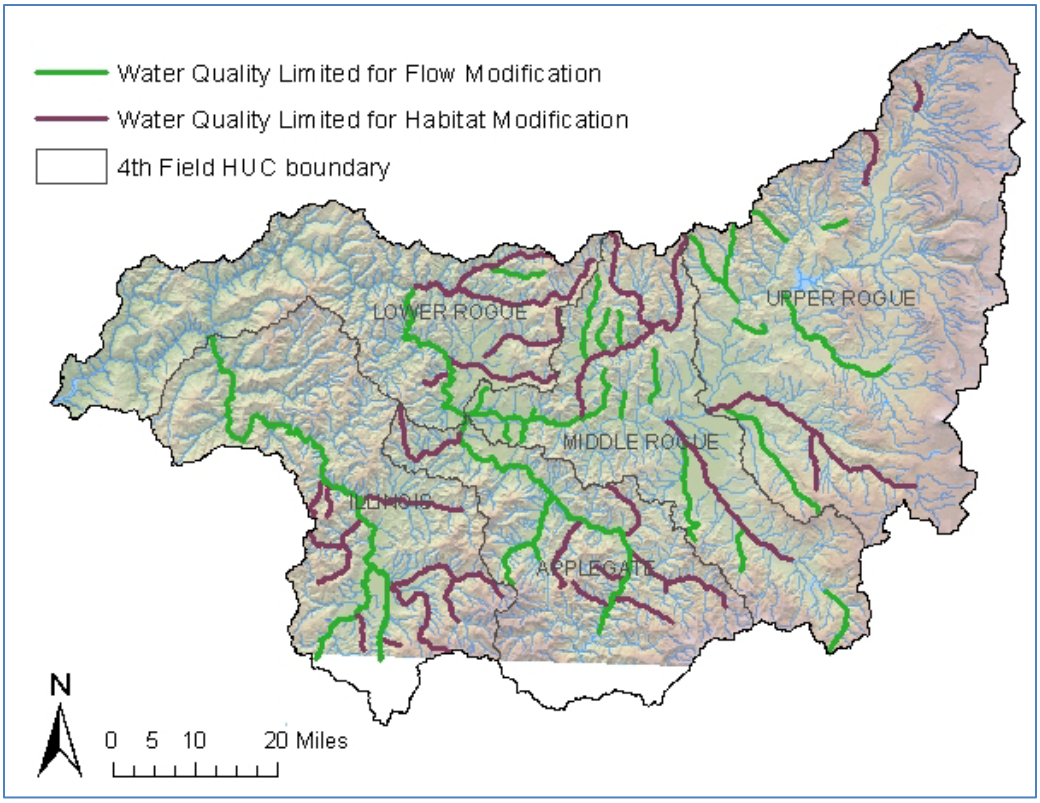
Fish and Aquatic Life

CONCERN: Flow/Habitat
There were 87 flow and habitat modification impairments identified in the 2004/2006 Water Quality Assessment (Map 12). In 2002, it was determined that flow and habitat modifications are not pollutants and therefore TMDLs do not apply. DEQ does however expect to see some improvements to flow and habitat as a result of implementing the current TMDLs and implementation plans should help to address these factors.

RESPONSE: DEQ's current process to promote flow protection and habitat restoration relies on voluntary measures and community initiative. The direct regulation of flow is not under the jurisdiction of DEQ but is addressed through Oregon Water Resources Department. DEQ and OWRD are currently collaborating to develop strategies to address the influence of water quantity on water quality, through an Integrated Water Resources Strategy, (http://www.oregon.gov/OWRD/LAW/ Integrated Water SupplyStrategy.shtml).

Currently, OWRD's data collection network in the Rogue Basin continuously monitors parameters such as flow, temperature, and turbidity. In the future, in-stream water rights as well as other tools that could be used for maintaining flows may help in meeting water quality standards. Both DEQ and ODFW have applied for in-stream water rights in some basins. The US Army Corps of Engineer dams at Lost Creek Lake and Applegate have submitted Temperature TMDL Water Quality Plans to DEQ. The USACE employs reservoir release strategies that are developed annually with input from the Rogue Basin Water Management Advisory Group. Various federal and state agencies compose this advisory group; which includes ODFW. The Oregon Water Resources Department (OWRD) serves as the lead agency that submits, to the USACE, a coordinated package of reservoir release recommendations for the State of Oregon.

Map 12. Flow and Habitat Impaired Waterbodies in the Rogue River Basin



Fish and Aquatic Life

CONCERN: Rogue River Estuary
The Coastal Environmental Monitoring and Assessment Program (/http://www.deq.state.or.us/lab/wqm/CEMAP.htm) sampled the Rogue estuary in 1999, 2001 and 2004. Water column temperature, pH, and DO met water quality criteria. The water column showed typical temperature and salinity stratification. Water quality nutrient levels and trophic status were good. The metals aluminum, antimony, arsenic, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, selenium, silver and zinc were detected in estuary sediments. Tin was the only metal not detected. There are published Effects Range Low (ERL) and Effects Range Median (ERM) concentrations for 9 of the 15 metals detected (Long, MacDonald, Smith and Calder 1995). Arsenic, copper, and chromium exceeded the ERL in every sample. Mercury narrowly exceeded the ERL in one sample. Median nickel concentrations were five times the ERM. EPA's Mid-Atlantic Integrated Assessment ranked sediments exceeding one or more metal ERL as intermediate, and those exceeding any ERM as poor. For polycyclic aromatic compounds the acenaphthene concentration marginally exceeded the ERL in one sample, and anthracene met its ERL in another. PCBs 8 and 52, and the pesticides Heptachlor and Lindane (gamma-BHC) were detected in one sediment sample; Heptachlor, Lindane, and Endosulfan Sulfate were detected in another. Other PCB and pesticides were not detected.

Fish Tissue Contaminants. Shiner surf perch (*Cymatogaster aggregata*) were caught in 2001 and Pacific staghorn sculpin (*Leptocottus armatus*) in 2004. Aluminum, arsenic, chromium, copper, iron, nickel, zinc, silver, selenium, mercury and the pesticide 4,4'-DDE were detected in the surf perch. Pacific staghorn sculpin contained the metals aluminum, chromium, copper, nickel, iron, silver, zinc, lead, selenium, and mercury. Several poly-brominated-diphenyl-ether flame retardants were added to the organic compound analytical suite in 2004. The PBDEs 2,2',4,4',5-pentabromo-diphenyl-ether; 2,2',4,4',6-pentabromo-diphenyl-ether; 2,2',4,4'-

tetrabromo-diphenyl-ether were detected, as were the pesticides hexachlorobenzene and trans-nonachlor. There was no sediment toxicity with the test organism ampelisca abdita, but a sediment porewater test of sea urchin fertilization and development showed some impairment.

Non-native Invasive Species. Benthic infauna were collected on each survey. The New Zealand Mud Snail (*Potamopyrgus antipodarum)* was found in 1999 and 2001. The 2004 sample didn't contain New Zealand Mud Snail but three other exotic species were identified. 1999: Potamopyrgus antipodarum (5 individuals), 2001: Potamopyrgus antipodarum (3,797 individuals), 2004: Heteromastus filiformis (exotic species), Pseudopolydora kempi (exotic species), and Mya arenaria.

Water Quality Project Implementation Highlights

Agencies and stakeholders with jurisdiction over activities that impact water quality in the Rogue Basin consist of a network of federal, state, and local agencies and organizations, as well as private landowners. Oregon DEQ's role is to communicate regularly with these entities to facilitate opportunities with these stakeholders to protect, enhance, restore and monitor the Rogue River Basin watersheds. What follows is a very brief overview of selected implementation actions and activities in the Rogue Basin.

Bear Creek Improvement Projects

For decades, urban, forested and agricultural areas have contributed excess nutrients and other pollutants to Bear Creek, prompting DEQ to add 26.3 miles of Bear Creek and some of its main tributaries to the state's list of impaired waters in 1998. To reduce excess nutrients like phosphorus in Bear Creek, watershed stakeholders have collaborated to invest over $39.5 million since 1997 on water quality improvement projects including upgrading a wastewater treatment plant, educating landowners, and implementing numerous agricultural and urban best management practices. As a result, water quality has measurably improved and phosphorus levels have dropped steadily in Bear Creek and four of its tributaries. The 1992 Bear Creek TMDL established that the in-stream concentration of total phosphorus must be less than 0.08 milligrams per liter (mg/L) from May 1 through November 15 in order to meet water quality standards. Although Bear Creek and its tributaries do not yet meet this goal consistently, significant progress had been made. For example at Bear Creek river mile 10 in Medford, average phosphorus levels have declined from 0.27 mg/L in 1996–1998 to 0.08 mg/L in 2008–2009 for the September/October time period (Figure 3). In Ashland Creek, upgrading the treatment plant has resulted in dramatic phosphorus decreases as well (Bear Creek Success Story). Consistent collaboration and targeted funding has been central to current success and will be the key to future anticipated improvements within the watershed.

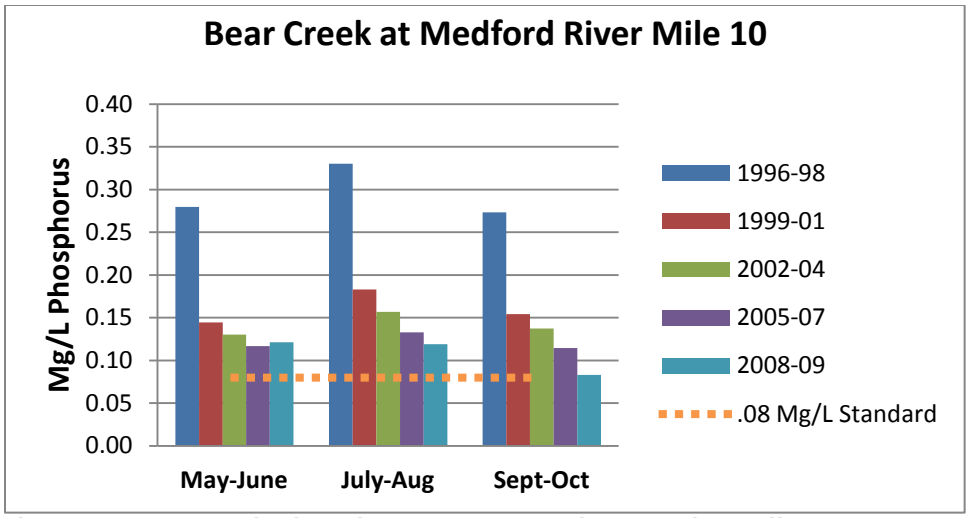
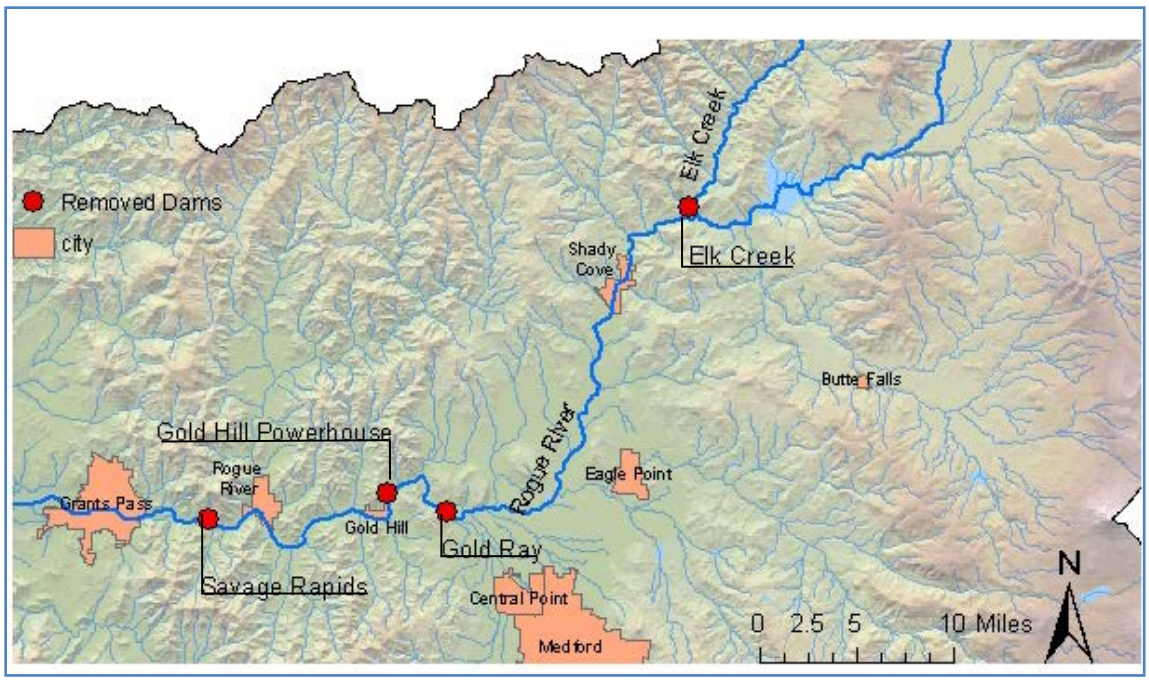


Figure 3. Bear Creek Phosphorus Concentrations at River Mile 10

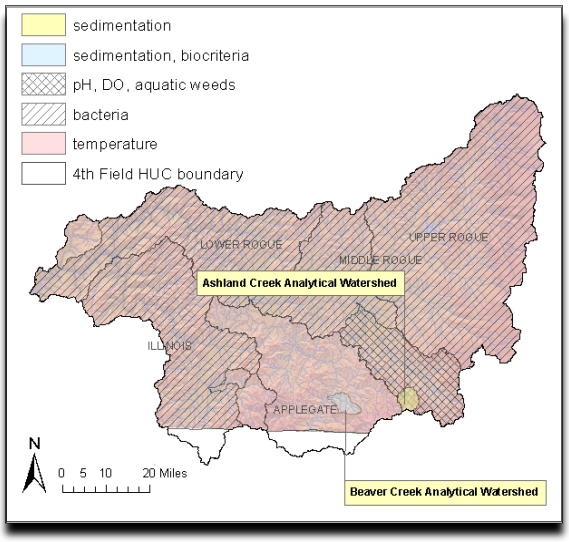
Rogue Basin Dam Removal

The Rogue River has long been known for its scenic beauty, world-class whitewater, and famed salmon and steelhead fishery. It was designated as one of the original "Wild and Scenic Rivers" with passage of the federal Wild and Scenic Rivers Act of1968. The Rogue is the second largest producer of salmon in Oregon outside of the Columbia Basin and one of the few remaining salmon strongholds in the Pacific Northwest. Over the course of the last 100 years, the Rogue River, its tributaries, and its fish have suffered from a series of dams that inhibit or completely block fish migrations and degrade water quality and habitat. In addition to impacts to dissolved oxygen and pH due to impoundments behind the dams, the 2008 Rogue River Basin TMDL estimated that water temperatures (seven day average daily maximums) increased by as much as 0.1°C due to dams on the mainstem Rogue. However, one of the nation's most significant river restoration projects was completed in 2010 with the removal of four of the most harmful dams on the river. In 2008, the Gold Hill Diversion Dam was removed and the Elk Creek Dam was notched. Savage Rapids Dam removal was completed in 2009 and Gold Ray Dam was removed in 2010 (Map 13). The removed dams provide salmon and steelhead with better access to over 333 miles of high-quality spawning habitat and improve water quality. Future monitoring will quantify the impact of dam removal on temperatures in the Rogue River mainstem.

Map 13. Dams removed in the Rogue Basin



TMDLS and Implementation Plans – Focused Actions



TMDLs have been completed for the Rogue Basin addressing the majority of water quality impairments. As a result of TMDLs, designated management agencies (DMAs), those with jurisdiction over activities that may impact water quality, are required to submit implementation plans as required by OAR 340-042-0080 (Table 9). These implementation plans describe timelines and the actions DMAs will take to reduce their impact on water quality. On agricultural land these implementation plans are developed through the Oregon Department of Agriculture's Area Plan process. On state and private forestlands, the Department of Forestry has the lead in providing water quality protection through the Forest Practices Act and long range management plans. In urban and rural landscapes, local governments take the lead in developing TMDL implementation plans. Irrigation Districts develop TMDL implementation plans as well to address the maintenance and operation of canals and the outreach and education of irrigation system users. The US Forest Service and the Bureau of Land Management develop water quality restoration plans for lands under their jurisdiction. Under most circumstances, TMDL implementation plans rely on cooperation among landowners and land managers within a river basin. Local watershed councils, soil and water conservation districts or other organizations serve as community-based coordination points for implementation. The TMDL program incorporates ODEQs commitment to The Oregon Plan for Salmon and Watersheds designed to restore the healthy function of Oregon's natural aquatic systems. By cooperatively developing total maximum daily loads with other state and federal agencies DEQ provides the needed scientific information for understanding water quality problems and guidance for developing successful management plans.

Table 9. Rogue Basin Implementation Plan Status as of January 2011.

DMAs Identified in TMDLs	TMDL and Date of Completion					
	Upper Sucker Creek 1999	Lower Sucker Creek 2002	Lobster Creek Watershed 2002	Applegate Subbasin 2004	Bear Creek Watershed 1992 & 2007	Rogue Basin 2008
Ashland					Complete	
Talent					Complete	
Phoenix					Complete	
Medford					Complete	
Jacksonville					Complete	
Central Point					Complete	
Rogue RV Valley Irrigation					Complete	Complete
Talent Irrigation					Complete	
Medford Irrigation					Complete	Complete
USBOR						
Butte Falls						
Shady Cove						Complete
Eagle Point						Complete
Gold Hill						
Rogue River						Complete
Grants Pass						Complete
Cave Junction						Complete
Gold Beach						Complete
Eagle Point Irrigation						Complete
Grants Pass Irrigation						Complete
Gold Hill Irrigation						
Curry County						Complete
Jackson County				Complete	Complete	Complete
Josephine Co.		Complete		Complete		Complete
DOGAMI						
US Army Corps Engineer s						
Department of State Lands						
Oregon Parks and Rec.						
ODA*		Complete		Complete	Complete	Complete
ODF*	Complete	Complete	Complete	Complete	Complete	Complete
ODOT*		Complete		Complete	Complete	Complete
BLM	Complete	Complete	Complete	Complete		
USFS	Complete	Complete	Complete	Complete		
DEQ – permit Renewals	Complete	Complete	Complete			
Note: if cell is blank, DMA was not identified in TMDL						
Plans completed and up to date	Complete					
Plans in progress						
No plan submitted to date						

*DMA implementation plan is covered under a statewide or federal plan

DEQ Administered Funding

Section 319 of the Federal Clean Water Act requires states to have nonpoint source management programs based on assessments of the amounts and origins of nonpoint source pollution in the state. Nonpoint source pollution comes from numerous diffuse sources such as runoff from roads, farms, septic systems, and construction sites. This type of pollution is thought to be the largest source of water quality impairment in Oregon and for the country. Section 319 grant monies are federal dollars administered by DEQ to address nonpoint source pollution. Since 1998 DEQ has targeted approximately $1 million dollars to projects in the Rogue Basin.

These DEQ section 319 grants provide money to local organizations for nonpoint source projects such as planning, public education, monitoring and watershed restoration. To date approximately 44% of the grant funds have focused on planning projects, 38% on implementation activities (primarily riparian restoration), 14% on monitoring and 4% on educational activities (Figure 4). Approximately 50% of section 319 dollars have been spent in the Middle Rogue Subbasin, 31% spent in the Applegate Subbasin, 6% in the Upper Rogue Subbasin, 3% in the Illinois Subbasin, and 10% on basin wide projects. Section 319 funds have been used to successfully implement numerous monitoring and planning projects in the basin. In the coming years it is expected that a greater portion of the 319 funds will be spent on implementation projects that directly address water quality problems identified in TMDLs and Water Quality Improvement Plans (WQIP). Several 319 project highlights are included below: As part of the Bear Creek TMDL (2007) and the Rogue Basin TMDL (2008) DMAs are working with the Rogue Valley Council of Governments to develop regional education and outreach programs addressing bacteria and temperature with help from 319 funding. In addition to this work a prioritized riparian restoration plan is in development, as are revised riparian ordinances or other mechanisms to protect riparian areas. Non-phase II communities are working to implement the minimum stormwater control measures as part of this 319 supported planning process.

The Bear Creek TMDL (1992) resulted in the development of a watershed monitoring program, supported by the Bear Creek DMAs, 319 funds, and implemented by the Rogue Valley Council of Governments. This program has been collecting water quality data in the Bear Creek Watershed since 1992. The data generated through this program has allowed DEQ to document water quality improvements in Bear Creek. Significant water quality achievements in this area have resulted from a variety of activities and management strategies. Some of the 319 funded restoration projects include: riparian planting, irrigation upgrades, and stormwater controls.

Riparian restoration work has been ongoing in the Applegate Subbasin as a result of the Applegate TMDL (2003) and 319 funding. The Applegate Partnership and Watershed Council have conducted workshops, educated land owners, stabilized channels and reforested riparian areas as well as addressed sediment sources from roads and irrigation canals.

The United States Forest Service, Illinois SWCD, and local organizations and landowners are actively implementing the Sucker Creek TMDLs (2002 and 1999) with the help of 319 funds. Implementation activities include road decommissioning, riparian restoration, floodplain and in-stream restoration projects. The results of these projects are being monitored and it is expected that sedimentation loading and temperatures will decrease.

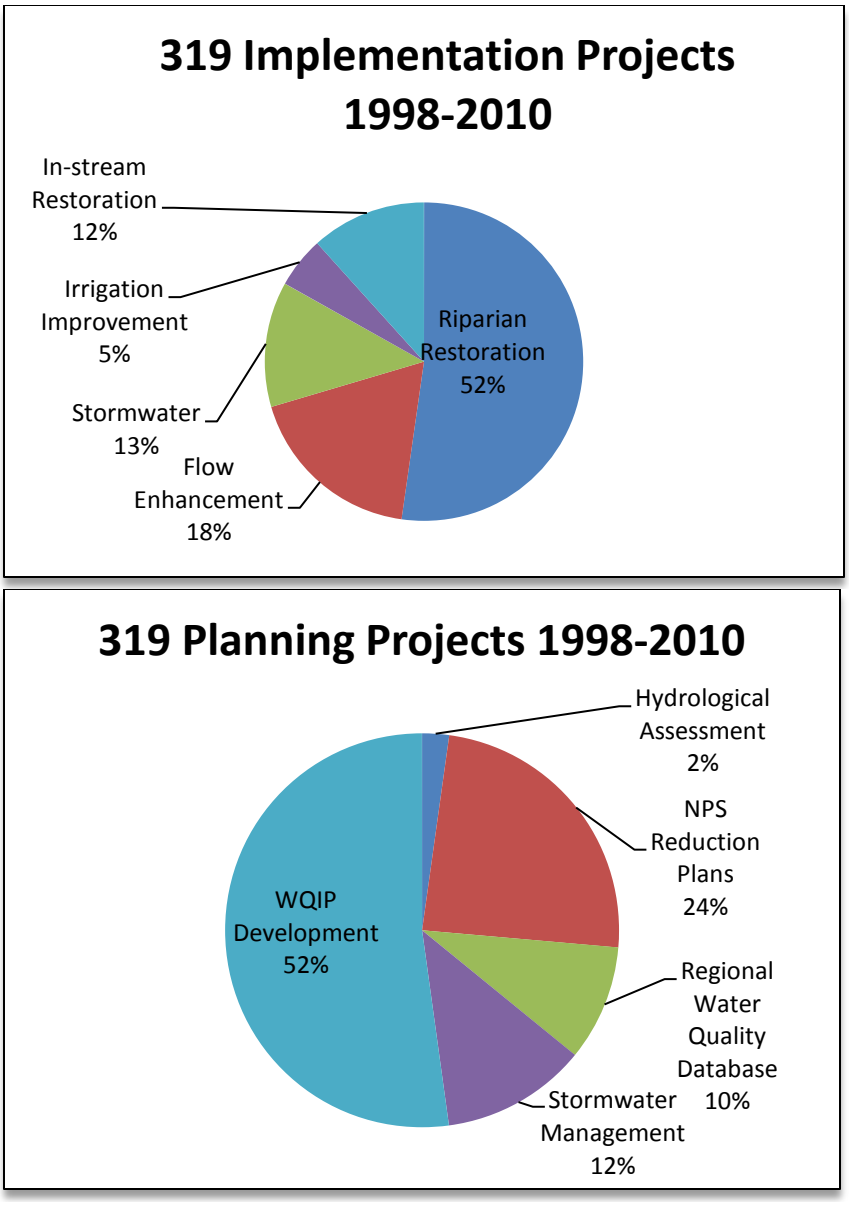


Figure 4. DEQ 319 grants program: Grant Expenditures on Implementation and Planning Projects.

Summary of Water Quality Concerns by Subbasin

The following tables summarize the status of surface and ground water related resources in the Rogue Basin as identified through existing data or information, knowledge of DEQ staff, or from local stakeholders. It is meant to act as a compilation of the data and information presented in this status report and to be used in identifying and prioritizing actions within 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

Water Quality Action Plan

Purpose

The Department of Environmental Quality (DEQ) is undertaking a Watershed Approach to assist in managing water quality in the State of Oregon. A key component of this approach is an action plan that can be used along with an assessment of the status of water quality (Status Report) in the adaptive management of the water quality within a geographic area. This Action Plan identifies potential actions and opportunities for alignment for DEQ water quality programs or activities. The intent of this document is to help guide DEQ's water quality management in the Rogue Basin for the next five years: 2011–2015. Periodic updates are expected as part of the adaptive management process as DEQ moves forward with implementing the identified actions. The next major update is anticipated in 2015.

Within the DEQ Water Quality program, primary functions and program activities have been grouped into the major categories shown in Table 1. Each category is described in more detail on the following pages followed by identified action items and opportunities for alignment with other programs and partners. Action items, alignment opportunities and partnerships are assembled in an Action Plan Summary Table located in **Appendix A: Identified Actions and Primary Programs**. Appendix A identifies 85 primary actions which are grouped according to how soon they should be implemented: Near-Term, the next 18 months; Mid-Term, the next 18 months to 3 years; Far-Term, the next 3 to 5 years.

Table 1: Water Quality Program Activities

1. Total maximum daily loads and water quality implementation plans
2. Water quality standards and assessment
3. Wastewater control – Point Source Program
- **a. Industrial and domestic permitting**
- **b. Stormwater**
- **c. retreatment Program**
- **d. Biosolids Program**
- **e. Underground injection control**
- **f. 401 certification – Removal/Fill Certification**
- **g. 401 certification – Hydroelectric Certification**
- **h. Onsite septic systems**
- **i. Water reuse**
- **j. Confined Animal Feeding Operations (CAFO)**

4. Compliance and enforcement
5. Groundwater Program
6. Safe Drinking Water Act Implementation
7. Water quality monitoring
- **a. Ambient Monitoring Network**
- **b. Biomonitoring**
- **c. Compliance Monitoring**
- **d. Senate Bill 737**
- **e. Toxics Monitoring Program (TMP)**

8. Financial and technical assistance
- **a. Clean Water State Revolving Fund Loan Program**
- **b Section 319 Grants - Nonpoint Source**

Goals

The goal of the Rogue Basin Water Quality Action Plan is to guide DEQ program priorities to address existing problems and prevent future water quality related problems and to facilitate the efficient alignment of water quality activities within the basin. An additional goal is to facilitate the alignment of water quality program activities within DEQ as articulated in the 2011-2013 DEQ Agency Request Budget.

- Align water quality monitoring to basin needs
- Align individual permit issuance to the basin plans
- Align TMDL development and implementation to the basin plans
- Align nonpoint source implementation work to priorities in the basins
- Align groundwater protection work with needs outlined in the basin plans

- Align drinking water protection work with needs outlined in the basin plans

Summary of Water Quality Resource Concerns by Geographic Area

The following tables summarize the status of surface and ground water related resources in the Rogue Basin. The tables were compiled based on existing data, the professional judgment of DEQ staff, and input from local stakeholders. More detailed information on the Rogue Basin can be found in the Rogue Basin Status Report and Rogue Basin TMDL documents.

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

General Priority Concerns in the Rogue Basin

The Rogue Basin Status Report summarized the current water quality conditions for the basin and identified a number of initial project needs. Actions specific to address these project needs, concerns and areas of geographic focus will be identified as the Watershed Approach continues with DEQ subprogram discussions. Discussions will also occur with TMDL Designated Management Agencies, permitees, and other stakeholders within the basin. Discussions will include an identification of subprogram alignment opportunities and partnerships to increase the effectiveness and efficiency of any actions taken.

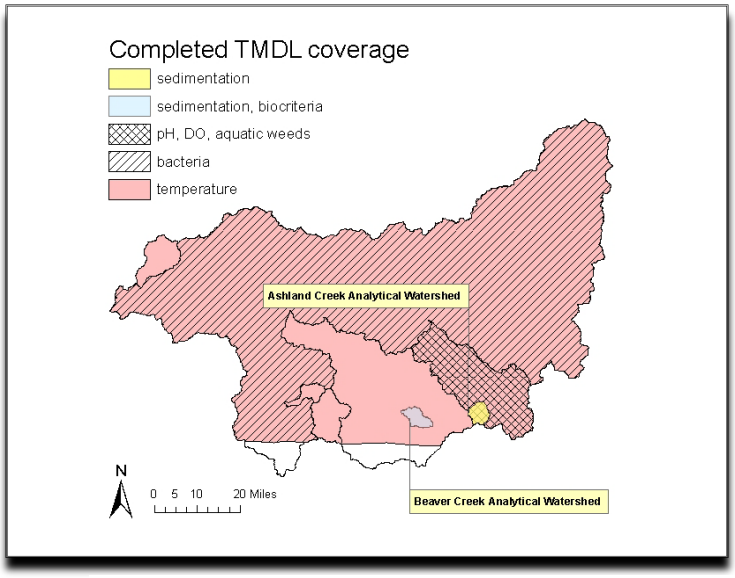
General Priorities:

- Work with partners to implement action plans to address temperature basin-wide. (Where possible, these actions should additionally address flow modification, habitat modification and sedimentation);
- Work with partners to implement action plans to address nutrients and bacteria in the Middle Rogue;
- Work with selected partners to develop and implement a strategy to address HABs;
- Work with partners to measure the effectiveness of our actions;
- Monitor for toxics to include surface waters, drinking source water protection, and ground water.

Water Quality Programs and Activities

1. Total maximum daily loads and water quality implementation plans

TMDLs have been completed for the Rogue Basin addressing the majority of water quality impairments (Map 1, Table 2). To date the majority of designated management agencies with jurisdiction over nonpoint source pollution sources have submitted implementation plans as required by OAR 340-042-0080 (Table 3). These plans describe actions to reduce their contribution to water quality problems. On agricultural land these implementation plans are developed through the Oregon Department of Agriculture's SB1010 process. On state and private forestlands, the Oregon Department of Forestry has the lead in providing water quality protection through the Forest Practices Act and long range management plans. In the urban and rural landscape, local governments take the lead in developing TMDL implementation plans. Irrigation canals fall under the jurisdiction of Irrigation Districts who develop TMDL implementation plans for the maintenance of the canals and outreach to irrigation users. The US Forest Service and the Bureau of Land Management develop water quality restoration plans for lands under their jurisdiction. Under most circumstances, TMDL implementation plans rely on cooperation among landowners and land managers within a river basin. Local watershed councils, soil and water conservation districts or other organizations serve as community-based coordination points for implementation. The TMDL program is part of DEQ's commitment to The Oregon Plan for Salmon and Watersheds designed to restore the healthy function of Oregon's natural aquatic systems. By cooperatively developing TMDLs



Map 1. Rogue Basin TMDL Coverage

with other state and federal agencies DEQ provides the needed scientific information for understanding water quality problems and guidance for developing successful management plans.

Action 1*:* Staff Collaboration. Continued collaboration is needed between point source permit writers and the TMDL group as implementing a TMDL often includes revising industrial and municipal wastewater permits to incorporate revised permit limits based on TMDL derived waste load allocations. TMDL staff and stormwater staff also need to collaborate to evaluate the effectiveness of stormwater control measures incorporated into TMDL Implementation Plans for those areas not covered by NPDES Phase II stormwater requirements. Collaboration is also needed to minimize duplication between NPDES Phase II requirements and TMDL requirements.

Action 2: Regional Coordination. Continue regional coordination between the designated management agencies, DEQ, and other partners and stakeholders. As TMDL implementation moves forward the greatest water quality improvements are likely to be achieved through regional planning, prioritization, and implementation. The first 5 years of TMDL implementation are focused on assessments and prioritization of projects, revisions to ordinances and codes, and the development of public outreach programs. The level of project implementation will increase for the following 5 year implementation plan.

Action 3: Implementation Plan Monitoring. As the Rogue basin continues to move forward with TMDL implementation, focus must remain on working with DMAs to ensure that implementation plans are implemented as described and adapted over time. Modifications to implementation plans are expected to occur on an annual basis, while reviews of the TMDLs are expected to occur approximately five years after the final approval of the TMDLs, or whenever deemed necessary by DEQ. All plans have reporting requirements and should be reviewed by DEQ on an annual basis.

Action 4: Effectiveness Monitoring. Effectiveness monitoring is moving forward in the Bear Creek Watershed and additional monitoring will be needed strategically throughout the Rogue basin to ensure that implementation actions are improving water quality and will achieve beneficial uses. EPA has developed guidance for measuring effectiveness on the 6th field (12 digit HUC) scale.

Action 5: Additional 303(d) Listed Parameters. In the Rogue Basin there are several outstanding 303(d) listings that cannot be currently addressed (Map 2). If it is determined that these listings are a high priority then the following actions will be needed in advance of TMDL development:

1.) Defining the extent of the estuary
2.) Obtaining more water column data to address bacteria impairments in shellfish growing waters,
3.) Additional data is needed to address the sediment listings in the Upper Rogue Subbasin (Map 2)
4.) Algae, DO, and pH TMDLs have been developed for the Bear Creek watershed however more data will need to be collected before the remaining DO (10) and pH (3) impairments in the Upper Rogue and Applegate subbasins can be addressed.
5.) New aquatic weeds and algae impairments (5) due to harmful algal blooms (HABs) have been added to the integrated report in 2010. A HABs strategy and sample approach will be to be developed to address these additional listings.
6.) A sampling approach is needed in order to address mercury in Emigrant Lake and the associated public health risk.

Alignment Opportunity. Action items #1-5 above will require the alignment of the NPS, PS, State Revolving Fund (SRF) programs, laboratory staff, and others. In addition other collaborative needs include: SB1010 Agricultural Water Quality Management Plan review and input, needs related to the Coastal Zone Act (Section 6217), and others.

Table 2. Rogue Basin TMDLs and 303(d) Listing Status

Location in Rogue	Date TMDLs Completed	303d Listings Category 5a*	Recommended Action to Address 303(d) Listing
Rogue TMDL Basin	Temperature (2008); Bacteria (2008)		
Rogue estuary		Bacteria, shellfish	Define extent of estuary and develop sample plan for additional data
Upper Rogue		Dissolved oxygen pH Sedimentation	Collect data to characterize sites. Develop statewide methods rules for sediment.
Upper Rogue - Willow Lake		Aquatic Weeds or Algae**	Develop HABs strategy. Collect data – may include sediment core samples.
Upper Rogue - Lost Creek Reservoir		Aquatic Weeds or Algae**	Develop HABs strategy. Review USACE data.
Upper Rogue - Fish Lake		Aquatic Weeds or Algae**	Develop HABs strategy. Review tui chub reduction strategy.
Illinois - Lake Selmac		Aquatic Weeds or Algae**	Develop HABs strategy. Collect data
Middle Rogue - Whetstone Pond		Aquatic Weeds or Algae**	Develop HABs strategy. Review fish management strategy.
Lobster Creek Watershed	Temperature (2002)		
Lower Sucker Creek Watershed, approx.	Temperature (2002)		
Upper Sucker Creek Watershed, approx.	Temperature (1999)		
Bear Creek Watershed	Temperature (2007); Bacteria - recreation (2007); Algae, DO, pH (1992)		
Ashland Creek Analytical Watershed	Sedimentation (2007)		
Middle Rogue - Emigrant Creek/Lake		Mercury**	Conduct lake study and mercury source assessment.
Applegate Subbasin	Temperature (2004)	Dissolved oxygen	Collect data to characterize sites
Beaver Creek Analytical Watershed	Sedimentation (2004); Biological Criteria (2004)		

*Category 5a is identified as water quality limited, TMDL needed
**draft 2010 WQ Assessment

Map 2. Streams Needing TMDLs as of 2010

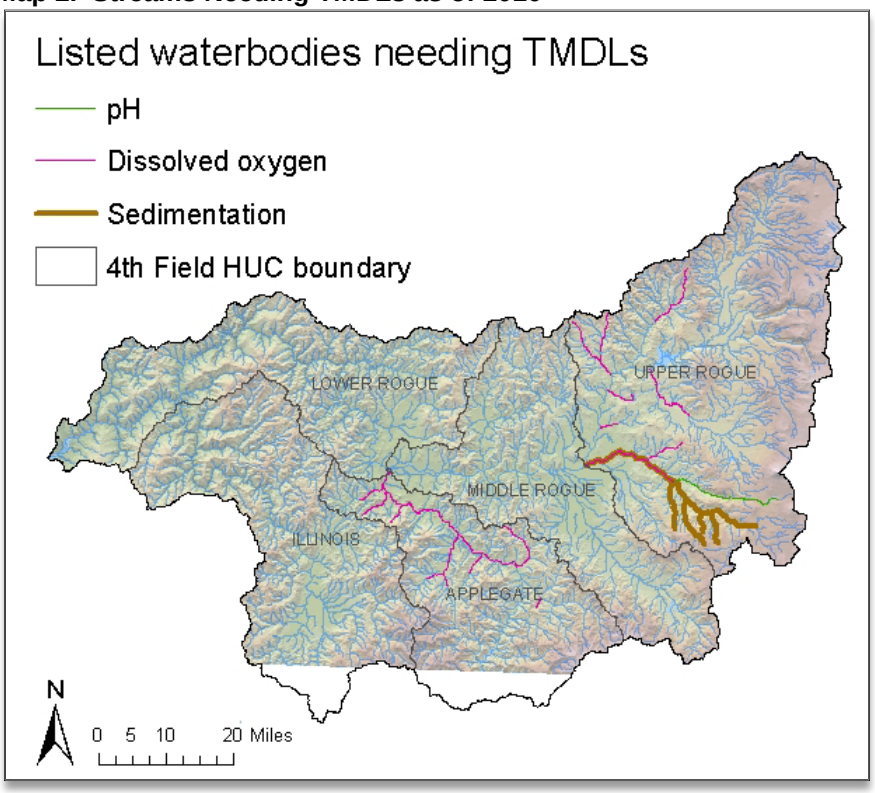


Table 3. Rogue Basin Implementation Plan Status

DMAs Identified in TMDLs	TMDL and Date of Completion					
	Upper Sucker Creek 1999	Lower Sucker Creek 2002	Lobster Creek Watershed 2002	Applegate Subbasin 2004	Bear Creek Watershed 1992 & 2007	Rogue Basin 2008
Ashland					Complete	
Talent					Complete	
Phoenix					Complete	
Medford					Complete	
Jacksonville					Complete	
Central Point					Complete	
Rogue RV Valley Irrigation					Complete	Complete
Talent Irrigation					Complete	
Medford Irrigation					Complete	Complete
USBOR						
Butte Falls						
Shady Cove						Complete
Eagle Point						Complete
Gold Hill						
Rogue River						Complete
Grants Pass						Complete
Cave Junction						Complete
Gold Beach						Complete
Eagle Point Irrigation						Complete
Grants Pass Irrigation						Complete
Gold Hill Irrigation						
Curry County						Complete
Jackson County				Complete	Complete	Complete
Josephine Co.		Complete		Complete		Complete
DOGAMI						
US Army Corps Engineer s						
Department of State Lands						
Oregon Parks and Rec.						
ODA*		Complete		Complete	Complete	Complete
ODF*	Complete	Complete	Complete	Complete	Complete	Complete
ODOT*		Complete		Complete	Complete	Complete
BLM	Complete	Complete	Complete	Complete		
USFS	Complete	Complete	Complete	Complete		
DEQ – permit Renewals	Complete	Complete	Complete			
Note: if cell is blank, DMA was not identified in TMDL						
Plans completed and up to date	Complete					
Plans in progress						
No plan submitted to date						

*DMA implementation plan is covered under a statewide or federal plan

2. Water quality standards and assessment

Establishing water quality standards for surface water is at the core of DEQ's water quality activities. The Water Quality program establishes standards to protect beneficial uses of water, such as water supply, aquatic life, and recreation and then acts to protect and restore water to the standards that allow those uses. Staff perform the following water quality standards and assessments activities: conduct standards reviews and rule revisions to establish and update scientifically based water quality standards, identify water bodies not meeting water quality standards, develop policy, and procedures documents for implementing standards. The standards development is not currently being done to address the 303(d) listings. It is rather the

reverse – A new Oregon water quality standard for turbidity would be incorporated into the next WQ Assessment, and the WQ status for the streams in the Rogue Basin would be reviewed and updated using those standards. We have no plans at this time to revise the sedimentation or biological criteria, which are currently narratives. We have discussed developing implementation guidance to apply the narratives, but we have not committed to a timeline for developing those. Nutrients is on our list of standards review needs and we intend to evaluate how to address nutrients and develop a recommendation on an approach/plan within the next year. However, it is premature to say that these are "actions" that the standards program has committed to do in the near future or on any given time frame.

Action: Data Management. All programs in water quality would benefit by having any new water quality monitoring data regularly and routinely uploaded into LASAR. The data would then become available for multiple programs and the public. Any water chemistry, physical, and biological habitat data that are collected in the basin for TMDL development, implementation, effectiveness, 319 project monitoring should be required to be uploaded into LASAR as a condition of accepting, approving, or using the data. Once in LASAR, these data then will be included in the next cycle of periodic 305b/303d WQ assessment.

Action: Monitoring. Monitoring plans developed to support any single water quality project in the Rogue Basin should be designed to consider the data and information needs for other WQ programs within the basin. For example:

- Effectiveness monitoring to track implementation of a temperature TMDL implementation plan could be designed to collect information about other pollutants or conditions that have not yet been addressed in TMDLs, but where 303(d) listings exist, or there is not sufficient data to determine the water quality conditions for other programs such as the WQ Assessment, toxic reduction strategy, drinking water protection program, etc. This will align work to address one pollutant with a holistic approach and to eventually address all the pollutants causing beneficial use impairments in the basin.

- When designing monitoring plans for permit compliance in the Rogue Basin it is important to review and align both TMDL point source requirements and water quality data gaps. A WQ Assessment category of "Insufficient data" or "Potential concern" for any pollutant or beneficial use should trigger the alignment of monitoring plans (project or basin specific) to address those data needs.

- Monitoring at locations of stream restoration projects (part of TMDL implementation or 319 funded projects) could collect and/or monitor for other pollutants that are not the target of the TMDL, but may or may not be responding to those activities. This will help to holistically understand the basin. How are concentrations of toxic substances (pesticide, metals, pharmaceuticals) changing as stream bank projects are implemented? How does the project activity affect nutrient, pH, DO, sediment, and biological community conditions? Are other beneficial uses being protected and restored – drinking water sources, biological communities besides fish and aquatic life?

Action: Assessment benchmarks – The WQ assessment team can use benchmark numeric water Quality standards developed to implement DEQ's narrative water quality criteria. The effort and priority of agency work to develop and implement these benchmarks could be aligned to the needs and priorities of the Rogue Basin. Evaluate the importance and determine the program priority of having developing an assessment benchmark for sediment.

Action: The current water quality standards and assessment team is currently developing toxic standards for human health and turbidity, which will include implementation plans for any new or revised standards. This work should be aligned with the identified needs in the Rogue Basin through the TMDL, drinking water, permits, and groundwater programs.

Alignment Opportunity: Standards and Assessment should be group aligned with Monitoring, NPS, Permits, and Toxics groups to ensure that any monitoring that is done serves to fill gaps and meet the needs identified in the Rogue Basin.

3. Wastewater control – Point Source Program

a. Industrial and Domestic Wastewater Permitting

DEQ's wastewater management program regulates the impacts of point source pollution on Oregon's waters. The term *point source* generally refers to wastewater discharged into water or onto land though a pipe or a discernible channel. Point sources in Oregon are regulated under the terms of a federal National Pollutant Discharge Elimination System (NPDES) permit or a State of Oregon Water Pollution Control Facilities (WPCF) wastewater discharge permit. NPDES and WPCF permits are classified as either general or individual. A general permit is used to cover a category of similar discharges, rather than and individual permit which applies to a specific site. DEQ may issue a general permit when there are several minor sources or activities involved in similar operations that may be adequately regulated with a standard set of conditions. General NPDES permits expire in five years, WPCF permits are generally valid for 10 years. DEQ currently utilizes 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 the Lower Rogue River Subbasin, 4 in the Illinois River Subbasin, 123 in the Middle Rogue River Subbasin, and 19 in the Upper Rogue River Subbasin (Table 4).

Table 4. Rogue River Basin – NPDES General Permits

Permit Type	Permit Description	Count
GEN01	Industrial Wastewater; NPDES cooling water	10
GEN02	Industrial Wastewater; NPDES filter backwash	4
GEN03	Industrial Wastewater; NPDES fish hatcheries	1
GEN04	Industrial Wastewater; NPDES log ponds	4
GEN12A	Stormwater; NPDES sand and gravel mining	15
GEN12C	Stormwater; NPDES construction more than 1 acre	56
GEN12CN	Stormwater; NPDES government agency construction, >1 acre	1
GEN12Z	Stormwater; NPDES specific SIC codes	58
GEN15A	Industrial Wastewater; NPDES petroleum hydrocarbon cleanup	2
GEN17A	Industrial Wastewater; NPDES wash water	8
	Total	159

Note: Additional general permits issued by DEQ but not present in the Rogue Basin include: 500J - Boiler blowdown, 900J - Seafood processing, 1300J - Oily stormwater runoff, oil/water separator, 1900J - Non contact geothermal, 1200COLS, 2100J and 2200J. General permits are site-specific and required to provide a specific location for operations and discharge. However, suction dredges regulated under a 700PM permit are not required to provide locations and are not included in Table 4.

An individual NPDES permit is site-specific; and is developed to address discharges from a specific sewage or industrial wastewater treatment facility. Individual NPDES permits are issued for a period not to exceed five years. Individually permitted sources have the potential to impact surface waters generally require frequent monitoring by the permittee and DEQ to assure that permit limitations are being met.

At the time of this writing, there are 14 individual NPDES permits within the Rogue River Basin TMDL area: 1 in Illinois, 1 in Applegate, 1 in Lower Rogue, 8 in Middle Rogue, 3 in Upper Rogue. There are also 3 individual NPDES MS4 stormwater permits in the basin (Table 5).

Table 5. Rogue Basin Individual Permits

Permit ID	Permittee Name	Class	Renewal Year	Status
101609	Ashland WWTP	MAJOR	2011	WLA developed
101552	Butte Falls WWTP	minor	2010	no WLA needed
102305	Cascade Wood Products	minor	2014	WLA developed
102610	Cave Junction WWTP	minor	2013	WLA developed
101990	Countryview Mobile Home Estates	minor	2014	WLA developed
102578	Fleming Middle School WWTP	minor	2010	no WLA needed
102494	Gold Hill WWTP	minor	2010	WLA developed
101985	Grants Pass WWTP	MAJOR	2010	WLA developed
100985	Medford WWTP	MAJOR	2011	WLA developed
101475	Riviera Mobile Park	minor	2014	WLA developed
102588	Rogue River WWTP	minor	2014	WLA developed
100988	Shady Cove WWTP	minor	2010	WLA developed
102034	Truegard	minor	2010	no WLA needed
102221	Hidden Valley High School	minor	2012	no WLA needed
102898	City of Medford	MS4 Stormwater	2012	WLA developed
102897	City of Ashland	MS4 Stormwater	2012	WLA developed
102899	Rogue Valley Sewer Services	MS4 Stormwater	2012	WLA developed

As of January 2011, there are three expired individual NPDES permits in the Rogue Basin (City of Medford, Riviera Mobile Park, and City of Rogue River). These expired permits have been administratively extended until the Department takes action on the renewal applications. The permit renewal schedule is shown in Table 5 above. DEQ intends for permits to be issued on the watershed cycle. Permits in the Illinois sub-basin are scheduled for renewal during 2013. All Lower Rogue, Middle Rogue and Upper Rogue permits (except Medford) are scheduled for renewal during 2014. The Medford permit will be issued “off-cycle” in 2011.

If water quality problems associated with point sources are suspected, permit writers will include permit conditions to collect the needed information to determine the contribution from the specific point sources. Currently additional water quality monitoring data is required from major the facilities in the Rogue Basin (Ashland, Medford and Grants Pass) for toxic compounds as part of Senate Bill 737. If a point source is not able to immediately meet its permit requirements, a compliance schedule may be included in the permit. Five permits in the Rogue Basin currently contain Schedule C compliance schedules for administrative purposes. Permits must also be written to comply with the waste load allocations and requirements of TMDLs as they are issued.

Actions: As per the 2011-2013 DEQ Agency Request Budget, the industrial and domestic wastewater permitting sub-program must carry out the following four activities: 1) issue discharge permits that adequately evaluate and limit pollution to prevent an impact on receiving waters and the beneficial uses of those waters (drinking, swimming, fishing, aquatic habitat, etc.), 2) inspect facilities and review monitoring results, 3) take prompt and appropriate enforcement actions when violations occur, 4) provide essential technical assistance for facility owners and operators to help assure ongoing compliance at minimum expense to permit holders.

Alignment Opportunity. Point Source staff to coordinate with nonpoint source staff to evaluate the feasibility of water quality trading where warranted (Ashland and Medford). Point Source staff to coordinate with the SRF staff to assist in focusing SRF technical assistance to facilities with required upgrades in the near future. Align water quality monitoring required from permittees with TMDL and DEQ laboratory needs to provide a better understanding of receiving water conditions.

b. Stormwater

Stormwater discharges are considered point sources, which under certain circumstances require an NPDES permit. The federal NPDES permit regulations were issued in two phases. Phase I was established in 1990. It required NPDES permit coverage for large or medium municipalities that had populations of 100,000 or more as well as certain types of industrial facilities and construction sites disturbing 5 or more acres. The NPDES Phase II program extended the permit coverage to construction sites disturbing 1 or more acres and smaller communities and public entities within urbanized areas (population greater than 50,000 people and a population density of 1,000 people per square mile) as designated by the 2000 U.S. Census that own or operate municipal separate storm sewer systems (MS4). In the Rogue Basin only the jurisdictions of Ashland, Talent, Phoenix, Medford, Central Point, Jacksonville, and Jackson County meet the qualifications to fall under the NPDES Phase II program. There are no NPDES Phase I communities. DEQ determined that the city of Jacksonville met the criteria for a waiver from Phase II permit requirements. In 2010 DEQ denied a petition to include the cities of Grants Pass and Eagle Point into the NPDES Phase II program indicating that DEQ could address stormwater impacts from these jurisdictions under its TMDL program. Below are current trends in the management of stormwater sources under the NPDES MS4 Permit Program and TMDL Program.

Upcoming Phase II MS4 Permit Renewals

DEQ has indicated to Phase II permittees that the level of expectations for each 5-year permit cycle will be increasing. The first cycle of the Phase II MS4 permits end for most permitees in early 2012. In 2011, Phase II permittees will be moving into the last year of their first 5-year Phase II permit and initiating the development of performance measures for evaluating the effectiveness of BMPs identified in permittees' stormwater management plans (SWMP) and pollutant load reduction benchmarks for any established wasteload allocations. In 2010, EPA released a NPDES MS4 Permit Improvement Guide for NPDES permit writers. This guide provides examples of permit conditions and supporting rationale for developing MS4 permits. The suggested permit language is meant to ensure 1) significant progress in stormwater management, 2) the intent of federal regulations is incorporated into future MS4 permits, and 3) that permit provisions are clear, specific, measurable, and enforceable. Moreover, the intent of this guide is to incorporate a performance standard for post-construction stormwater management to ensure the restoration of a stable hydrology to protect the water quality of receiving waters. When applied to permit development, the guide will move Phase II permittees to develop structural and nonstructural controls indicative of Low Impact Development (LID).

Note that in November 2010, EPA issued a memorandum to its 2002 memorandum revising previous guidance on incorporating TMDL wasteload allocations into NPDES MS4 permits. As part of this memo, EPA encourages permitting authorities to consider designating stormwater sources for coverage under a NPDES permit when NPDES permits are a more effective regulatory mechanism than nonpoint source control methods. EPA also recommends including more flexible language in a TMDL for stormwater sources that may be required to obtain a NPDES permit in the future. For example, a TMDL writer should include language in the TMDL that a stormwater source is under a load allocation contingent upon the source remaining unpermitted, but the load allocation would become a wasteload allocation if the source were required to obtain a NPDES permit. The purpose of this flexible TMDL language is to ensure WQBELs in a NPDES permit of the newly permitted source are consistent with the requirements of the TMDL's allocation to that source.

Actions: As per the 2011-2013 DEQ Agency Request Budget, stormwater general permits for industrial and construction activities are to be issued within 30 days after the close of the public comment period. Starting in early 2011, DEQ will start working with the NPDES Phase II MS4s in the Rogue Basin on permit renewal activities before their permits expire in 2012 (note date varies for each permittee).

Alignment Opportunity. Stormwater program to provide assistance to nonpoint source program staff as they work with urban areas to integrate stormwater measures into TMDL implementation plans for those areas that are not be covered by NPDES Phase II stormwater requirements.

c. Pretreatment Program

The National Pretreatment Program is a cooperative effort of federal, state, and local regulatory environmental agencies established to protect water quality. The U.S. Environmental Protection Agency (EPA) has delegated DEQ the authority to approve pretreatment programs at the local level and oversee state-wide pretreatment activities. The communities approved to implement the pretreatment program have the legal authority to issue industrial user permits, conduct inspections of industrial and commercial sources, sample industrial discharges and enforce regulations. These programs also routinely perform self monitoring to ensure the protection of worker safety, sewage treatment plant operations, biosolids, and water quality.

Objectives of the pretreatment program:

1. Protect publicly owned treatment works (POTW) from pollutants that may cause interference with sewage treatment plant operations.
2. Prevent introducing pollutants into a POTW that could cause pass through of untreated pollutants to receiving waters.
3. Manage pollutant discharges into a POTW to improve opportunities for reuse of POTW wastewater and residuals (sewage sludge).
4. Prevent introducing pollutants into a POTW that could cause worker health or safety concerns, or that could pose a potential endangerment to the public or to the environment.

Oregon has about 25 approved programs that oversee more than 300 industrial users. There are two programs in the Rogue Basin (Table 6). Regulatory oversight of industrial sources by approved programs includes formal permitting, compliance monitoring (routine compliance inspections and sampling), and enforcement. Many pretreatment programs work effectively with industrial users to reduce contaminants in the waste stream through voluntary pollution prevention efforts.

Table 6. Pretreatment Communities in the Rogue Basin

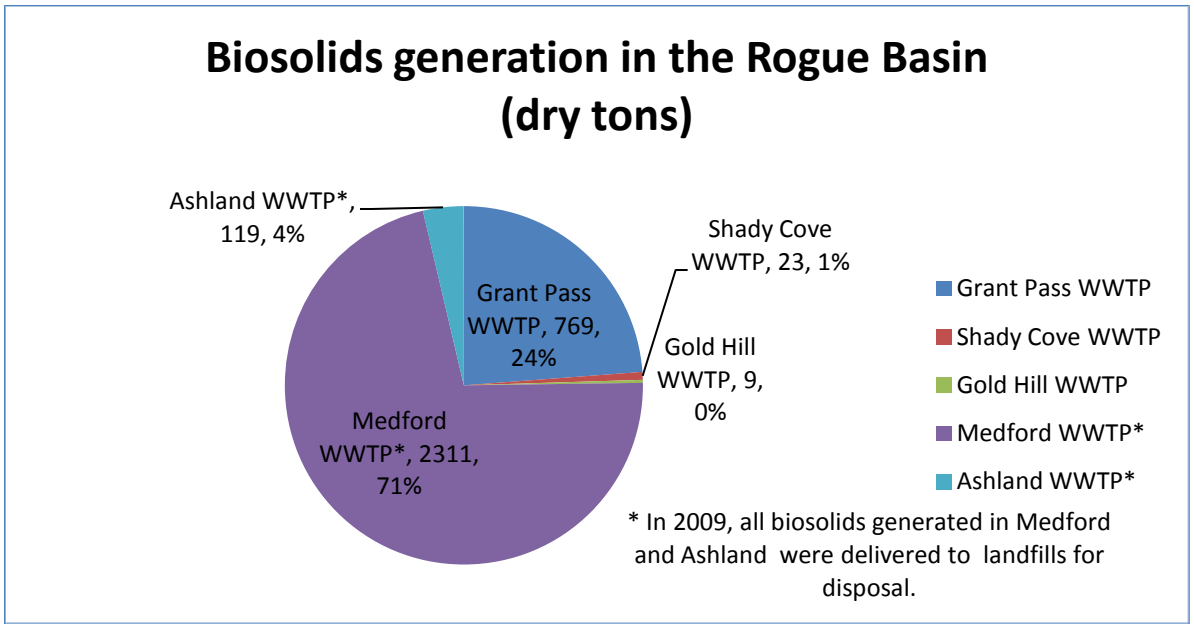
EPA Permit Identifier	Name	City	Permit Renewal Date
OR0028843	City of Grants Pass	Grants Pass	2013
OR0026263	City of Medford	Medford	2011

Actions: Continue to review and approve pretreatment programs at the local level and oversee state-wide pretreatment activities.

Alignment Opportunity. The Pretreatment program participates in the development of the toxics strategy, which includes evaluating opportunities for the Pretreatment program to address and contribute to reduction in priority toxic pollutants. As DEQ develops specific strategies and increased protections related to emerging contaminants, the pretreatment program may be a valuable tool to reach up the pipe with BMPs and or to set local limits as part of a source reduction strategy to address newly identified toxic pollutants of concern.

d. Biosolids Program

The Biosolids program regulates wastewater solids and domestic septage that have undergone sufficient treatment to allow use as a soil amendment or fertilizer through land application. Biosolids and domestic septage are regulated through NPDES or WPCF water quality permits issued by DEQ. Land application activities are described in biosolids management plans and site authorization letters that are reviewed and approved by DEQ. Additionally, DEQ works with domestic wastewater treatment facilities to ensure biosolids are adequately stabilized and land application operations and management meet federal and state regulations. DEQ requires wastewater treatment facilities to monitor and report on biosolids activities. Statewide, 95 percent of biosolids are beneficially reused as a soil amendment or fertilizer. In 2009, approximately 3,231 dry tons of biosolids were generated from municipal wastewater treatment facilities in the Rogue Basin. Unlike most of Oregon, only 25 percent of the biosolids generated in the Rogue Basin are beneficially reused; the remaining 75 percent of the biosolids are disposed in regional landfills.



Actions: Continue to require monitoring and reporting on biosolids activities, review monitoring results, take prompt and appropriate action when potential issues arise, provide technical assistance for facility owners and operators when needed. Coordinate with wastewater treatment facilities and identify opportunities for the beneficial reuse of biosolids generated in the Rogue Basin.

Alignment Opportunity. Biosolids program may provide assistance to the drinking water program, Groundwater program, nonpoint source program, and ODA in order to minimize potential water quality impacts.

e. Underground Injection Control

The Underground Injection Control (UIC) program began in 1974 under the Safe Drinking Water Act. Oregon DEQ regulates this program under OAR Chapter 340, Division 44. A UIC is a system created to discharge fluid below the ground surface. The most common systems in Oregon are stormwater drywells. The UIC program's goal is to protect groundwater aquifers from contamination due to injection systems.

In the Rogue Basin the primary UIC related concerns are due to high groundwater levels. UICs are not allowed to directly discharge into a high seasonal aquifer since discharges can contaminate the unconfined dunal aquifer. Many residences with the Rogue Basin rely on existing dunal aquifers as their primary water supply and in many cases groundwater may be their only source. The key beneficial use that is impacted is drinking water, specifically municipal and domestic drinking water wells. From a regulatory perspective all groundwater aquifers in Oregon are considered suitable as drinking water. Potential groundwater contaminant sources include unregistered UICs that DEQ regional staff have noted are in use and may discharge directly into the high seasonal groundwater with no pretreatment. Jackson, Curry, and Josephine counties have 200 UICs that are known (98, 64, and 38 UICs respectively) and more may exist. DEQ program staff continue to address the need for UIC systems to be authorized by rule or permitted.

Action: Coordination of the permit programs (NPDES, WPCF and UIC) to bring the basin UICs into compliance with state and federal regulations. There are a number of educational opportunities that could be pursued with municipalities about UICs, in combination with stormwater and infrastructure needs (especially in high risk areas), financial assistance programs (SRF), and program rules and enforcement.

Alignment Opportunity. Coordinate the UIC program with stormwater and SRF programs to pursue outreach, education, and financing opportunities. NPS program can also assist with outreach in the Rogue Basin.

f. Section 401 Removal/Fill Certification

Section 401 of the federal Clean Water Act requires that any federal license or permit to conduct an activity that may result in a discharge to waters of the United States must first receive a Water Quality Certification (WQC) from the state in which the activity will occur. DEQ 401 program staff evaluate project proposals for potential impacts to water quality and beneficial uses. Certifications may be: 1) issued for the project as proposed, 2) issued with conditions intended to eliminate or minimize impacts, 3) denied, or 4) waived if DEQ takes no action within one year of receiving the request for 401 WQC. The majority of applications receive 401 WQC with conditions. Most certification requests come to DEQ through either the Federal Energy Regulatory Commission (FERC) process for hydroelectric projects, or through US Army Corps of Engineers (USACE) permits for removal and fill activities. For more info:

http://www.deq.state.or.us/wq/sec401cert/sec401cert.htm . A proposal to conduct work in waterways or wetlands requires a Joint Permit Application submitted to both the USACE and the Department of State Lands (DSL). These agencies process the applications separately. DEQ's 401 WQC process is triggered when USACE makes a determination that an application 1) requires a permit and 2) may result in a discharge.

Status 2005-2009. Approximately 51 projects were considered for 401 WQC in the Rogue Basin during this period. Of these, 8 were for gravel removal operations (in the Rogue, Applegate, and Illinois) which have been undertaken annually for several decades. There were also 4 annual maintenance dredging projects in the middle and lower Rogue (mostly for late season navigation of jetboats, mailboats, and sheriff vessels). There were also approximately 29 residential/housing/commercial development projects and 5 road/bridge projects in this basin. Finally, there were 3 dam removal and fish passage improvements at dams on the Rogue and Red Blanket Creek, and 2 suction dredge gold mining proposals in the Sucker Creek watershed.

Water quality and habitat degradation concerns have been raised with the on-going gravel removal and maintenance dredging projects – concerns have been raised on 18 of 58 proposed dredging projects. Studies have been completed by the US Geological Service (USGS) in the Chetco River and are underway in the Rogue and Hunter Creek (Curry County). Studies were commissioned by a multi-agency regulatory group (USACE, EPA, USFWS, NMFS, DEQ, DLCD, ODFW), to determine the potential sediment delivery regimes for these streams and the extent of alteration of the physical and biological systems in response to alteration of the sediment regimes. Results of these studies may warrant additional limiting conditions or cessation of these actions to protect water quality and beneficial uses of these streams. For all of the development projects there is a 401 certification requirement for implementation of an approved stormwater management plan (SWMP) – 29 of the 51 proposed projects between 2005 and 2009 were development projects. This ensures that treatment of stormwater runoff from all associated impervious surfaces will occur for the life of the projects.

Action: When completed DEQ 401 program staff should incorporate the results of the USGS sediment study on the Rogue River into Water Quality Certifications.

Alignment Opportunity. DEQ 401 program staff will work with NPS staff to share results of studies and limiting conditions in the WQCs. Nonpoint source staff can also provide input into local conditions when applicable and assist with outreach if needed in the Rogue Basin.

g. Section 401 Certification - Hydroelectric Certification

The 401 hydropower certification program issued a certification for the Prospect Number 1, 2 and 4 project in 2007. The project diverts water from the Middle Fork Rogue River, Rogue River, and Red Blanket Creek. Additional flow from the South Fork Rogue River is diverted to the project by placing the tailrace discharge of Prospect Project No. 3 into the project's Middle Fork Rogue canal. The project certification requires monitoring for several water quality parameters including temperature, dissolved oxygen, and turbidity. Concerns were raised with turbidity from possible canal or flume failure and the removal of sediments from project impoundments. The certification also summarizes minimum flow requirements. Temperature affects in Red Blanket Creek are being addressed by increasing the minimum flows.

Action: 401 hydropower certification staff will continue permitting process and incorporating TMDL load allocations for all areas of the Rogue Basin. Review monitoring data as per certification and share information with NPS TMDL staff.

Alignment Opportunity. 401 hydropower certification staff will align with nonpoint source staff to ensure TMDL load allocations inform the certification process in the Rogue Basin.

h. Onsite Septic Systems

Over 30% of Oregonians dispose of wastewater from their homes and businesses through the use of septic systems. The siting, design, installation and ongoing operation and maintenance of septic systems are regulated by DEQ. Without this oversight, septic systems can fail or malfunction, pollute Oregon's land and waterways with raw sewage and create public health hazards. In the Rogue Basin, DEQ manages the onsite program in Jackson and Josephine counties. Douglas, Klamath and Curry counties directly manage their own programs under contract with DEQ. DEQ and its contract agents also ensure that septic tank pumpers have the necessary equipment to safely pump and transport septage. In addition, DEQ certifies and licenses installers, pumpers, and maintenance providers, and reviews and approves products such as septic tanks, alternative treatment technologies, and alternative drainfield products.

The onsite program is funded by fees charged by the program for services provided and these fees must cover the costs of issuing permits or evaluating sites for potential septic approvals and the costs for enforcement and complaint investigation. Under current staffing levels, complaints of sewage surfacing in the Rogue Basin largely go uninvestigated because DEQ does not have the personnel for follow up. A discharge into a road-side ditch may degrade the water quality of the nearest surface water and could create a public health hazard. Complaint response is evaluated on an individual complaint basis however current programmatic response in many circumstances is to send out letters notifying complainants of alleged violations, citing general requirements, and requesting compliance. There are approximately 300 complaints a year.

Action: Policy package #120 proposes to add staff to oversee the time of transfer evaluation and septic tank pumping event program in the Coastal Zone (includes all of the Rogue Basin). DEQ has also introduced legislative concept #848 to have all fines for onsite septic system violations returned to the program to fund training, education and outreach, repair or replacement of failing septic systems and working with communities on area-wide septic system problems. The policy package and legislative concept will help the program to be sustainable.

Alignment Opportunity: The TMDL nonpoint source program can provide data where needed to support efforts such as Jackson County's project to get areas of the Bear Creek valley hooked up to the sewer system (Area-Wide Goal 11 exception process). Align surface water bacteria data with onsite program priorities to identify problem areas that may be due to septic system failures.

i. Water Reuse

Water reuse for non-potable purposes allows municipalities and industrial facilities an option for managing treated effluent. State regulations require a water quality permit for this option and allow treated effluent to be used for beneficial purposes, most of which occurs through irrigation of crops and golf courses. DEQ works with the Oregon Department of Human Services - Health Services Division and Oregon Water Resources Department on the permitting of this practice. DEQ staff also work with municipal and industrial facilities to ensure proper operation and management of wastewater treatment facilities that pursue water reuse. Facility permits require management plans for water reuse.

Action: DEQ Wastewater Permitting staff will coordinate with wastewater treatment facilities and continue to explore opportunities for water reuse. On June 12, 2009, Governor Kulongoski signed House Bill 2080 into law, legalizing the use of graywater for beneficial uses in Oregon. Graywater refers to wastewater from the shower and bath, bathroom sink, kitchen sink, and

laundry. This bill expanded water reuse opportunities from municipalities and industrial facilities to individual property owners. The bill specified that a person may not construct, install or operate a graywater reuse and disposal system without obtaining a permit from DEQ. The bill further directed the Environmental Quality Commission (EQC) to adopt rules for graywater permitting and to consider the recommendations of an advisory committee. DEQ initiated a rulemaking process in December 2009 and expects to present the final rule for adoption by the EQC at the August 2011 meeting.

Alignment Opportunity. Nonpoint source staff can assist with local stakeholder outreach as part of the rulemaking process. Once systems are installed, Water Reuse staff can work with the groundwater and NPS programs to provide outreach to graywater users to ensure systems are maintained to protect water quality.

j. Confined Animal Feeding Operation (CAFO)

Confined Animal Feeding Operations (CAFOs) are registered to the Oregon CAFO general (NPDES) permit are managed by Oregon Department of Agriculture (ODA). Permit conditions ensure no discharge of fecal bacteria or nutrients under normal conditions. There are currently 22 active CAFO permits in the Rogue Basin. Thirteen are in compliance with all of the permit requirements. Each permitted CAFO receives a routine inspection from the area Livestock Water Quality Inspector once a year, on average. During this inspection, the operator and inspector discuss the operation and review required plans and records. The inspector views the entire operation to assure compliance with permit terms and water quality rules and laws. Inspection reports detail permit compliance in the following areas: permitted number of animals, animal confinement requirements, manure and silage containment requirements, manure application requirements, and record keeping. Problems in any of these areas including incomplete record keeping can result in the issuance of a water quality advisory or a notice of noncompliance (NON). When a discharge occurs or where there is a potential for a discharge to occur, ODA may take samples of the effluent to determine bacterial concentrations. Surface water quality samples are taken when visual or anecdotal evidence of discharge is present. Some of the NONs issued in the Rogue Basin have recorded the release of high levels of bacteria establishing the potential for CAFOs to impact bacteria levels in the Rogue River. In the event a violation is found, the inspector works with the operator to develop a solution to the problem and a schedule to complete the corrective actions. ODA can also issue civil penalties for violations listed in NONs. Over 100 NONs have been issued in the Rogue Basin since 1999.

Action: NPS and Groundwater program staff to work with Oregon Department of Agriculture to develop advanced best management practices for CAFO waste management that is protective of both surface and ground water.

Alignment Opportunity. DEQ to collaborate with ODA to provide monitoring data to inform the CAFO program. Investigate opportunities for collaboration between ODA and TMDL outreach activities. Coordinate with the Groundwater program to develop a research forum on determining nitrogen loading rates that are protective of groundwater.

4. Compliance and Enforcement

DEQ has a range of compliance and enforcement tools at its disposal including technical assistance, compliance inspections, warning letters, field citations, compliance orders, mutual agreement and orders (MAOs), and formal enforcement actions. DEQ regularly conducts inspections of projects, facilities, permitted entities and reviews monitoring data to determine compliance with DEQ permits and state laws. DEQ also investigates complaints received from the public and other agencies about possible violations.

When an inspector determines a violation exists or occurred, the inspector determines the appropriate level of enforcement by consulting DEQ's "Enforcement Guidance for Field Staff". The Guidance is organized by program and subprogram and directs the inspector how to respond to any given violation depending on the circumstances surrounding the violation (e.g. whether the violation has been repeated in the last 36 months, whether it was beyond the reasonable control of the violator, etc.). The purpose of the Guidance is to ensure that DEQ enforcement is consistent and fair, regardless of the region or office where the violation originates.

For the most serious violations, the Guidance directs an inspector to write a Pre-Enforcement Notice (PEN) and refer the matter to the Office of Compliance and Enforcement (OCE) for formal enforcement action (FEA). Once OCE receives a referral, it is given a case number and assigned to an environmental law specialist (ELS). OCE currently has 8 ELSs, each of whom specialize in a different DEQ program. Case numbers identify the program, the sub-program, the region where the violation occurred and the referral originated, the year the referral was received by OCE and the chronological order in which the referral was received by OCE (e.g., case number WQ/SW-NWR-10-230 signifies that it is a water quality case ("WQ"), in the stormwater program ("SW"), from the northwest region ("NWR"), referred in 2010 ("10"), and is the 230th case assigned by OCE to an ELS in that year). One can search OCE's enforcement database for any of these parameters in addition to others, such as, the city or town where the violation took place. There is currently no way to search the enforcement database by basin.

The ELS drafts and issues the formal enforcement action (the FEA usually includes a cover letter, the Notice of Civil Penalty Assessment and Order, and an Exhibit with the penalty calculation), and if the Respondent appeals the matter (by submitting a written answer) the ELS schedules an "informal discussion" with the Respondent and the inspector at a location convenient to all parties. ELSs are encouraged to travel to the region or locale where the Respondent resides or where the violation took place so that DEQ can have a face-to-face meeting. Sometimes weather, distance from Portland to the regional office, or the schedules of the ELS or inspector do not permit a face-to-face meeting and in these situations the informal discussion can be conducted over the phone.

New information learned during the informal discussion often results in a settlement offer. Where it does not, the Respondent may choose to proceed to a contested case hearing before an administrative law judge (ALJ). Like informal hearings, contested case hearings usually take place at or near the locale where the violation took place, or in a place that is convenient to the Respondent. ALJs are assigned by the Office of Administrative Hearings and are often specific to regions within the state. The ALJ will issue an opinion (officially known as a "proposed order"). The violator has the right to appeal the opinion to the EQC and, beyond that, to the Oregon Court of Appeals.

As an alternative to paying the civil penalty to the state of Oregon's general fund, state law allows respondents to pay up to 80% of their civil penalty towards a Supplemental Environmental Project (SEP). An SEP is a project that primarily benefits public health or the environment in the geographic region where the violation took place. It can be an on-the-ground stream bank restoration project, an education pamphlet that informs people of the risks of spreading invasive species, trash removal, etc. DEQ encourages respondents to perform SEPs and we are liberal when reviewing SEP applications. An SEP may be proposed at any time after an FEA is issued. While DEQ encourages Respondents to perform SEPs, DEQ cannot outwardly advocate for one SEP over another. DEQ does however maintain a small list of SEP ideas that includes a list of non-profit groups, watershed councils, and other potential SEP partners that we pass out to respondents interested in doing an SEP.

Actions and Alignment Opportunities:

- Assign one ELS to handle all WQ formal enforcement actions within a basin
- Develop basin-specific enforcement guidance that reflects the priorities within a basin, particular threats to beneficial uses within the basin, resource constraints within the basin (e.g. if turbidity is a particular problem within the basin revise the guidance so that water quality violations where there is a potential for turbid water discharge receive a heightened enforcement response).
- Change formal enforcement action case numbers to include a basin identifier so that enforcement efforts within a particular basin are easier to identify and search.
- Include a field for basin identification in the development of the ACES database.
- Develop SEP ideas and SEP partners within a basin in order to facilitate and encourage respondents to perform SEPs.
- Develop SEP ideas and SEP partners that may address basin priorities (e.g. if temperature is a problem, include tree planting SEPs in the SEP idea list).

5. Groundwater program

Seventy percent of Oregon's people depend on groundwater for their daily water needs via private, public and industrial water wells. Groundwater can travel very slowly, and once contaminated, can be very difficult or nearly impossible to clean up. It is also very expensive to clean up groundwater. Contamination affects not only the immediate uses of groundwater, such as drinking water supplies, but may also have pronounced effects on surface water quality. DEQ has primary responsibility for implementing groundwater protection in Oregon. DEQ uses a combination of programs to help prevent groundwater contamination from point and non-point sources of pollution, clean up pollution sources, and monitor and assess groundwater and drinking water quality. DEQ implements some programs though partnerships with the Oregon Department of Human Services- Environmental Public Health, Oregon Water Resources Department, Oregon Department of Agriculture, Oregon State University and other state, local, and private organizations, businesses and individuals.

Action: Conduct a groundwater assessment in the Rogue Basin in order to better inform education/outreach, and interagency coordination opportunities.

Action: The Groundwater program can design and conduct an outreach and education plan for the basin. Present groundwater protection and domestic drinking water information at various residential venues. Provide free nitrate well water 'screening'. Using this nitrate data, determine locations that would be appropriate for additional assessment and technical assistance.

Action: The Groundwater program can work with Oregon Department of Agriculture to develop advanced best management practices for CAFO waste management and develop a research forum on determining nitrogen loading rates that are protective of groundwater.

Action: The Groundwater program can coordinate on setting measurement goals for the action plan nitrate level, work with realtors and health care providers to disseminate information about nitrate in groundwater and design a planning tool kit for ground water protection for use by local jurisdictions.

Alignment Opportunities. The Groundwater program can work with monitoring staff to develop a ground water monitoring plan. Align with NPS and drinking water program priorities when

developing outreach strategies. Coordinate with point source staff to address septic issues, biosolid application, and graywater concerns.

6. Safe Drinking Water Act Implementation

The 1996 amendments to the federal Safe Drinking Water Act included funding for public drinking water supply system improvements to meet existing and future human health standards, identify public drinking water supply source areas and inventory potential contamination sources. A primary goal of the amendments was to help reduce the risk of pollution to public water systems, including contamination that could potentially result in the loss of the drinking water resource. There are 22 public water systems (serving over 196,000 people) in the Rogue Basin using surface water. DEQ drinking water protection staff have prioritized technical assistance and prevention activities for Rogue Basin public water systems based on detections of bacteria, nitrates and low levels of toxics in drinking water. Turbidity is also a periodic issue in the basin. Existing data shows that there are potential groundwater impacts to surface water but we have very little data for surface water upstream of intakes. Safe Drinking Water Act monitoring data is required for about 73 chemicals in finished (post-treatment) water only. There are no requirements for testing other contaminants that pose potential risks to public water systems, including "emerging contaminants" such as pharmaceuticals, chemicals associated with personal care products, and many ubiquitous pesticides and semi-volatile and volatile organic chemicals. DEQ and the Department of Human Services recently initiated a statewide monitoring project to determine if there are levels of concern of emerging contaminants in source waters (Senate Bill 737). To date, limited monitoring for these contaminants has occurred in the Rogue Basin through the Drinking Water Source Water Monitoring project, as well as through the DEQ Toxics Monitoring Program. More data is especially needed in the Rogue Basin to help assess whether source water is being negatively impacted by biosolids applications, high density septic systems, pesticide applications, and forest management practices.

Action: Emerging contaminant monitoring results provide a basis for prioritizing pollutant reduction strategies for drinking water in the basin, but more data may be needed to help identify the source of these contaminants and develop specific technical assistance and management strategies. The lab results for the fall 2010 monitoring are expected to be completed by February 2011. Additional action is needed to address data gaps for remaining locations upstream of drinking water intakes.

Action: A number of public water systems have continuous turbidity monitoring equipment yielding high quality data on turbidity levels of untreated drinking water. A plan for installing this equipment at public water systems throughout the Basin would be a major benefit for assessing impacts. DEQ should continue coordination with partnering agencies to share research results, monitoring data, and mapping.

Action: Address data gaps to include: location and extent of existing and future biosolids applications sites; increased monitoring of pharmaceuticals, personal care products and other emerging contaminants in the vicinity of high density septic systems and biosolids application sites; data to assess the transport of contaminants via groundwater inputs to surface water; data to better characterize the risk of algal toxins to public water systems; data to better characterize the risks to public water systems from elevated turbidity associated with forest management practices and roads; data to better characterize correlations between storm events and impacts to public water systems from specific contaminants including fecal coliform and turbidity; analysis of land use patterns and disturbances and how they relate to source water turbidity

Alignment Opportunities. The integration of drinking water protection with other agency programs including spill response, household hazardous waste collection, hazardous waste cleanup, underground storage tank cleanup, toxics reduction, water quality permitting and pollution prevention technical assistance for preventing contamination of public water supplies. Drinking water protection program staff to work with monitoring staff to develop a monitoring plan to address the above listed data gaps. Align monitoring plan with needs addressed by groundwater and nonpoint source TMDL staff.

7. Water Quality Monitoring

Water quality monitoring and assessment provides the foundation for water quality management actions at DEQ and as well as other state and federal natural resource agencies, counties and municipalities. DEQ's water quality monitoring programs work in conjunction with other local and regional monitoring efforts to provide information on the status and trends of water quality in the Rogue Basin and across the state. Monitoring is conducted to determine if water quality supports beneficial uses and if water quality standards are met. Streams that do not meet specific water quality standards are placed on the 303d list and will have TMDLs developed for them. In order to develop TMDLs, studies must be conducted to determine the sources and quantities of pollutants affecting the water body and how those vary over time.

a. Ambient Monitoring Network

The ambient water quality monitoring network consists of 131 statewide locations. The network includes 8 sites in the Rogue Basin that are sampled six times annually for conventional water quality pollutants: water temperature, dissolved oxygen, pH, conductivity, turbidity, alkalinity, bacteria, total organic carbon and nutrients (which includes total phosphorus, dissolved orthophosphate, nitrate/nitrite, and ammonia). Information collected at these sites is used to assess general water quality conditions using the Oregon Water Quality Index (OWQI) and to assess the trends at these locations. For water year 2009 six ambient sites in the Rogue were classified in "good" or "excellent" condition using the OWQI. Two sites, Little Butte Creek at Agate Road and Bear Creek at Kirtland Road were in "poor" condition based on the index. Water quality trends for the sites are shown in Table 7. Ambient monitoring data formed the foundation of the Bear Creek Phosphorus Success Story submitted to EPA in November of 2010.

Table 7. Pollutant trends at Rogue Basin OWQI Monitoring Sites

Site	Significant OWQI and Sub-Index Trends
Rogue R. at Lobster Ck. Br.	↓OWQI ↓ BOD, ↓TS
Illinois R. downstream of Kerby	↓OWQI ↑ N; ↓ BOD
Rogue R. at Robertson Br.	(NT) OWQI
Applegate R. at HWY 199	(NT) OWQI ↓ BOD
Rogue R. at Rock Point Br.	(NT) OWQI ↓ BOD, ↓TS
Bear Ck. at Kirtland Rd.	(NT) OWQI ↑ DO, ↓P
Little Butte Ck. at Agate Rd.	(NT) OWQI ↑ DO; ↓ BACT
Rogue R. at Dodge Pk.	(NT) OWQI --

Action: DEQ's water quality monitoring program to continue ambient monitoring to assess status and trends and use data to support TMDL development and TMDL effectiveness monitoring.

Action: DEQ's water quality monitoring program and Nonpoint Source TMDL staff to investigate forming a Rogue Basin Water Monitoring Council (RWMC) that participates in a broader Oregon Water Monitoring Council (OWMC). Goals of such a group would be to bring everyone together to discuss who is doing what where, discuss indicators, develop quality assurance plans, and sampling plans, fill data gaps, and share information.

Alignment Opportunities. DEQ's water quality monitoring program to continue trend analysis and sharing of results with NPS and PS programs. NPS staff to align with the water quality monitoring program for effectiveness monitoring associated with Gold Ray and other dams that have been removed on the Rogue River.

b. Biomonitoring

Biomonitoring staff conduct studies to determine the relationship between water quality, habitat conditions and the biological condition of macroinvertebrates. In the Rogue Basin, macroinvertebrate samples were collected at 62 sites on smaller wadeable streams from 2000 – 2008. Predictive models can then be used to assess biological conditions and infer the level of water quality impairment.

Action: TMDL NPS staff to support the use of biological assemblages as an element for use in effectiveness monitoring studies.

Alignment Opportunities. Align biomonitoring work with TMDL effectiveness monitoring. Use biological indexes as the method to indicate changes in watershed conditions and to determine beneficial use support.

c. Compliance Monitoring Studies to Determine Compliance with Permit Conditions

Compliance monitoring is required for all individual permits in the watershed and for some general permits. Parameters monitored and the frequency of monitoring vary with each individual permit. Permitted sources in the basin with the potential to impact water quality include:

- NPDES permitted sources – general and individual permits
- Suction dredge mining
- WPCF permitted sources

- Municipal Separate Storm Sewer System (MS4) Discharge Permit
- 401 Hydroelectric Certifications
- 401 Dredge and Fill Certifications
- On-Site Septic System Permitting
- CAFO permitted sources
- Removal/Fill permitted sources

Action: As permits are renewed permit writers should review monitoring requirements to ensure that monitoring aligns with identified impairments in the basin.

Alignment Opportunities. Permit compliance monitoring can be used to inform TMDL and to help determine beneficial use support given. Note that all point sources in the Rogue Basin are DMAs as per TMDLs completed in 2008.

d. Senate Bill 737

Senate Bill 737 was enacted by the Oregon Legislature in 2007. The bill directed DEQ to identify a list of persistent, bioaccumulative, and toxic ("PBT") chemicals which might be present in the effluent of 52 of Oregon's largest wastewater treatment facilities. The list of PBT chemicals was developed through a public process and included consultation with Oregon Association of Clean Water Agencies, the League of Oregon Cities and other stakeholders. Ultimately, the SB 737 list included 119 chemicals thought to pose the greatest risk to human and environmental health. Twice in 2010, samples were collected from the 52 largest wastewater treatment plants in the state including the cities of Medford, Ashland, and Grants Pass in the Rogue Basin. The results of these tests are expected to be released in early 2011. Should concentrations of any of the PBT chemicals included in the list be found above recommended levels, the wastewater facilities will be required to develop pollution prevention/reduction plans in 2011.

Action: Complete SB737 analysis and share results with sources and local communities.

Alignment Opportunities. Alignment begins with sharing results among Pointsource program, Nonpoint source TMDL program, and Groundwater and Drinking Water programs.

e. Toxics Monitoring Program (TMP)

In 2008, DEQ initiated the Toxics Monitoring Program (TMP). The goal of the TMP is to measure and assess the state's surface waters and aquatic resources for the presence of toxic pollutants, and where possible, identify the sources of the pollutants. The TMP focuses on measuring chemicals produced intentionally or unintentionally as the result of industrial, municipal, or agricultural processes whose physical and chemical characteristics have been demonstrated to impair the normal functioning of biological systems at low exposure levels. The TMP measures more than 270 pollutants of interest in water and/or fish, including; volatile and semi volatile organics, poly-aromatic hydrocarbons, poly-chlorinated biphenyls, poly-brominated flame retardants, dioxins and furans, select metals, select current-use/legacy pesticides and emerging contaminants (i.e., pharmaceuticals, personal care products, and plasticizers ("P3 List")). Approximately 1/3 of the SB 737 priority pollutants will be measured in fish, water or both as part of the TMP. The ultimate scope of the TMP is to measure the concentrations of toxic pollutants in surface water and aquatic resources in all 13 major basins of the State. While the primary focus of the TMP is on surface water and aquatic resources, where possible the program will work with internal and external stakeholders and partners to also assess ground water for the presence of organic and inorganic pollutants. Following two public meetings in 2010 DEQ collected fish tissue from 4 locations in the Rogue Basin. Surface water samples will be collected and analyzed for toxic pollutants from seven to ten monitoring locations throughout

the basin in 2011 during the spring summer and fall. Efforts are underway to bolster the groundwater monitoring component of the TMP in the Rogue Basin. If funding and partners are available, the TMP is looking into augmenting previous work performed by the ODEQ Drinking Water Protection Program (DWPP).

Action: Toxics Monitoring Program to complete TMP analysis and share results with sources and local communities. Analysis should include determination of risk to public water supplies.

Alignment Opportunities. Alignment begins with the Toxics Monitoring Program sharing results among Pointsource program, Nonpoint source TMDL program, and Groundwater and Drinking Water programs.

8. Financial and Technical Assistance

a. Clean Water State Revolving Fund Loan program

DEQ administers the Clean Water State Revolving Fund loan program which is capitalized through federal appropriations. The CWSRF loan program can provide financial assistance to public entities (cities, special districts, tribal governments) to address water quality problems. Since 2000, DEQ has provided $28 million in loans to cities and districts within the Rogue Basin.

Table 8. Water Quality related needs in the Rogue Basin over the next 20 years (from current CWSRF applications)

CWSRF Loan Applicants	Application Date	Amount Requested	Project
City of Ashland	2009	$2,745,280	WWTP improvements
City of Ashland	2009	$315,000	Riparian area restoration
City of Central Point	2009	$1,961,816	Stormwater improvements
City of Gold Hill	2009	$1,775,650	WWTP improvements
Harbor Sanitary District	2010	$1,390,000	Sewer improvements
City of Rogue River	2009	$371,003	Inflow and Infiltration improvements

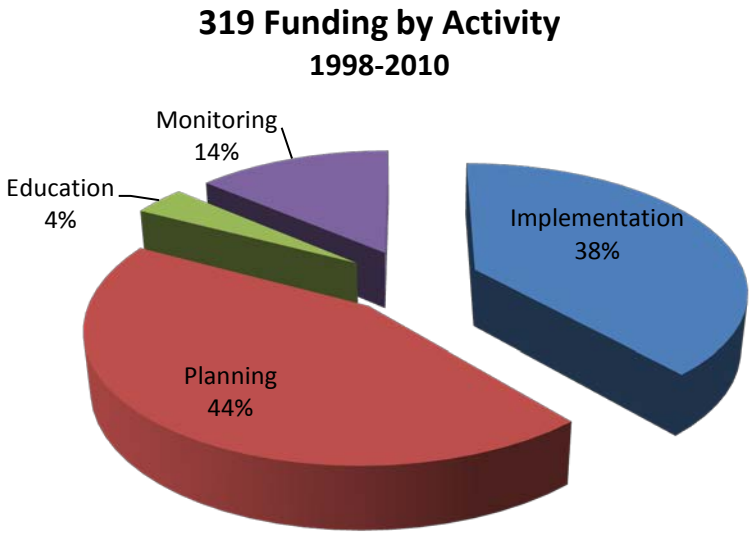
Action: If a city includes a qualifying nonpoint source activity in conjunction with a municipal wastewater project, a combined CWSRF loan may be available at a substantially discounted interest rate. The Nonpoint Source program may be able to work with the SRF program to identify nonpoint source projects that may help CWSRF recipients qualify for this program (the sponsorship option). http://www.deq.state.or.us/wq/loans/docs/CurrentRule051410.pdf

Alignment. Twenty percent of the SRF loan program's annual capitalization grant is set aside fund green infrastructure, water or energy efficiency improvements, or other environmentally innovative activities. In 2010, $4.6 million was set aside for these "green projects". DEQ's loans can fund both nonpoint source and point source projects. This represents a great opportunity for the SRF program to align with the nonpoint source program to identify nonpoint source projects within the Rogue Basin.

b. Section 319 Grants - Nonpoint source pollution control

Section 319 of the federal Clean Water Act requires states to implement nonpoint source pollution management programs based on assessments of the amounts and origins of nonpoint source pollution in the state. DEQ administers the Section 319 Nonpoint Source grants program which is capitalized through federal appropriations. Nonpoint source pollution comes from numerous diffuse sources such as runoff from roads, farms, and construction sites. This type of pollution is thought to be the largest source of water quality impairment in Oregon and

for the country. DEQ provides grant money to local organizations for nonpoint source projects such as public education and watershed restoration. Within the Rogue Basin over the past twelve years approximately 44% of the Section 319 grant funds have focused on planning projects, 38% on implementation activities (primarily riparian restoration and other on the ground projects), 14% on monitoring and 4% on educational activities. During this period of TMDL development and water quality implementation plan (WQIP) development, approximately 39% of the 319 funds were used to provide planning assistance in developing water quality implementation plans and stormwater management plans. In the coming years it is expected that a greater portion of the 319 funds will be spent on the implementation of projects that address the water quality problems identified in TMDLs and WQIPs.



Action: NPS 319 program staff priorities for 2011 – 2015 will be working with partners to focus on implementation actions that will result in temperature, bacteria, and sediment improvements on urban, agricultural, and forested lands, as well as addressing storm water issues in urban areas.

Action: NPS 319 program staff will work to distribute the Rogue Basin's portion of the estimated $3.2 million statewide to fund project proposals based on identified priorities including drinking water source protection, TMDL development and implementation, and groundwater issues. This will include preparing an annual report of nonpoint source program accomplishments

Alignment Opportunities. NPS 319 program staff will align with TMDL water quality implementation plans, water quality management plans, groundwater and safe drinking water programs in the identification of priorities. NPS 319 program staff will evaluate opportunities to align with the SRFs green infrastructure projects.

Potential Section 319 Projects:

- Harmful algae bloom investigations in the Rogue Basin: inventory of existing data, collect and analyze a sediment cores to evaluate data, and make recommendations (further study, management related, etc)
- Phosphorous investigation: Conduct soil analysis to evaluate if phosphorous is a limiting element in the Bear Creek valley. The goal of this project would be to develop a zero phosphorous fertilizer outreach program.

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Department of Environmental Quality (2008). *Total Maximum Daily Load.* Rogue River Basin.

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Harmful Algae Bloom (HABs) Guidance documentation:
http://www.oregon.gov/DHS/ph/hab/docs/DHS_GUIDANCE_on_HAB.pdf;

Integrated Water Resources Strategy available at: http://www.oregon.gov/OWRD/LAW/ Integrated Water Supply Strategy.shtml).

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Turner, D., 2010, Remote sensing of chlorophyll *a* concentrations to support the Deschutes Basin lake and reservoir TMDLs, Oregon Department of Environment Quality. Not currently available on the web.

Appendix A: Rogue Basin Identified Actions and Primary Programs

Rogue Basin Identified Actions & Primary Programs **Near Term (N) = next 18 months,** **Mid Term (M) = 18 months - 3 years,** **Far Term (F) = 3 to 5 years**	**Time: N, M, F**	**Biosolids**	**Reuse**	**CWSRF**	**Drinking Water**	**Ground Water**	**Onsite**	**UIC**	**401 Hydro**	**401 Dredge/Fill**	**Standards**	**Muni/Indust Permits**	**Pre-treatment**	**Stormwater**	**Monitoring**	**Nonpoint-TMDL**	**OCE**	**319**	**External Partners**
Address remaining 303(d) listed impairments in the Rogue: DO (20) (2010 Assessment)	N														x	x			Watershed Councils
Address remaining 303(d) listed impairments in the Rogue: Aquatic Weeds and Algae: HABs (5) (2010 Assessment)	N														x	x			Watershed Councils
Pursue missing implementation plans for Dams: Applegate and Lost Creek	N															x			USACE
Ensure TMDL WLA are incorporated into NPDES permits	N											x		x		x			
Review Urban IP's for non-phase II communities to ensure that they are properly incorporating stormwater requirements	N													x		x			
Develop a web presence and outreach strategy for the Watershed Approach	N															x			
Stormwater and TMDL implementation collaborate to review IP's to prevent duplication in Phase II communities (permits renewed in 2012)	N													x		x			
NPS staff work to create regional coordination between DMAs, DEQ, Federal Partners, and other TMDL implementation stakeholders	N															x			All TMDL DMAs
Facilitate regional planning, prioritization, and implementation of NPS projects to address TMDL identified WQ impairments	N															x			DMAs, Watershed Councils
Track implementation plans that are in progress: are actions being implemented, are they affective, is TA needed or other assistance.	N														x	x			All TMDL DMAs
Annual Review of basin urban implementation plans: Rogue 17, Bear Creek 10	N															x			All TMDL DMAs

Rogue Basin Identified Actions & Primary Programs **Near Term (N) = next 18 months,** **Mid Term (M) = 18 months - 3 years,** **Far Term (F) = 3 to 5 years**	**Time: N, M, F**	**Biosolids**	**Reuse**	**CWSRF**	**Drinking Water**	**Ground Water**	**Onsite**	**UIC**	**401 Hydro**	**401 Dredge/Fill**	**Standards**	**Muni/Indust Permits**	**Pre-treatment**	**Stormwater**	**Monitoring**	**Nonpoint-TMDL**	**OCE**	**319**	**External Partners**
Review data and provide input to update Bear Creek effectiveness monitoring program	N															x			Bear Creek DMAs
Biosolids program integrate with drinking water program, NPS TMDL, ODA, ground water to ensure no WQ impacts based on current data	N	x			x	x										x			
401 hydro certification continues to incorporate TMDL load allocations for all areas of the Rogue Basin	N								x							x			
Update SEP list for the Rogue to include project ideas, lists of nonprofit groups, watershed groups and other partners	N			x	x	x						x		x		x	x		All Project Partners
Update DEQ Implementation website to include current examples of implementation plans and current basin contact information	N															x			
Conduct an assessment of the Rogue Basin groundwater quality to inform education, outreach, and coordination opportunities.	N					x									x				
Set measurement goals for the action plan nitrate level in groundwater for the Rogue Basin	N					x									x				
Data to characterize the risk from algal toxins to public drinking water systems	N				x										x				
Continue ambient monitoring to assess status and trends	N														x				
Lab to perform continuing trend analysis and sharing of results with PS and NPS programs	N			x	x	x	x					x	x	x	x	x			
SB737 results and prevention/reduction plans to be shared with NPS program, PS program, groundwater, drinking water programs	N				x	x		x				x	x	x	x	x			

Rogue Basin Identified Actions & Primary Programs **Near Term (N) = next 18 months,** **Mid Term (M) = 18 months - 3 years,** **Far Term (F) = 3 to 5 years**	**Time: N, M, F**	**Biosolids**	**Reuse**	**CWSRF**	**Drinking Water**	**Ground Water**	**Onsite**	**UIC**	**401 Hydro**	**401 Dredge/Fill**	**Standards**	**Muni/Indust Permits**	**Pre-treatment**	**Stormwater**	**Monitoring**	**Nonpoint-TMDL**	**OCE**	**319**	**External Partners**
NPS, DW, Ground Water, Biosolids subprograms to provide input to Toxics Monitoring Program to aid in site selection and analytes in the Rogue	N	x	x		x	x							x		x	x			
319 to fund temperature implementation actions	N															x		x	All Project Partners
319 to fund bacteria implementation actions	N															x		x	All Project Partners
319 to fund sediment implementation actions	N															x		x	All Project Partners
319 to fund basin-wide collaborative planning actions	N															x		x	All Project Partners
Ensure that Rogue Basin issues are considered during the development of the integrated water resources strategy with OWRD	N		x		x	x		x								x			
Work with DMAs to implement effectiveness monitoring program in Bear Creek (focus is Urban/Irrigation)	N														x	x			Bear Creek Partners
Provide guidance to ODA and SWCDs in the Rogue Basin to direct their new watershed focused approach based on Status Report	N															x			ODA, SWCD
Measure impact of the removal of 4 dams on the Rogue River system on temperature - effectiveness monitoring	N														x	x			
Pursue missing implementation plans - Forest Service	M															x			USFS
Pursue missing implementation plans - DOGAMI	M															x			DOGAMI

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Pursue missing implementation plans - Department of State Lands	M															x			DSL
Review of BLM basin WQRPs to check adequacy to meet the TMDL (25 plans submitted so far)	M															x			BLM
Effort and priorities of WQ Standards and Assessment aligned to address priorities in the basin: turbidity, sedimentation	M										x					x			
USGS sediment study to be incorporated into Rogue River water quality certification (WQS)	M								x	x									USGS
Nonpoint source staff to provide input on local conditions as part of 401 removal/fill certification	M								x	x						x			
Update formal enforcement action (FEA) case numbers to include a basin identifier so that enforcement actions can be searched by basin	M																x		
Groundwater to work with monitoring staff to develop a groundwater monitoring plan for the Rogue Basin	M					x									x				
Address data gaps for emerging contaminant monitoring upstream of drinking water intakes	M				x										x				
Integration of drinking water protection with spill response, household hazardous waste, hazardous waste cleanup, UST, toxics reduction, permits	M	x	x		x							x	x	x	x				
Collect pesticide data (POCIS) for intensive agricultural areas of the Rogue Basin - especially Bear Creek	M														x	x			
Address remaining 303(d) listed impairments in the Rogue: Sediments (7 listings, 2 addressed via TMDL) (2010 Assessment)	M														x	x			

Rogue Basin Identified Actions & Primary Programs **Near Term (N) = next 18 months,** **Mid Term (M) = 18 months - 3 years,** **Far Term (F) = 3 to 5 years**	**Time: N, M, F**	**Biosolids**	**Reuse**	**CWSRF**	**Drinking Water**	**Ground Water**	**Onsite**	**UIC**	**401 Hydro**	**401 Dredge/Fill**	**Standards**	**Muni/Indust Permits**	**Pre-treatment**	**Stormwater**	**Monitoring**	**Nonpoint-TMDL**	**OCE**	**319**	**External Partners**
Pursue missing implementation plans - Oregon Parks and Recreation	M															x			OR Parks
Review and comment on agricultural water quality management plans - biennial reviews	M															x			ODA
5 year review of IP's - Bear Creek 2013	M															x			
Monitoring to include other programs to see if it can address multiple needs: WQ Assessment, DW, GW, Toxics,	M				x	x									x	x			
Focus SRF actions on facilities that will require upgrades in the near future	M			x								x		x					Permitted Facilities
Pretreatment program to guide toxics reduction strategy for Medford, Grants Pass, Ashland as part of SB737	M												x		x				Permitted Facilities
Coordinate outreach, education, financing opportunities between TMDL, Stormwater, SRF, UIC (take advantage of the overlap)	M			x			x	x						x		x		x	
DEQ to collaborate with the ODA CAFO program to provide monitoring data where available	M				x	x									x	x			ODA CAFO
Groundwater program to collaborate with the CAFO program to determine nitrogen loading rates that are protective of groundwater	M					x													CAFO
Develop basin-specific enforcement guidance reflective of priorities in a basin - if turbidity is an issue in basin violations receive a heightened response	M																x		
Design and conduct a groundwater outreach plan - could include free NO3 testing and determination of areas for more focused efforts	M					x									x				ODA, SWCD

Rogue Basin Identified Actions & Primary Programs **Near Term (N) = next 18 months,** **Mid Term (M) = 18 months - 3 years,** **Far Term (F) = 3 to 5 years**	**Time: N, M, F**	**Biosolids**	**Reuse**	**CWSRF**	**Drinking Water**	**Ground Water**	**Onsite**	**UIC**	**401 Hydro**	**401 Dredge/Fill**	**Standards**	**Muni/Indust Permits**	**Pre-treatment**	**Stormwater**	**Monitoring**	**Nonpoint-TMDL**	**OCE**	**319**	**External Partners**
Groundwater to coordinate with onsite program, biosolids application, graywater concerns, and UIC.	M	x	x			x	x	x											
Collect data to determine if source water is being impacted by biosolids, septic systems, pesticides, and forest management	M	x			x		x								x				
Increased monitoring of personal care products and other emerging contaminates in the vicinity of high density onsite and biosolids sites	M	x	x				x								x				
Better data to assess transport of contaminants via groundwater to surface water	M					x									x				
Data to characterize the risk from elevated turbidity due to forest management practices and roads to public drinking water systems	M				x														
Analysis of land use patterns and disturbances and how they relate to source water turbidity	M				x										x	x			
Develop guidance for Rogue Basin effectiveness monitoring - consider biological assemblages	M															x			
Use compliance monitoring of receiving waters to inform TMDL and help determine beneficial use support	M											x				x			Permitted Facilities
Provide TA to SRF recipients to promote nonpoint source activities that would qualify for a combined SRF loan at a lower interest rate	M			x												x			All DMAs
Promote green infrastructure projects that qualify for SRF loans and meet TMDL objectives	M			x														x	All DMAs
SRF green infrastructure projects to collaborate with 319 program to see if linkage exists to NPS improvements and potential funding	M			x											x	x			All DMAs

Rogue Basin Identified Actions & Primary Programs **Near Term (N) = next 18 months, Mid Term (M) = 18 months - 3 years, Far Term (F) = 3 to 5 years**	**Time: N, M, F**	**Biosolids**	**Reuse**	**CWSRF**	**Drinking Water**	**Ground Water**	**Onsite**	**UIC**	**401 Hydro**	**401 Dredge/Fill**	**Standards**	**Muni/Indust Permits**	**Pre-treatment**	**Stormwater**	**Monitoring**	**Nonpoint-TMDL**	**OCE**	**319**	**External Partners**
Work with DMAs to implement effectiveness monitoring program in Rogue Basin (urban focus for starters)	M															x			All DMAs
98% of bacteria is from nonpoint sources in Rogue and 95% in Bear Creek- focus on nonpoint source bacteria sources	M														x				All DMAs
Sample for mercury in fish tissue in Agate Lake and Squaw Lake to fill data gap	M															x			
Identify specific projects for 319 and recruit organizations to implement	M															x		x	All Partners
Address remaining 303(d) listed impairments in the Rogue: Estuary Bacteria	F														x				
Address remaining 303(d) listed impairments in the Rogue: Mercury (1)	F														x				
Use effectiveness monitoring results to adaptively manage/revise implementation plans	F															x			
Data management: all chemistry, physical, biological, habitat data collected for any reason updated in LASAR	F														x				All Partners
Align surface water bacteria data in the Rogue with onsite program priorities to identify problem areas that may be due to failing systems	F						x								x	x			
Water reuse to work with groundwater and NPS staff to provide outreach to graywater users to ensure systems are operated and maintained	F		x			x										x			
Identify location and extent of existing and future biosolids application sites and share with subprograms	F	x			X	X										X			

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Develop Rogue Basin Water Monitoring Council (RWMC) that participates in a broader Oregon Water Monitoring Council (OWMC)	F														x	x			
Perform additional research on well logs, real estate transaction logs, geology and agricultural use to ID areas of high NO3 in groundwater	F				x														County, Real Estate
Data collection to confirm that sediment loading is decreasing as a result of TMDL implementation	F														x	x			
Address remaining 303(d) listed impairments in the Rogue: pH (3) (2010 Assessment)	F														x	x			
5 year review of IP's - Rogue 2015	F															x			
Environmental Law Specialists assigned to a program and a geographic area	F																x		
Develop a plan for installing continuous turbidity monitoring equipment at public water systems throughout the state	F				x											x			Public Water Systems
Determine strategy to address habitat and flow modification (87 stream segments in the Rogue)	F										x					x			