2016 Oregon Nonpoint Source Pollution Program Annual Report

As required by the Federal Clean Water Act

Submitted to: EPA Region 10

June 2017

Watershed Management
700 NE Multnomah
Portland, OR 97232
Phone: 503-229-5325
800-452-4011
Fax: 503-229-6762
Contact: Gene Foster
www.oregon.gov/DEQ

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

DEQ
State of Oregon
Department of Environmental Quality

This report prepared by:

Oregon Department of Environmental Quality
700 NE Multnomah Street, Suite 600
Portland, OR 97232
1-800-452-4011
www.oregon.gov/deq

Contact:
Gene Foster
503-229-5325

Table of Contents

Tables

Figures

Executive Summary

In 2016 Clean Water Act Section 319 funds paved the way for projects across Oregon that helped restore riparian buffers, ensured best management practices were implemented on farms and rangeland, improved pesticide management and provided valuable education on water quality to Oregonians of all ages.

The Oregon Nonpoint Source Pollution Program 2016 Annual Report documents the activities and accomplishments of the Oregon Department of Environmental Quality's implementation of the state's Nonpoint Source Program. DEQ developed the report to meet the requirements of Section 319 of the federal Clean Water Act, the U.S. Environmental Protection Agency's 2014 Nonpoint Source Program and Grant Guidelines and to address the recommendations in EPA's Region 10 Sept. 23, 2016 Determination of Progress for Oregon's Nonpoint Source Management Program letter to DEQ.

The report provides a summary of the nonpoint source activities implemented by the state during 2016 and highlights the progress Oregon is making toward meeting the substantial challenges presented by nonpoint source impairments such as temperature, dissolved oxygen, sedimentation and bacteria which account for approximately 74 percent of current impaired waters listings in the state. The report includes progress updates on milestones, implementation targets and annual reporting requirements identified in the 2014 Oregon Nonpoint Source Management Plan. Annual status updates ensure that Section 319 funding, technical support and other resources are effective and efficient.

To address EPA's recommendations, the outline and content of the report have been revamped to be more succinct. Among the revisions: a summary of nonpoint source accomplishments in 2016 and a more in-depth look at nonpoint source implementation activities occurring statewide. Basin summaries include a description of: basin characteristics, water quality impairments, watershed partners, agricultural implementation efforts and basin-wide planning and restoration priorities.

DEQ continues to implement the Nonpoint Source Program throughout its water quality programs and with local, state and federal agencies as well as organizations that have either the responsibility, authority, expertise or funding to address land uses or land management that can be nonpoint sources of pollution. DEQ has directed 319 grants based on priorities designed to implement the current Oregon Nonpoint Source Management Program Plan. DEQ nonpoint source staff prioritize 319 grants using input from a variety of sources including TMDLs and other water quality analyses and planning documents that include EPA's nine minimum elements. The 2016 319 Grant funded 20 projects in the following categories: riparian restoration and other best management practices implementation, education and outreach, monitoring, and pesticide stewardship partnerships. Some significant activities from 2016 were:

Pesticide Stewardship Partnerships: Pesticide Stewardship Partnerships are a cooperative, voluntary process designed to identify potential concerns regarding surface and groundwater affected by pesticide use. Its purpose is to reduce pesticide residues in Oregon's water bodies where there is potential concern by working with local stakeholders and to provide a mechanism to share successful strategies with all Oregonians. The program's goal is to achieve measurable environmental improvements, making Oregon waters safer for people and aquatic life. The partnerships combine local expertise and water quality sampling to encourage voluntary changes in pesticide use and management practices. State partners including DEQ, the Oregon Watershed Enhancement Board, Oregon Health Authority, Oregon State University's Extension Service, Oregon Department of Agriculture and Oregon Department of Forestry work with diverse parties, including watershed and other natural resource groups, local landowners and growers, soil and water conservation districts and tribal governments to find ways to reduce pesticide

levels while measuring improvements in water quality and crop management. Data collected as part of the partnerships appears to continue to have an effect on pesticide management strategies as evidenced by a decline in the number of exceedances of benchmarks and a decline in the maximum level of the pesticides detected.

Water Quality Status and Trends Reports for Agricultural Rule and Plan Reviews: In late 2016, DEQ began producing management area specific reports titled Water Quality Status and Trends Analysis for the Oregon Department of Agriculture's Biennial Review of the Agricultural Area Rules and Plan. Oregon statute and administrative rules require ODA to consult DEQ during the biennial review of Agricultural Water Quality Management Area Rules and Plans (Oregon Revised Statute 568.930). DEQ Total Maximum Daily Load and nonpoint source program staff conduct these reviews based on ODA's biennial review schedule of its area rules and plans. ODA's Agriculture Water Quality Program is outcome based, explicitly describing prohibited conditions, similar to DEQ's TMDL and nonpoint source programs which explicitly define water quality targets and goals. The analysis of landscape conditions and water quality data is used for implementing these programs as well as identifying data gaps. The reports present data and analysis that will help DEQ fulfill its roles in the biennial review process. The reports present an analysis of water quality data readily accessible from public databases and available in sufficient quantity to indicate status and trends.

Western Oregon Low-Impact Development Training for Small Communities: 319 grant funds were used to promote trainings for small communities who are likely to be or are designated management agencies in Western Oregon to help facilitate implementation of TMDLs through the reduction of nonpoint sources. The Oregon Environmental Council worked with experts to produce a low-impact development guidance template tailored for Western Oregon that was released in January 2016. A series of workshops was held in 2016 to help communities implement the guide.

Conservation Effectiveness Partnership: The Conservation Effectiveness Partnership is a collaborative effort between Natural Resources Conservation Service, Oregon Watershed Enhancement Board, ODA and DEQ with a mission to: describe the effectiveness of cumulative conservation and restoration actions in achieving natural resource outcomes through collaborative monitoring, evaluation and reporting. The goals of the partnership are to:

- Build an understanding of the extent of the investment in watershed improvement and the watershed response through the agencies' collective grant programs
- Develop a clearer understanding of how local organizations are utilizing the agencies respective grant programs, in concert
- Evaluate the effects of conservation and restoration investments on water quality and watershed condition
- Design tools and methods of reporting results of investments

The partnership has completed evaluations for the Wilson River for bacteria and 15-Mile Creek for sediment. The partnership is currently working on projects for Prairie Creek in the Wallowa Basin and Dairy Creek in the Tualatin Basin.

Coastal Zone Act Reauthorization Amendments Gaps: In 2015, EPA reduced DEQ's 319 grant funds because EPA and National Oceanic and Atmospheric Administration determined that Oregon did not submit a fully approvable Coastal Nonpoint Control Program under the Coastal Zone Act Reauthorization Amendments. The gaps in Oregon's program related to forestry to meet or maintain water quality

standards and to protect beneficial uses. The four areas that EPA and NOAA identified as needing additional work were:

- Protection of riparian areas for small and medium fish-bearing streams and non-fish bearing streams from increases in stream temperatures
- Programs to address runoff from forest roads built prior to modern construction and drainage standards
- Measures to protect areas of high landslide risk and tools to reduce the risk of such landslides
- Programs to ensure that forest operators are complying with federal law governing the aerial application of herbicides

According to EPA and NOAA, the state lacks regulatory and/or voluntary (with effectiveness monitoring) management measures to reduce and prevent nonpoint sources of pollution from these sources during forestry operations. DEQ continued to work with ODF, EPA, and NOAA to resolve inadequacies in the Coastal Nonpoint Control Plan regarding forest practices on private lands. State and federal agency managers and staff participated in a Coastal Nonpoint Control Plan technical workshop in November 2016 tasked with identifying impediments and solutions to meet additional Coastal Zone Act Reauthorization Amendments measures. As a follow up to this workshop, staff from DEQ, ODF, EPA and NOAA are cooperatively crafting approaches to resolve these inadequacies through existing regulatory tools and new voluntary measures with tracking.

In addition to the Coastal Zone Act Reauthorization Amendments lawsuit, DEQ has struggled with demonstrating water quality improvements because of the lack of accessibility to DEQ and third-party data. In EPA's Determination of Satisfactory Progress letter the agency urged DEQ to move forward with the development of a data system. DEQ is moving forward with the purchase of an off-the-shelf system called Ambient Water Quality Monitoring System to manage DEQ's environmental monitoring data. This system will manage data that is generated from DEQ's laboratory as well as third-party data. In addition, DEQ will use the system to upload data to the EPA WQX/STORET database. The system is expected to be purchased and implemented by mid-2017 and should help produce the Integrated Report and other reports that utilize DEQ water quality data.

An additional recommendation from EPA indicated a need for DEQ to fill key vacancies in the 319 Program. Due to limited program resources, some of these key vacancies remain open. The 319 workload was redistributed to existing staff in order to meet deadlines in a more timely and efficient manner.

Despite these limitations, the state's nonpoint source program continues to use innovative, cooperative, and community-based methods to protect and improve water quality affected by nonpoint sources of pollution. This is done by working with state, local and national partners as well as tribal nations on water quality protection and restoration, supporting and encouraging implementation of TMDLs and monitoring Oregon's water quality to support water quality program needs, identify emerging issues, understand water quality status and trends and to inform management activities targeted at restoring Oregon's water quality and beneficial uses. The Oregon Nonpoint Source Program leverages work from other Clean Water Act Programs within DEQ and relies on federal and state authority. The program relies on communication, coordination, and collaboration between local, state, and federal agencies and other entities through either voluntary or regulatory requirements to protect and improve Oregon's water quality.

1. Introduction

This Oregon Nonpoint Source Pollution Program 2016 Annual Report meets the requirements of Section 319 of the Federal Clean Water Act. The report documents the activities and accomplishments of the Oregon Department of Environmental Quality implementation of the state's Nonpoint Source Program.

The report provides a summary of the nonpoint source activities implemented by the state during 2016 and highlights the progress Oregon is making toward meeting the substantial challenges presented by nonpoint source impairments such as temperature, dissolved oxygen, sedimentation and bacteria which account for over 75 percent of current impaired waters listings. The 2016 Oregon Nonpoint Source Annual Report includes progress updates on milestones, implementation targets and annual reporting requirements identified in the 2014 Oregon Nonpoint Source Management Plan. Annual status updates help to ensure that section 319 funding, technical support and other resources are directed in the most effective and efficient manner.

1.1 Nonpoint Source Programmatic Achievements

The State Water Quality Program continues to use innovative, cooperative, and community-based methods to improve water quality affected by nonpoint sources of pollution through the implementation of its 2014 Nonpoint Source Program Management Plan. This is done through the strategic implementation of the following program priorities: working with state, local and national partners on water quality protection and restoration, supporting and encouraging implementation of TMDLs, monitoring Oregon's water quality to support water quality program needs, to identify emerging issues, to understand water quality status and trends, and to inform management activities targeted at restoring Oregon's water quality and beneficial uses. DEQ's accomplishments in the Nonpoint Source program are consistent with the goals and milestones in the 2014 Nonpoint Source Program Management Plan. See Appendix A.

Summary of 2016 accomplishments:

- Distributed $333,501 in 2016 Section 319 grants to fund 20 projects in Oregon's priority basins and groundwater management areas to address nonpoint source pollution
- Funded five water quality monitoring projects that built on existing local partnerships to restore waterbodies through TMDL development and implementation
- Funded five riparian restoration projects in high-priority watersheds designed to reduce thermal loads and minimize bacteria and sediment loads to waterbodies
- Documented a 50 percent decline in the maximum level of the pesticides detected through the collection and analysis of 330 water samples across nine pesticide stewardship partnership watersheds, facilitating local partners to direct resources to priority implementation actions
- Streamlined process for developing, documenting, and scheduling new data collection for TMDL/nonpoint source projects to ensure monitoring resources are spent on the most critical projects
- Participated in a Coastal Nonpoint Control Program technical workgroup tasked with identifying solutions to meet additional Coastal Zone Act Reauthorization Amendments measures.
- Automated water quality analysis and began providing Water Quality Status and Trends information for biennial reviews of Agricultural Water Quality Management Plan to facilitate identifying monitoring and implementation priorities for applicable plan area.

- DEQ participated in seventeen biennial reviews in 2016.
- DEQ renewed its Memorandum of Understanding with the Bureau of Land Management for another five-year term which allowed DEQ and the bureau to streamline coordination and TMDL implementation.
- Through National Water Quality Initiative program, local partners and DEQ staff conducted macroinvertebrate and sediment monitoring in the Fifteenmile Creek watershed in an attempt to determine if implementation of conservation practices resulted in improved instream conditions. The findings from the monitoring effort will be evaluated in 2017.
- Received EPA approval for the 2015 Nonpoint Source Annual Report in September 2016.

1.2 Roadblocks

In 2015, EPA reduced DEQ's 319 grant funds because EPA and the National Oceanic and Atmospheric Administration determined that Oregon did not submit a fully approvable Coastal Nonpoint Control Program under the Coastal Zone Act Reauthorization Amendments. The program was not fully approvable because Oregon's forestry related program aimed at meeting or maintaining water quality standards and protecting beneficial uses had several gaps. The four areas that EPA and NOAA identified as needing additional work were:

- Protection of riparian areas for small and medium fish-bearing streams and non-fish bearing streams from increases in stream temperatures
- Programs to address runoff from forest roads built prior to modern construction and drainage standards
- Measures to protect areas of high landslide risk and tools to reduce the risk of such landslides
- Programs to assure that forest operators are protecting non fish bearing streams from the aerial application of herbicides

According to EPA and NOAA, the state lacks regulatory and voluntary (through effectiveness monitoring) management measures to reduce and prevent nonpoint source pollution from these sources during forestry operations. DEQ continued to work with the Oregon Departments of Forestry and Agriculture, EPA, and NOAA to resolve inadequacies in the Coastal Nonpoint Control Plan with regard to forest practices on private lands. Staff from all four agencies are cooperatively crafting approaches to resolve these inadequacies through existing regulatory tools and new voluntary measures with tracking. In March 2016, EPA and NOAA notified DEQ that Oregon's 2015 grant funds would be redistributed to other states and territories that have approved coastal nonpoint programs. In 2016, Section 319 pass-through grant funds were also reduced and totaled $333,501.

Total FFY 2016 Appropriation:	$2,153,000
Less penalty (30 percent of (reduced) 2015 grant award of $1,451,800):	$435,540
Minus PPG for FTE:	$1,383,959
Available for pass through grants:	$333,501

In 2009, Northwest Environmental Advocates sued NOAA and EPA for failing to enforce the Coastal Zone Act Reauthorization Amendment program. The 2010 settlement of that case called for DEQ to demonstrate that it could regulate logging directly, through the Clean Water Act. Under the terms of the settlement, EPA and NOAA were required to issue a proposed approval or disapproval of Oregon's

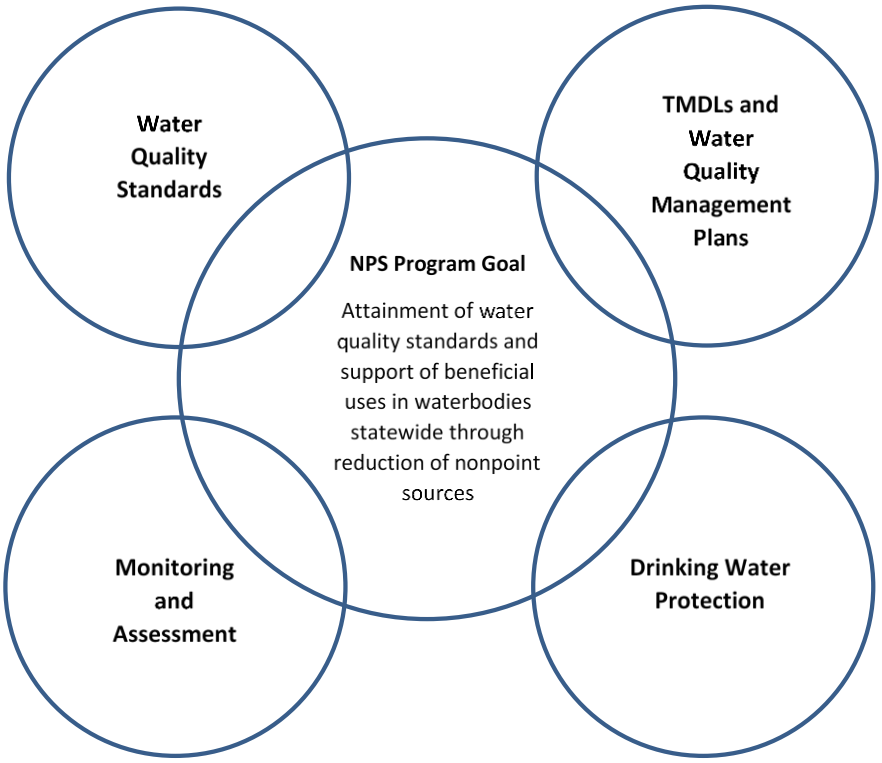
coastal nonpoint program by 2013. EPA and NOAA disapproved Oregon's coastal nonpoint program in January 2015.

In addition to the Coastal Zone Act Reauthorization Amendments lawsuit in 2009, DEQ has struggled with demonstrating water quality improvements because of accessibility of DEQ and third party data. In EPA's "Determination of Satisfactory Progress" letter they urged DEQ to move forward with development of a data system. DEQ is moving forward with the purchase of an off-the-shelf system called Ambient Water Quality Monitoring System to manage DEQ's environmental monitoring data. This system will manage the data DEQ's laboratory generates as well as third-party data. DEQ will also use the system to send its data to the EPA Water Quality Exchange (WQX) and STOrage and RETrieval (STORET) databases. DEQ expects to purchase and be using the system by mid-2017 and should start producing the Integrated Report and other reports that utilize DEQ water quality data.

1.3 Oregon Water Quality Nonpoint Source Program

The water quality nonpoint source program's mission is to protect and improve Oregon's water quality. Oregon's rivers, streams, lakes, estuaries and groundwater resources provide multiple beneficial uses such as drinking water, fish and aquatic wildlife habitat, recreation and irrigation. Protecting water quality also protects beneficial uses, the environment and Oregon's economy.

Figure 1: Illustration of Oregon's Water Quality Program



The program's mission is built around developing and implementing water quality standards and TMDLs. Standards and TMDLs identify which tools and actions are needed in order to protect beneficial uses.

This science-based approach has produced a diverse set of tools, which use regulatory, voluntary, financial, and technical assistance approaches to achieve a balanced program.

The program also continues to collect and evaluate water quality data in order to assess and adapt tools that address priority water quality issues. An ongoing priority, as outlined in the 2014 Nonpoint Source Management Plan and the Performance Partnership Agreement with EPA, is to actively manage and control nonpoint sources of pollution that affect Oregon's waterways. Progress in carrying out nonpoint source measures is tracked through successful execution of four different yet related efforts (Figure 1). In 2016 DEQ redesigned its website as the state prepared to launch its new website. Current links to Oregon's Nonpoint Source Program website can be found here: http://www.oregon.gov/deq/wq/programs/Pages/Nonpoint.aspx.

2. Oregon's Nonpoint Source Program

The Oregon Nonpoint Source Management Program strategy involves baseline water quality management programs in conjunction with regulatory, voluntary, financial and technical assistance to achieve a balanced program. The program's primary components are: assessment, planning, implementation and education.

2.1 Assessment

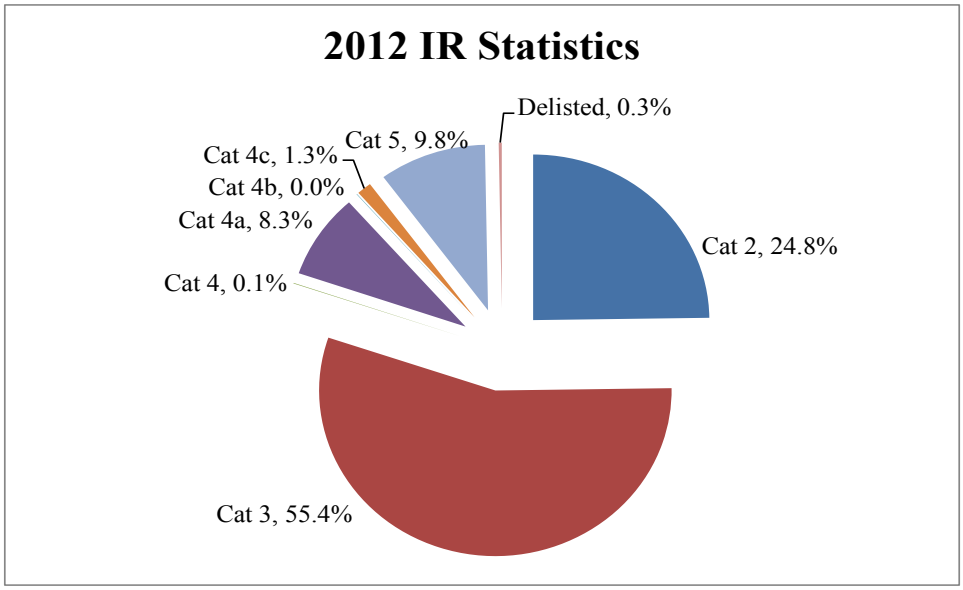
The federal Clean Water Act requires states to submit information to EPA on a biennial basis to identify impaired waters needing Total Maximum Daily Loads (Section 303(d)) and to report on the overall condition of waters of the state (Section 305(b)). DEQ's funding and staffing for the Water Quality Assessment program have been inadequate to regularly produce biennial Integrated Reports required by the Clean Water Act. As a result, Oregon has produced only four Integrated Reports since 2000.

DEQ submitted the 303(d) list as part of its 2012 Integrated Report to EPA for review and approval in November 2014. The assessment was limited in geographic scope and focused on a limited list of

pollutants that included dissolved oxygen in two basins and toxic pollutants with human health criteria that had been recently revised or withdrawn such as iron and manganese. On Dec. 21, 2016, EPA partially approved and partially disapproved Oregon's 2012 303(d) list.

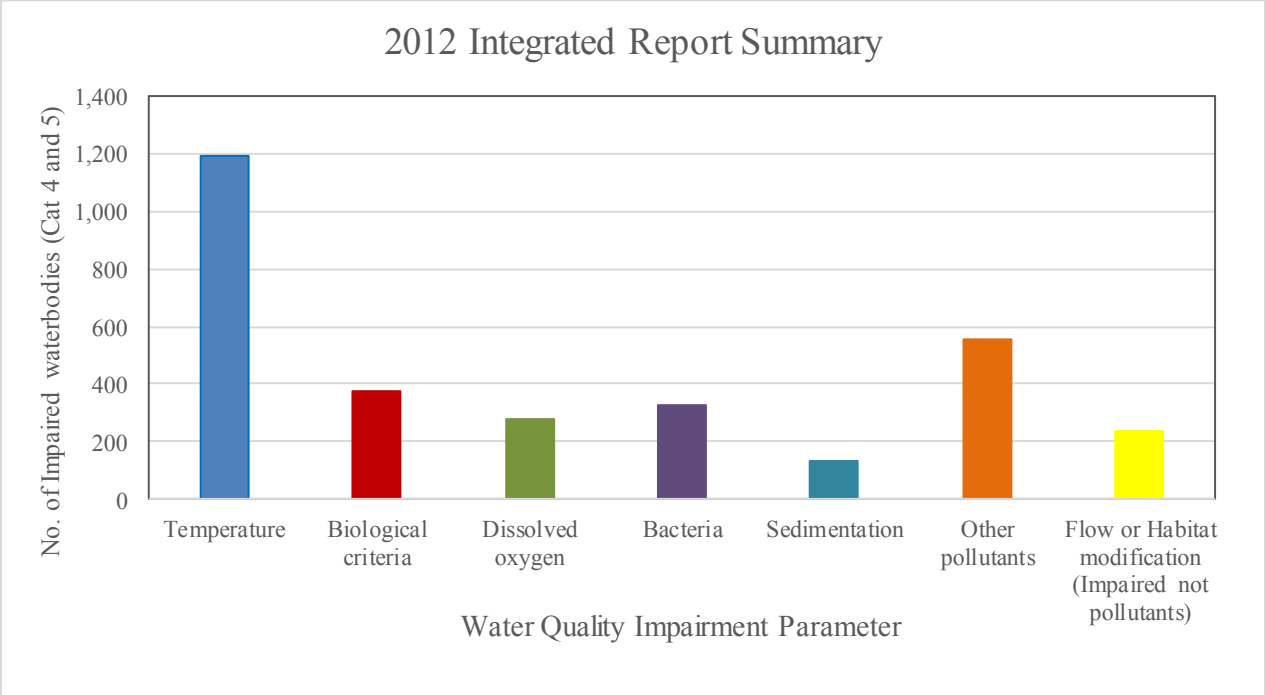
Oregon's 2012 Integrated Report (prior to EPA's proposed additions) indicates that 19,421 segment/parameter/season combinations have been assessed, with the majority of the assessments falling in Category 3 (55.4 percent), where insufficient data exists to determine whether or not pollutant criteria are met in the segment. The second largest assessed category is Category 2 (24.8 percent), where data indicates the segment is attaining the criteria that were assessed. The report identifies impairments in 18 percent of assessed waters. This includes assessments in Category 5 (10 percent), which is Oregon's 303(d) List of Impaired Waters needing TMDLs and in Category 4 (10 percent), which includes impaired waters where either TMDLs have been approved or some restoration planning or implementation is underway (Figure 2).

Figure 2: 2012 Integrated Report Summary



Based on the 2012 Integrated Report, the top five causes or indicators of impairments (Categories 4 and 5) in Oregon water bodies are: temperature (1,196 waters); biological criteria (373 waters), bacteria (330 waters), dissolved oxygen (279 waters) and sedimentation (133 waters) (Figure 3). The total number of stream segments identified in the Integrated Report as impaired for sediment may be skewed low because DEQ lacks a quantifiable assessment protocol for determining sediment impairment. DEQ is developing an approach to quantify sedimentation through the development of TMDLs in the Mid-Coast. There are 557 waters impaired by other pollutants such as toxic substances including metals, pesticides, polycyclic aromatic hydrocarbons, polychlorinated biphenyls, solvents and dry cleaning fluids and other indicators such as pH, aquatic weeds and chlorophyll a. Two-hundred-forty water bodies have been identified in Category 4 as impaired by flow or habitat modifications which are conditions that are not addressed by pollutant load allocations in TMDLs.

Figure 3: Top five Water Quality impairments identified in the 2012 Integrated Report.



EPA approved DEQ's assessment that added 131 segment/pollutant listings and removed 77 water quality limited segment/pollutant listings from the 2012 303(d) list. The approved portions of the 2012 303(d) list are now effective in Oregon. EPA partially disapproved DEQ's 303(d) list because all readily available data had not been evaluated. EPA determined the list was incomplete and did not identify all of the impaired waters needing TMDLs, and that eight segments were erroneously removed from the list. EPA proposed adding 1,055 listings to Oregon's 2012 303(d) list. Based on its review of readily available data and information for pollutants and waters that DEQ did not assess 332 additional listings were proposed. Additionally, EPA proposed re-listing 714 segments on the impaired list that were previously de-listed on the basis of temperature TMDLs that they anticipate will be invalidated with pending U.S. District Court decisions on litigation. EPA closed its public comment period on the proposed additions on April 3, 2017. In addition to the revised listings, EPA also sought data, information and comments on potential aquatic life impairments in Oregon coastal marine waters related to ocean acidification. Final EPA action on Oregon's 2012 303(d) list is anticipated in 2017.

2.2 Planning

An update to Oregon's Nonpoint Source Plan was completed in 2014. The updates reflect current and planned goals, priorities, actions and milestones for the next five years. The five-year plan provides the basis for tracking annual progress under the program (see Appendix A) Since many EPA and state rules, regulations, and programs continue to evolve, EPA expects all states to review and, as appropriate, revise and update their Nonpoint Source Management Program Plan every five years. An updated, comprehensive program is critical to ensuring that Section 319 funding, technical support and other resources are directed in the most effective and efficient manner.

The current Oregon Nonpoint Source Management Plan describes the goals, priorities, objectives, and strategies the Oregon Nonpoint Source Program used to protect, prevent, control and eliminate water pollution from nonpoint sources in waters of the state and to meet water quality standards and TMDL allocations. This is the basis for the short and long-term goals summarized below (Table 1).

Table 1: Short- and long-term goals conceived from 2014 Nonpoint Source Management Plan. The full list of the goals is attached in Appendix A.

Long-Term Goals	Progress Toward Achieving
Attainment of water quality standards and support of beneficial uses in waterbodies statewide.	• 77 segments removed from 303(d) list • 25 percent of data assessed as Category 2 in the Integrated Report indicate that beneficial uses are attained
Short-Term Goals	**Progress Toward Achieving**
Continue to work with the Water Quality Pesticide Management Team and implement programs to address water quality pesticide issues, including the nine active pesticide stewardship partnership projects and any new pilot projects that are initiated (TOX-1).	• 330 water samples collected and analyzed across the nine partnership watersheds were presented to local partners including grower groups and other pesticide users • 50 percent decline in the maximum level of the pesticide(s) detected was observed in the maximum level of pesticides detected
Empower Oregonians at the local level through the Volunteer Monitoring Program to assist in identifying and solving the state's water quality problems (WBP-4).	• Provided water quality testing equipment and supplies to 21 volunteer organizations • Approximately 35 active volunteer organizations around the state • Provided technical assistance on equipment and protocols to approximately 21 organizations and conducted training for seven different organizations in water quality monitoring techniques
Work with the Oregon Department of Agriculture to identify areas impacted by agricultural nonpoint source pollution using the Status and Trends tool (AG–3).	• Three Status and Trends reports were provided for biennial reviews of Agricultural Water Quality Management Area plans in Fall/Winter 2016. There were 17 biennial reviews conducted in 2016.
Promote educational opportunities for designated management agencies which facilitate implementation of TMDLs through the reduction of nonpoint sources (319-2).	• Through a 319 grant, the Oregon Environmental Council worked with experts to produce a Low Impact Development Guidance Template tailored for Western Oregon and was released in January 2016. A series of workshops were held in 2016 to help communities implement the guide.
Conduct analysis during TMDL/Water Quality Management Plan development to provide reasonable assurance and guide implementation for TMDLs (WQP-7).	• Coquille TMDL – 2017: DEQ worked with EPA to develop mapping tools that identify priority areas for restoration and mitigation to achieve water quality and fish habitat improvements. • Mid Coast – 2017/2018

To help protect, improve and enhance the quality of Oregon waterways, DEQ has conducted assessments of the state's basins since 2011. To produce these basin documents, DEQ followed a "watershed approach" that looked at all factors influencing water quality in a certain region. This approach combined the expertise of DEQ's 17 water quality sub-programs with a commitment to working with local stakeholders (communities, watershed councils and conservation districts) to find smart solutions to local water quality issues. These assessments took the form of local Water Quality Status and Action Plans, which described water quality conditions and included recommended actions that DEQ and others who are interested in these basins can take to improve water quality. DEQ has suspend development of these Watershed Basin Status and Action Plans due to limited resources after completing draft Watershed Basin Status and Action Plan for the Upper Willamette. https://www.oregon.gov/deq/wq/Pages/watershed.aspx

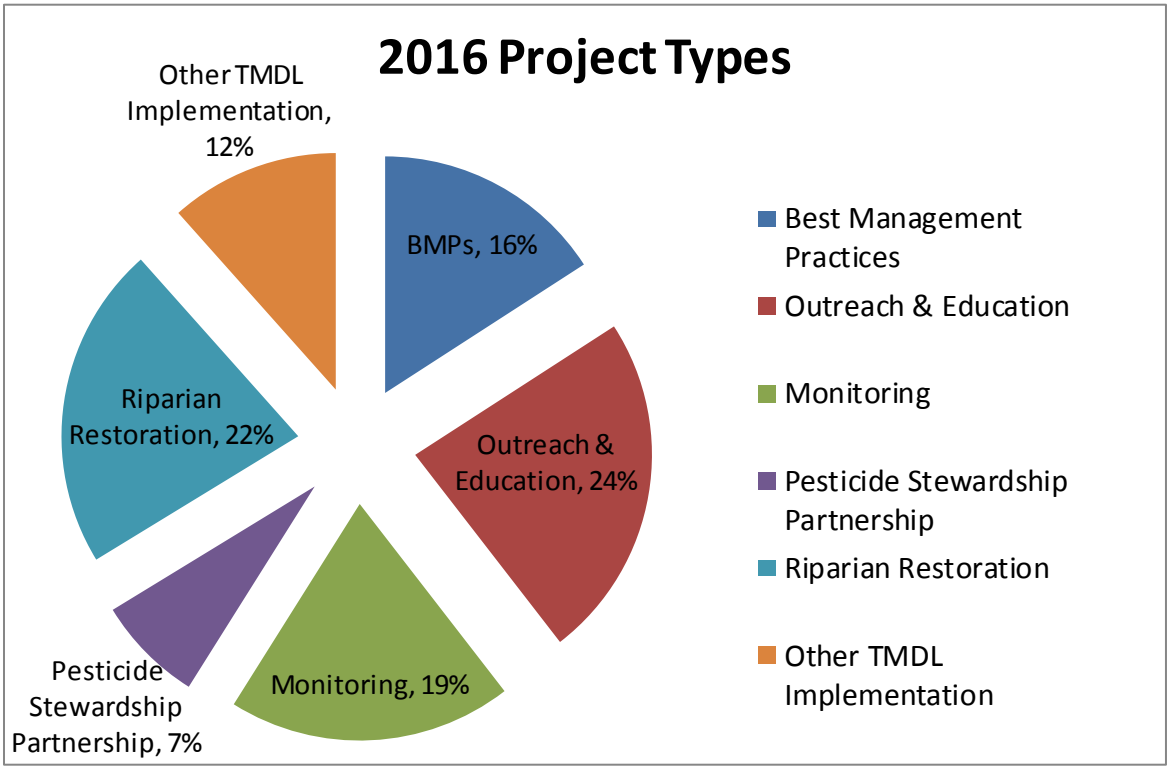
2.3 Implementation

Oregon's Nonpoint Source Program is implemented by targeting land uses and their associated nonpoint pollution sources from agricultural lands, state, private, or federal forest lands, or urban areas. The goal of the Nonpoint Source program has been broadened to safeguard groundwater resources as well as surface water. The state has been divided into 21 watershed basins and 91 sub-basins (Figure 4). The state's permitting and assessment work has been aligned and prioritized according to these sub-basins. Forty-three local, state, and federal regulatory and non-regulatory programs address nonpoint source control and treatment.

Figure 4: Map of Oregon basins

Implementation of the Nonpoint Source Program is administered through the federal Clean Water Act, state water quality standards, the TMDL rule, the Coastal Zone Act Reauthorization Amendments (section 6217-Coastal Nonpoint Source Control Program), the National Estuary Program, the Northwest Forest Plan, the Western Oregon Plan Revisions, the Forest Practices Act, the Oregon Plan for Salmon and Watersheds, the Agricultural Water Quality Act and the State Land Use Planning Program, as well as state drinking water and groundwater protection programs. DEQ allocates Section 319 funds to help communities implement restoration projects to address waterbodies impaired by nonpoint source pollution. In 2016, the Section 319 grant allocation of $333,501 funded 20 projects across the state. Chapter 5 takes a closer look at the nonpoint source work that is being implemented in basins across the state.

Figure 5: Breakdown of project types funded by 2016 319 funds



During the Request for Proposal process, DEQ identified specific regional priorities for implementation of the Oregon 319 Nonpoint Source Grant. These priorities provided the framework for which projects were selected. Figure 5 illustrates the types of projects that were funded in 2016. DEQ continually strives for the timely and efficient issuance of 319 grants. Because of turnover in the budget office, a grant administration training originally scheduled for December 2016 will now take place in spring 2017. The Nonpoint Source Process Improvement Team continues to target improvements in planning, contracting, invoicing and reporting for 319 projects.

Implementation of the Nonpoint Source Program also relies heavily on designated management agencies, (DMAs) entities with the authority to manage and regulate sources of pollutants that are listed in the TMDL, and their TMDL implementation plans. DEQ staff provide technical assistance to DMAs, and other local, state, and federal counterparts on TMDL development and implementation efforts. DEQ continues to review TMDL Implementation Plan annual reports and revise TMDL implementation plans

every five Years. TMDL implementation plans describe the selected management strategies and measurable milestones necessary to prevent, control, and/or treat specific sources of the TMDL pollutant in sufficient detail (i.e. providing program components, siting criteria and operating methods/procedures) to inform DEQ's independent and objective review and effectiveness evaluation. The TMDL implementation plan must also include implementation timelines and performance monitoring, with reasonable assurance that the strategies described in the plan will work. Since 2000, approximately 55 TMDLs have been completed that address 1,206 water quality limited segments. In the Rogue Basin, TMDLS were developed in 2007 and 2008. In 2016, all 23 designated management agencies submitted annual reports on time. In the Willamette Basin, 68 of 75 designated management agencies are submitting annual reports with approximately 88 percent submitted on time. The summaries of the DMA's accomplishments for each basin are included in Chapter 6. The discussion on other state and local partners without regulatory authority to address TMDLs are included in Chapter 4.

2.4 Education

The fourth and final component of Oregon DEQ's Nonpoint Source Program is to increase and maintain public awareness of water quality and nonpoint source pollution through effective education and outreach. One of the most effective means of outreach is through place-based education. This approach, which engages members of the public with their watershed, is accomplished through DEQ's Volunteer Water Quality Monitoring Program. Since its inception in 1997, the program has assisted more than 50 partner organizations around Oregon to gather environmental data from rivers and streams. DEQ's laboratory manages the volunteer program and trains and equips community groups so they can gather data and answer questions about local stream conditions. Local communities make use of water monitoring feedback to assist with their environmental stewardship efforts. In addition, DEQ uses this data for watershed assessment and reporting, and to determine if water bodies meet water quality standards. Data is also used to inform development of water quality improvement plans. In 2016, five of the 20 nonpoint source grant funded projects went towards education and outreach.

DEQ's restoration partners, such as the Oregon Watershed Enhancement Board and soil and water conservation districts, also provide significant support for outreach and education. See Chapters 4 and 6 for details. Approximately 45 percent of OWEB's investments fund water quality related outreach and education activities such as: increasing the organizational capacity of local community groups who perform on the ground work; increasing awareness of landowners to the value of healthy watersheds, watershed workshops and field experiences for K-12 students, adults, and field professionals.

Education and Outreach is also a fundamental component of designated management agencies' TMDL implementation plans. The agencies support local creek cleanups, organize Earth Day activities, participate in the Salmon Watch program and provide local water quality information on regional websites, such as Stream Smart. A good example of outreach is the Oregon Parks Department. Parks staff provide outreach as an important part of their TMDL implementation. In the Willamette watershed, Silver Falls Park provided six watershed evening programs to 207 visitors and staff also participated in the interpretive portions of the week-long Paddle Oregon. In the Tryon management area in the greater Portland area, guided walks were provided on various topics of water, watersheds, fish and creek ecology. They also hosted several school field trips with a watershed theme and staffed roving stations on water quality and sediment in the park. Willamette Mission hosted SOLVE Project Oregon with environmental study stations on water quality, riparian inventory and macroinvertebrates. Other designated management

agencies' activities include city or county expos, family science nights, restoration tours and volunteer events.

Due to diminished resources, DEQ provides outreach on a limited basis. In 2016, DEQ provided outreach at two events in March and April 2016. In March, DEQ participated in the Children's Water Festival at the University of Portland. The event targeted 250 fourth-graders from the Portland area and taught them about their watersheds. In April 2016, DEQ participated in the Tillamook Water Festival at Friends Camp in Rockaway Beach, Oregon (Figure 6). One-hundred-fifty fourth- and fifth-grade students from Tillamook County took part in watershed bingo to learn about their local watersheds.

Figure 6: DEQ booth at Tillamook Water Festival, April 2016

2.5 Program Funding

Federal Section 319(h), funds are provided annually through the EPA to states for the development and implementation of each state's Nonpoint Source Management Program. In Oregon the 319 grant funding is divided between Performance Partnership Grant funds which fund nonpoint source staff positions and pass through funds which support priority projects that are funded through the Nonpoint Source Grant Program. The Performance Partnership Grant funds maintain 9.23 full-time positions within DEQ that support the implementation of the Nonpoint Source Program and 319 funded activities such as: management of nonpoint sources of pollution, water quality standards and assessment, TMDLs, DEQ's groundwater program, and water quality data analysis, management and monitoring (Table 2). DEQ administers this program to provide funding to stakeholders for activities that address the goals and objectives of the Nonpoint Source Management Program. Although federal 319 funds have decreased by over a third since 2010, Oregon continues to fund projects that target nonpoint source pollution (Table 3).

Table 2 Oregon's 319 Grant funded positions

2016 OREGON'S 319 GRANT FUNDED POSITIONS / NONPOINT SOURCE PROGRAM ACTIVITIES	FTE
Nonpoint Source TMDL Modeling	1.89
Regional Nonpoint Source Implementation and Nonpoint Source TMDL Development and Implementation	3.34
Prorates and Management and Administrative Support	1.01
319 Grant Administration and Provision of Technical Assistance with Applicants, DEQ Staff and Coordination with Other Funding Agencies	1.00
Nonpoint Source Policy Development, Collaboration and Provision of Technical assistance with Stakeholders and other Local, State, and Federal Agencies	2.00
TOTALS	9.23

DEQ targets nonpoint source grants for the following projects: TMDL implementation plans, surface and ground water quality monitoring, data analysis and modeling, demonstration of innovative best management practices, technical assistance to landowners for conservation planning, public outreach based education, implementation, development of EPA's nine-element watershed plans, and monitoring activities to determine the effectiveness of specific pollution prevention methods. As illustrated in Figure 2, money from 2016 funded: best management practice implementation, outreach and education, monitoring, riparian restoration, TMDL implementation and pesticide stewardship partnerships.

Table 3 Oregon Total Section 319 Funding 2014 to 2016

Oregon Total Section 319 Funding 2014 to 2016			
YEAR	STAFF	PROJECTS (Pass through)	TOTAL
2016	$1,384,049	$333,501	$1,717,550
2015	$1,370,949	$80,851	$1,451,800
2014	$1,200,000	$905,000	$2,105,000
TOTALS	$3,954,998	$1,319,352	$5,274,350

Clean Water Act Section 319(h) National Program Guidance requires states to use at least 50 percent of the Section 319(h) funds to implement nonpoint source watershed projects. DEQ was granted a waiver in FY2015 and FY 2016 due to difficulties in meeting this requirement. In its letter, EPA encouraged DEQ to explore a "leveraged exemption" from the 50/50 spending requirement since Oregon devotes and leverages significant (beyond the 40 percent match required under section 319) non-federal resources in implementing its Nonpoint Source Plan. Since approval of the waiver in September 2016, DEQ has explored alternatives for meeting the requirement. DEQ determined that documenting staff activities eligible for implementing watershed-based plans is a preferred approach for meeting the 50/50 spending requirement as specified on Page 52 of EPA's 2013 Nonpoint Source Program and Grants Guidelines for States and Territories. DEQ will include staff activities eligible for implementing watershed based plans

in our FY 2017 319 Work Plan. With significant nonfederal funding available in Oregon, staff activities to leverage and steer those funds toward high priority projects that improve water quality are eligible for watershed project funding. These tasks include: providing coordination and support among key partners in addressing nonpoint source pollution within the watershed, leveraging and targeting other state, private, and non-319 funds in the watershed, participation in Oregon Watershed Enhancement Board regional review teams, and sub-grantee time spent managing project work plans, deliverables, reimbursements, modifications, and reporting for watershed projects.

DEQ is committed to improving the 319 process, as captured in the Nonpoint Source Program Plan's goals and milestones. Regional and headquarters staff held monthly conference calls to identify and prioritize program areas in need of increased efficiency and streamlining. Training for 319 staff has been scheduled for May 2017 based on process improvement recommendations for drafting grant agreements and processing invoices.

2.5.1 Clean Water State Revolving Fund

The Clean Water State Revolving Fund loan program provides low-cost loans to public agencies for the planning, design or construction of various projects that prevent or mitigate water pollution. Eligible agencies include federally recognized Indian tribal governments, cities, counties, sanitary districts, soil and water conservation districts, irrigation districts, various special districts and intergovernmental entities. DEQ partners with Oregon communities to implement projects that attain and maintain water quality standards, and are necessary to protect beneficial uses.

In 2016, six Clean Water State Revolving Fund loans were awarded to entities that were addressing nonpoint source pollution in their communities. All of these projects included a nonpoint source pollution reduction component or focus and intend to address non-point source issues such as flow modification, temperature, and bacteria.

2.5.1.1 City of Dallas ($1,750,000)

In 2016, Dallas signed a sponsorship option loan agreement that involved the acquisition of industrial forestland to ensure that ongoing land management practices would protect the city's drinking water reservoir. DEQ offers sponsorship options, in the form of a reduced interest rate, as an incentive to encourage loan applicants to implement nonpoint source pollution control projects in conjunction with a treatment works project funded through the loan program. The project will acquire 460 acres of land containing and immediately adjacent to the reservoir. The identified high-hazard areas would be set aside from logging and preserved in order to protect the watershed, aquatic environment and municipal water source.

2.5.1.2 Coos Bay ($2,200,000)

Coos Bay submitted a $2.2 million sponsorship option application in 2016 and started navigating the permit process to prepare for implementation. This project proposed replacing a failing box culvert to allow fish passage to an estuary area that provides sheltering and rearing habitat for salmon protected by the Endangered Species Act. The culvert replacement includes stream bank restoration in addition to stormwater controls designed to treat runoff. The application also includes projects for stormwater management planning, a stormwater development ordinance, stream restoration, stormwater treatment retrofit involving green infrastructure with an education and outreach component, installation of a stormwater treatment control at a centralized trash disposal facility, and the development of a pet waste

education program. Since the project has not completed its final review, the amount of funding has not yet been determined.

2.5.1.3 Central Oregon Irrigation District (Loan agreement has not been signed)

The Central Oregon Irrigation District signed a loan to pipe approximately 3,000 linear feet of open canal which is estimated to conserve five cubic feet per second for instream use. In addition, the district will also upgrade the fish screen for the Central Oregon Canal at its inlet on the Deschutes River to protect its aquatic life beneficial use.

2.5.1.4 Rock Creek Improvement District ($270,786)

The Rock Creek Irrigation District also completed a piping project along 1.76 miles of its main irrigation canal which is expected to provide water quality and quantity improvements that benefit aquatic species and instream flow.

2.5.1.5 Clackamas Soil and Water Conservation District ($250,000)

The Clackamas Soil and Water Conservation District received a loan to develop a pilot program to repair/replace failing onsite systems within its service area. The project will initially focus on previously identified hotspots; however, all private landowners will be eligible to participate in the program. The applicant will work with Clackamas County Water Environment Services to verify failing systems and recommend remediation options.

2.5.1.6 City of Newport ($4,128,454)

Newport has a sponsorship option project which addressed stormwater issues such as upgrades to the storm sewer in the Bay-Moore basin, installation of a bio-retention facility at Sam Moore Creek and the design of a fish passage at the Big Creek reservoirs.

2.5.2 Drinking Water Revolving Loan Fund

The Oregon Health Authority administers the Drinking Water Revolving Loan Fund. OHA, which regulates drinking water under state law and the Safe Drinking Water Act, works cooperatively with DEQ on source water protection efforts. Money from the loan fund is used to fund: Source Water Protection Grants (up to $30,000) to fund source water protection activities, monitoring, and planning in Drinking Water Source Areas and loans for improving drinking water treatment, source water protection activities, or land acquisition in source areas. Oregon's Infrastructure Finance Authority is responsible for administering these projects. The loan fund set-asides also fund five Drinking Water Protection positions at DEQ. These positions delineate source areas, integrate Clean Water Act programs (including the Nonpoint Source Program) with source water protection needs, provide technical assistance to public water systems, and research nonpoint source pollution's impacts on surface and ground drinking water sources.

In 2016, a total of $200,000 of Oregon Drinking Water State Revolving Fund money was awarded to public drinking water source protection. All of these projects included a nonpoint source pollution reduction component or focus and intend to address non-point source issues such as turbidity, temperature, toxic pollutants and eutrophication.

2.5.2.1 City of Canyonville and Partnership for the Umpqua Rivers ($30,000)

The City of Canyonville in cooperation with the Partnership for the Umpqua Rivers will undertake riparian and in-stream restoration in the Canyon Creek watershed which is the city's drinking water source area. The restoration project will increase the stability and diversity of riparian plants and dissipate streamflow energy during peak storm events. This is expected to result in reductions in streambank erosion, reductions in fine sediment and bacteria entering waterways, and an increase in the resiliency of streamside vegetation to recover from forest fire. The project is also expected to raise the water table and increase late summer flows which may also reduce turbidity, lower stream temperatures and decrease the risk of harmful algae blooms.

2.5.2.2 City of Newport, City of Toledo, and Lincoln SWCD ($43,457)

This cooperative project between the Cities of Newport and Toledo and the Lincoln Soil and Water Conservation District will continue surface water monitoring and trend analysis for turbidity and total suspended solids in priority locations of the Siletz Basin. In addition, the project will use site characterization and prioritization information collected from recent bank erosion and sediment source analysis efforts, to continue outreach to landowners regarding implementation of best management practices in the basin.

2.5.2.3 Glide Water Association and U.S. Forest Service, Douglas County ($15,000)

The Glide Water Association is partnering with the Umpqua National Forest to decommission or improve drainage on forest roads, and stabilize slopes to reduce erosion, fine sediment transport, and turbidity within their drinking water source area. The project is expected to reduce road failures and landslides that can deliver large quantities of sediment to waterways. In addition to reducing landslide risk, reductions in sediment transport may also reduce associated contaminants such as herbicides and excess nutrients.

2.5.2.4 Neah Kah Nie Water District, Tillamook County ($30,000)

The district will conduct a study to evaluate alternatives for roadway spill containment from Highway 101 which is up-gradient and in close proximity to their primary water source (Spring 3). Spring 3 supplies approximately 75 percent of the district's drinking water. The study will include an assessment of each alternative's ability to reduce the risk of contamination from spills and runoff containing petroleum, toxins or other harmful pollutants.

2.5.2.5 Columbia City Waterworks, Columbia County ($30,000)

Columbia City plans to decommission two stormwater injection wells that are within the two-year time-of-travel zone of the well that serves as the primary supply for the city's drinking water. Stormwater will be diverted to alternative treatment, such as drainage swales. The dry wells are potential sources of groundwater contamination from petroleum, metals, nitrate and solvents.

2.5.2.6 Nesika Beach – Ophir Water District ($30,000)

Nesika Beach will work with the Port of Gold Beach to purchase land or easements to restrict public access to highly sensitive areas near their wellhead, which is directly adjacent to the Rogue River. This project will reduce compaction and erosion, thus reducing the delivery of soil and sediment to the river, and increase the infiltration of water to the aquifer. In addition, the project will reduce the risks of

petroleum and other hazardous fluid spills associated with motor vehicle access, as well as reduce illicit dumping within the floodplain and groundwater recharge area.

2.5.2.7 North Clackamas County Water Commission and Clackamas River Water Providers ($21,543)

Water providers will develop a number of resources focused on spill prevention and response planning to reduce the risk of pollutants such as petroleum, metals and toxins from contaminating Clackamas River's drinking water. The resources will consist of outreach and educational materials, a workshop/training to commercial and industrial businesses, enhanced hazardous materials programs in collaboration with a local fire district, and a cost-share program to provide incentives for proper spill prevention and containment.

3. Integration of Nonpoint Source Program

3.1 Water Quality Standards

The Water Quality Program's mission is to protect and improve Oregon's water quality. Protecting Oregon's rivers, streams, lakes and estuaries keeps these waters safe for multiple beneficial uses such as drinking water, fish and aquatic wildlife habitat, recreation and irrigation. This is accomplished through the development and implementation of water quality standards, collection and evaluation of water quality data, development of TMDLs to allocate pollutant loads for point and nonpoint sources, and through grants and technical assistance to reduce nonpoint pollution sources. Establishing water quality standards for Oregon is at the core of DEQ's Water Quality Program. Accomplishments of the Water Quality Program in 2016 include:

- The Oregon Environmental Quality Commission adopted revised copper criteria in November 2016 and received EPA approval in January
- DEQ posted information regarding application of the copper criteria using the Biotic Ligand Model on the water quality standards webpage.
- The commission adopted revisions to the water quality standards for bacteria and clarification of its associated uses,
- DEQ began rulemaking process to designate the North Fork Smith River and its tributaries and wetlands as Outstanding Resource Waters
- DEQ began scope of work development for the Lower Willamette Cold Water Refuge Plan

3.2 Monitoring and Assessment

For the Integrated Report and other aspects of the Oregon Nonpoint Source Management Program collection and assessment of water quality data is important. Oregon DEQ conducts both routine ambient

monitoring and special studies such as toxics monitoring, groundwater monitoring and pesticide monitoring. In addition to samples collected by the DEQ, the Volunteer Monitoring Program collects and submits data from across the state.
Monitoring efforts in 2016 focused on providing data for: the development of TMDLs, adaptive management of pesticide use in targeted watersheds, issuance of beach bacteria, harmful algae bloom and fish consumption advisories and characterization of groundwater quality in vulnerable aquifers.
Monitoring data is used for understanding statewide water quality trends in major rivers and streams, identifying and characterizing toxic contaminants in water, supporting the development of water quality permits, supporting the development of new, or revised water quality standards, identifying impaired aquatic communities, and responding to environmental emergencies and investigations.

Highlights of the Monitoring and Assessment program for 2016 include:

- Assessed the status and trends of Oregon's surface waters through the Ambient Monitoring Network - DEQ monitored approximately 130 ambient water quality stations six times a year in order to provide aggregate water quality information to local, state, and federal partners as well as members of the state legislature
- Documented a 50 percent decline in the maximum level of the pesticides detected through the collection and analysis of 330 water samples across nine Pesticide Stewardship Partnership watersheds facilitating local partners to direct resources to priority implementation actions
- Gained ability to reduce the risk of exposure to toxic chemicals in surface and groundwater through the second round of risk-based toxics monitoring in the Willamette Basin and Northeast Oregon
- Targeted sampling for TMDL development in the following basins with high-priority water quality issues to determine sources and loads of pollutants: Upper Deschutes watershed, Tenmile Lake, Nehalem Watershed, Tillamook Watershed, Mid-Coast area, the Coquille Watershed and the Santiam and Calapooya watersheds
- Provided resources and technical assistance to local organizations to collect and assess data in their own watersheds through 35 active organizations in the Volunteer monitoring Program allowing the groups to evaluate effectiveness of their programs and direct resources for on-the-ground projects
- Protected public health by modifying the coastal beach bacteria monitoring to correspond with the newly revised and reduced Beach Action Value that triggers beach advisories
- Reduced the risk of exposure to toxic chemicals in groundwater through completion of two regional groundwater studies in the North Coast Basin (2015-2016) and the Walla Walla Basin (2016);
- Identified high-risk groundwater areas in finalized Rogue Valley Groundwater Study Report which informed ongoing watershed planning efforts;
- The Biomonitoring Program supported TMDL development through macroinvertebrate collection, conventional water quality parameters and habitat measurements at 25 randomly selected locations in the Deschutes Basin and assessed status and trends at 12 statewide reference sites
- Completed R code to automate calculation of macroinvertebrate and physical habitat metrics increasing DEQ's efficiency and capacity to provide analytical support for identification of limiting factors and impairments

- Through National Water Quality Initiative program, local partners and DEQ staff conducted macroinvertebrate and sediment monitoring in the Fifteenmile Creek watershed to determine if implementation of conservation practices resulted in improved instream conditions

DEQ is required to assess water quality and report to EPA on the condition of Oregon's waters in the Integrated Report every two years. The Integrated Report includes an assessment of each water body where data are available. Data are assessed to determine if a water body attains its water quality standards and whether its designated uses are supported. For waters identified as impaired, DEQ uses the list of impaired waters to set priorities for TMDL development. DEQ's monitoring program provides data that is collected to support assessment decisions and for implementation of the Nonpoint Source Management Program. Data are also used to characterize the potential sources of pollution, model the pollutant loads and assess the effectiveness of best management practices.

Ongoing, long-term, ambient water quality monitoring of conventional water quality parameters and pollutants (e.g. temperature, dissolved oxygen, pH, bacteria, nutrients, turbidity, and conductivity) at fixed stations around the state continues to provide valuable insights into long-term statewide trends. Data from this program are used for permit and TMDL development in addition to providing important data to develop water quality standards. In addition to its internal use at DEQ, long-term ambient data is used to calculate the Oregon Water Quality Index which is used to show high level, long-term water quality trends to the public, legislators, stakeholders, and land use managers and provides insights into factors contributing to those changes.

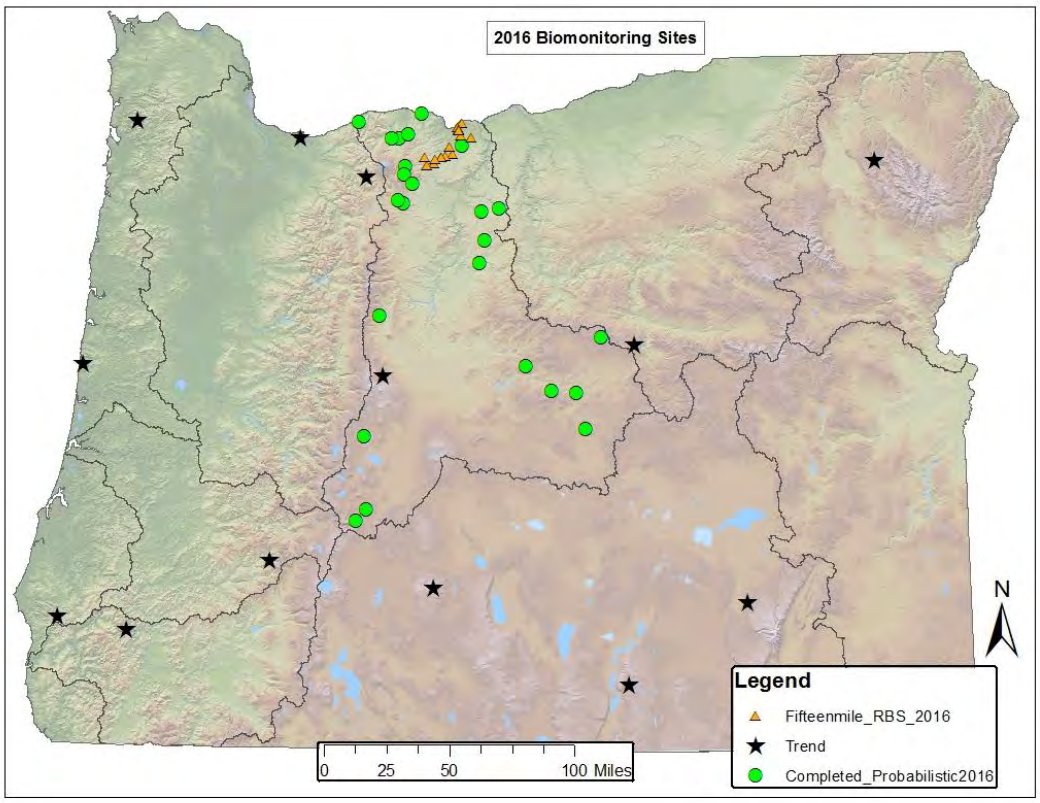
After completing the "Statewide Water Quality Toxics Assessment Report" in spring 2015 the DEQ toxics monitoring program initiated a second round of toxics monitoring based on the findings and recommendation of the report. Objectives of ongoing monitoring efforts are aimed at filling data gaps, utilizing new analytical capabilities and better characterizing toxics in water, streambed sediments and tissue. In 2016, the second round of risk-based toxics monitoring started in the Willamette Basin and Northeast Oregon.

TMDL monitoring activities in 2016 focused on data collection in targeted watersheds in the Upper Deschutes watershed, Tenmile Lake, Nehalem Watershed, Tillamook Watershed, Mid-Coast area, the Coquille Watershed and the Santiam and Calapooya watersheds. Water quality parameters and data-collection efforts were specifically planned to develop or refine water quality models used to assign waste load and load allocations to designated management agencies.

The beach bacteria monitoring schedule was modified in 2016 to anticipate the newly revised and reduced Beach Action Value that triggers beach advisories. The new value is approximately half of the old value which will likely result in 30 percent to 40 percent more advisories on the Oregon Coast. In order to accommodate the anticipated increase and be able to resample locations with active advisories, the entire coast will only be covered once every three weeks. The program also did a special investigation in the Rockaway Beach area where there was an increase in the number of advisories in 2016.

The Biomonitoring Program collected macroinvertebrates, conventional water quality parameters and habitat measurement at 25 randomly selected locations in the Deschutes Basin and at 12 statewide reference sites (Figure 7). The program also contributed stressor identification of macroinvertebrate samples collected along the Mid-Coast of Oregon for the TMDL in that area and worked on the development of a biological condition gradient for Oregon.

Twenty-four sites were visited in the region with water chemistry, habitat data, and macroinvertebrate and periphyton community samples collected at each site.



In addition to surface water monitoring, the Statewide Groundwater Monitoring Program studies groundwater conditions throughout Oregon. DEQ completed two regional groundwater studies in 2016. Each study included two sampling events to look into seasonal and climatic differences in groundwater quality. The study areas were selected based on a variety of data including past studies as well as nitrate data collected during real estate transactions. Study areas sampled in 2016 included the North Coast Basin (2015-2016) and the Walla Walla Basin (2016). The Rogue Valley was sampled in 2015, and the Rogue Valley Study Report was completed in 2016.DEQ plans to conduct one regional groundwater study in 2017 and may resume conducting two studies per year if funding becomes available.

Sampling of the three existing Groundwater Management Areas continued in 2016. The Lower Umatilla Basin Groundwater Management Area was sampled quarterly as in previous years. The Northern Malheur County Groundwater Management Areas was only sampled once in 2016, as opposed to quarterly, as a result of reductions implemented in 2016. Sampling in the Southern Willamette Valley Groundwater

Figure 7: Biomonitoring Sites (2016)

Management Areas was also reduced in 2016. The full well network in the Southern Willamette Valley Groundwater Management Area was sampled once, and a sub-set of 12 wells was sampled quarterly.

In addition to samples collected by the DEQ's various agency monitoring programs, the Volunteer Monitoring Program collects and submits data from across the state as well as various other soil and water conservation districts, watershed groups and designated management agencies. Volunteer monitoring activities in 2016 focused on the development of tools to improve volunteer data processing with the goal of reducing the substantial data backlog. The program provided calibrated water quality instruments, trainings, monitoring plan development, quality assurance planning, and data evaluation to volunteer watershed groups across the state. DEQ is working on the acquisition of a new data repository to house environmental monitoring data including volunteer data.

3.3 TMDLs and Water Quality Management Plans

The federal Clean Water Act requires that water pollutant reduction plans, called TMDLs, be developed for water bodies that are listed in Category 5 of the Integrated Report (303(d) List). TMDLs describe the maximum amount of pollutants that can enter the river or stream and still meet water quality standards.

TMDLs take into account the pollution from all sources including discharges from industry and sewage treatment facilities, runoff from farms, forests and urban areas, and natural sources. TMDLs include a margin of safety to account for uncertainty, and may include a reserve capacity that allows for future discharges to a river or stream. DEQ typically develops TMDLs on a watershed, subbasin, or basin level and occasionally at the reach level depending on the type and extent of impairments.

The Water Quality Management Plan is the framework for TMDL implementation that is issued by Oregon along with the TMDL (Oregon Administrative Rules 340-042-0040(l)). The plan provides the blueprint for TMDL implementation, serves as a multi-sector plan and provides the reasonable assurance that the TMDL will be implemented and allocations will be achieved. In 2016, DEQ's Nonpoint Source Process Improvement Team identified the intersection of Water Quality Management Plans s and EPA's nine key elements as a program priority. TMDL Program achievements in 2016 include:

- Facilitated two designated management agencies meetings to discuss status of TMDL implementation in the Willamette River Basin
- Approximately 91 percent of Willamette designated management agencies successfully implementing TMDL Plans, as documented through the Annual Report process
- Approximately 100 percent of Rogue and Bear Creek Basin DMAs successfully implementing TMDL plans, as documented through the annual report process
- In 2016 basin coordinators facilitated multiple technical assistance workshops specific to TMDL Implementation in the Willamette, South Coast and Umatilla basins
- Provided status and trends information for 18 Agricultural Management Area Plans

In 2012, Northwest Environmental Advocates filed suit against EPA challenging Oregon's natural conditions temperature TMDLs, the Willamette Mercury TMDL and the Klamath Temperature TMDL. On Oct. 12, 2016 the magistrate judge recommended that the district judge find in favor of the organization on two related Clean Water Act challenges. He concluded that EPA's decision approving TMDLs in September 2006 that used the natural conditions criterion was "arbitrary and capricious." The magistrate judge's conclusion was largely based on the earlier temperature standards case that concluded that EPA's decision to approve the natural conditions criteria was arbitrary and capricious. The magistrate judge instructed the parties to the litigation (which included DEQ) to negotiate potential remedies that would address this decision. The Klamath Temperature TMDL and the Willamette Mercury TMDL were

remanded to EPA for further action, and a two-year time limit for further action was placed on both TMDLs. He also recommended the Willamette Mercury TMDL remain in place during that period. The magistrate judge also recommended that the parties negotiate the remedy, and if agreement can't be reached, then the parties should return to court to determine the appropriate remedy. DEQ will provide an update of the 2017 court ruling in its 2017 Annual Report.

3.4 Drinking Water Protection

Oregon's Drinking Water Protection Program works to implement strategies that ensure the highest quality water is provided to public intakes and wells. Mandated by the 1996 Federal Safe Drinking Water Act, Source Water Assessments including identifying risks associated with the land management activities in drinking water source areas have been completed for all public water systems that have at least 15 hookups, or serve more than 25 people year-round.

Technical assistance is available to all public water systems and their communities to implement protection and restoration activities that address point and nonpoint sources of pollution that were identified in the Source Water Assessments (completed from 2000 through 2005) and more recent risk identification based on more advanced data and improved GIS capabilities.

As a result of the Drinking Water Source Monitoring project's susceptibility analysis which was completed in 2014, DEQ also evaluated land uses/activities of source areas for each of the intakes and wells. For each contaminant detected, staff conducted source evaluations on a site-by-site basis likely from multiple land uses and activities in the watershed or recharge area for the wells. Since the levels were very low in this initial sampling project, OHA and DEQ used the data analysis to determine potential associations with sources and to provide technical assistance to public water systems to reduce concentrations of source water contaminants. The major nonpoint sources in public water supplies as determined by the data analysis include: microbes, phthalates, pesticides, pharmaceuticals, steroids, hormones and metals.

DEQ's drinking water protection program and the Nonpoint Source Management Program collaborate to help identify, prioritize and implement best management practices for water quality improvements that address harmful algal blooms, nutrients, turbidity, microbes and toxics. The objectives of the collaboration include optimizing agency resources by focusing on the highest priority pollutants in a coordinated way, implementing actions that reduce toxic pollutants at the source, and establishing partnerships with other agencies and organizations to increase the effective use of public and private resources. Highlights from 2016 include:

- As of June 30, 2016 302 community water systems (35 percent of Oregon's community water systems) have "substantially implemented" a strategy to protect their drinking water. These water systems include many of Oregon's larger communities and serve a total of approximately 2.8 million Oregonians, more than 80 percent of the estimated 3.5 million Oregonians served by community water systems.
- In 2016, DEQ and OHA began Updated Source Water Assessments for surface water systems with projected completion in 2017. The highest priorities for the assessments are the coastal watersheds.

- The Nov. 19,2016 agriculture and commercial pesticide waste collection event in McMinnville netted 49,151 pounds from 45 participants, and set the record for the greatest quantity of pesticide waste collected at one of these events in Oregon.
- Participation in Southern Willamette Valley Groundwater Management Area events.
- DEQ launched an improved Drinking Water Source Protection Interactive Map Viewer in 2016 for the State of Oregon website based on a GEOCORTEX (Latitude Geographics) platform. The application allows the viewer to identify land uses and potential sources of pollutants identified on regulatory databases within public drinking water source areas, and the output can be further evaluated to target technical assistance work. The map can be accessed at https://www.oregon.gov/deq/wq/programs/Pages/DWP-Maps.aspx.
- A TMDL for turbidity/suspended sediment is currently being developed for the Siletz River. In 2016, drinking water staff conducted an in-depth review of existing scientific literature with regard to sediment pollution and land management which will allow drinking water protection and other water quality programs to use science to demonstrate connections between land management, changes in sediment movement and impacts to drinking water and other beneficial uses.
- The 2016 Toxics Strategy work focused on pesticide collection events, implementation of the Governor's Executive Order for chemical reduction in products, and revising the 2012 strategy report as a committee.
- DEQ drinking water staff provided input for the Watershed Assessment Reports identified in the Performance Partnership Agreement and for Agricultural Water Quality Management Plans. As of 2016, the drinking water input for the agricultural plans have been developed for the Clackamas, Crooked River, Greater Harney, Goose/Summer Lakes, Hood River, Lost River, Lower Deschutes, Lower Willamette, Mid-Coast, Mid-Deschutes, Middle John Day, Powder and Wasco plan areas. Drinking water input for the watershed assessments has been developed for the North Coast, South Coast, Deschutes, Rogue, Powder/Burnt, Clackamas/Sandy, Umatilla, Umpqua and Willamette basins.
- Two separate resource guides for groundwater and surface water sources for drinking water source protection were initiated in 2016. The Surface Water Resource Guide draft should be available for review in mid-2017.

3.5 Stormwater Coordination

The DEQ Stormwater Integration Group was formed in January 2015 and is made up of staff from the TMDL, Municipal Separate Stormwater Sewer System, Clean Water State Revolving Fund, 401 Water Quality Program, Underground Injection Control, and Industrial Construction programs. It was tasked with providing internal coordination and problem-solving for DEQ's program areas that have policy, regulatory, technical and/or outreach components involving stormwater. The group works to enhance external and internal communication on stormwater issues and topics of interest. A survey of DEQ staff was completed in 2015 which identified five major stormwater priorities:

- Develop a Statewide Stormwater Manual
- Identify stormwater subprograms that share parallel requirements and identify topics and tasks where internal coordination will create clear and consistent messages, regulatory requirements and permit conditions

- Evaluate and identify technical resources and priorities for stormwater data management and analysis, best management practices and engineering concepts review, and subsequent best management practices approval and compliance assurance among subprograms
- Develop a plan for internal and external communication on stormwater topics and a mechanism to deliver the information to the respective stakeholders
- Develop tools and resources aimed at small communities (with populations of 10,000 or fewer residents) for developing and implementing stormwater requirements

Accomplishments in 2016 include the development of an employee training module focusing on the integration between stormwater and other water quality programs and creation of a Decision Flow Diagram that can be used to streamline the requirements for DEQ programs that pertain to stormwater.

3.6 Onsite Wastewater Management Program

Over 30 percent of Oregonians rely on septic systems for their homes and businesses. DEQ regulates septic system siting, design, installation and maintenance. Without this oversight, septic systems can fail or malfunction, pollute Oregon's land and waterways with raw sewage and create public health hazards. In 2016, DEQ and regional nonprofit lender Craft3 came together to make septic system repairs more affordable through a new loan program. As of Oct. 31, 2016, approximately one-third of project funding had already been allocated. Of the 10 applications received: two closed for a total of $30,455, which will result in the treatment of 394,000 gallons of wastewater, an additional two are in the closing process in spring 2017(total of $35,000); and five are in the underwriting stage (total of $79,325). Additional highlights from 2016 include:

- In January 2016, DEQ provided training in Lincoln City for individuals who provide existing septic system evaluations. Additional trainings are scheduled for 2017.
- DEQ gave a presentation on Existing System Evaluations at the annual Oregon Wastewater Association conference.
- Increased the SepticSmart list to greater than 100 qualified staff available to perform evaluations of existing septic systems.
- Updated the Existing System Evaluation Report form in 2016 based on suggestions provided by evaluators.

4. Integrated Nonpoint Source Water Quality Management Strategy

Oregon's Nonpoint Source Management Program is a collaborative effort of federal, state and local agencies, as well as nonprofits and citizen groups. In recent years, state and federal funding for DEQ's Clean Water Act work has declined, both in dollar amount and in how far those dollars go to solve watershed issues. In order to make the most of limited resources, DEQ and other state agencies have partnered with local watershed councils and soil and water conservation districts on monitoring and restoration projects. Partnerships with federal and state agencies such as the Natural Resources

Conservation Service and ODA target agricultural best management practices for restoration and protection in agricultural watersheds. DEQ partnered with the Bureau of Land Management's to craft riparian protections in new Western Oregon Resource Management Plans which were finalized in August 2016. Collaboration between the Oregon Department of Forestry, Oregon Department of Fish and Wildlife and DEQ continue at the forefront for addressing Coastal Zone Act Reauthorization Amendment concerns.

4.1 Oregon Integrated Water Resources Strategy

The Oregon Water Resources Commission adopted the state's first Integrated Water Resources Strategy on Aug. 2, 2012. With leadership, support, and direction from the Oregon Legislature and the Water Resources Commission, Oregon's natural resource agencies set out to develop a statewide, integrated water resources strategy to meet current and future water needs. The strategy provides a blueprint to help the state better understand and meet its instream and out-of-stream needs, taking into account water quantity, water quality and ecosystem needs.

The Oregon Water Resources Department worked closely with DEQ and the Oregon Department of Fish and Wildlife to ensure that water quality needs and ecological needs were directly addressed in the plan. The Oregon Department of Agriculture also played a key role in developing the Integrated Water Resources Strategy.

4.2 State Partners

State agencies are important partners for achieving goals and objectives in the "Nonpoint Source Program Plan" due to their regulatory authority around nonpoint source pollution, expertise on land use activities, as well as their ability to fund projects and management measures to improve watershed conditions.

4.2.1 Oregon Watershed Enhancement Board

The Oregon Watershed Enhancement Board provides grants to help Oregonians protect and restore local streams, rivers, wetlands and natural areas. Its mission is to help protect and restore healthy watersheds and natural habitats that support thriving communities and strong economies. OWEB grants are funded through a combination of the Oregon Lottery, federal dollars and salmon license plate revenue.

The board's grants fund a variety of activities that local partners have identified as priorities in watershed assessments, action plans, or regional plans such as Endangered Species Act Recovery Plans, groundwater management areas, or TMDLs and Water Quality Basin Status and Action Plans. Restoration actions address watershed process and functions necessary to support natural processes that are indicative of healthy watersheds. This includes, but is not limited to improving water quality, water quantity, habitat complexity, flood plain interaction, vegetation structure and species diversity. The work funded by the Oregon Watershed Enhancement Board addresses nonpoint source pollutants including thermal loading, sediment, bacteria, and nutrients. The state funding the board disburses is a critical source of nonfederal matching funds for 319 grants. Through acquisition grants, vulnerable and ecologically valuable parcels of land are acquired by local governments and nonprofits. DEQ staff sit on regional review teams which evaluate grant proposals and ensure that DEQ needs and priorities are

considered in the grant award process. The Oregon Watershed Enhancement Board is a vital partner to DEQ in reducing nonpoint source pollution for human activities, past and present.

The board focuses on local partnerships and voluntary actions, and builds on what Oregonians are already doing that is good for water, people and wildlife. It provides grants to local watershed councils, soil and water conservation districts, land trusts, tribes, government agencies, and other organizations to restore and protect Oregon's rivers and streams. Since 1999, the board has spent over $500 million in a statewide, collaborative and voluntary approach to watershed health. In 2016, it disbursed over $30 million for restoration, monitoring, technical assistance, and outreach projects (Table 4). Additional monies were allocated to other types of grants, such as Conservation Reserve Enhancement Program technical assistance, weed grants, council capacity grants and more. Approximately $1 million of the funding was earmarked for projects in strategic implementation areas.

In 2017, DEQ intends to further explore the nexus between Oregon Watershed Enhancement Board-funded projects and implementation of the state's Nonpoint Source Program. DEQ continues to explore options for maximizing the amount of on the ground nonpoint source restoration activities through the efficient use of resources.

Table 4 2016 OWEB Investments

OWEB Funds	Oct 2016
Open Solicitation Grants:	Expressed in Millions
Restoration	25.207
Technical Assistance	4.110
Monitoring Grants	2.120
Outreach	0.600
Land and Water Acquisition	7.500
Weed Grants	2.500
Small Grants	2.800
Programmatic Effectiveness Monitoring	0.500
TOTAL	**45.337**
% of assumed TOTAL BUDGET:	**59.16%**
Focused Investments:	
Implementation	14.058
Capacity-Building	1.039
Effectiveness Monitoring	0.500
TOTAL	**15.597**
% of assumed TOTAL BUDGET:	**20.35%**
Operating Capacity:	
Capacity grants (Watershed Councils/Soil and Water Conservation Districts)	12.500
Statewide partnership support	0.300
Building Capacity Grants	0.400
TOTAL	**13.200**
% of assumed TOTAL BUDGET:	**17.22%**
Other:	

OWEB Funds	Oct 2016
Conservation Reserve Enhancement Program	0.500
Oregon Plan/Governor Priorities	1.000
Strategic Implementation Areas	1.000
TOTAL	**2.500**
% of assumed TOTAL BUDGET:	**3.26%**
Other Distributed Funds:	
Oregon Department of Fish and Wildlife – Pacific Coast Salmon Recovery Funds	9.512
Forest Health Collaboratives from Oregon Department of Forestry	0.660
Rangeland Fire Protection Assoc. from Oregon Department of Forestry	1.200
Pacific States Marine Fisheries Commission-Intensively Monitored Watershed	0.591
Lower Columbia Estuary Partnership	0.300
ODOT	0.250
TOTAL	**12.513**

4.2.2 Oregon Department of Agriculture

The Agricultural Water Quality Management Act (ORS 568.900 to 568.933) authorizes ODA to develop Agricultural Water Quality Management Area Plans and rules throughout the state.
The statute authorizes the development of Agricultural Water Quality Management Area Rules to serve as a regulatory backstop to the voluntary efforts described in the area plans. ORS 561.191 states that ODA shall develop and implement any program or rules that directly regulate farming practices to protect water quality.

The Agricultural Water Quality Management Program is the main regulatory tool to prevent and control nonpoint sources of pollution from agricultural lands through implementation of area plans and enforcement of area rules to meet the goals of Coastal Zone Act Reauthorization Amendments and TMDL load allocations. The program staff members are also involved with the development of Groundwater Management Act action plans, and lead the implementation of action plans to improve groundwater quality.

In 2012, DEQ and ODA signed a Memorandum of Agreement that describes the statutory authority of ODA and DEQ to implement the Agriculture Water Quality Management Program. To focus its investments and demonstrate measurable results, ODA established focus areas and strategic implementation areas which made investments in small geographic areas. Focus areas are subwatersheds chosen for intensive voluntary improvement efforts lead by soil and water conservation districts while strategic implementation areas are subwatersheds chosen for intensive surveying, education, and enforcement actions by ODA.

DEQ works in collaboration with ODA to evaluate area plan and rule implementation effectiveness. In 2016, ODA investigated 167 compliance issues related to sediment, riparian, manure, nutrients and pesticides. In addition to complaint investigations, ODA's 214 site inspections resulted in 192 compliance actions which include: 20 letters of compliance, 10 in-field determinations of compliance, 15 "fix-it" letters, 50 water quality advisories, 30 warning letters, six pre-enforcement in-field determinations, two notices of non-compliance.

Under state statute, ODA must consult with DEQ during ODA's biennial review of agricultural water quality management area plans and rules. In 2016, DEQ participated in ODA's 17 biennial reviews. Coordination between the two agencies has improved over the years, and ODA has introduced a number of projects and initiatives to improve its Agricultural Water Quality Management Program. However, there are still concerns that there is a lack of adequate information such as explicit goals and milestones to determine if progress is being made toward meeting TMDL load allocations and water quality standards. DEQ and ODA continue to work together to implement the 2012 agreement and evaluate whether agricultural activities conducted on agricultural lands in Oregon are making satisfactory progress toward achieving TMDL load allocations and not causing or contributing pollutants that cause non-attainment of water quality standards.

ODA and DEQ developed a list of questions to facilitate DEQ's review of agricultural area plans and rules for each area. To further streamline the biennial review process, DEQ and ODA are collaborating on a two–tiered approach at the statewide programmatic level as well as at the management area level. Management area-specific reviews were conducted in 2016, and DEQ and ODA will conduct a programmatic review in 2017 to determine if the goals and objectives of the Agricultural Water Quality Management Program are being met.

Prior to 2016, ODA used Oregon's Water Quality Index to report on general water quality trends for each agriculture water quality management area. In 2016, DEQ began issuing Water Quality Status and Trends Analysis reports specific to local management Areas to present data and analysis that helps DEQ fulfill its roles in the biennial review process described in the agreement between ODA and DEQ. These reports compare data to water quality standards, and where appropriate, TMDL allocations. In fall and winter 2016, DEQ issued reports with temperature, pH, and bacteria (*E. coli* and enterococcus) analyses for the Lower Deschutes, Burnt, Coos and Coquille, and Sandy Agricultural water quality management areas.

These reports included an analysis of water quality data readily accessible from public databases and available in sufficient quantity to indicate status and trends. DEQ used available water quality data to answer the following questions:

- What is the status of water quality parameters downstream of agricultural land?
- What is the trend in water quality at key locations downstream of agricultural land?
- Are sites downstream of agricultural land meeting TMDL agricultural load allocations?

Sufficient data was defined separately for status and for trend analyses (Figure 8). For status analysis, data from the two most recent years of data was used to compare to the water quality standard. For trend analysis, data was needed from eight or more years. Table 5 below demonstrates that while there are many stations with data there are very few with recent data available for status and even fewer with long term datasets for trend analyses. Table 6 illustrates that by parameter, bacteria and pH are some of the most consistently monitored parameters while temperature is primarily monitored for shorter time periods.

Table 5 Summary of Available Data for Status and Trends Analyses

Management Area	Number of Accessible Stations	Sufficient for Status Analysis	Sufficient for Trend Analysis	>20% Ag and Range Land Use
Lower Deschutes	105	4	1	4
Burnt	83	7	6	7
Coos and Coquille	520	12	7	11
Sandy	120	8	8	0*

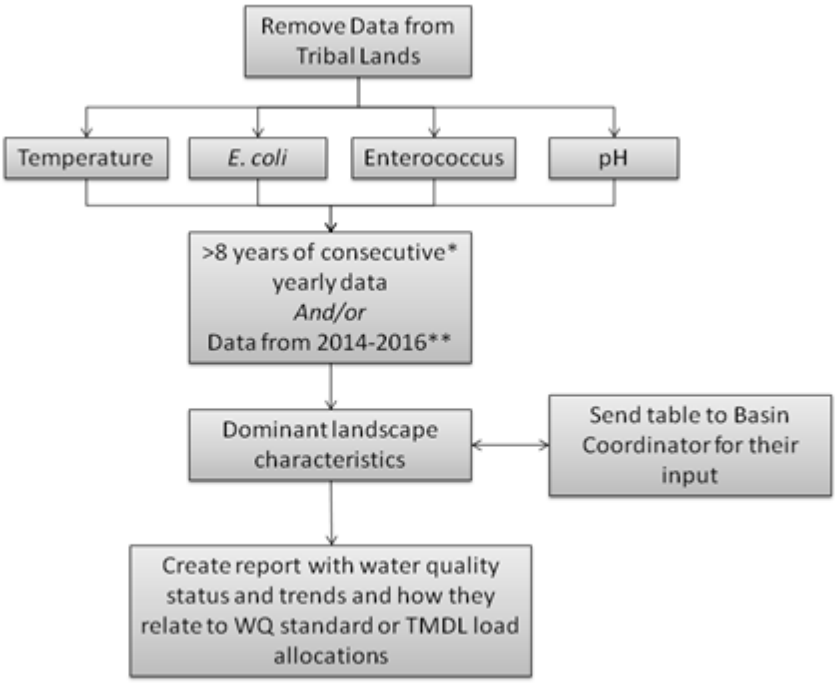
*** Does not include range**

The results of water quality status and trend analyses for the Burnt, Lower Deschutes, Coos and Coquille, and Sandy management areas conducted in 2016 are summarized in Tables 6 and 7. It should be noted that sample stations in the Lower Deschutes Management Area were chosen only if upstream land use was more than 20 percent Agriculture. The land use filter was not used to select sample stations for Coos and Coquille, Sandy, and Burnt agricultural management areas.

Table 6 Number of stations with water quality standards exceedances/Number of stations analyzed

Management Area	Temperature	Bacteria	pH
Burnt	Insufficient data	5/6	3/7
Lower Deschutes	1/1	2/3	1/1
Coos/Coquille	Insufficient data	5/12	0/6
Sandy	5/7	0/1	0/1

Figure 8: Station identification decision criteria for Burnt, Coos and Coquille, and Sandy Water Quality Status and Trends reports.



***consecutive: if not much data is available, may use eight or more non-consecutive years of data;**
****If 2014-2016 data are not available, most recent status**

Table 7 Parameter Summary for Temperature, *E-coli*, *Enterococcus*, and pH.

Management Area	Station Description	% Ag*	Temperature	E-coli	Enterococcus	pH
Burnt	Burnt River at Snake River Road	70.2				
Burnt	Burnt River at Clarks Creek bridge					
Burnt	Burnt River at Unity Reservoir Dam	34.2				
Burnt	Unity reservoir 200 meters above dam	34.1				
Burnt	S. Fork Burnt River at	29.6				

Management Area	Station Description	% Ag*	Temperature	E-coli	Enterococcus	pH
	Rouse Lane Bridge					
Burnt	Middle Fork Burnt River at Rice Road Bridge	24.2				
Burnt	West Fork Burnt River at Rice Road Bridge	23.6				
Lower Deschutes	Fifteenmile Creek at Petersburg	85				
Lower Deschutes	Deschutes River at Moody, near Biggs	64.4				
Lower Deschutes	Deschutes River at Deschutes River Park					
Lower Deschutes	Fifteenmile Creek at Boyd Market Road at Dufur	64.3				
Coos and Coquille	Big Creek at Sunset Bay SP footbridge	44.4				
Coos and Coquille	Middle Fork Coquille River at River Mile 0.2 at Hwy 42 (Hoffman State Park)	35.5				
Coos and Coquille	Coquille R Middle Fork at River Mile 1.25	35.4				
Coos and Coquille	Beaver Hill Landfill SS-5	33.5				
Coos and Coquille	Coquille River at Sturdivant	31.2				

Management Area	Station Description	% Ag*	Temperature	E-coli	Enterococcus	pH
	Park Dock (Coquille)					
Coos and Coquille	North Fork Coquille River at Hwy 42 (Myrtle Point)	29.4				
Coos and Coquille	Sunset Bay State Park Beach at restroom	28.9				
Coos and Coquille	South Fork Coos River at Anson Rogers Bridge	28.7				
Coos and Coquille	South Fork Coquille River at Broadbent	28.7				
Coos and Coquille	North Spit	28.5				
Coos and Coquille	Lower Coos Bay Estuary	28.5				
Coos and Coquille	Tenmile Creek at Spinreel Campground boat ramp	11.1				
Sandy	Sandy River at Troutdale Bridge	3.4*				
Sandy	Little Sandy River Near Bull Run	0.8*				
Sandy	Bull Run River Near Multnomah Falls	0.0*				
Sandy	South Fork Bull Run River Near Bull Run	0.0*				
Sandy	North Fork Bull Run	0.0*				

Management Area	Station Description	% Ag*	Temperature	E-coli	Enterococcus	pH
	River Near Multnomah Falls					
Sandy	Bull Run R At Larson's Bridge, Near Bull Run	0.1*				
Sandy	Fir Creek Near Brightwood	0.0*				
Sandy	Bull Run River At Lower Flume Nr Brightwood	0.0*				

Orange indicates at least one sample was not meeting the water quality standards within the last two years of available data. Green indicates all samples were meeting the water quality standards within the last two years of available data. Downward point arrows indicate a degrading trend based on the Seasonal Kendall Analysis. Upward pointing arrows indicate an improving trend. Flat arrows indicate a steady trend while the slash indicates the data did not show a statistically significant trend. No slash or arrows indicate insufficient data was available to determine trend.
*** Does not include range land use**

DEQ basin coordinators participated in ODA's biennial reviews by studying pertinent information including Water Quality Status and Trends Analysis reports (Figure 8). DEQ basin coordinators recommended additional data and resources necessary to achieve water quality standards and meet TMDL agricultural load allocations through ODA's survey. DEQ will continue to provide Water Quality Status and Trends Analysis reports for each biennial review.

In 2016, both agencies continued to collaborate on temperature issues related to agricultural management practices. Although a definition for system potential shade is contained in Oregon Administrative Rules, DEQ and ODA continued discussions on refinements to the definition of site capable vegetation. In 2016, ODA established a method for evaluating streamside vegetation. In 2016, DEQ led shade assessments throughout Oregon, however the assessments were not specifically designed to evaluate implementation activities to achieve TMDL/water quality standards goals for the statewide Agricultural Water Quality Management Program.

ODA is also working with Natural Resources Conservation Service and OWEB to develop crosswalk of conservation and restoration practices under NRCS, EPA, and OWEB programs to facilitate nonpoint source project implementation reporting for biennial reviews through Conservation Effectiveness Partnerships. The project should be completed in 2017.

In addition to the collaboration on agricultural water quality management area plans, Oregon Department of Agriculture, Tetra Tech, and DEQ developed a groundwater contour mapping tool to predict the five-year groundwater flow path in the Southern Willamette Valley Ground Water Management Area through an EPA Regionally Applied Research Effort grant. The model will be used to visualize the potential

radius of agricultural influence and identify influences that may be upgradient of groundwater wells. Use of the contour model in conjunction with over eight years of groundwater quality and elevation data will allow DEQ and its partners to interpret the time trends in well nitrate data and target implementation of Best Management Practices. ODA has also funded a lysimeter study in the groundwater management area to study the effects of nitrate leaching below the root zone and research on precision agriculture techniques through Fertilizer Grants Program.

4.2.3 Oregon Department of Forestry

Forest practice rules, as directed by the legislature, are to ensure that forest operations do not impair water quality standards as established by the Oregon Environmental Quality Commission. In 2002, riparian studies were initiated to ensure the Forest Practices Act rules were effectively meeting water quality standards for temperature. Those studies indicated that, on average, forest operations on private lands resulted in streams warming by +0.7 degrees Celsius, falling short of meeting the protecting cold water criterion of the temperature standard which prohibits cumulative increases greater than 0.3 degrees Celsius. The resulting rule analysis began in January 2012, and the Oregon Board of Forestry directed the Oregon Department of Forestry to begin rulemaking for new private forestry rules to increase protections on salmon, steelhead, and bull trout streams to improve compliance with the protecting cold water criterion of Oregon's temperature standard. A public comment period ended March 1, 2017 and public hearings were completed. The final rule was adopted on April 26, 2017 with a proposed effective date of July 1, 2017. The revised Riparian Management Area widths are illustrated in Table 8. Further updates will be in the 2017 Nonpoint Source Annual Report.

Table 8 Oregon Department of Forestry revised riparian management area widths for streams of various sizes and beneficial uses (Oregon Administrative Rules 629-635-0310)

Stream Size	Fish-bearing (may also be used for domestic water supply) (Type F)	Salmon, steelhead and bull trout (Type SSBT)	Domestic water supply, no fish (Type D)	Non fish-bearing or domestic water supply (Type N)
Large	100 feet	N/A	70 feet	70 feet
Medium	70 feet	80 feet	50 feet	50 feet
Small	50 feet	60 feet	20 feet	Apply specified water quality protection measures

As stated earlier in this report, DEQ worked with the Oregon Department of Forestry and other state and federal agencies to address the gaps outlined in NOAA and EPA's disapproval of Oregon's Coastal Nonpoint Source Control Plan required in the Coastal Zone Act Reauthorization Amendment. Gaps in Oregon's forestry program were one of the main reasons why the plan was not fully approvable.

4.3 Federal Partners

DEQ works with federal agencies that manage federal forests and lands to meet water quality standards and where applicable, TMDL load allocations. In addition DEQ coordinates with federal partners with technical expertise and funding to support community led watershed protection and restoration.

4.3.1 U. S. Forest Service

In 2014, DEQ signed a Memorandum of Understanding that outlined the DEQ and U.S. Forest Service strategy for managing and controlling point and nonpoint source water pollution from U.S. Forest Service managed lands in Oregon. In the document, DEQ recognizes the service as a designated management agency for nonpoint source control and implementation of State and Federal water quality rules and regulations on lands under service jurisdiction. The service agreed to manage its lands to protect, restore and maintain water quality so that state and federal water quality standards and goals are met in accordance with all applicable laws and regulations. In addition, the service will develop and implement strategies such as best management practices to protect and restore water quality conditions when the service's actions affect or have the potential to affect 303(d) listed waters. DEQ and Forest Service staff held their annual meeting in the second quarter of 2016 to discuss achievement of both agency's goals and responsibilities. Forest Service staff and DEQ are working jointly to submit an annual report to DEQ in 2017 to document accomplishments and demonstrate the compliance of both agencies with the interagency Memorandum of Understanding. The annual report will be attached in the 2017 Annual Report.

The U.S. Forest Service continued to implement the Northwest Forest Plan, including the Aquatic Conservation Strategy in Western Oregon federal lands managed by the U.S. Forest Service. In Eastern Oregon, the service managed federal forestlands under individual National Forest Plans which must comply with PACFISH/INFISH Biological Opinion goals and standards. Generally, watershed health and water quality are steady or improving on U.S. Forest Service lands. The year 2016 marked completion of the first multi-year, regional-scale analysis of the implementation and effectiveness of water quality best management practices, including those meant to protect water quality and aquatic ecosystems. Collaboration was ongoing on the development and testing of a streamlined version of the Geomorphic Road Assessment and Inventory Package, which characterizes road risks to aquatic resources and prioritizes them for restoration or mitigation.

Restoration work was completed in the Umpqua, Siuslaw, Deschutes, Upper Willamette, Rogue, John Day and Middle Columbia subbasins. Restoration projects focused on restoring floodplain connectivity, channel complexity, improving habitat and restoring fish passage. Highlights of these projects can be found at: https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd530163.pdf.

4.3.2 Bureau of Land Management

DEQ entered into a Memorandum of Understanding with the Bureau of Land Management to document their strategies for managing and controlling point and nonpoint source water pollution from bureau-managed lands in Oregon. The document defines the process by which the bureau and DEQ will cooperatively meet state and federal water quality rules and regulations. The Bureau of Land Management agreed to comply with the TMDL rule and manage its lands to protect, restore and maintain water quality so that state and federal water quality standards and goals are met in accordance with all applicable laws and regulations. At the DEQ and Bureau of Land Management annual meeting in August 2016, the two agencies agreed to renew their Memorandum of Understanding for another five years. The agencies completed this renewal in early 2017. As part of the understanding, bureau staff are required to submit a midterm (two to three years into the understanding) report to DEQ to document its accomplishments and demonstrate compliance of both agencies with the agreement.

In 2016 the bureau adopted new resource management plans for the Western Oregon Bureau of Land Management-managed federal lands. The revised riparian and steep slope protection requirements were constructed to meet water quality objectives. In Eastern Oregon, bureau-managed federal lands under individual district resource management plans must comply with the PACFISH/INFISH Biological Opinion goals and standards. Based on cooperative monitoring between the bureau and U.S. Forest Service, watershed health and water quality are generally steady or improving on BLM-managed lands. Restoration activities and land management changes to improve watershed health are ongoing.

4.3.3 U. S. Army Corps of Engineers

Under Section 404 of the Clean Water Act, the U.S. Army Corps of Engineers administers the permitting program to regulate the discharge of dredged or fill materials into waters of the U.S. including wetlands. The corps is a designated management agency under a number of TMDLs and works with DEQ on a number of projects to assess, protect and improve water quality.

As part of the Reasonable and Prudent Alternative 5.1.4 in the 2008 Willamette Project Biological Opinion, the U.S. Army Corps of Engineers must monitor and evaluate the effectiveness of interim and permanent water quality improvement measures in the Willamette Basin. In 2013, the corps began including the Willamette Basin Interim TMDL Water Quality Plan Report as part of its annual March submittal. The highlights below are from their 2016 report:

- Collected temperature data at Detroit, Big Cliff, Green Peter, Foster, Cougar Fall Creek, Hills Creek, Lookout Point, Dexter, Cottage Grove Fern Ridge and Dorena reservoirs.
- Used CE-QUAL-W2 model to evaluate temperature impacts at reservoir dams
- Implemented temperature control operations at Detroit and Cougar dams
- Monitored turbidity, suspended sediment and dissolved oxygen during Fall Creek fish passage
- Coordinated with other agencies regarding visual monitoring of cyanobacteria blooms
- Collaborated with U.S. Geological Survey for a low-flow water quality monitoring study

4.3.4 Natural Resources Conservation Service

The Natural Resources Conservation Service, through incentive programs including the Environmental Quality Incentives Program and the National Water Quality Initiative, provide financial assistance to producers for water quality improvements on their farms or ranches to reduce water quality pollution from agricultural lands in priority watersheds. In addition, service conservationists provide technical assistance to producers and operators. The service also partners with state agencies to share information and tools to evaluate effectiveness of conservation activities in Oregon. Projects funded by NRCS funds are included in the Summary of Basin Wide Nonpoint Source Implementation in Chapter 6.

4.4 Local Partners

The cornerstone of the Oregon Water Quality Program is to promote community led watershed protection and restoration by facilitating communities to identify solutions at the local level. Watershed Councils, soil and water conservation districts, irrigation districts, cities and counties all play an important part in the state's strategy to protect and restore Oregon waterbodies. Almost all of the funds allocated in 2016

went to watershed councils, soil and water conservation districts and local partnerships. Highlights of projects by local partners are included in the basin summaries in Chapter 6.

4.5 Multi-Agency Partnerships

Building partnerships with multiple agencies and communicating regularly is necessary to implement actions to meet the goals and objectives identified in the 2014 Nonpoint Source Management Plan. DEQ engages in a number of collaborative efforts to improve efficiencies around water quality monitoring and evaluation of the effects of conservation and restoration investments.

4.5.1 Clean Water Partnership

The Clean Water Partnership is a multi-agency effort to improve the success of Oregon's programs to protect and restore waters of the state and their beneficial uses. The effort, led by Governor Kate Brown and her Natural Resources Office, with leadership from DEQ, Oregon Department of Agriculture, Oregon Department of Fish and Wildlife and the Oregon Watershed Enhancement Board, includes participants from the Oregon Department of Forestry, Oregon Water Resources Department, Oregon Department of State Lands as well as key federal agencies such as: U.S. Forest Service, Bureau of Land Management, EPA, NOAA and U.S. Geological Survey. The goals of the partnership are:

- Improve the information on current status and trends of the water quality, fish and habitats in Oregon
- Enable cooperation between state and federal agencies and improve the efficiency of monitoring
- Implement conservation and restoration work
- Collaborate decision making on where and how funding should be spent to get the best outcomes and improvements

4.5.2 STREAM Team

The STREAM Team (STRategic Enterprise Approach to Monitoring Team) is a technical state multi-agency team interested in both water quality and water quantity. Its mission is to facilitate collaborative decision making to support a healthy environment through coordinated planning, monitoring, and communication of water related data and information among Oregon's natural resource agencies. It seeks to identify roles and responsibilities, data gaps, avoid redundancy, promote efficiency and provide feedback when there are questions or reporting needs. Specifically, the team is working on a monitoring strategy for the state of Oregon, and once the strategy is developed, will work on funding proposals to implement the strategy.

4.5.3 Conservation Effectiveness Partnership

The Conservation Effectiveness Partnership is a collaborative effort between the Natural Resources Conservation Service, the Oregon Watershed Enhancement Board, Oregon Department of Agriculture, and DEQ with a mission to: describe the effectiveness of cumulative conservation and restoration actions in achieving natural resource outcomes through collaborative monitoring, evaluation and reporting. The goals of the partnership are:

- Build an understanding of the extent of the investment in watershed improvement and the watershed response through the agencies' collective grant programs
- Develop a clearer understanding of how local organizations are utilizing the agencies respective grant programs, in concert
- Evaluate the effects of conservation and restoration investments on water quality and watershed condition
- Design tools and methods for reporting results of investments

The CEP has completed reports on: Wilson River for bacteria, Whychus Creek for temperature, and Fifteenmile Creek for sediment. The partnership is currently working on projects for Prairie Creek in the Wallowa Basin and Dairy Creek in the Tualatin Basin.

4.5.4 Partnership to Improve Nutrient Efficiency

The Partnership to Improve Nutrient Efficiency is a collaboration between EPA, Oregon State University, Oregon Department of Agriculture, Natural Resources Conservation Service and DEQ that works with Southern Willamette Valley Groundwater Management Area farmers to measure nitrate leaching below the root zone of crops. This work was conducted as a follow up study to work completed in the 1990s by Oregon State University. Results from the lysimeter study indicate that a shift in crop production combined with a shift in agronomic and land management practices are helping to protect and improve groundwater quality.

As a result of the partnership's ongoing work on nitrogen dynamics in the Groundwater Management Area, researchers from The U. S. Environmental Protection Agency in Ada, Oklahoma partnered to design a study at the Oregon State University vegetable farm. The study seeks to identify if interplanting cover crops between corn rows will result in nitrate leaching reductions and will complement local and national, ongoing research on the efficacy of using cover crops to help reduce nitrate contamination of ground water and surface waters across the U.S.

4.5.5 Water Quality Pesticide Management Team

Several state agencies are responsible for the development and enforcement of water quality policies in Oregon. The Water Quality Pesticide Management Team, an interagency team comprised of representatives from the Oregon Department of Agriculture, DEQ, Oregon Health Authority, and Oregon Department of Forestry was formed to address pesticide contamination issues in waters across the state.

The team seeks to reduce concentrations and frequencies of pesticide detections in waters of the state through facilitation and coordination of water quality related activities such as monitoring, data analysis and communication, prioritizing program activities, review and implementation of federal policies. http://www.oregon.gov/ODA/programs/Pesticides/Water/Pages/AboutWaterPesticides.aspx

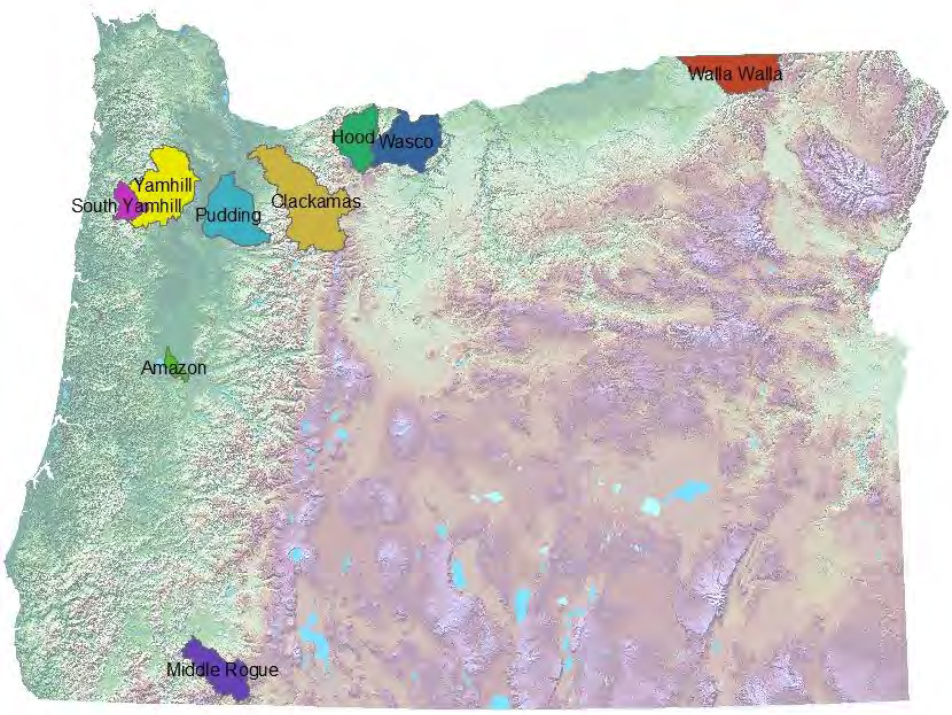
4.5.6. Pesticide Stewardship Partnerships

Established in 2000, the Pesticide Stewardship Partnership uses local expertise with water quality sampling results to encourage voluntary changes in pesticide use and practices. During the 2015-17 biennium, the partnership funded five grant projects for more than $165,000 using mostly state funds.

These grants were competitive in nature and were selected for funding by the state Water Quality Pesticide Management Team. The project recipients were:

- Oregon State University for development and calibration of an established surface and groundwater model to predict the effects of land and pesticide use on water quality
- Oregon State University to develop and implement a training program for applicators of pesticides to increase proficiency in spray equipment calibration and develop a management tool to improve pesticide application activities
- Oregon State University to develop conservation biological control management plans to enhance the presence of beneficial insects as an alternative to pesticide use
- Northwest Center for Alternatives to Pesticides to develop education and outreach materials providing growers and the general public information on impacts to endangered salmon from pesticide management actions. This is focused on three partnership areas in Clackamas, Marion, and Yamhill counties
- Columbia Gorge Fruit Growers to demonstrate the use and effectiveness of recently developed tools for monitoring natural enemies of pear psylla

Figure 9: 2016 Pesticide Stewardship Partnership Watersheds



As part of the Pesticide Stewardship Partnership, 330 water samples were collected and analyzed across the nine partnership watersheds (Figure 7, thus far for the 2015-17 biennium through December 2016). Several pesticides were added to the analytical suite since the 2013-15 biennium based on evolving use patterns employed by applicators of registered pesticides. Water quality results indicate the number of pesticides exceeding an EPA aquatic life benchmark declined in 2015 (141) from that seen in the 2013

(206) samples. In 2013 11 pesticides exceeded a benchmark at least once, while in 2015 that number had declined to nine pesticides.

Reduction of instream pesticides has resulted in a 50 percent decline in the maximum level of pesticide being detected. Although the sample population is relatively small it is an indication that the data being generated from the partnership has positively impacted pesticide management practices.

4.5.7 National Water Quality Initiative

The 2013 Nonpoint Source Program and Grants Guidelines for States and Territories directs DEQ to devote sufficient Section 319 resources to coordinate with the Natural Resources Conservation Service. In Oregon, Natural Resources Conservation Service has partnered with DEQ, Oregon Department of Agriculture, U.S. Fish and Wildlife Service and others to identify National Water Quality Initiative watersheds and monitoring projects with clear goals and objectives, approved methods, strong local partnerships and the availability of prior monitoring data. In addition to on-the-ground implementation of conservation practices, 319 funds are also being used to conduct effectiveness monitoring in National Water Quality Initiative watersheds. Effectiveness monitoring plans have been developed for Fifteenmile Creek and Willow Creek and implementation is ongoing through 2014-2019. In 2014, DEQ allocated $25,000 of Section 319 funds to support monitoring both watersheds.

In 2016, EPA funded TetraTech to provide a report detailing the analysis and interpretation of stream sediment data in the greater Fifteenmile Creek watershed in the Middle Columbia Basin. No meaningful change in substrate conditions was observed in the watershed between 2005 and 2006 and 2015 and 2016. Improvements were observed in the western portion of the Fifteenmile Creek watershed when data from 1994 was compared with recent data, but this portion of the watershed was affected more by road improvements rather than agricultural best management practices.

5. Success Stories

5.1 EPA Performance Measures

The Section 319 Nonpoint Source success stories website features stories about primarily nonpoint source-impaired waterbodies where restoration efforts have led to water quality improvements. Waterbodies are separated into three categories, depending on the type of water quality improvement achieved:

- Partially or fully restored waterbodies
- Progress toward achieving water quality goals
- Ecological restoration

The Nonpoint Source Success Stories serve two main purposes. First, they offer an opportunity for states to highlight where their restoration efforts have resulted in water quality improvements in nonpoint source-impaired waterbodies. Second, they allow EPA to track the number of nonpoint source-impaired waterbodies that are partially or fully restored—which is a key measure in the effort to document how

nonpoint source restoration efforts are improving water quality across the nation. These measures show Congress why 319 funds are needed and document the success of these funds towards improving water quality.

All previous Oregon's Watershed Measures and Waterbody Restoration Stories (i.e."Success Stories") were developed by DEQ staff with assistance from EPA's contractor Tetra Tech. Previous success stories can be found at: https://www.epa.gov/Nonpoint Source/nonpoint-source-success-stories

Nonpoint source success stories for 2016 have not yet been identified, however several watersheds across Oregon are demonstrating measurable improvements in water quality.

5.2 North Coast

Water quality monitoring taking place in the North Coast is focused on watershed scale water quality improvement. Limited, project specific (project effectiveness) water quality monitoring is being conducted, and DEQ uses the Tillamook Estuaries Partnership Volunteer Water Quality Monitoring Program data to determine status and trends for bacteria throughout the Tillamook Estuaries Partnership study every two years. The last assessment was performed in 2014.

In general, the Wilson, Kilchis, and Nehalem rivers have been meeting recreational standards since 2005, 2009 and 2010 respectively. The Tillamook River, while not meeting standards, continues to improve at all monitoring locations. The Nestucca River Watershed bacteria data collection began in 2012. As a result, there is less data available making it challenging to establish any trends. Generally, the lower reaches of the Nestucca River and the Little Nestucca River are not meeting the recreational use standard. However, monitoring sites in the upper watershed are meeting standards.

DEQ also assessed bacteria levels in the five estuaries within the study area. Oregon's recreational use standard for estuaries is based on Enterococcus bacteria. Nehalem Bay is the only estuary currently meeting the state standard at all monitoring locations. Tillamook Bay is not meeting standards at any of the three monitoring locations but shows improvement at one location. The bacteria levels at the other estuaries are generally meeting standards at sites closest to the mouth of the estuaries, but not upstream in the estuaries.

While monitoring shows that improvements are being made in many of the watersheds as it relates to the state's recreational standards for bacteria, there are opportunities for continued improvement. A number of stakeholders in the North Coast are involved in planning and will continue to implement restoration and pollution control projects. Using the partnership's monitoring results, DEQ identifies and prioritizes water quality limited areas and works with partners to target areas for water quality improvements.

5.3 Umatilla

Preliminary data indicates that several projects have resulted in improvements in water quality parameters. The Meacham Creek restoration project was a multi-phase project designed to improve in-stream and riparian habitat for listed and non-listed fish species by restoring channel morphology and hydrologic, riparian, and in-stream processes. Past impacts and current factors limit aquatic productivity, specifically, levees and spur dikes limit floodplain connectivity and riparian shade, and the lack of large

wood limits in-stream habitat complexity and quantity. Post-project completion, measured water temperature improvements have been documented.

The Oxbow Restoration/Revegetation Project near Hermiston, Oregon was funded through an Oregon Watershed Enhancement Board grant by the Umatilla Basin Watershed Council. Representatives from the watershed council, Bureau of Reclamation, Hermiston and local volunteers planted 7,000 trees on a 20-acre section of the property to reestablish a natural floodplain. The watershed council continues to maintain the property, and approximately 70 percent of the trees planted have survived. Measured improvements in shade and vegetation have been documented.

The Walla Walla Basin Aquifer Recharge Projects consists of 18 project sites and is a collaboration between the Walla Walla Basin Watershed Council, OWEB, Bonneville Power Administration and local irrigation districts. The project utilizes artificial aquifer recharge which is the enhancement of natural groundwater supplies using man-made conveyances such as infiltration basins, field flooding, infiltration galleries or injection wells. Aquifer recharge is conducted to improve groundwater resources (i.e. increasing storage) and is often incorporated into a broader water resource plan. Completed projects have seen measured increases in stream flows, measured increases in the water table and have calculated decreases in water temperatures.

5.4 South Coast

Tenmile Watershed: DEQ has supported monitoring in the Tenmile Watershed for many years using 319 funds to match Oregon Watershed Enhancement Board grants. The TMDL for the watershed was approved in 2007 and set a water column total phosphorus target of 7.1micrograms per liter.

The Tenmile Lakes Basin Partnership's June 2014 monitoring report demonstrated a statistically significant decreasing trend in total phosphorus levels at two North Lake monitoring stations. Monitoring conducted in support of TMDL development found the total phosphorus average from 1998 to 2001 was 38µg/L. The 2011 annual total phosphorus average was 30 µg/L. If the current decreasing trend is sustained at the same level, the TMDL for total phosphorus target will be reached in 17 years. Seasonally, while winter total phosphorus levels are falling, summer levels show a statistically significant upward trend at the sample location in close proximity to residential development. Conversely, the deeper lake site more distant from development shows no significant trend.

Significant investment has been made by the Oregon Watershed Enhancement Board and DEQ to implement upland sediment abatement projects as well as tributary riparian enhancement. This investment appears to be influential in the downward trend for winter total phosphorus levels. This information is useful in guiding implementation and supports focusing on projects that will reduce sources of total phosphorus during the summer months. The data collected through this partnership also supports the determination that the TMDL/Water Quality Management Plan are being implemented (June 2014 Final Report OWEB No. 212-2033).

Coos Watershed Association: Restoration of Willanch Creek began in 1995 and was aimed at improving habitat conditions for salmon by addressing four main building blocks: fish passage, stream temperature, sediment inputs, and general spawning, rearing, and migratory habitat. These restoration objectives were based on the necessary habitat conditions for salmon reproduction and survival. The efforts used to address these objectives are interrelated and improve multiple habitat conditions. The restoration of Willanch Creek involved: planting trees, building willow walls, and building livestock exclusion fences

along stream banks to reduce erosion and to filter runoff from adjacent pastures, replacing culverts with bridges at four sites to permit fish to pass and to allow gravels to move downstream, replacing the tide gate at the mouth of Willanch Creek with an improved design to allow juvenile fish access to the estuary during critical times, putting large wood in the stream to provide cover, collect gravels, and scour pools, and blocking and removing unneeded logging roads to reduce soil erosion and prevent illegal garbage dumping. Riparian conditions and floodplain connectivity were enhanced as part of the restoration effort.

Stream temperatures were monitored over 12 years. The lower site showed a decrease in temperature from 74.2Fahrenheit to 61.9 Fahrenheit. All sites have met the DEQ rearing and migration temperature criteria during the last four years of data collection. The report hypothesizes that initial cooling was due to shading by riparian vegetation planted in 1997 and the second period of cooling was likely due to improved channel entrenchment ratio that resulted in more floodplain connectivity. In addition, beavers colonized the area further increasing floodplain connectivity and water storage capacity (http://cooswatershed.org/Publications/Willanch%20Final%20Version.pdf).

6. Nonpoint Source Basin Level Achievements in 2016

In 2016, DEQ allocated $333,501 to 319 Nonpoint Source Pass-Through Grant projects. The funds targeted priority basins for specific nonpoint source pollutants to effectively improve water quality. Five projects in Eastern Region, seven in Northwest Region, six in Western Region and two for source water protection (Table 9) were funded in 2016. Some of the funds were awarded to applicants who had been slated for funding in 2015 but did not receive them due to reductions in Coastal Zone Act Reauthorization Amendments reductions.

DEQ nonpoint source and TMDL staff identified regional priorities. The four general focus areas used to develop DEQ project priorities and to ensure 319 funds are used to implement watershed based plans and plan alternatives:

- TMDL implementation
- 303(d) listings
- Groundwater Management Areas
- Drinking Water Source Areas

Table 9 319 Projects funded in 2016

List of Projects Recommended for 2016 319 Funding				
REGION	**Project Name**	**Submitted by**	**Type of project**	**Budget**
Eastern	2015-16 No-Till Drill for Malheur River Watershed	OSU Extension - Malheur	Best Management Practices	$24,904
Eastern	2015-16 Salmon Safe Certification in Peas/Wheat Agronomic Crop Rotation	OSU Extension - Umatilla	Best Management Practices	$22,000

List of Projects Recommended for 2016 319 Funding				
REGION	**Project Name**	**Submitted by**	**Type of project**	**Budget**
Eastern	2015-16 Upper Klamath Basin Non-Point Source Education Project	Klamath Watershed Partnership	Outreach and Education	$7,947
Eastern	2015-16 Getting the Word Out and Making Things Happen in the Malheur River Basin - Phase II	Malheur Watershed Council	Outreach and Education	$20,000
Eastern	2015-16 Powder Basin Water Quality Monitoring Program - Macro invertebrate Sampling	Powder Basin Watershed Council	Monitoring	$20,000
Western	Coquille Mainstem Cold Water Refugia Monitoring Project	Coos Soil and Water Conservation District	Monitoring	$6,000
Western	Coquille Solid Waste Master Plan Update with Water Quality Implement Plan	City of Coquille	TMDL Implementation	$14,136
Western	Siletz Watershed - Monitoring and Assessment 2016-2017	Lincoln Soil and Water Conservation District	Monitoring	$24,714
Western	WISE Monitoring Effectiveness Monitoring Project Proposal	Rogue River Watershed Council	Monitoring	$14,000
Western	Storm and Drinking Water Improvements for Cities in the Long Tom Watershed	Long Tom Watershed Council	Outreach and Education	$30,000
Western	Effectiveness Monitoring of flood sprinkler irrigation conversion, Central Point	Jackson Co SWCD/Patton Environmental LLC	Best Management Practices	$6,000
Northwest	Upper Nehalem - Riparian Restoration	Upper Nehalem Watershed Council	Riparian Restoration	$13,970
Northwest	Tillamook Soil and Water Conservation District 2016 Stream Enhancement and Restoration	Tillamook Soil and Water Conservation District	Riparian Restoration	$14,980
Northwest	Milk Creek Riparian and Stream restoration project	Clackamas Soil and Water Conservation District	Riparian Restoration	$14,980
Northwest	Nestucca, Neskowin and Sand Lake Watersheds Rip Rest Program	Nestucca, Neskowin and Sand Lake	Riparian Restoration	$14,980

List of Projects Recommended for 2016 319 Funding				
REGION	**Project Name**	**Submitted by**	**Type of project**	**Budget**
		Watershed Council		
Northwest	College Creeks Clean Water Retrofit	Sandy River Basin Watershed Council	Outreach and Education	$14,980
Northwest	Scappoose Bay Watershed Restoration Action Plan	Scappoose Bay Watershed Council	Outreach and Education	$5,980
Northwest	Backyard Planting Program 2016-17 - 16-22	Tillamook Estuary Partnerships	Riparian Restoration	$14,980
State wide	DEQ– Portland State University TMDL Status and Trend Study	Portland State University	TMDL Implementation	$24,475
State wide	Pesticide Stewardship Partnership	Existing hauler contract	Pesticide Stewardship Partnership	$24,475
TOTAL				**$333,501**

6.1 Estimates of Nonpoint Source Load Reductions

Section 319 (h) (11) requires states to "report annually on what their nonpoint source programs are accomplishing, including available information on load reductions and actual water quality improvements." Annual load reduction estimates are completed for projects funded through the 319 program (Table 10).

EPA requires that DEQ complete nonpoint source pollutant load reductions using EPA's Section 319 Grants Reporting and Tracking System. DEQ used the load reduction model, "Spreadsheet Tool for Estimating Pollutant Load," within the system to estimate nitrogen (pounds per year), and phosphorus (pounds per year), sedimentation-siltation (tons per year) for each 319 funded project. Load reduction estimates were included in the EPA system.

Under the 2014 Nonpoint Source Program and Grants Guidelines for States and Territories, states are required to include information on load reductions in annual reports. Currently EPA provides tools to estimate nitrogen, phosphorus and sedimentation/siltation loading, but not for temperature. The lack of a tool to estimate temperature loading has caused Oregon to chronically underreport water quality improvements as DEQ cannot accurately capture all the work being done to address temperature TMDL allocations. DEQ is exploring the use of changes in percent effective shade as a tool for calculating reductions in thermal load and reporting on them in their annual report.

Percent effective shade is straightforward to monitor, calculate and is easily translated into quantifiable water quality management and recovery objectives. Removal or disturbance of riparian vegetation is the primary nonpoint source activity that affects stream temperatures since shading from vegetation limits the amount of solar radiation that reaches the stream in many of the waterbodies in Oregon. The principal means of achieving system potential shading is through protection and restoration of riparian vegetation. By using shade targets and effective shade curves as "surrogate measures" for temperature, designated

management agencies can address, monitor, and report on shade levels over a stream, rather than monitoring actual stream temperatures.

In Oregon, the Shade-a-lator tool is used in many ways including development of temperature TMDLs and water quality trading as part of a tool kit to calculate thermal load reductions from riparian shade restoration projects. DEQ plans to ask EPA to consider Shade-a-lator as a tool to report on load reductions for stream temperature in the coming year.

Table 10 Total 2016 load reduction estimates by pollutant for six 319 funded projects. These were projects where it was appropriate to estimate load reductions.

Project No.	Project Title	Funding year	Budget	Project recipient	End date	N, lbs/yr	P, lbs/yr	SED, T/yr	BOD, lbs/yr
W12643	Filter strip WQ Improvement	2012	$25,300	Owhyee Watershed Council	12/31/2016	66677	18715	9599	137625
W12651	Nestucca Riparian Restoration	2012	$53,115	Nestucca Neskowin Watershed Council	12/31/2016	1896	688	532	3406
W12670	Nestuca - Neskowin WSC 2015 Riparian Restoration	2012	$10,000	Nestucca Neskowin Watershed Council	12/31/2016	751	240	146	944
W12641	Milton-Freewater Levee Setback and Habitat Enhancements	2012	$82,702	Walla Walla Watershed Council	1/22/2016	137	47	35	224
W13700	Walla Walla River Levee Setback - Smith River Channel	2013	$45,000	Walla Walla Watershed Council	2/10/2016	21044	5918	3518	50526
W13717	Big Elk Creek BMP Implementation Project	2013	$15,524	Lincoln SWCD	2/22/2017	13		60	

6.2 Summary of Basin Wide Nonpoint Source Implementation

Consistent with EPA's desire for states to implement watershed based plans, implementation of the Nonpoint Source Program can be summarized by a basin-wide approach. DEQ made significant changes to the outline of its 2016 Annual Report in response to comments from EPA. Following a list of nonpoint source accomplishments in 2016, more detailed summaries of basin characteristics, impairments, partners, planning and implementation efforts are detailed by basin.

Summaries that will be included in the 2017 Nonpoint Source Annual Report:

- Columbia River

- Sandy
- John Day
- Grande Ronde
- Snake River/Hells Canyon
- Oregon Closed Lakes Basin

Watershed Characteristics

The Deschutes Basin is the second largest watershed in Oregon, covering 10,759 square miles (more than 6.8 million acres) in the north-central part of the state. The basin extends west to the crest of the Cascade Mountains, south to lava plateaus, east into the Ochoco Mountains and to the plateau between the Deschutes and John Day Rivers, and north to its confluence with the Columbia River. Much of the geography of the basin has been shaped by volcanic activity, from the young cinder cones and pumice deposits of the Cascades to the massive Columbia River basalts in the canyons of the lower river.

The headwaters of the Deschutes River and most major tributaries receive large amounts of precipitation, but much of the subbasin lies in the rain shadow of the Cascade Mountains and is sheltered from western Oregon's heavy rainfall. Average annual precipitation amounts to more than 100 inches on the eastern slopes of the Cascades, mostly as snow, but drops to only 40 inches in the Ochoco Mountains and 10 inches at lower central locations. Consequently, while the Metolius drainage receives up to 50 inches of precipitation annually, the Bakeoven drainage receives only 10-12 inches.

The climate in much of the basin is considered continental, with low precipitation and humidity, large daily temperature fluctuations throughout the year, and high evaporation rates. Cold winters and hot, dry summers are common. Temperatures in the Crooked River watershed, for example, can exceed 100 degrees Fahrenheit in the summer and drop below 30 below Fahrenheit in the winter. The City of The Dalles, located near the basin's mouth on the Columbia River, is often the warmest location in the state.

Parts or all of nine Oregon counties are situated in the Deschutes watershed. These counties include Crook, Deschutes, Harney, Hood River, Jefferson, Klamath, Lake, Sherman and Wasco. Five of these counties — Crook, Deschutes, Jefferson, Sherman and Wasco — comprise most of the watershed. Larger population centers in the subbasin include Bend, Redmond, Madras and Prineville.

Oregon DEQ Station number 10688, Deschutes River at Pringle Falls

Land ownership in the Deschutes Basin is approximately 51 percent public, 7 percent tribal and 42 percent private. The federal government owns and manages most public land in the basin, including three national forests, one National Grassland and one Bureau of Land Management District. Lands of the Warm Springs Tribal Reservation extend over approximately 641,000 acres and lie mostly in the Lower Deschutes Subbasin. Land use in the Deschutes Basin is approximately 59 percent grassland/shrub, 34 percent forested, 3 percent agriculture, 2 percent urban and 2 percent other. *See map on Page 4*.

The Deschutes Basin is very large and encompasses a wide range of environmental, social and cultural conditions. In order to better assess and describe the conditions in the basin, and to more effectively communicate with stakeholders during the watershed assessment process, the basin was divided into four separate subsec-

Continued on next page

State of Oregon Department of Environmental Quality

Watershed Characteristics (continued)

tions: the Crooked River subbasins, the Upper and Little Deschutes subbasins, the Lower Deschutes Subbasin and the Trout and Willow subbasins. This breakdown generally follows the boundaries of the Agricultural Water Quality Management Areas (Upper and Little Deschutes subbasins = Oregon Department of Agriculture Upper Deschutes Water Quality Management Area; Crooked Subbasin = ODA Crooked River Water Quality Management Area; Trout and Willow Creek subbasins = ODA Middle Deschutes Water Quality Management Area; Lower Deschutes Subbasin = ODA Lower Deschutes Water Quality Management Area).

Public interaction, pollutant and resource assessments and priorities were developed separately for each of these four areas. Subbasin in this context is meant to indicate that these four areas each represent a portion of the larger, Deschutes Basin. The term subbasin will be used to refer to these four geographic areas. In most cases, DEQ's use of subbasin corresponds to the hydrologic subbasins, with the exception of the Trout and Willow subbasins. For our purposes, this area refers to the Trout and Willow Creek watersheds along with the surrounding area of agency plains.

Partners and Collaboration

The Middle Deschutes was added as a pilot Pesticide Stewardship Partnership program in 2014, using resources allocated by the 2013 Oregon Legislature. Working with the Middle Deschutes Watershed Council, Jefferson Soil and Water Conservation District, Oregon Department of Agriculture and local landowners, samples were collected from Willow Creek, Campbell Creek, Mud Springs Creek and Trout Creek. Eighteen individual pesticide compounds were detected in the watershed between late March and early December 2014. The overall detection frequency across sites was fairly low, with the highest being the herbicide diuron at just over 30 percent. The EPA benchmark for linuron was exceeded in two samples from Campbell Creek. In addition to the pesticide monitoring, the program supported waste pesticide collection events in November 2014 and February 2017 where a total of over 17,000 pounds of waste pesticide were collected. To gather more information about pesticides found in the watershed, a second phase of pilot program monitoring is being conducted in 2017.

DEQ has partnered with the Upper Deschutes Watershed Council and others over the past 10-15 years to support stream restoration and long-term watershed monitoring projects in the Upper Deschutes Subbasin. Monitoring is used to: analyze the status of local rivers and streams, track changes over time, evaluate the effectiveness of restoration projects and inform the community about important issues. Recent efforts have focused on Whychus Creek, and the Deschutes River downstream of Bend (the "middle Deschutes"). In Whychus Creek, extensive restoration efforts have occurred and the Upper Deschutes Watershed Council is conducting long-term, watershed-scale monitoring in collaboration with the Bonneville Environmental Foundation's Model Watershed Program to better understand long-term changes in physical and biological indicators such as temperature and macroinvertebrates. In the middle Deschutes, monitoring is being used to identify targets for stream flow restoration to improve stream temperatures and improve the health of resident fish populations. Partners in both efforts include: Oregon Department of Fish and Wildlife, Oregon Watershed Enhancement Board, Oregon Water Resources Division, U.S. Forest Service, U.S. Fish and Wildlife Service, irrigation districts, Deschutes Land Trust, Deschutes River Conservancy, Xerces Society, the Freshwater Trust, Portland General Electric and many others.

Partners in the Basin include:

Continued on next page

Partners and Collaboration (continued)

Soil and Water Conservation Districts: Wasco County, Sherman County, Jefferson County, Crook County, Deschutes County

Watershed Councils: Bakeoven, Buckhollow, White River, Middle Deschutes, Crooked River, Upper Deschutes

State and Federal Government: Oregon Department of Fish and Wildlife, Oregon Water Resources Department, Oregon Department of Agriculture, Oregon Department of Forestry, Oregon Watershed Enhancement Board, Department of State Lands, Department of Land Conservation and Development, Mt. Hood National Forest, Deschutes National Forest, Ochoco National Forest, Bureau of Land Management- Prineville District, U.S. Fish and Wildlife Service, Natural Resource Conservation Service, U.S. Bureau of Reclamation, U.S. Geological Survey, U.S. Environmental Protection Agency, National Marine Fisheries Service/ National Oceanic and Atmospheric Administration

Green Lakes, August 2008

Tribal Government: Confederated Tribes of Warm Springs

Local Government: Cities of Bend, Redmond, Sisters, Prineville, La Pine, Madras, Maupin, Crook, Deschutes and Jefferson, Wasco and Klamath Counties

Irrigation Districts: North Unit, Central Oregon, Swalley, Tumalo, Arnold, Ochoco, Lone Pine, Three Sisters

Others: Deschutes River Conservancy, Central Oregon Flyfishers, Portland General Electric, Trout Unlimited, Upper Deschutes River Coalition, Water for Life, WaterWatch of Oregon, Nature Conservancy, Central Oregon Intergovernmental Council, Oregon State University Extension Service, Friends of the Metolius, Deschutes Land Trust, Coalition for the Deschutes, Deschutes River Conservancy

Contact Information

Bonnie Lamb

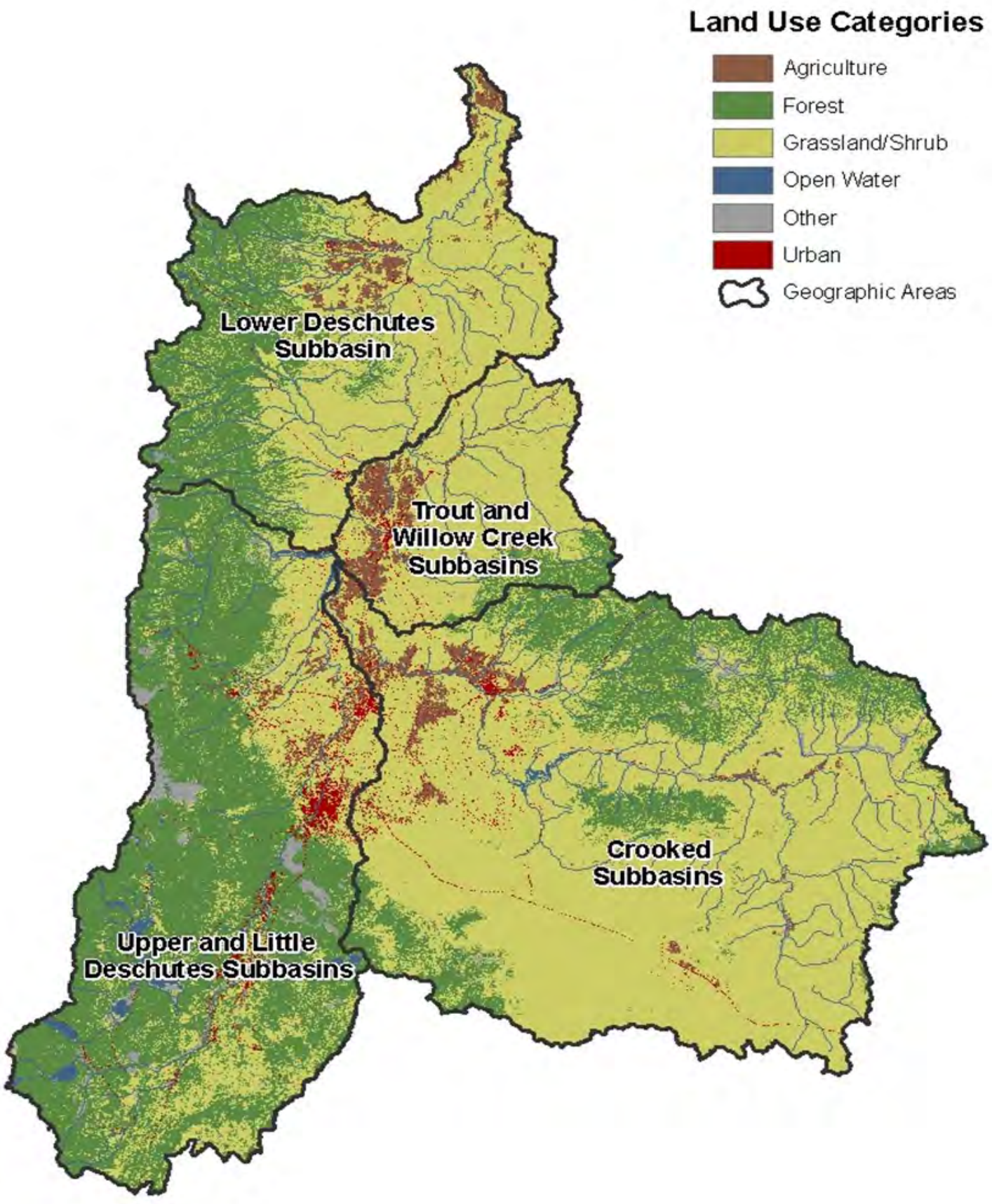
Deschutes Basin Coordinator

541-633-2027

lamb.bonnie@deq.state.or.us

DEQ
State of Oregon Department of Environmental Quality

Deschutes Basin Report



Deschutes Basin Report

Current impairments and TMDLS

Water quality in the Deschutes Basin ranges from very poor to excellent. According to the most recent 2016 assessment of the Oregon Water Quality Index, of the 10 DEQ long-term ambient monitoring stations in the Deschutes Basin, five recorded excellent conditions, two recorded good conditions, two recorded poor conditions and one recorded very poor conditions (Trout Creek downstream of Mud Springs Creek). Temperature is a widespread issue of concern that affects fish and other aquatic life throughout the Deschutes Basin. Macroinvertebrate data collected around the basin indicate that temperature may be a significant stressor on the macroinvertebrate community, with the majority of sites sampled being in poor condition for temperature stress.

No Total Maximum Daily Loads have been issued in the Deschutes Basin. DEQ is currently working on TMDLs for nutrients, dissolved oxygen and pH in the Upper and Little Deschutes subbasins. Once these are completed, DEQ will initiate TMDL development in the rest of the basin.

Parameter/Pollutant	No. of 303(d) Listings
Dissolved Oxygen	15
Metals	2
Biocriteria	16
Eutrophication	11
Sedimentation	14
Bacteria	4
Temperature	100
pH	19
Other	1
Total	**182**

About the 303(d) Program

Under section 303(d) of the Clean Water Act, states, territories and authorized tribes must submit lists of impaired waters. These waters are too polluted or otherwise degraded to meet water quality standards. The law requires that states establish priority rankings for waters on the lists and develop Total Maximum Daily Loads for these waters. — Source EPA

NPS Implementation in Agricultural Lands: Highlights

There are four Agricultural Water Quality Management Area Plans in the Deschutes Basin: Lower Deschutes, Middle Deschutes, Upper Deschutes and Crooked River. The one recent 319 project is located in the Upper Deschutes Management Area, so information from that plan is included here.

Upper Deschutes Agricultural Water Quality Management Plan:

Indian Ford Strategic Implementation Area: The Oregon Department of Agriculture recently completed an evaluation of agricultural management activities and landscape conditions with potential to contribute to or cause water pollution in the Indian Ford Creek Watershed. Agricultural areas of the watershed consist mostly of pasture and small acreage livestock facilities. Water quality concerns in the watershed are for temperature, but this is limited to available data. As a result of the Strategic Implementation Area, the Deschutes Soil and Water Conservation District is working closely with landowners to apply for grant funding for various restoration activities along Indian Ford, including riparian vegetation planting and manure storage facilities. The district is currently working with landowners on stream bank restoration along 1.5 miles of Indian Ford and Whychus creeks.

Deschutes Irrigation Water Management: Irrigation water in Deschutes County used to be delivered to larger acreages by irrigation districts. The point of delivery consisted of some kind of headgate for the acreage. From there, water was delivered throughout the property in earthen ditches, primarily to flood-irrigate fields. Over time, most of these properties were subdivided, and a 160-acre farm could now consist of 32 five-acre properties

Continued on next page

NPS Implementation in Agricultural Lands (cont'd)

that have one point of delivery and some kind of rotation system for delivering water amongst the properties. This kind of setup is fraught with wasteful water use and tension amongst neighbors. In 2009, the grassroots Irrigation Water Management group formed in Central Oregon with a mission to accelerate the adoption of on-farm irrigation water management. This group realized that success would necessitate working with these landowners that share a point of delivery; they named these groups 'Pods.' Over the years, this group worked to identify all the challenges with working successfully with Pods to improve IWM.

The Deschutes Soil and Water Conservation District has strategically selected two Pods to start working with, one within the Central Oregon Irrigation District and one within the Swalley Irrigation District. The Deschutes district has selected two private laterals that included about 20 landowners on 200 acres. The district met three times with landowners and submitted two grant proposals for irrigation assistance. The district is awaiting approval of those two proposals before moving forward with implementation.

La Pine Resource Conservation Area: The La Pine Basin is a part of a unique ecosystem in Oregon dominated by wetland habitats that support the endangered Oregon spotted frog. The majority of riparian/wetland habitat in the Little Deschutes River watershed is privately owned. Southern Deschutes County has two agricultural water quality issues: inadequate riparian vegetation along the Little Deschutes River, connected sloughs and/or wetlands and its tributaries; and *E. coli* and nitrates from livestock manure polluting groundwater around La Pine or contained in runoff that flows directly into streams.

Transport of pesticides to groundwater is also of concern. Groundwater is very shallow in this area and is the focus of DEQ efforts to address septic systems. Conservation partners, especially ODA, Upper Deschutes River Coalition, Deschutes River Conservancy, Deschutes County, Upper Deschutes Watershed Council, Oregon Watershed Enhancement Board, Natural Resources Conservation Service, and DEQ, are very interested in improving streamside conditions and water quality in the south county.

The Deschutes Soil and Water Conservation District has evaluated riparian vegetation conditions along 65.5 miles of the Little Deschutes River and assessed properties in six townships for the likelihood of manure contamination.

Based on these assessments, the district has done repeated outreach to landowners in an effort to improve conditions, however outreach efforts have largely not been successful to date. Broader outreach efforts in the conservation area have been more successful and included:

- Identified landowners bordering 45 miles of the Little Deschutes using the county website creating a contact list for landowners
- Sent letters to landowners eligible for Conservation Reserve Enhancement Program
- Held a composting class in the conservation area at a plant nursery
- Held three classroom discussions at La Pine middle and high schools on water quality
- Acquired landowner agreements for streambank planting on Little Deschutes
- Planned and funded fencing off 1,000 feet of degraded bank from livestock damage
- Developed a grazing plan that was implemented on 46 acres
- Coordinated a fire fuels reduction project on 80 acres

Contact Information

Bonnie Lamb

Deschutes Basin Coordinator

541-633-2027

lamb.bonnie@deq.state.or.us

DEQ
State of Oregon Department of Environmental Quality

Deschutes Basin Report

319 Projects

Project	Category	Goals	Description
Mid-Deschutes River and Tumalo Creek Temperature Monitoring	Monitoring	Characterize water temperature effects resulting from increases in stream flow in the Deschutes River and Tumalo Creek. Evaluate the effectiveness of stream flow restoration in reducing water temperatures. Identify flow targets for stream flow restoration.	Collect two years of continuous (spring to fall) temperature data in the Deschutes River and Tumalo Creek to determine suitability of water quality conditions for native fish populations. Analyze the collected data in the context of the existing 10-12 year dataset to quantify reductions in temperature in relation to increases in streamflow.

About 319 Grants

The federal Clean Water Act grants states, territories and tribes grants for technical assistance, education, training, technology transfer, demonstration projects and monitoring to assess the success of specific nonpoint source implementation projects. Learn more at https://www.epa.gov/lakes/clean-water-act-section-319.

Over the period 2014-2016, over $18,000 319 dollars have been leveraged on projects targeting nonpoint source pollution in the Upper Deschutes Basin.

Whychus Creek

Watershed Plans

The U.S. Environmental Protection Agency requires that proposed watershed-based plans developed or implemented using Section 319 funds must include nine key elements. This will assure that public funds are being used effectively and that projects make progress towards restoring waters impaired by nonpoint source pollution. These elements include identification of the causes and sources of pollutants, management measures and their expected load reductions, funding and sources, and information or education component.

NINE KEY ELEMENTS

- Causes, sources and extent of pollutants
- Description of management measures
- Load reductions expected from measures
- Funding needs and sources
- An information or education component
- An implementation schedule
- Measurable milestones of implementation
- Criteria for determining progress
- A monitoring component

Watershed Plans in the Deschutes Basin include:

◊ Deschutes Basin: Integrated Watershed Approach Status Report and Action Plan
◊ Upper Deschutes Subbasin Assessment
◊ Upper Deschutes Subbasin Action Plan
◊ Little Deschutes Subbasin Assessment
◊ Little Deschutes Subbasin Action Opportunities
◊ Upper Deschutes River Restoration Strategy
◊ Whychus Creek Restoration and Management Plan
◊ Crooked River Watershed Assessment
◊ Lower Crooked River Watershed Assessment
◊ Lower Crooked River Hydraulic Assessment
◊ White River Watershed Assessment
◊ White River Council Watershed Action Plan
◊ Buckhollow Watershed Plan and Environmental Assessment
◊ Bakeoven Watershed Assessment and Action Plan
◊ Bakeoven/Buck Hollow Watershed Council Restoration Action Plan
◊ Trout Creek Watershed Assessment
◊ Middle Deschutes Watershed Council: Watershed Restoration Action Plan
◊ Deschutes Subbasin Plan
◊ Lower Deschutes Agricultural Water Quality Management Area Plan
◊ Middle Deschutes Agricultural Water Quality Management Area Plan
◊ Upper Deschutes Agricultural Water Quality Management Area Plan
◊ Crooked River Agricultural Water Quality Management Area Plan

Future Project Goals, Needs and Priorities

The Deschutes Basin was not identified as a 319 priority basin in 2016 or 2017. There are four Eastern Region 319 priorities, which are relevant in this basin. These include the following:

Effectiveness Monitoring and TMDL Implementation Tracking:

- ◊ Targeted effectiveness monitoring projects include monitoring and assessment of systems to characterize the effectiveness of implementation projects specific to improving water quality and habitat; and to track basin -scale progress.
- ◊ Assessment or characterization of the impacts of water management, storage projects and TMDL implementation.

Pesticide Reduction Activities:

- ◊ Targeted pesticide reduction projects to reduce/remove old or unused pesticides, and encourage replacement of current use pesticides with softer alternatives.
- ◊ Targeted project elements include public education programs to increase public awareness of environmental quality and health concerns associated with pesticide use and storage. Projects targeting underserved areas will be given priority.

Riparian Restoration:

- ◊ Targeted riparian restoration project elements include restoring morphologic function (increased sinuosity, decreased width/depth ratios), revegetation of riparian areas, floodplain reconnection and increased instream flow.
- ◊ Proposed projects are expected to include an extensive portion of the stream channel over time rather than isolated small-length segments. Riparian restoration projects should target activities in the area of on-going project work whenever possible. Projects correlated with and/or adjacent to other restoration work will be given priority.

DEQ Station Number 10508, Deschutes River at Lower Bridge

Stormwater:

- ◊ Targeted projects include: water quality improvement specific to stormwater impacts including local planning, alternatives assessment, stakeholder and homeowner education and information program development, feasibility studies and similar efforts.

Contact Information

Bonnie Lamb

Deschutes Basin Coordinator

541-633-2027

lamb.bonnie@deq.state.or.us

State of Oregon Department of Environmental Quality

Watershed Characteristics

The Middle Columbia-Hood Basin is in the north-central part of Oregon occupying approximately 1,140 square miles. The basin is a collection of rivers and creeks which are tributaries to the Columbia River and enter the river roughly between the cities of Cascade Locks to the west and The Dalles to the east. The basin can be split into two geographic regions that generally follow county lines: Hood River County in the western half of the basin (including the Hood River Watershed) and Wasco County in the eastern half (including the Mosier Creek, Mill Creek and Fifteenmile Creek Watersheds). Projects and active partnerships generally follow the county lines. The entire basin contains lands ceded to the Confederated Tribes of the Warm Springs Reservation of Oregon.

Hood River County: Streams in the basin's western half originate on the eastern slope of the Cascade Range largely in conifer forests and flow north from Mt. Hood. The Hood River and a number of its upper tributaries are fed by glacial sources and can transport large amounts of bedload and sediment. This portion supports a wide range of native fish, including bull trout, spring Chinook salmon, summer and winter steelhead, rainbow and cutthroat trout, and lesser numbers of fall Chinook and Coho salmon. In 1998, steelhead and bull trout in the Hood River were listed as threatened under the Endangered Species Act.

In this western half of the basin, approximately 85 percent of the land is forestland, with more than two-thirds of this managed by the Mt. Hood National Forest. Agriculture, primarily fruit production, is the second largest land use, accounting for over 7 percent of the land area. Agriculture is the leading industry, followed by tourism, outdoor recreation and forestry. Approximately 4 percent of the land area has urban and/or residential development. The population in the county is dispersed, with almost 70 percent of county residents living outside urban growth boundaries. There are four small urban centers in the county: Hood River, Cascade Locks, Odell and Parkdale.

Major human disturbances that have affected hydrology, aquatic life and water quality in the area include:

- Diminishment or depletion of stream flows at irrigation, hydropower and municipal water diversions
- Fish migration barriers at dams, diversions and road crossings
- Loss of large woody debris recruitment and reduced riparian-floodplain interactions caused by historic timber practices
- Channel confinement and interference with stream and riparian processes by roads and other land use
- Water quality alteration by sediment inputs from roads and irrigation networks, pesticide and nutrient contamination from agricultural and other non-point sources, temperature increases from flow modification, reservoir discharge, or riparian vegetation removal

Wasco County. Streams in this eastern half of the basin originate on the forested eastern slopes of the Hood River Range, a north-south range starting approximately nine miles east of Mt. Hood and running north to the Columbia River. The Cascade Mountains produce a rain-shadow effect, drastically reducing the total precipitation to the east. Average annual precipitation varies from 65-80 inches in the higher elevation headwaters in the west to 10-11 inches on the eastern border of the basin. Only 5-10 percent of the moisture falls from June through August. Because of both the seasonality of moisture and the total low precipitation, tributaries originating at lower elevations are usually not perennial. The watershed is home to a variety of fish species, including Pacific lamprey, resident Redband trout and coastal cutthroat trout.

The economy of the eastern half of the basin is based on agriculture, recreation and grazing, with a smaller component of forest production. Approximately 84 percent of the land is privately owned and is largely dominated by cropland and rangeland. Of the cropland, the vast majority is non-irrigated and is almost ex-

Continued on next page

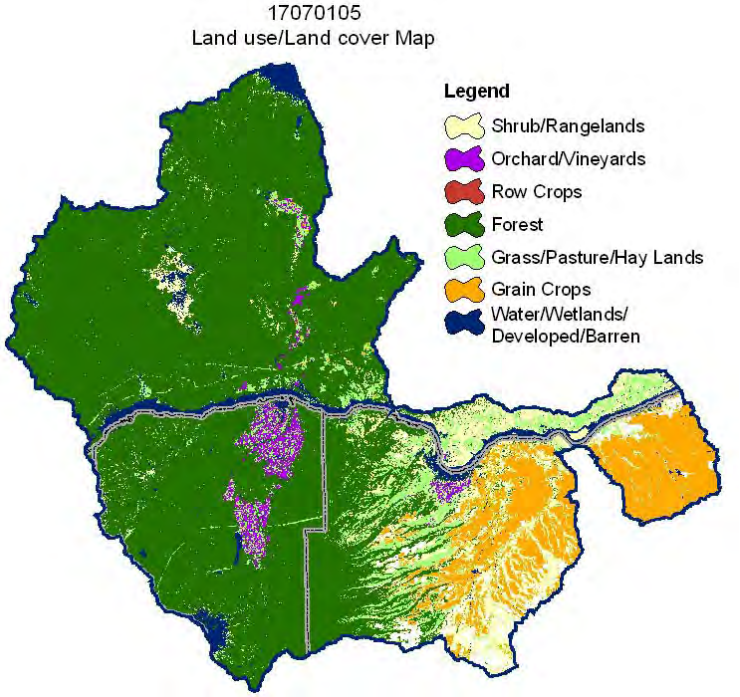
DEQ
State of Oregon Department of Environmental Quality

Watershed Characteristics (continued)

clusively in wheat or other grain production. Less than 5 percent is irrigated orchards and vineyards. Approximately 4 percent of the land area has urban and/or residential development.

Major human disturbances that have affected hydrology, aquatic life and water quality in the area include:

- Changes to land cover that affect wildlife habitat, hydrologic regimes and erosion rates
- Alteration of instream and riparian conditions through channelization of streams, road-building, removal of large woody debris, and historic logging patterns
- Pesticide and fertilizer use
- Groundwater overdraft



Right: Natural Resources Conservation Service land use map—2005

Partners and Collaboration

In 1998, a number of creeks in the Fifteenmile Creek watershed in Wasco County were listed as impaired for sedimentation. To address this, local, state and federal agencies worked with private landowners to restore and conserve the land. Two major actions on farmlands are: establishing and protecting streamside vegetative buffers, and converting wheat plowing practices to no-till/direct seeding. A myriad of restoration activities have also been conducted on forestland by the Mt. Hood National Forest. To better understand, monitor, and communicate the benefits of these practices, DEQ recently entered into several state and federal partnerships. These include a Conservation Effectiveness Partnership with the Oregon Department of Agriculture, Oregon Watershed Enhancement Board, Natural Resources Conservation Service and a partnership with Natural Resources Conservation Service and the U.S. Environmental Protection Agency under the National Water Quality Initiative. Both partnerships have involved other local partners including: Wasco Soil and Water Conservation District, Oregon Department of Fish and Wildlife, Fifteenmile Watershed Council and private landowners.

The Pesticide Stewardship Partnership continues to be successful in Hood River and Wasco County. Working closely with local stakeholders in the early 2000s, DEQ started two pilot pesticide projects in Columbia Gorge watersheds: Hood River and Mill Creek (Wasco County). The projects evolved into the state-wide partnership that now exists. Today, DEQ works with local partners to monitor 10 locations in Hood River, Neal Creek, Lenz Creek, Odell Creek, Mill Creek, Threemile Creek and Fifteenmile Creek. Partners include the Confederated Tribes of the Warm Springs Reservation, ODA, Oregon Department of Forestry, Hood River Watershed Group, the Wasco County Watershed Councils, Hood River and Wasco County Soil and Water Conservation Districts, Oregon State University Extension Service, the Columbia Gorge Fruit Growers and others. In addition to grab sampling, sediment samples and passive samples were taken at several sites. In recent years, all water samples have been analyzed for a range of insecticides, fungicides and herbicides. Substantial reductions in the concentrations of high-priority insecticides have been observed in both the Hood and Wasco watersheds since monitoring began.

State of Oregon Department of Environmental Quality

Partners and Collaboration (continued)

DEQ's extensive list of partners in the watershed includes:

Hood River County:

- Hood River Watershed Group
- Hood River Soil and Water Conservation District
- Wasco County Soil and Water Conservation District
- Hood River Pesticide Stewardship Partnership
- Middle Fork Irrigation District
- East Fork Irrigation District
- Farmers Irrigation District
- Dee Irrigation District
- U.S. Fish and Wildlife Service
- NOAA National Marine Fisheries Service
- Hood River County
- City of Hood River

Wasco County:

- Fifteenmile Watershed Council
- The Dalles Watershed Council
- Mosier Watershed Council
- Wasco County Soil and Water Conservation District
- Wasco Watersheds Pesticide Stewardship Partnership
- Wasco County
- Cities of The Dalles, Mosier and Dufur
- Freshwater Trust

Partners in both watersheds:

- Landowners/farmers
- Confederated Tribes of Warm Springs
- Mt. Hood National Forest
- Oregon Department of Agriculture
- Oregon Department of Fish and Wildlife
- Oregon Water Resources Department
- Oregon Department of Forestry
- Oregon Watershed Enhancement Board
- Natural Resources Conservation Service
- Oregon State University Extension Service
- Columbia Riverkeepers
- Mid-Columbia Agricultural Research and Extension Center
- Bonneville Power Administration

Current impairments and TMDLS

Water quality in the Middle Columbia-Hood Basin is generally considered poor to good. Of the four DEQ long-term ambient monitoring stations in the basin in 2016, one recorded good conditions, two recorded fair conditions and one recorded poor conditions. Temperature, nutrients and fine sediment have been identified as pollutant stressors that affect fish and other aquatic life throughout the basin.

Two TMDLs for temperature have been issued in the basin. The Western Hood Subbasin TMDL was issued in December 2001 and covers the western half of the basin. This TMDL is currently being revised to incorporate changes in DEQ's temperature standard that were adopted in 2004. DEQ expects to issue this revision in 2017. The Middle Columbia-Hood (Miles Creeks) Subbasin TMDL was issued in December 2008 and covers the eastern half of the basin. In both TMDLS, the primary nonpoint source contributions to temperature impairments identified are: riparian vegetation disturbance or removal, reduced stream flows and channel modification and widening.

Parameter/Pollutant	No. of 303(d) Listings
Dissolved Oxygen	2
Metals	19
Biocriteria	10
Eutrophication	0
Sedimentation	6
Bacteria	4
Temperature	3
pH	3
Other	11
Total	**58**

319 Projects

Project	Category	Goals	Description
Lower Mill Creek Riparian Restoration Project	Best Management Practices/ Technical Assistance	Improve habitat, flow, passage and riparian vegetation condition on Lower Mill Creek.	Remove an existing levee to allow flow into a historic side channel. Add large wood to the floodplain to increase roughness. Plant native riparian woody species within the floodplain where invasive species currently dominate. Replace the existing culvert with a foot bridge. Monitor temperature effects through fish and other appropriate surveys.
Rock Creek Restoration Design	Best Management Practices/ Technical Assistance	Improve habitat, floodplain connection and riparian vegetation condition on Rock Creek.	Project funds supported designs to place large woody debris in erosion-prone areas to reduce erosion, encourage greater floodplain connection and improve habitat for adult and juvenile fish during high flow

Mill Creek side channel restoration site—Wasco SWCD

About 319 Grants

The federal Clean Water Act grants states, territories and tribes grants for technical assistance, education, training, technology transfer, demonstration projects and monitoring to assess the success of specific non-point source implementation projects. Learn more at https://www.epa.gov/lakes/clean-water-act-section-319.

Since 2014, approximately $80,000 has been spent on floodplain connection projects that improve essential fish habitat in the Middle Columbia-Hood Basin.

State of Oregon Department of Environmental Quality

Middle Columbia-Hood Basin Report

NPS Implementation in Agricultural Lands: Highlights

There are two Agricultural Management Plan Areas within the Middle-Columbia-Hood Basin: Hood River and Lower Deschutes Management Area. The Lower Deschutes Management Area includes the Wasco County portion of the Hood Basin, along with Wasco and Sherman County portions of the Lower Deschutes Subbasin. The Local Advisory Committee for this area met on Dec. 15, 2016 to revise the plan. Revisions have not yet been completed, but the following list describes some key highlights/milestones that were identified. It is expected that the plan on the Oregon Department of Agriculture website will soon be updated with the 2016 plan. The highest nonpoint source priorities for agricultural lands in this area are:

- Provide adequate riparian vegetation for stream bank stability and stream shading consistent with site capability

  Goal: By June 30, 2026, 95 percent of perennial streams in agricultural areas will have streamside vegetation that likely provides the full suite of water quality functions the site is capable of (i.e., shade, bank stability, filtration of overland flow).

  Current status (2016): Currently 91 percent of streams fully provide canopy and ground cover.

- Control soil erosion on uplands to acceptable rates

  Goal: By June 30, 2020, reduce the average erosion rate on tilled cropland to 1.0 tons of soil per acre per year without increasing the total erosion for the year above 300,000 tons.

  Current status (2016): During 2015, the average erosion rate on tilled cropland was 1.34 tons of soil per acre per year. In addition, the total erosion for the year was approximately 300,000 tons.

- Prevent water pollution from wastes.

  Goal: By June 30, 2021, zero livestock operations are likely to pollute perennial streams.

  Current status (2016): Three livestock operations were identified likely to pollute perennial streams.

The Hood River Management Plan Area includes most of Hood River County and the Hood River drainage and all other tributaries to the Columbia River between and including Eagle Creek to the west and Fir Mountain to the east.

The Hood River Soil and Water Conservation District and Local Area Committee prioritized watersheds in the Management Area. The focus areas identified in the 2014 Plan were Indian and Neal creeks.

The Local Advisory Committee set a goal of 100 percent of the streambanks on agricultural lands in Class I (vegetation on agricultural lands likely sufficient to moderate solar heating, stabilize streambanks and filter out pollutants consistent with site capability) throughout the management area. However, it believes it will take more than voluntary measures to achieve that due to the large number of small parcels, scattered rural residential properties, landowner turnover, and the small but persistent number of landowners who need the threat of regulation to make changes.

Pre-assessment of riparian condition along 14.8 miles of Indian Creek and major tributaries in 2013 resulted in 34 percent in non-agricultural use. Of the remaining riparian area, 81 percent in Class I, 3 percent in Class II (agricultural activities allowing plant growth, but vegetation likely insufficient to moderate solar heating, stabilize streambanks or filter out pollutants consistent with site capability), and 16 percent in Class III (Agricultural activities likely not allowing vegetation to moderate solar heating, stabilize streambanks, or filter out pollutants consistent with site capability).

Due to limited staff, the district will evaluate the management area one watershed at a time, beginning with Indian Creek and proceeding to Neal Creek. With more information, they will begin developing Management Area-wide Measurable Objectives.

The measurable objective that was developed for Indian Creek was to decrease the percentage of stream miles in Class III to less than five percent by June 30, 2015 and keep it there. Measurable objectives for Neal Creek will be developed by the Local Advisory Committee at the 2016 biennial review.

Middle Columbia-Hood Basin Report

Watershed Plans

The U.S. Environmental Protection Agency requires that proposed watershed-based plans developed or implemented using Section 319 funds must include nine key elements. This assures public funds are being used effectively and that projects make progress towards restoring waters impaired by nonpoint source pollution. These elements include identification of the causes and sources of pollutants, management measures and their expected load reductions, funding and sources, and an information or education component.

NINE KEY ELEMENTS

- Causes, sources and extent of pollutants
- Description of management measures
- Load reductions expected from measures
- Funding needs and sources
- An information or education component
- An implementation schedule
- Measurable milestones of implementation
- Criteria for determining progress
- A monitoring component

Watershed Plans in the Middle Columbia-Hood Basin include:

Hood River County/Watershed:

- Hood River Watershed Assessment (Hood River Watershed Group)
- Hood River Watershed Action Plan: 2014 Update (Hood River Watershed Group)
- Hood River Subbasin Plan (Northwest Power and Conservation Council)
- Hood River Basin Aquatic Habitat Restoration Strategy (U.S. Forest Service)
- Hood River Basin Study Report (U.S. Bureau of Reclamation)
- Hood River Water Conservation Strategy
- Hood River Agricultural Water Quality Management Area Plan (Oregon Department of Agriculture)
- Western Hood Subbasin Temperature TMDL (DEQ)

Wasco County/Miles Creeks:

- Fifteenmile Watershed Assessment (Wasco Soil and Water Conservation District)
- Fifteenmile Watershed Council Restoration Action Plan (Wasco Soil and Water Conservation District)
- Fifteenmile Action to Stabilize Temperatures
- Mosier Watershed Assessment (Wasco Soil and Water Conservation District)
- Mosier Watershed Council Restoration Action Plan (Wasco Soil and Water Conservation District)
- The Dalles Watershed Assessment (Wasco Soil and Water Conservation District)
- The Dalles Watershed Council Restoration Action Plan (Wasco Soil and Water Conservation District))
- Lower Mill Creek Vision and Plan (Wasco Soil and Water Conservation District)
- Wasco County Area Watershed Councils Work Plan: 2015-2017 (Wasco Soil and Water Conservation District)
- Wasco County Area Watershed Councils Annual Report: FY15/16 (Wasco Soil and Water Conservation District)
- Fifteenmile Subbasin Plan (Northwest Power and Conservation Council)
- Lower Deschutes Agricultural Water Quality Management Area Plan (Oregon Department of Agriculture)
- Middle Columbia-Hood (Miles Creeks) Subbasin Temperature TMDL (DEQ)

Future Project Goals, Needs and Priorities

The Middle Columbia-Hood Basin was not identified as a 319 priority basin in 2016 or 2017. There are four Eastern Region 319 priorities, which are relevant in this basin. These include the following:

Effectiveness Monitoring and TMDL Implementation Tracking:

◊ Targeted effectiveness monitoring projects include monitoring and assessment of systems to characterize the effectiveness of implementation projects specific to improving water quality and habitat; and to track basin -scale progress.

◊ Assessment or characterization of the impacts of water management and storage projects and TMDL implementation.

Pesticide Reduction Activities:

◊ Targeted pesticide reduction projects to reduce/remove old or unused pesticides, and encourage replacement of current use pesticides with softer alternatives.

◊ Targeted project elements include public education programs to increase public awareness of environmental quality and health concerns associated with pesticide use and storage. Projects targeting underserved areas will be given priority.

Riparian Restoration:

◊ Targeted riparian restoration project elements include restoring morphologic function (increased sinuosity, decreased width/depth ratios, floodplain reconnection), revegetation of riparian areas and increased instream flow.

Hood River

◊ Proposed projects are expected to include an extensive portion of the stream channel over time rather than isolated small-length segments. Riparian restoration projects should target activities in the area of ongoing project work whenever possible. Projects correlated with and/or adjacent to other restoration work will be given priority.

Stormwater:

◊ Targeted projects include: water quality improvement specific to stormwater impacts including local planning, alternatives assessment, stakeholder and homeowner education and information program development, feasibility studies and similar efforts.

Contact Information

Bonnie Lamb

Middle Columbia-Hood Basin Coordinator

541-633-2027

lamb.bonnie@deq.state.or.us

DEQ
State of Oregon Department of Environmental Quality

Watershed Characteristics

The Klamath River originates in southern Oregon and flows through northern California entering the Pacific Ocean at Requa in Del Norte County, California. Forty-four percent of the 12,680 square mile watershed lies within the boundaries of Oregon while the remaining lies across the state line within the boundaries of California.

The Klamath River basin is of vital economic and cultural importance to the states of Oregon and California, as well as the Klamath Tribes in Oregon; the Hoopa, Karuk, and Yurok tribes in California; the Quartz Valley Indian Reservation in California, and the Resighini Rancheria in California. It provides fertile lands for a rich agricultural economy in the upper basin. Irrigation facilities known as the Klamath Project owned by the U.S. Bureau of Reclamation support this economy as well as hydroelectric power provided via a system of five dams operated by PacifiCorp. Historically, the basin once supported vast spawning and rearing fishery habitat with cultural significance to the local Indian tribes. The watershed supports an active recreational industry, including activities that are specific to the wild and scenic portions of the river designated by both the states and federal governments in Oregon and California. Finally, the watershed continues to support what were once historically significant mining and timber industries.

The Klamath River is of vital importance to Oregon and California.

Partners and Collaboration: Highlights

The Klamath Basin Monitoring Program was formed to implement, coordinate and collaborate on water quality monitoring and research throughout the Klamath Basin. Program monitoring activities focus on characterizing sources of impairment through the study of ecosystem elements, including water quality, fish populations and health, flows, benthos and aquatic plant communities. Program monitoring aids the development and implementation of Total Maximum Daily Load plans by monitoring pollutant loadings across the basin. Program monitoring also informs the public and tribal community about public health concerns. The program has a diverse membership which reflects the diverse and complex nature of water quality issues within the Klamath Basin.

DEQ partners with many groups in the Klamath Basin to improve water quality conditions. Partners include: Klamath Tribes, U.S. Bureau of Reclamation, Trout Unlimited, Klamath Watershed Partnership, the Nature Conservancy and the Klamath County Soil and Water Conservation District.

DEQ
State of Oregon
Department of
Environmental
Quality

Current impairments and TMDLS

DEQ and partner agencies monitor water quality in streams and lakes throughout the Klamath Basin. Every two years, DEQ is required to assess water quality against water quality standards and report to the U.S. Environmental Protection Agency on the condition of Oregon's waters.

Water bodies that do not meet standards are listed as "water quality impaired." The list of impaired streams is called the "303(d) list." Streams are removed from the list once Total Maximum Daily Loads, which are pollution limits, are complete.

Total Maximum Daily Loads, commonly called TMDLs, for the Upper Klamath and Lost River subbasins were completed in 2010 and focused on impairments by: temperature, pH, dissolved oxygen and chlorophyll *a* . In 2006, California completed a TMDL analysis of the Upper Lost River from Malone dam at the state border upstream to the headwaters of the Lost River above Clear Lake Reservoir (North Coast Regional Water Quality Control Board 2006), and in 2008 EPA completed the dissolved inorganic nitrogen and biochemical oxygen demand TMDLs for the Lower Lost River in California which includes Tule Lake watershed and the Lower Klamath Wildlife Refuge.

Currently, DEQ, the California North Coast Regional Water Quality Control Board and EPA have been working cooperatively on the development of TMDLs for both the Klamath River and the Lost River as required under the federal Clean Water Act and in accordance with a 2008 Memorandum of Agreement between EPA, DEQ and the North Coast Regional Water Quality Control Board. The TMDL includes analyses for temperature, pH, dissolved oxygen, ammonia and chlorophyll *a* impairments.

The current TMDL for the Klamath Basin did not address impairments for a number of creek segments impaired by sedimentation or for biological criteria. Currently, DEQ is developing a sedimentation assessment methodology that could be used for implementing the narrative sedimentation standard and possibly the biological criteria impairment, as well. When the methodology and associated guidance is completed, the agency will establish sedimentation TMDLs for those waterways on the 303(d) list.

Forty-four percent of the 12,680 square mile watershed lies within Oregon .

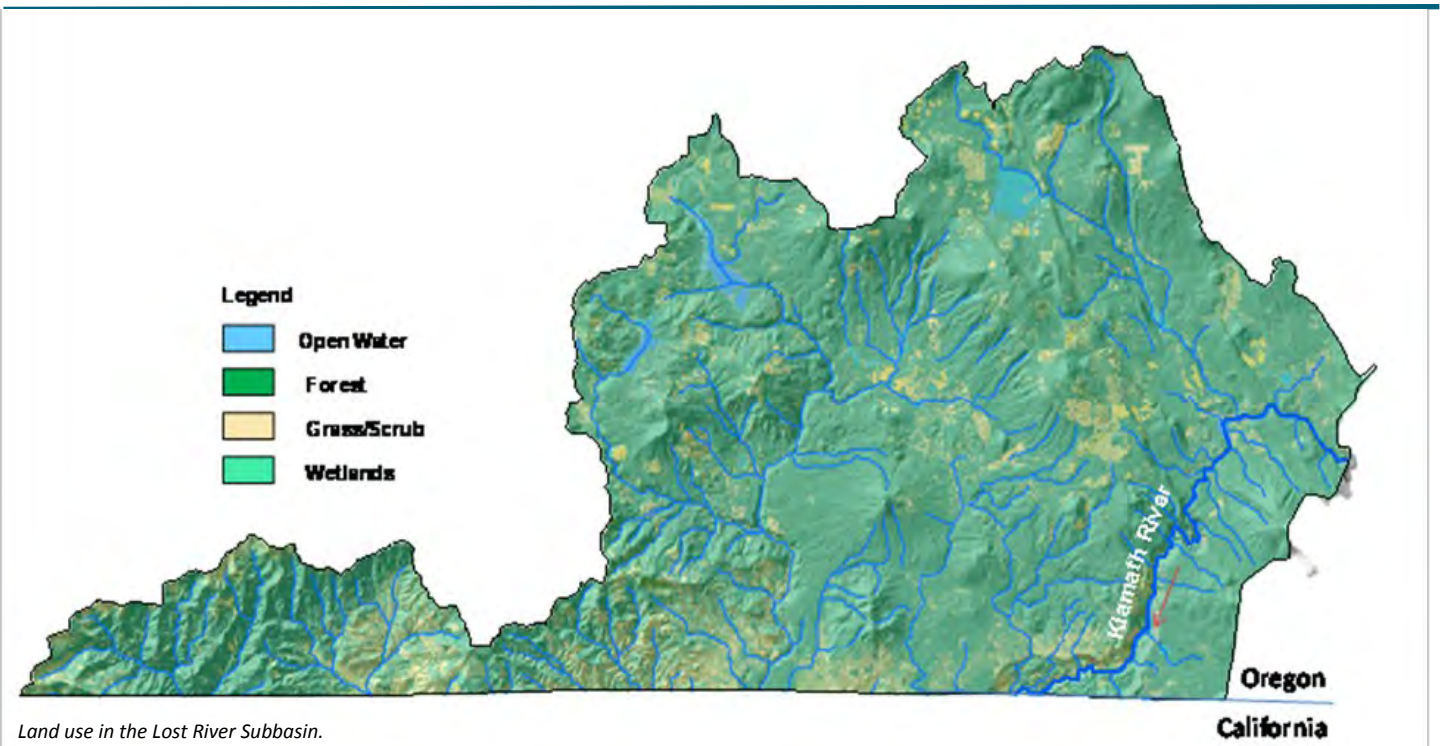
Parameter/Pollutant	No. of 303(d) Listings 2012
Dissolved Oxygen	9
Metals	3
Biocriteria	2
Eutrophication	10
Sedimentation	3
Bacteria	2
Temperature	24
pH	5
Other	0
Total:	58

About the 303(d) Program

Under section 303(d) of the Clean Water Act, states, territories and authorized tribes must submit lists of impaired waters. These waters are too polluted or otherwise degraded to meet water quality standards. The law requires that states establish priority rankings for waters on the lists and develop Total Maximum Daily Loads for these waters. — Source EPA

DEQ
State of Oregon Department of Environmental Quality

Klamath Basin Report



Land use in the Lost River Subbasin.

319 Projects

Project	Category/ Goals	Description
Nonpoint Source Pollution Education	**Outreach/ Education** Increase awareness of local water quality concerns and opportunities available to basin residents to reduce pollutant loading.	Education targeting stormwater runoff (bacteria, nutrients, metals, turbidity and sediment) through development of nonpoint source education materials, volunteer stenciling of storm drains, information kiosks. Develop interactive display on wetlands and nonpoint source pollution for use in local events and school activities. Distribute water quality and resource health information for Klamath Falls and the associated rural areas.

DEQ
State of Oregon Department of Environmental Quality

About 319 Grants

The federal Clean Water Act grants states, territories and tribes grants for technical assistance, education, training, technology transfer, demonstration projects and monitoring to assess the success of specific nonpoint source implementation projects. Learn more at https://www.epa.gov/lakes/clean-water-act-section-319.

DEQ is continually seeking project proposals to address nonpoint sources of pollution in the state. In an ongoing effort to achieve measurable results, DEQ has placed a strong emphasis on projects that support drinking water source protection, groundwater management areas and Total Maximum Daily Load development and implementation and watershed approach implementation.

Klamath Basin Report

NPS Implementation in Agricultural Lands: Highlights

The Oregon Department of Agriculture is developing Agricultural Water Quality Management Area Plans to prevent and control water pollution and soil erosion from agriculture. DEQ continues to work closely with ODA and Soil and Water Conservation Districts to incorporate meaningful metrics and benchmarks in area plans that will help meet nonpoint load allocations. While efforts to identify specific goals and objectives in the area plans are a work in progress, on-the-ground initiatives and projects continue to address nonpoint source priorities on agricultural lands.

There are two area plans in the Klamath Basin: the Upper Klamath Lake Watershed and the Lost River Subbasin. Accomplishments in the Klamath headwaters included: 6.2 miles of riparian fencing installed, installation of three off stream watering systems, 300 acres converted from irrigated pasture to dryland pasture, 22 acres of wetland restored and 1,100 feet of shoreline erosion control implemented.

Klamath Basin is home to two area plans.

In the Lost River Subbasin, 5,778 acres of wetland were restored, 144,756 feet of riparian fencing and 12 livestock watering facilities were installed, and 3,112 acres were managed for nutrients. One impediment that needs to be addressed is outreach and education to landowners.

Watershed Plans

There are two watershed planning efforts in the Klamath Basin. The Klamath Watershed Partnership, with funding from the Oregon Watershed Enhancement Board and in partnership with the Hatfield Group, coordinated watershed assessments and action plans in the Upper Klamath Basin. Building on efforts to collaborate on monitoring, the Klamath Tracking and Accounting Program is being piloted for the basin with the goal of increasing the pace and reducing the cost of improving Klamath Basin water quality to support all beneficial uses including, but not limited to, the recovery of native fish. The Klamath Tracking and Accounting Program defines a consistent accounting system that links conservation actions to watershed needs by quantifying ecosystem benefits from conservation projects.

By integrating the Klamath Basin Monitoring Program's water quality monitoring network and Klamath Tracking and Accounting Program's shade and nutrient reduction projects, partners in the Upper Klamath Basin developed a Decision Management Framework. The framework uses Geographic Information Systems for the placement and prioritization of stewardship activities aimed at improving water quality conditions in the Upper Klamath Basin.

The second watershed planning effort includes National Resource Conservation Service and other local partners. The service's National Water Quality Initiative is looking for potential pilot projects and ready and willing partners in a Total Maximum Daily Load watershed. The service's local staff are working with a partner group from the Lost River in Klamath County to develop a proposal for a pilot project. The pilot project would focus on providing technical assistance through watershed planning.

Contact Information

Mike Hiatt

Oregon Department of Environmental Quality

Klamath Basin Coordinator

541-273-7002

hiatt.mike@deq.state.or.us

Future Project Goals, Needs and Priorities

Priority projects for the Klamath basin in the 2017 Request For Proposals are projects that work to address the following areas:

◊ **Coordinated TMDL Implementation Planning**

Projects include design/development of a unified implementation plan for irrigation and drainage districts and others that will identify and prioritize implementation activities to help meet water quality objectives identified by the Total Maximum Daily Loads. Projects that will improve overall coordination of future implementation activities between separate entities in the basin.

◊ **Pollutant Source Characterization**

Projects include development and implementation of monitoring programs specific to the characterization of sources of: elevated water temperatures, nutrients, bacteria and pesticide concentrations, depressed dissolved oxygen in local surface and groundwater, and agricultural drains in support of targeting and refining Total Maximum Daily Load implementation efforts and changes in management practices.

◊ **Nutrient Reductions**

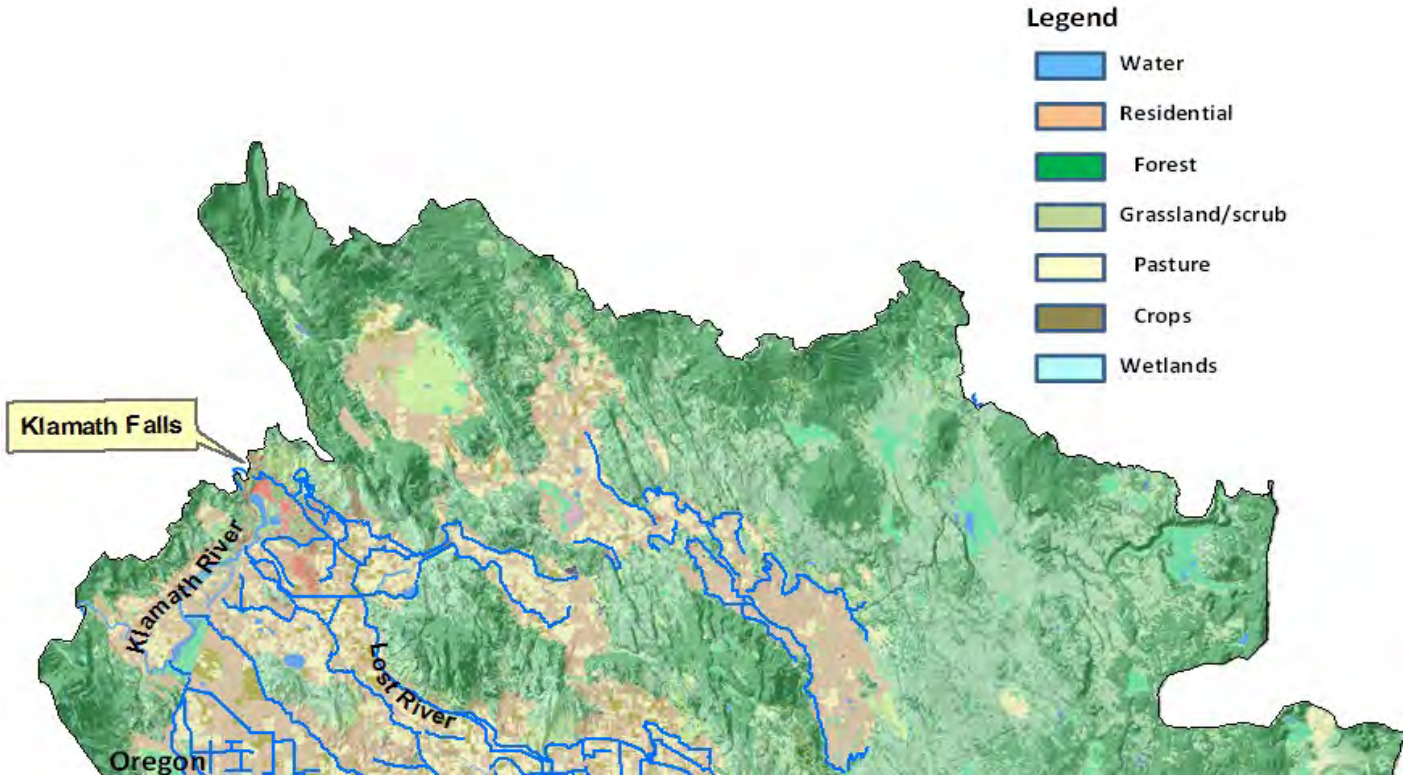
Projects include research, design and implementation activities that will reduce nutrient loading to the Klamath and Lost Rivers and their tributaries.

◊ **Agricultural Implementation**

Targeted agricultural implementation projects include riparian area restoration activities, waste management, grazing management, irrigation management and effectiveness monitoring to characterize watershed response to implementation projects.

◊ **Channel and Riparian Restoration**

Projects include restoring morphologic function (increased sinuosity, decreased width/depth ratios, floodplain reconnection), revegetation of riparian area or increased instream flow.



Land use and land cover spatial distributions for the Upper Klamath Subbasin.

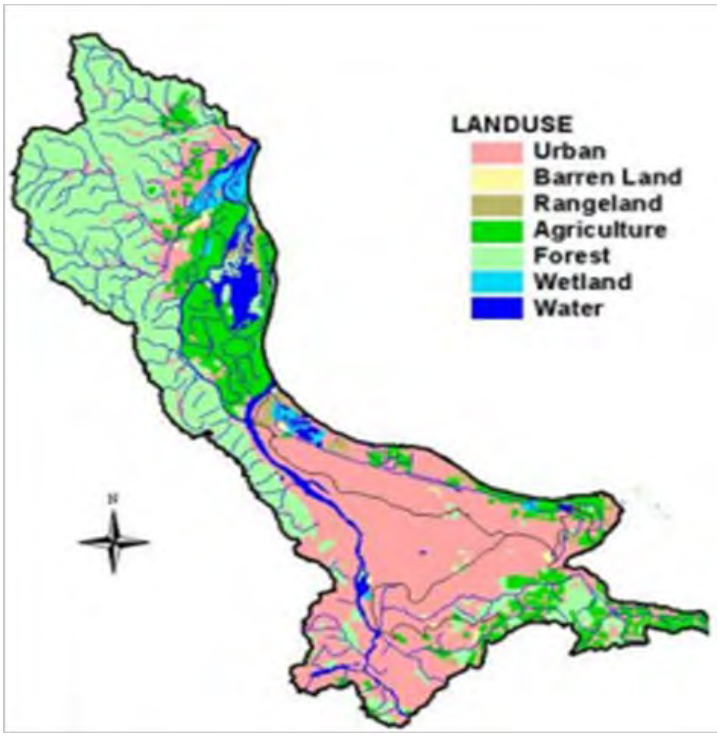
Watershed Characteristics

The Lower Willamette subbasin is in the northernmost portion of the Willamette Basin and is drained by the Willamette River, Multnomah Channel and tributaries. The subbasin's 408 square miles extend from the divides shared with the Sandy and Clackamas subbasins in the Cascade foothills on the east, across the Willamette River to the Tualatin divide on the west, north to the town of St. Helens and south to Willamette Falls at river mile 26.6. The southeastern portion of the subbasin drains directly to the Willamette River and contains the majority of the Portland metropolitan area, while the northwestern portion generally drains rural and agricultural lands through tributaries that discharge to the Multnomah Channel.

The Lower Willamette Subbasin also includes the Columbia Slough, which is a 19-mile long complex of channels on the floodplain of the Columbia River between Fairview Lake on the east and the Willamette River at Kelley Point Park on the west. The Columbia Slough Watershed drains approximately 51 square miles of land. Fairview Creek, which drains to Fairview Lake, also lies within the geographic boundary of the Columbia Slough Watershed.

Most of the subbasin is privately owned, with scattered parcels in the northwest portion owned by the U.S. Forest Service and state wildlife refuge lands in the lowlands surrounding Sturgeon Lake. Land use is primarily urban, forestry and agriculture.

Waterbodies within the Lower Willamette foster salmon and trout rearing, and several reaches of the Lower Willamette watershed, such as Scappoose and Milton



Land uses in the Lower Willamette Watershed

Creek watersheds in the northwestern part of the Lower Willamette and Johnson and Crystal Springs creeks in the southeastern part of the watershed have active salmon and steelhead spawning.

Molalla-Pudding Subbasin

The Molalla-Pudding subbasin is in the northeastern portion of the middle Willamette Basin. The Molalla River flows into the Willamette River between river miles 35 and 36. The Molalla River drains approximately 878 square miles of which the Pudding River drains approximately 530 square miles. The Pudding River flows into the Molalla River at approximately 0.7 miles upstream of the Molalla River's confluence with the Willamette River. The topography, surficial geology, stream channel characteristics, and land use are distinct between the Molalla River and Pudding River portions of

Continued on next page

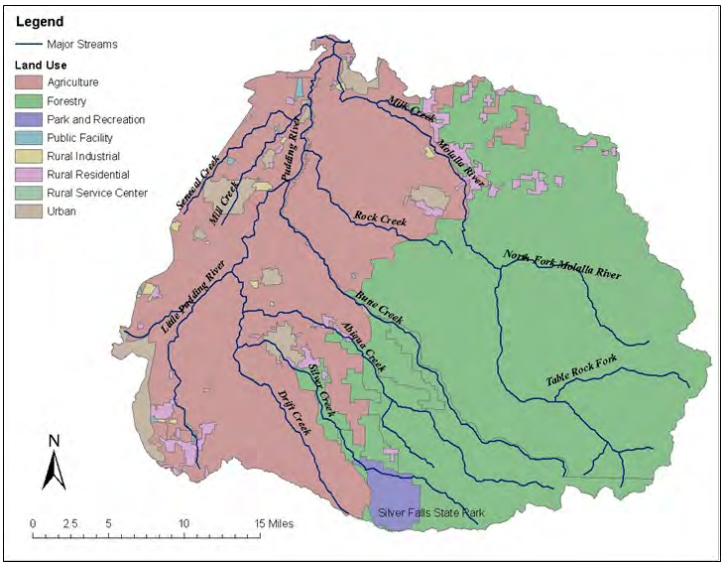
Lower Willamette Basin Report

Watershed Characteristics (continued)

the subbasin.

The Molalla-Pudding subbasin is within Clackamas and Marion Counties, and includes the cities of Woodburn, Mt. Angel, Silverton, Canby, Molalla, Hubbard, Gervais, Aurora, Brooks, Barlow, Colton, Scotts Mills and portions of Salem, Keizer, Donald and Wilsonville. Most land in the Molalla-Pudding Subbasin is privately owned. The Bureau of Land Management administers the largest portion of public land in the subbasin, including Oregon and California railroad lands. The U.S. Forest Service manages comparatively little land in the far eastern and southeastern portions of the subbasin. The largest portion of state-managed land is Silver Falls State Park, in the south central portion of the subbasin.

Agriculture and forestry land uses predominate in the subbasin. Agriculture is most common in the lower elevation and western portions of the subbasin. Forestry land use occurs mainly in the eastern portion of the subbasin. Urban



Land uses in the Molalla Pudding subbasin

land use is concentrated around the cities of Woodburn, Silverton, Mt. Angel, Canby and Molalla. Urban land use associated with the larger cities of Salem and Keizer occurs in the southwestern corner of the subbasin.

In general, agricultural watersheds with the highest crop diversity are those in the northern part of the basin. In the northern part of the basin row crops, berries, orchards, nurseries, and vineyards are common, whereas in the southern part of the basin grass seed and other seed crops predominate.

Clackamas Subbasin

The Clackamas River and tributaries drain the Clackamas Subbasin, in the Willamette Basin. The subbasin's 940 square miles extend from the Mt. Hood National Forest northwest to the Willamette River and include portions of Clackamas and Marion Counties, a small portion of the Warm Springs Indian Reservation, and the cities of Oregon City, Gladstone, Sandy and Estacada. The subbasin also contains the smaller communities of Damascus and Boring. The Clackamas River provides drinking water for approximately 175,000 people in Clackamas County, the metropolitan area and Estacada.

The U.S. Forest Service manages most of the 72 percent of the subbasin that is publicly owned; the Bureau of Land Management manages about 2 percent of land in the subbasin, usually in portions smaller than one square mile.

Approximately 25 percent of land in the Clackamas Subbasin, mostly in the lower watershed, is privately owned. Timber companies own private land within and outside of the Mt. Hood National Forest boundaries, and Pacific Gas and Electric owns land associated with its hydropower facilities. Individual, commercial and industrial land owners operate in the lower watershed.

Forestry is the dominant land use by area, although much of the land in the upper watershed is protected to varying degrees from timber harvest. Little or no timber harvest is allowed on lands that are administratively withdrawn, late successional reserves, riparian reserves, or congressionally reserved areas such as Wilderness Areas and Wild and Scenic River segments. The Clackamas Subbasin contains two wilderness areas; the Bull of the Woods Wilderness Area protects 34,900 acres in the Collawash and Hot Springs Fork of the Collawash drainages, and the Salmon Huckleberry Wilderness Area protects 44,600 acres, including a portion of the Eagle Creek drainage. Approximately 50 miles of the Clackamas River, and 14 miles of the Roaring River, are designated Federal Wild and Scenic Rivers. The Clackamas River designation extends from Big Spring, in the Olallie Lake Scenic Area, to Big Cliff, just upstream of North Fork Reservoir.

Commercial and industrial land use is concentrated near the mouth of the Clackamas River, as well as in and around smaller urban areas and along major transportation corridors. Agricultural production consumes much of the lower third of the watershed.

DEQ
State of Oregon
Department of
Environmental
Quality

Partners and Funding

DEQ has been working with numerous partners in the nine subbasins of the Willamette Basin to implement Total Maximum Daily Loads and other watershed improvements. Highlights from just a few recent and ongoing partnerships are:

Johnson Creek Inter-Jurisdictional Committee

The committee, which formed in 1999, is comprised of a collaborative group of scientists from the numerous agencies that operate within the Johnson Creek watershed. Participating agencies include the Johnson Creek Watershed Council, Multnomah and Clackamas Counties, the Cities of Gresham, Portland and Milwaukie, Metro, U.S. Geological Survey, the East Multnomah Soil and Water Conservation District and DEQ. The committee meets monthly to cooperate on issues related to understanding and improving watershed health.

Clackamas Pesticide Stewardship Partnership

DEQ has been working for 10 years with the Clackamas Soil and Water Conservation District, Oregon State University Extension, non-profit organizations, and private parties to monitor pesticide concentrations in surface water, share that information with the public and engage in outreach to promote careful pesticide management practices. Focused outreach has occurred with nurseries, Christmas tree growers, and road departments.

Ongoing Partnerships

- Johnson Creek Inter-Jurisdictional Committee
- Johnson Creek Watershed Council
- Scappoose Bay Watershed Council
- Columbia Slough Watershed Council
- Tryon Creek Watershed Council
- East Multnomah Soil and Water Conservation District
- West Multnomah Soil and Water Conservation District
- Cities, Metro, counties
- Clackamas Soil and Water Conservation District
- Clackamas River Basin Council
- Clackamas Water Providers
- Molalla River Watch

Pudding Pesticide Stewardship Partnership

DEQ has been working with the Marion Soil and Water Conservation District, Oregon State University Extension, and other basin partners in the Pudding watershed to monitor pesticide concentrations in surface water, share that information with the public and engage in outreach to promote careful pesticide management practices.

Current impairments and TMDLS

DEQ and partner agencies monitor water quality in streams throughout the Lower Willamette Basin. Every two years, DEQ is required to assess water quality against water quality standards and report to the U.S. Environmental Protection Agency on the condition of Oregon's waters.

Water bodies that do not meet standards are listed as "water quality impaired." The list of impaired streams is called the "303(d) list." Streams are removed from the list once Total Maximum Daily Loads, which are pollution limits, are complete.

The Willamette Basin-wide Total Maximum Daily Load, commonly called a TMDL, for temperature, bacteria and mercury was completed in 2006. The Clackamas Subbasin was also included as part of this TMDL for temperature and mercury. TMDLs were also completed for temperature and bacteria in the Molalla and Pudding rivers portion of the watershed in 2008. The Pudding River and its tributaries also have TMDLs for legacy pesticides, iron and nitrate.

Percent of effective shade was used as a surrogate measure for nonpoint source pollutant loading in the temperature TMDL since it is easily translated into quantifiable water management objectives. The TMDL established site-specific shade targets for some mainstem segments and subbasin-wide “shade curves” that can be used to establish shade targets for all streams in the Lower Willamette Subbasin.

Elevated levels of bacteria were also documented across the watershed. The basin-wide bacteria TMDL identifies reductions of 66 to 80 percent in bacteria loads to support its beneficial use of contact recreation. DEQ provided an alternate allocation expressed as a percent reduction of DDT for urban stormwater and as either a percent reduction or total suspended solids concentration for nonpoint sources. The percent reduction in DDT concentration is 77 percent for urban stormwater and 94 percent for nonpoint sources. For nonpoint sources, a surrogate measure of 15 mg/l total suspended solids may also be used to express compliance with instream DDT concentrations. The reduction target for removing mercury fish consumption advisories is 27 percent. Pollutant load allocations are set for each sector but no effluent limits were specified in the TMDL. Sources of mercury in the subbasin will be required to develop mercury reduction plans.

About the 303(d) Program

Under section 303(d) of the Clean Water Act, states, territories and authorized tribes must submit lists of impaired waters. These waters are too polluted or otherwise degraded to meet water quality standards. The law requires that states establish priority rankings for waters on the lists and develop Total Maximum Daily Loads for these waters. — Source EPA

Parameter/Pollutant	No. of 303(d) Listings	Total River Miles
Dissolved oxygen	8	55
Metals (includes mercury)	9	328
Biological Criteria	13	86
Eutrophication	7	61
Sedimentation (total suspended solids, turbidity)	0	0
Bacteria	0	0
Temperature	0	0
pH	5	28
Other (toxics)	15	367
Total	57	925

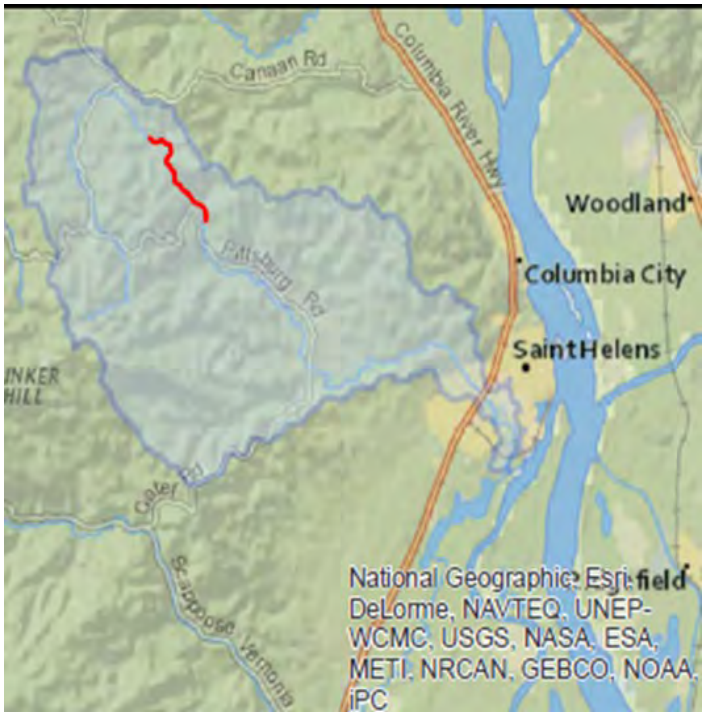
Lower Willamette Basin Report

319 Projects

Project	Category	Goals	Description
The Wetlands Conservancy: Wetlands Conservancy Scorecard	Education/Outreach Closed 2016	Develop a scorecard for four urban wetlands	Scorecard metrics included flood resilience, water quality, biodiversity and habitat and human access. Also held events to gather community input on restoration strategies and priorities.
Scappoose Watershed Council: Milton Creek Riparian Enhancement	Restoration Open	Help restore riparian function to Milton Creek	Removed invasive riparian plants and replanted the area with native riparian species and conifers in upland areas.
Columbia SWCD: Watershed Scale Water Quality Monitoring Project	Monitoring Ongoing	To evaluate current water quality conditions within the Columbia River drainages in Columbia County	The Columbia Soil and Water Conservation District will develop a monitoring plan in coordination with the Lower Columbia River Estuary Program and monitor key water quality parameters. The objective is to maintain a sustained monitoring program and evaluate long-term trends.
Clackamas Soil and Water Conservation District: Milk Creek (Molalla) Streambank and Riparian Buffer Restoration Project	Restoration Closed December 2014	Stabilize and revegetate eroding stream bank	Installed engineered log matrix, removed invasive species, installed livestock fencing and planted native species.
Molalla Riverwatch: Molalla River Corridor Campsite Restoration	Restoration Closed March 2016	Restore shade, reduce erosion in compacted streamside areas	Prepared sites and planted more than 1.4 acres/800 linear feet of riparian area.
Clackamas River Basin Council: Connecting People to Water Quality	Monitoring Closed September 2014	Effectiveness water quality and habitat monitoring at restoration sites; educate nursery operators on pest management best practices	Conducted monitoring at eight restoration sites according to Environmental Monitoring and Assessment protocol. Conducted educational workshops and outreach to nurseries.

319 Projects (continued)

Project	Category	Goals	Description
Clackamas River Water Providers: Septic System Water Quality Monitoring Study	Monitoring Closed December 2015	Use DNA analysis to identify human/septic contribution to bacteria contamination	Established bacteria DNA analysis method and equipment. Conducted monitoring and analysis in previously identified high-risk areas.
Clackamas River Basin Council: Engaging People in Stewardship for the Clackamas River	Monitoring Closed March 2016	Effectiveness water quality and habitat monitoring at restoration sites; educate county and city road departments on pesticide best management practices	Conducted monitoring at five restoration sites according to Environmental Monitoring and Assessment protocol. Conducted educational workshops and outreach to county and city road departments.
Portland State Center for Lakes and Reservoirs: Oregon Lake Watch Expansion	Monitoring Closed June 2016	Train volunteers to monitor and report on lake quality	Conducted volunteer trainings, expanded database. Provided equipment.



Snapshot of the Milton Creek Riparian Area restoration project location.

About 319 Grants

The federal Clean Water Act grants states, territories and tribes grants for technical assistance, education, training, technology transfer, demonstration projects and monitoring to assess the success of specific nonpoint source implementation projects. Learn more at https://www.epa.gov/lakes/clean-water-act-section-319.

Since 2014, over $100,000 319 dollars have been allocated to projects in the Lower Willamette Subbasins. Half of the projects funded since 2014 focus on monitoring and reporting on water quality, either through volunteer monitoring, bacteria source identification, assessment of current water quality conditions or monitoring the effectiveness of restoration efforts.

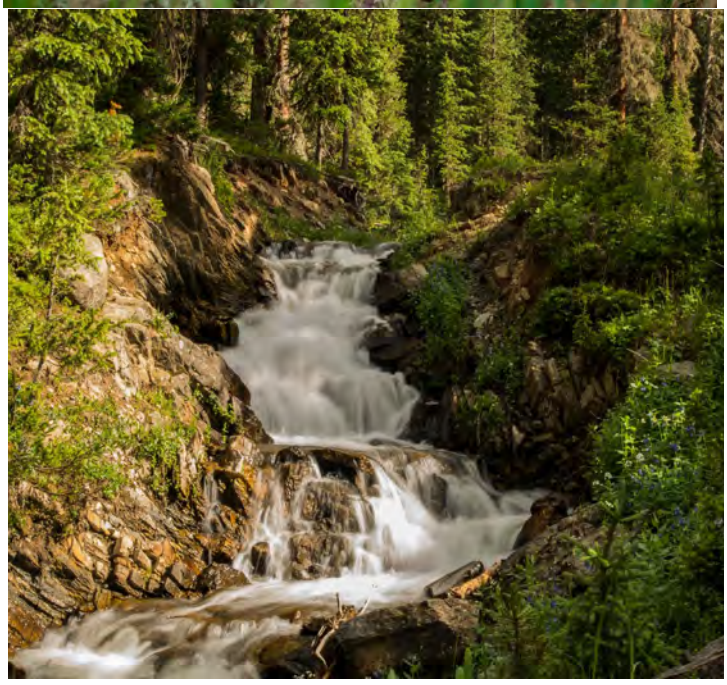
DEQ
State of Oregon Department of Environmental Quality

Watershed Plans

The Johnson Creek, Columbia Slough and Fairview Creek watershed councils are officially recognized and supported by the Oregon Watershed Enhancement Board. They have completed Watershed Assessments and Action Plans according to Oregon Watershed Enhancement Board protocols that detail restoration priorities for the watershed.

The Scappoose Bay Watershed Council received a recent 319 grant to develop a Watershed Action Plan, which is expected to be finalized by December 2017. In concert with DEQ and partner agencies' monitoring and assessment efforts, the watershed assessments and plans listed below represent a sample of the resources that have been developed to help guide efforts to improve water quality:

- Willamette Basin Total Maximum Daily Load, September 2006
- Molalla-Pudding Subbasin Total Maximum Daily Load, December 2008
- Clackamas Basin Watershed Council 2002 Action Plan
- Clear and Foster Creek Watershed Assessments (Clackamas)
- Goose, Deep and Eagle Creek Watershed Assessments (Clackamas)
- Rock and Richardson Creek Watershed Action Plans (Clackamas)



Contact Information

Karen Williams

Clackamas and Molalla Sub-Basin Coordinator

503-229-6254

williams.karen@deq.state.or.us

Andrea Matzke

Lower Willamette Basin Coordinator

503-229-5350

matzke.andrea@deq.state.or.us

NPS Implementation in Agricultural Lands: Highlights

The Oregon Department of Agriculture is responsible for developing Agricultural Water Quality Management Area Plans to prevent and control water pollution and soil erosion from agricultural activities. DEQ continues to work closely with ODA and Soil and Water Conservation Districts to incorporate meaningful metrics and benchmarks into area plans that will help meet nonpoint source load allocations. While efforts to identify specific goals and objectives in the area plans are a work in progress, on the ground initiatives and projects continue to directly address nonpoint source priorities in agricultural lands.

Some highlights from area plans include:

Clackamas: 191 acres were planned for conservation by the Soil and Water Conservation District in the Clackamas Watershed. Projects that were implemented in 2016 addressed nonpoint source issues such as: erosion control, irrigation, mud/manure management, nutrient management, pesticide use, riparian buffer management, riparian fencing, streambank erosion and streamside restoration.

Molalla-Pudding: A total of 91 conservation practices were implemented in 2016 affecting approximately 1.2 miles of stream. The Local Advisory Committee documented a need for greater marketing at a programmatic level to inform landowners of the area plan and agricultural landowner's role to make the plan a success.

Planting in the Milton Creek Watershed -- Scappoose Watershed Council.

Lower Willamette: The Soil and Water Conservation Districts in the Lower Willamette worked with landowners to implement 13 water quality improvement projects. Through the StreamCare program, 84 acres of riparian buffers along 4.3 miles of streams were planted in the Johnson Creek watershed. Outreach regarding nutrient and manure management and erosion control were also provided.

Future Project Goals, Needs and Priorities

Future project goals in the Lower Willamette include:

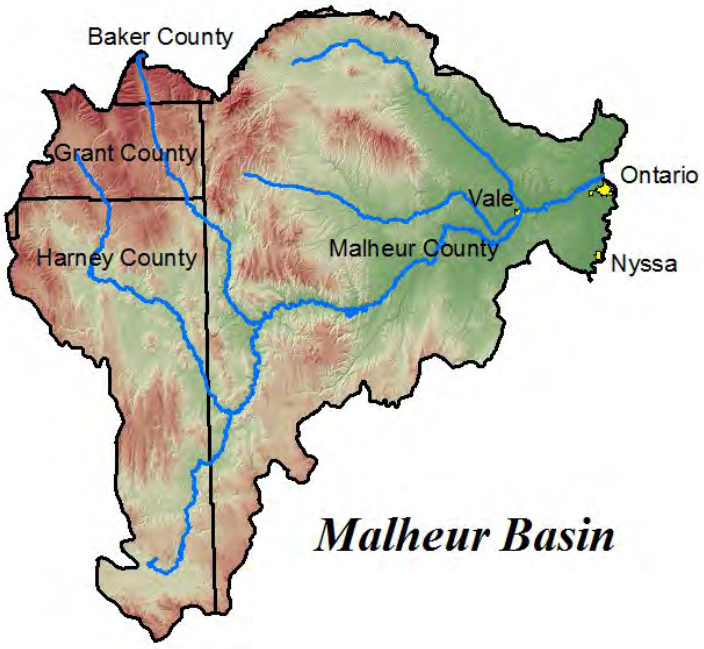
- Riparian and in-channel restoration (native planting, erosion control, large wood placement)
- Toxics reduction projects, including pesticides
- Nutrient reduction projects, including reduction from septic systems or those contributing to harmful algal blooms
- Innovative stormwater planning, tools and projects
- Agriculture practices that reduce erosion, runoff, riparian degradation
- Surface and groundwater conservation projects
- Total Maximum Daily Load implementation planning and adaptive management activities, including code/ordinance review, particularly targeting post construction stormwater management and riparian buffers

DEQ
State of Oregon Department of Environmental Quality

Watershed Characteristics

The Malheur River is a tributary of the Snake River located in Eastern Oregon along the border with Idaho. The Malheur River Basin is approximately 4,700 square miles and the main channel of the river is approximately 190 miles long. The Malheur River Basin is divided into four subbasins: Upper Malheur, Lower Malheur, Willow Creek and Bully Creek.

A majority of the land in the Malheur River Basin is public, managed mainly by the Bureau of Land Management, U.S. Forest Service and the State of Oregon. Rangeland is the dominant use in the basin along with some forested lands in the northwest portion of the basin, and irrigated agricultural land concentrated in the lower valleys to the east near Idaho. The climate is semi-arid, and agriculture is very dependent on the use of water stored in reservoirs that are filled by streams draining the southern Blue Mountains. Efforts to improve water quality in the basin have mainly focused on improving irrigation efficiency and minimizing irrigation-induced erosion, along with improvements to riparian vegetation condition.



Topographic map of the Malheur River Basin (TMDL, 2010)

Partners and Collaboration: Highlights

The Malheur Watershed Council and the Malheur County Soil and Water Conservation District have had a long successful partnership performing water quality monitoring in the basin. These two groups, along with other partners, have worked with the irrigation districts on many irrigation system improvements. Projects include piping of irrigation canals and improving irrigation efficiency in order to reduce irrigation induced erosion leading to significant reductions in pollutant loading to local waterbodies.

Current partners in the watershed include:

- Malheur County Soil and Water Conservation District
- Malheur Watershed Council
- Willow Creek Working Group
- Oregon State University Extension Service
- Oregon State University Malheur Experiment Station
- Natural Resources Conservation Service
- Bureau of Land Management
- U.S. Forest Service
- Oregon Department of Fish and Wildlife
- Burns Paiute Tribe
- Idaho Power
- Vale Oregon Irrigation District
- Warmsprings Irrigation District
- Owyhee Irrigation District

DEQ
State of Oregon Department of Environmental Quality

Current impairments and TMDLS

Water quality in the Malheur Basin is generally considered very poor. All six DEQ long-term ambient monitoring stations in the Malheur Basin recorded very poor conditions. Streams in the Malheur River Basin are typically impaired by bacteria, chlorophyll-*a*, dissolved oxygen, temperature and pesticides such as DDT and dieldrin. Two stations, the Malheur River at Little Valley and Willow Creek at the railroad crossing east of Vale, however, indicated improving trends in water quality in 2016.

Total Maximum Daily Loads, known as TMDLs, were developed in the Malheur Basin to address impairments from temperature, bacteria and eutrophication (i.e. phosphorus and chlorophyll-*a*) and were approved in 2010. Detailed review of monitoring data and applicable water quality criteria performed during TMDL development indicate that despite high nutrient concentrations and eutrophic conditions, applicable dissolved oxygen criteria are actually being met throughout the year. The Malheur River had been listed for low dissolved oxygen because past data analysis did not account for the use of warm-water dissolved oxygen criteria in the lower Malheur River Basin. This standard allows for the lower dissolved oxygen concentrations found in warmer water.

Review of chlorophyll-*a* data performed during TMDL development also indicate that chlorophyll-*a* criteria are also being met the vast majority of the time during the critical summer period in the Malheur River and Malheur River Basin tributaries. The historic data used for the chlorophyll-*a* 303(d) listings were not corrected for the presence of dead algal matter and led to the conclusion that chlorophyll-*a* criteria were being exceeded. Significant diurnal dissolved oxygen concentration and pH swings indicate that eutrophic conditions occur in the Lower Malheur River and tributaries as well as downstream in the Snake River. These conditions are likely caused by high phosphorus concentrations which encourage algal growth.

Phosphorus is a good surrogate parameter for chlorophyll and efforts to reduce phosphorus will reduce chlorophyll-*a* concentrations further and address the few instances where chlorophyll-*a* concentrations in the Malheur River exceed the seasonal water quality standard. Controlling phosphorus loading is also strongly related to control of sediment loading due to its affinity to bind to fine soil particles. The Malheur River was allocated a phosphorus load to the Snake River based on a total phosphorus concentration of 0.07 mg/l in the 2004 Snake River-Hells Canyon TMDL. Allocations within the Malheur River basin are based on this concentration limit.

Waterbodies in the Malheur River Basin are also limited due to fecal coliform bacteria concentrations which limit contact recreation (such as wading, swimming and fishing) and other beneficial uses. The 303(d) listings for bacteria occurred in the summer period, with the exception of Willow Creek, which was listed all year. Analysis of the bacteria data conducted during development of the TMDL

Continued on next page

Parameter/Pollutant	No. of 303(d) Listings
Dissolved Oxygen	8
Metals	5
Biocriteria	8
Eutrophication	1
Sedimentation	1
Bacteria	1
Temperature	0
pH	1
Other	2
Total:	**27**

About the 303(d) Program

Under section 303(d) of the Clean Water Act, states, territories and authorized tribes must submit lists of impaired waters. These waters are too polluted or otherwise degraded to meet water quality standards. The law requires that states establish priority rankings for waters on the lists and develop Total Maximum Daily Loads for these waters. — Source EPA

Current impairments and TMDLS (cont'd)

indicated that bacteria criteria are exceeded in Willow Creek, Bully Creek, the Malheur River and the North Fork Malheur River year round, with reduced impacts during the non-irrigation season of late fall through early spring.

Fecal coliform bacteria sources may include wildlife, livestock waste, failing residential septic systems, wastewater treatment plant malfunctions, rural residential runoff and urban runoff. There are no permitted point sources of bacteria in the basin, and the generally sparse residential development restricts potential septic and non-permitted point sources. Confined Animal Feeding Operations are considered to be point sources which are not allowed to discharge to waters of the state. The major developed areas of the basin such as Ontario and Vale do not discharge waste water to any Malheur River Basin surface waterbodies (Ontario discharges to the Snake River in winter) and there are no plans to do so in the future, therefore no reserve capacity was allocated. Fecal coliform bacteria loading in the Malheur River Basin appear to be dominated by non-point sources. Nonpoint source pollution comes from diffuse sources such as livestock, wildlife and urban runoff. Streamflow based allocations have been developed for nonpoint sources and apply year-round. The highest reductions in bacteria loading are needed in the lower Malheur River and its tributaries, Bully Creek and Willow Creek.

DEQ's Malheur Basin Coordinator taking shade measurements in the Upper Malheur River.

Lower Malheur River wetland

Temperature 303(d) listings occurred on approximately 320 miles of streams including the mainstem Malheur and tributaries above Warm Springs Reservoir, the North Fork Malheur and tributaries above Beulah Reservoir, Cottonwood Creek and Pole Creek (tributaries of the Lower Malheur River), and Basin Creek tributary of Willow Creek. The temperature TMDL applies to all intermittent and perennial streams in the Malheur River Basin and Middle Snake-Payette subbasin.

The temperature TMDL identified the primary source of heating is from the removal of natural streamside vegetation which has increased the amount of solar radiation the stream receives. Factors causing the loss of vegetation and stream warming include agricultural activities, current and legacy grazing impacts, Western Juniper expansion, and hydrologic modifications (e.g. water withdrawals and diversions). The TMDL requires designated management agencies to implement management strategies to restore or protect streamside vegetation, as well as encourage best management practices to minimize water withdrawals or diversions. The TMDL also requires the Bureau of Reclamation to eliminate excessive temperature increases downstream of their dams and to evaluate managed flows that may be required for the survival of downstream vegetation communities.

State of Oregon Department of Environmental Quality

Malheur Basin Report

319 Projects

Project	Category	Goals	Description
Northern Malheur County Water Quality Improvement Outreach and Best Management Practices Demo Project	Best Management Practices/ Technical Assistance	Reduce sediment, nutrient and bacteria loading to the Malheur River. Increase local awareness of water quality concerns and the role of agricultural management practices in reducing pollutant loading.	Design a sediment retention basin. Collect LiDAR data for a systems-wide analysis of the irrigation systems, return flows and drainage systems to improve water quality and water use in northern Malheur County. Develop and conduct educational programs of water quality issues and their solutions within the local community.
Getting the Word Out in the Malheur Basin	Outreach/ Education	Increase local awareness of water quality concerns and the role of agricultural management practices in reducing pollutant loading.	Develop and conduct educational programs on water quality issues and their solutions within the Malheur Basin through "town hall" meetings, one-on-one discussions and project tours. Measure the success of public outreach and education programs. Provide technical assistance relating to riparian restoration and protec-

DEQ's Ryan Michie measuring shade on the NF Malheur River

About 319 Grants

The federal Clean Water Act grants states, territories and tribes grants for technical assistance, education, training, technology transfer, demonstration projects and monitoring to assess the success of specific nonpoint source implementation projects. Learn more at https://www.epa.gov/lakes/clean-water-act-section-319.

Within the Malheur Basin, over $50,000 has been spent since 2014 on projects that address nonpoint source pollution. Partners in the watershed continue to actively work towards reducing pollutant loads.

DEQ
State of Oregon Department of Environmental Quality

Watershed Plans

The U.S. Environmental Protection Agency requires that proposed watershed-based plans developed or implemented using Section 319 funds must include nine key elements. This assures that public funds are used effectively and that projects make progress towards restoring waters impaired by nonpoint source pollution. These elements include identification of the causes and sources of pollutants, management measures and their expected load reductions, funding and sources, and information or education component.

Existing watershed plans in the Malheur Basin include:

- Malheur Basin Action Plan (Malheur Watershed Council, 2015)
- Malheur Subbasin Assessment Plan (Northwest Power and Conservation Council, 2004)
- Snake River-Hells Canyon TMDL (DEQ, 2004)
- Malheur River Basin TMDL (DEQ, 2010)
- U.S. Fish and Wildlife Service (USFWS) Bull Trout Recovery Plan (USFWS, 2015)
- Northern Malheur County Groundwater Management Area Plan (DEQ, 1991, 2003)

NINE KEY ELEMENTS

- Causes, sources and extent of pollutants
- Description of management measures
- Load reductions expected from measures
- Funding needs and sources
- An information or education component
- An implementation schedule
- Measurable milestones of implementation
- Criteria for determining progress
- A monitoring component

NPS Implementation in Agricultural Lands: Highlights

TMDL implementation in the Malheur River Basin and Middle Snake-Payette Subbasin is primarily accomplished through activities on private agricultural land and on federal land. The Oregon Department of Agriculture is responsible for developing Agricultural Water Quality Management Area Plans to prevent and control water pollution and soil erosion from agricultural activities on private lands. Malheur County, Harney County, the City of Ontario and local irrigation districts are required to cooperate with restoration efforts outlined in the ODA Agricultural Water Quality Management Area Plan. The primary sources of funding for implementation are Oregon Watershed Enhancement Board and DEQ's 319 Program.

The current area plan for the Malheur Basin was updated in 2015.Revisions to the plan should occur in 2017. Several focus areas were identified in the 2015 Malheur River Basin Agricultural Water Quality Management Area Plan:

Nevada-Blanton Focus Area – Current work focuses on monitoring this very complex irrigation return drain system with the goal of developing projects to reduce sediment and phosphorus loading to the Malheur River.

Coyote Gulch Focus Area – Malheur Soil and Water Conservation District is monitoring changes to sediment and nutrient loading in the irrigation return drains in this area as Natural Resource Conservation Service implements projects that will pipe irrigation canals and improve irrigation practices.

Willow Creek Special Emphasis Area – The Willow Creek Working Group, Malheur Watershed, local irrigation districts and other partners have been working on irrigation system improvements and other conservation practices that improve water quality for many years. Additional "shovel-ready" projects are being developed to be implemented if funding becomes available.

State of Oregon Department of Environmental Quality

Future Project Goals, Needs and Priorities

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

Malheur River at Highway 20—DEQ Site #11047

Pollutant Source characterization:
Targeted pollutant source characterization projects include development and implementation of monitoring programs specific to the characterization of sources of: elevated water temperatures, nutrients, bacteria, pesticide concentrations, and depressed dissolved oxygen in local surface and groundwater, and agricultural drains in support of targeting and refining TMDL implementation efforts and changes in management practices .

Nutrient Reduction:
Targeted nutrient reduction projects are those that include research, design and implementation activities that will reduce nutrient loading to the Malheur River, its tributaries and groundwater in the Northern Malheur County Groundwater Management Area.

Agricultural Implementation:
Targeted agricultural implementation projects include riparian area restoration activities, waste management, grazing management, irrigation management and effectiveness monitoring to characterize watershed response to implementation projects.

Channel and Riparian Restoration:
Targeted riparian restoration projects include restoring morphologic function (increased sinuosity, decreased width/depth ratios, floodplain reconnection), revegetation of riparian area and increased instream flow. Proposed projects are expected to include an extensive portion of the stream channel over time rather than isolated small-length segments.

Contact Information

John Dadoly
Oregon Department of Environmental Quality
Malheur Basin Coordinator
541-278-4616
dadoly.john@deq.state.or.us

DEQ
State of Oregon Department of Environmental Quality

Basin Characteristics

The Mid-Coast Basin encompasses four subbasins on Oregon's central coast: the Alsea, Siletz-Yaquina, Siltcoos and Siuslaw. This area contains a wide variety of ecosystems and habitats, including high elevation Coast Range temperate forests, low elevation valleys, coastal wetlands, shallow lakes, estuaries and beaches. Major land uses in the basin include private and federal forests, livestock grazing in valley pastures, rural residential development, with urban development concentrated along the Highway 101 corridor. The rivers, lakes and estuaries of the Mid-Coast Basin are historically rich in native fish and wildlife. Salmonids, including the Oregon Coast Coho, are key fish species which are culturally and economically important in Oregon's coastal basins. Certain salmonid populations are threatened or at risk due to factors documented elsewhere. Water quality in the Mid-Coast Basin affects native fish, other aquatic life and the beneficial uses of drinking water and water recreation. A large amount of the basin is forests exhibiting a wide range of seral stages, from recent clear cut harvest to mature forests. Off-shore commercial fishing is an important economic activity and tourism is also a vibrant industry along the coastal strip.

Grass Creek, Drift Creek watershed (Alsea subbasin)

Watershed Assessment and Plans

The Mid-Coast Watersheds Council performed a series of watershed analyses in the early 2000s that form the basis for planning in-stream restoration projects and other actions. The council began a five-year review and update of its Action Plan in 2014 and created a Business Plan in March 2016. The Business Plan reflects goals for the organization as a whole, while the Action Plan provides more technical guidance.

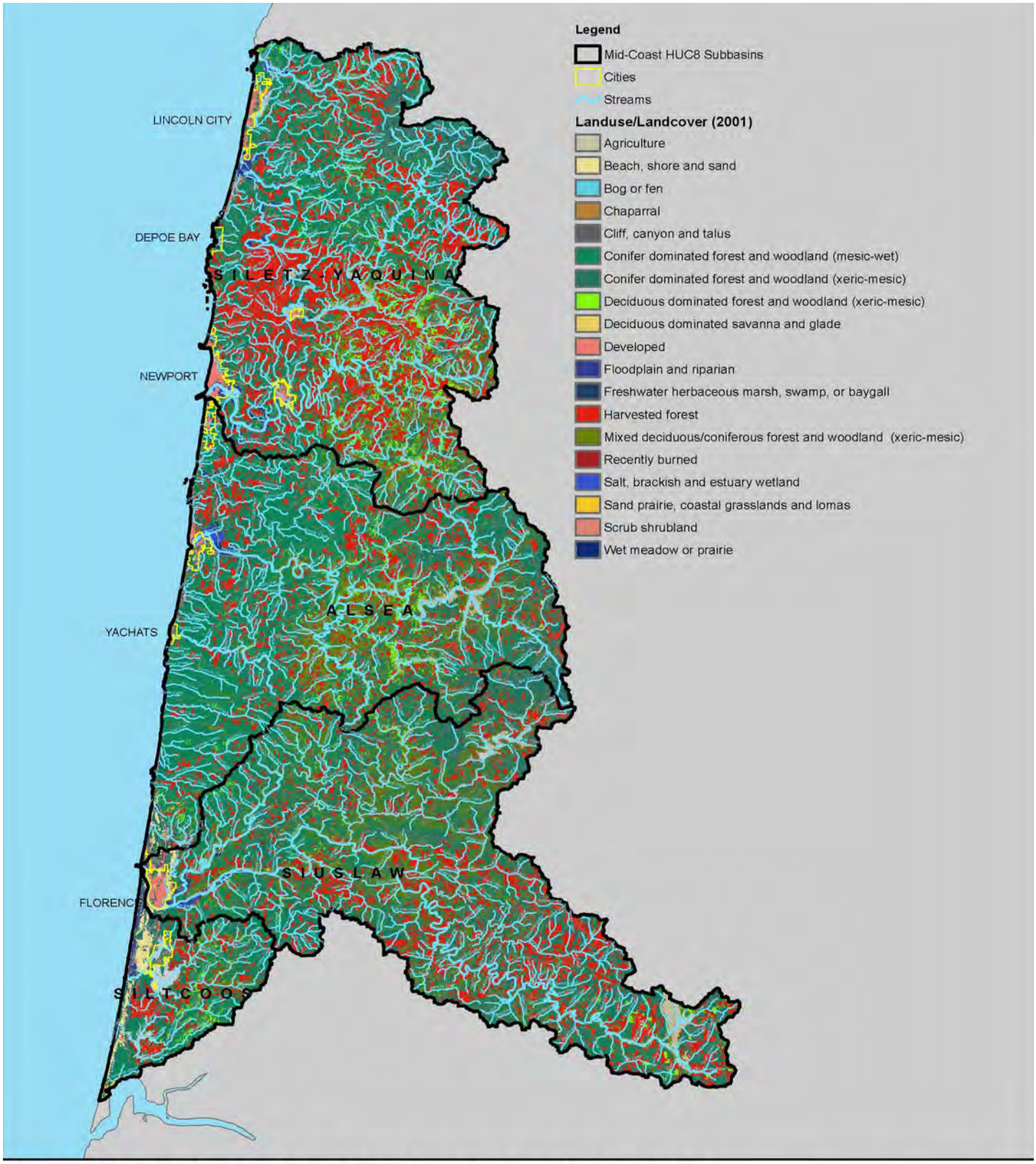
The revised Action Plan includes an exposition of life history diversity in Oregon Coastal Coho, a proposed methodology for assessing habitat for alternate life histories, and the watershed-specific prioritizations of potential projects. Within these plans, high-priority projects are based on willing land owners, willing partners, and logistical considerations and all projects are designed to serve a broad ecosystem function.

The Siuslaw Watershed Council developed a Seventh field Hydrologic Unit Code aquatic resources priority basin plan that is used for assessing allocation of resources and developing partnerships. A number of successful projects are underway or were conducted with the Siuslaw National Forest, Bureau of Land Management and Lane County during the reporting period that will have positive impacts on water quality and aquatic resources, including Five Mile Bell restoration and Cleveland Creek projects.

The Lincoln Soil and Water Conservation District conducted an assessment of streambank condition and unsurfaced roads in a portion of the Siletz drinking water source area in order to prioritize outreach to landowners and implementation of best management practices. The assessment is being used as a planning tool to target improvements and as support for grant funds to reduce erosion and fine sediment generation and delivery to the river from private or public lands.

DEQ
State of Oregon
Department of
Environmental
Quality

Mid-Coast Basin Report



Partners and Collaboration

Siletz-Yaquina Subbasin: In Lincoln County, the Lincoln Soil and Water Conservation District collaborated with Oregon Department of Agriculture, Natural Resources Conservation Service, DEQ and other local partners to identify Middle and Lower Big Elk Creek watersheds as the ODA "focus area" for outreach to agricultural landowners and best management practices implementation projects. Lincoln Soil and Water Conservation District successfully established landowner relationships and implemented multiple best management practices in the focus area during the reporting period. Several monitoring and implementation projects utilized Oregon's Nonpoint Source 319 grant funding and pollutant reductions and relevant information were reported through EPA's Grant Reporting Tracking System.

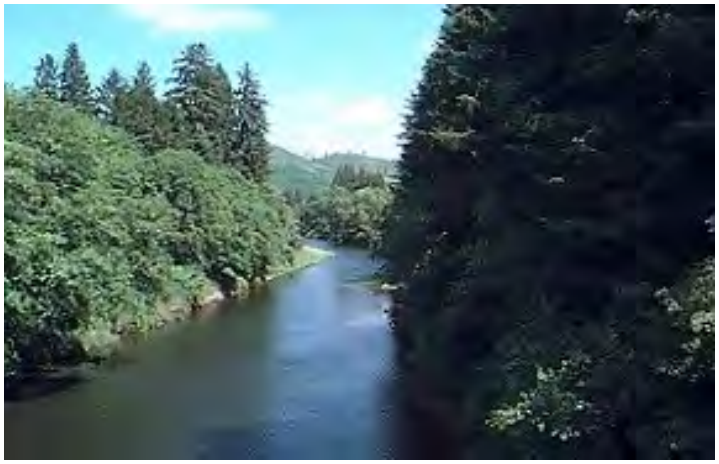
Upper Siuslaw Subbasin: The Siuslaw Watershed Council collaborated with the Oregon Department of Agriculture to identify the Upper Siuslaw watershed as a "focus area" for outreach to agricultural landowners and relevant implementation projects. The council established landowner relationships and implemented several riparian improvement projects in the focus area during the reporting period. Several monitoring and implementation projects utilized Oregon's Nonpoint Source 319 grant funding.

Alsea Subbasin: DEQ has not been actively involved in nonpoint source projects in the Alsea in recent years. There are plans to coordinate water monitoring with the Bureau of Land Management and others to assess conditions in areas where multiple restoration projects have been completed in recent years, or where management plans indicate will be addressed in the next few years.

Siltcoos Subbasin: The Siuslaw Soil and Water Conservation District implemented several restoration, land condition and riparian improvement projects in the Siltcoos Subbasin in cooperation with the NRCS and others. One project utilized drinking water protection grant funding from GEOS Institute Drinking Water Providers Partnership (*Fiddle & Billy Moore Creeks Riparian Enhancement Phase 1*). At the time of this report, the final project report was not yet available.

Watershed partners who directly participated in nonpoint source grant projects and Oregon Health Authority drinking water protection grants and/or volunteer monitoring efforts from 2014 to present include:

- Lincoln Soil and Water Conservation District
- Siuslaw Watershed Council
- Siuslaw Soil and Water Conservation District
- Salmon-Drift Creek Watershed Council
- Devils Lake Water Improvement District



Station No. 0391, Siletz River five miles downstream Siletz

- Confederated Tribes of the Siletz Indians
- City of Newport
- City of Toledo
- City of Florence

Federal resource management agencies play a large role in water quality protection and improvement in the basin, including U.S. Forest Service (Siuslaw National Forest), Natural Resources Conservation Service and Bureau of Land Management. State agencies implementing nonpoint source water protection in the basin are the Oregon Department of Agriculture, Oregon Department of Forestry, Oregon Department of State Lands and Oregon Department of Land Conservation and Development are active partners with local govern-

DEQ
State of Oregon Department of Environmental Quality

Current impairments and TMDLS

Water quality in the Mid-Coast Basin is generally considered good (based on the Oregon Water Quality Index). Of the six DEQ long-term ambient monitoring stations in the Mid-Coast Basin, two recorded excellent conditions, three recorded good conditions, and one recorded fair conditions. In general, there is no significant trend in water quality, however, Station number 33644, North Beaver Creek at Ona Grange, demonstrated an improving trend. Temperature, dissolved oxygen, bacteria, fine sediment and biocriteria have been identified as pollutant stressors that affect fish and other aquatic life in specific areas of the basin.

The Total Maximum Daily Loads, commonly called TMDLS, being developed for the Mid-Coast will address 303(d) listed segments for temperature, bacteria, dissolved oxygen and sedimentation/biocriteria/turbidity.

In March 2012, DEQ convened a Local Stakeholder Advisory Committee to provide input on the development of Mid-Coast Basin TMDLs and to assist with planning implementation-ready TMDLs. The committee and technical working groups met periodically from March 2012 to present. This process engaged many active stakeholders and partners in the basin, including several local, state and federal agencies.

DEQ periodically evaluates its TMDL development work plan and schedule, based on a combination of factors, including: the status of technical tasks, available resources, regulatory, legal and policy considerations, and the stakeholder involvement process.

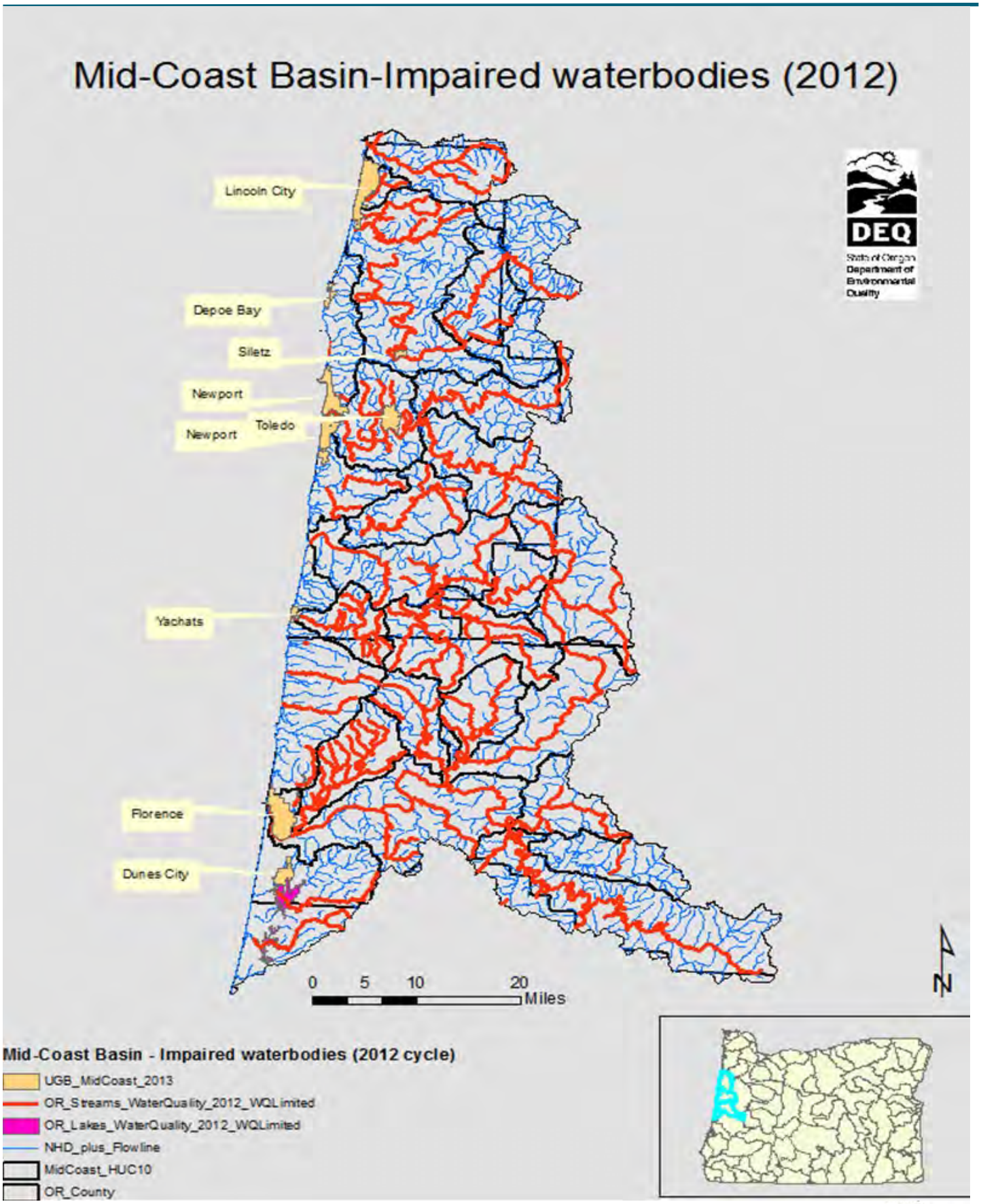
Parameter/ Pollutant	No. of 303(d) Listings	Total Miles of Listed Segments
Dissolved Oxygen	27	592
Metals	0	0
Biocriteria	27	252
Eutrophication	10	23
Sedimentation	8	104
Bacteria	35	309
Temperature	88	949
pH	3	9
Other	0	0
Total	**198**	**2238**

About the 303(d) Program

Under section 303(d) of the Clean Water Act, states, territories and authorized tribes must submit lists of impaired waters. These waters are too polluted or otherwise degraded to meet water quality standards. The law requires that states establish priority rankings for waters on the lists and develop Total Maximum Daily Loads for these waters. — Source EPA

North Fork Siuslaw River—Photo Credit to Doug Cottam, ODFW

Mid-Coast Basin Report



Mid-Coast Basin Report

319 Projects

Project	Category	Goals	Description
Upper Siletz Assessment and Restoration Project	Monitoring, riparian improvement and agricultural best management practices	Waterbody monitoring, land condition assessment (technical site evaluations), development and implementation of best management practice projects on agricultural lands	Targeted landowner outreach and project implementation by compiling existing water quality data, sensitive salmonid use areas, land conditions on agricultural properties, and use of newly acquired streambank erosion assessment. Recipient completed outreach to 19 landowners. Five conservation plans and final project designs were developed with three plans implemented.
Siuslaw Riparian Restoration and Water Quality Monitoring	Monitoring, riparian improvement	Deploy continuous data logger in the Upper Siuslaw watershed to fill data gaps; conduct landowner outreach, education and engagement in the Upper Siuslaw; develop two landowner cooperative agreements and implement two restoration activities with best management practices.	Water monitoring was successfully conducted. Between January to March 2016, 379 trees and 516 shrubs planted at two private properties along 1,624 feet of Hawley Creek and 1,630 feet of Norris Creek for a total planting area of 2.94 acres and length of 0.61 miles. Buffer widths ranged from 10 to 30 feet.
Big Elk Road Assessment/Best Management Practice Implementation Project	Riparian improvement and agricultural best management practices	Engage agricultural and small woodlot landowners in order to develop and implement nonpoint source pollution reduction projects using best management practices; Develop a minimum of two nonpoint source reduction projects that target pollution loads.	Eleven Big Elk Creek watershed landowners contacted; three nonpoint source projects and two cooperative agreements developed, approved and implemented in Lower and Middle Big Elk creeks. Two projects were monitored for effectiveness.

319 Projects (continued)

Project	Category	Goals	Description
Mid-Coast Best Management Practice Implementation Projects	Riparian improvement and agricultural best management practices	Develop and implement a minimum of four restoration and best management practice projects using watershed assessments and targeted landowner outreach.	Completed outreach to six agricultural landowners in the lower Schooner Creek basin, resulting in three individual landowner site visits with two resulting in best management practice projects. Completion of five additional agricultural best management practice projects. Projects addressed one or more targets aimed at reducing agricultural sources of sediment, bacteria, nutrients and thermal inputs in impaired surface waters.

Future Project Goals, Needs and Priorities

Based on a history of successful projects in the Mid-Coast Basin, DEQ and local stakeholders have identified needs in the following high-priority categories for future Section 319 Nonpoint Source grant projects:

- ◊ Water monitoring and land condition assessment by local partners (in coordination with DEQ's volunteer monitoring program)
- ◊ Best management practice project development and implementation on private agricultural lands

Livestock exclusion and bank stabilization project in the lower Big Elk Creek watershed (Photo courtesy Lincoln Soil and Water Conservation District)

- ◊ Assisting small coastal zone municipalities with development of stormwater management programs that measurably reduce pollutant loads

Contact Information

David Waltz

Mid-Coast Water Basin Coordinator

541-687-7345

waltz.david@deq.state.or.us

DEQ
State of Oregon Department of Environmental Quality

Mid-Coast Basin Report

319 Projects

Project	Category	Goals	Description
Riparian Restoration and Continuous Water Quality Monitoring - Phase II	Monitoring, riparian improvement	To monitor continuous dissolved oxygen and temperature at a minimum of two locations; conduct landowner outreach, education and engagement in the Upper Siuslaw or North Fork Siuslaw subbasins; develop at least one landowner cooperative agreement; implement one restoration activity that meets the best management practices of the agreement.	Monitoring activities for continuous dissolve oxygen/ temperature in 2016 exceeded those proposed. Riparian improvements and in-kind match from 10 Lorane Native Plant Distribution landowners was contributed for riparian planting and brush release activities in the Upper Siuslaw Subbasin; additional activities will be completed in 2017.

Rivers in the Mid-Coast Basin are affected by nonpoint source pollution.

About 319 Grants

The federal Clean Water Act grants states, territories and tribes grants for technical assistance, education, training, technology transfer, demonstration projects and monitoring to assess the success of specific nonpoint source implementation projects.

Learn more at https://www.epa.gov/lakes/clean-water-act-section-319.

During 2014-2016, around $150,000 in 319 funding has been leveraged on projects targeting nonpoint source pollution in the Mid-Coast basin.

DEQ
State of Oregon Department of Environmental Quality

Mid-Coast Basin Report

319 Projects

Project	Category	Goals	Description
Siletz, Yaquina, Beaver Creek Subbasin Best Management Practices Projects	Riparian improvement and agricultural best management practices	Engage agricultural and small woodlot landowners in order to develop and implement nonpoint source pollution reduction projects using best management practices. Develop at least two nonpoint source reduction projects that target pollution loads.	One project — the Little Rock Creek Riparian Restoration Project — was developed and will be implemented 2016/2017. Grant agreement for additional funding (Oregon Watershed Enhancement Board) to implement project is in process.

NPS Implementation in Agricultural Lands: Highlights

Two Agricultural Water Quality Management Areas cover most of the Mid-Coast Basin: the Mid-Coast Area Plan and Upper Willamette-Siuslaw Area Plan. A section of the basin is in Polk County but is primarily forestlands. The Mid-Coast Area Plan covers Lincoln County and most of western Lane County in the coastal zone; whereas the Upper Willamette-Siuslaw Area Plan covers a smaller area of the eastern portion of the Siuslaw Subbasin and a much larger area in the Upper Willamette Subbasin. The Area Rules and Plans, along with reports from the last biennial review, are found here: https://www.oregon.gov/ODA/programs/NaturalResources/AgWQ/Pages/AgWQPlans.aspx

The Area Plans are reviewed and revised as appropriate every two years. Pending issuance of TMDLs for the Mid-Coast Basin, DEQ's role has largely been to provide information on water quality status and trends, identify substantive issues related to agriculture's impacts on water quality in the area, and work collaboratively to address them. This includes cooperation with local partners to identify opportunities for specific projects and funding sources that improve water quality associated with agricultural practices.

Generally, DEQ works with the Soil and Water Conservation Districts and watershed councils to identify and develop the specific projects and Oregon Department of Agriculture has supported many of the same efforts through the "focus area" approach to prioritize and leverage resources. This approach includes targets, milestones and measurable indicators of success for a specific watershed (in contrast to the area plans' generic content). Most of the Section 319 nonpoint source grant agreements developed for the Mid-Coast Basin in the previous four years have involved agricultural focus areas to prioritize monitoring, project development and implementation activities in coordination with other partners. Grant funds have also been used for water monitoring and for opportunistic projects to improve conditions affecting water quality from agricultural activities (such as manure management) in non-focus areas.

Water quality project highlights from the 2015 Mid-Coast plan review include:

- Technical assistance to landowners
- 257 site visits conducted
- 23 agricultural water quality projects developed
- 44 agricultural water quality projects implemented
- 36 invasive species control projects
- Eight effectiveness monitoring sites

State of Oregon Department of Environmental Quality

Watershed Characteristics

The North Coast Basin extends from the Columbia River to the southern Tillamook County line and consists of eight watersheds. Six watersheds drain to the Pacific Ocean: Necanicum, Nehalem, Tillamook Bay, Nestucca, Netarts/Sand Lake and Neskowin and two drain to the lower Columbia River: Lower Columbia and Lower Columbia -Clatskanie. The North Coast Basin includes most of Clatsop, Columbia and Tillamook counties and the major cities of Tillamook, Vernonia, Cannon Beach, Astoria and Rockaway Beach. The three largest bays of Tillamook, Nehalem and Netarts provide for economic and recreational opportunities in the region. Chief among them is commercial and recreational shellfishing with over 2.3 million pounds of oysters and clams harvested annually in Oregon. Other important aquatic resources include the freshwater streams that provide critical habitat for native salmon and drinking water for area residents. Finally, the beaches, lakes, streams and estuaries all provide numerous recreational (swimming, fishing, boating, etc.) opportunities throughout the region.

Forestry is the predominant land use in the subbasin covering nearly 95 percent of the landscape, with the Tillamook State Forest being the largest portion. Agricultural land use is a small portion of the basin with most of it occurring in the lower portions of the rivers and near the bays. The dairy industry makes up much of this use with dairies located in the lower Tillamook, Nestucca and Nehalem watersheds. Cities are generally located in the coastal plains, adjacent to rivers, bays or the ocean.

Land use in the North Coast basin

Partners and Collaborations: Highlights

The Tillamook Estuaries Partnership has been a significant partner in the North Coast. The partnership has provided essential water quality data to DEQ and also implemented a large amount of riparian and other restoration work in the area that have led to measureable water quality improvements.

The Tillamook Soil and Water Conservation District has also been a significant partner. The district altered its focus area based on water quality data to include the Tillamook River. Since then the Tillamook River, while not meeting water quality standards, is showing statistically significant decreasing trends in *E. coli* concentrations at every monitoring site within the watershed. The district has also been essential in providing landowner outreach for many restoration projects as well as providing livestock exclusion fencing for riparian projects throughout Tillamook County.

Finally, the Oregon Department of Agriculture's Confined Animal Feeding Operation program has been another invaluable partner in the North Coast. The local inspector as well as the program manager have partnered with DEQ on several bacteria investigations in the area. One investigation led to the discovery of a sewer/stormwater cross connection in the City of Tillamook's wastewater treatment system. DEQ was able to work with the city to address the problem.

Continued on next page

DEQ
State of Oregon
Department of
Environmental
Quality

Partners and Collaborations (continued)

ODA has also partnered with DEQ on two significant research projects related to bacteria source assessment. The first was an effort led by the U.S. Environmental Protection Agency's Office of Research and Development and was a national endeavor to develop a standard method for analyzing bacteria DNA. Tillamook Bay was selected as a demonstration project for the larger EPA effort. Volunteers with ODA and Tillamook Estuaries Partnership collected additional samples for EPA from the Tillamook, Trask and Kilchis rivers from June 2014 to July 2015.

ODA also partnered with DEQ, Tillamook Estuaries Partnership and Oregon State University in a successful grant-writing effort for a research project entitled "Reducing Bacterial Contamination in the Tillamook Estuary through Performance-Based Incentives." The goal of the project was to try to better understand how general farm practices affect water quality, specifically *E. coli* bacteria, in the Tillamook River Watershed. The effort used established bacteria monitoring techniques including bacterial DNA analysis performed by OSU as well as new equipment developed by ZAPs Technologies. The ZAPs LiquID Station used an optical signature to determine water column *E. coli* concentration in a few seconds, compared to the standard method that requires 18 hours. Without the significant contributions from ODA's Confined Animal Feeding Operation program neither of these projects would have been successful.

DEQ's extensive list of partners in the watershed includes:

- Tillamook Soil and Water Conservation District
- Columbia Soil and Water Conservation District
- Natural Resources Conservation Service
- Oregon Department of Agriculture
- Oregon Department of Forestry
- Oregon Department of Fish and Wildlife
- Oregon Parks and Recreation Department
- Oregon Watershed Enhancement Board
- Oregon Health Authority
- Oregon Solutions
- Tillamook Bay Watershed Council
- Nestucca, Neskowin, Sand Lake watershed councils
- Lower Nehalem Watershed Council
- Upper Nehalem Watershed Council
- North Coast Watershed Association
- Lower Columbia Watershed Council
- Necanicum Watershed Council
- Lower Nehalem Community Trust
- Neskowin Citizens Advisory Committee
- Neskowin Regional Sanitary Authority
- Pacific City Citizens Advisory Committee
- Tillamook County
- Clatsop County
- Columbia County
- City of Tillamook
- City of Bay City
- City of Rockaway Beach
- City of Cannon Beach
- Oregon State University and Extension
- U.S. Fish and Wildlife Service
- U.S. Forest Service
- U.S. Geological Survey
- National Oceanic and Atmospheric Administration
- Confederated Tribes of Siletz Indians
- Port of Tillamook
- Port of Garibaldi
- Tillamook County Creamery Association
- Tillamook Pioneer Museum
- Stimson Lumber
- Northwest Oregon Restoration Partnership
- Surfrider
- Rockaway Beach Citizens for Watershed Protection
- North Coast private landowners

DEQ booth at Tillamook Water Festival, April 2016

North Coast Basin Report

Current impairments and TMDLS

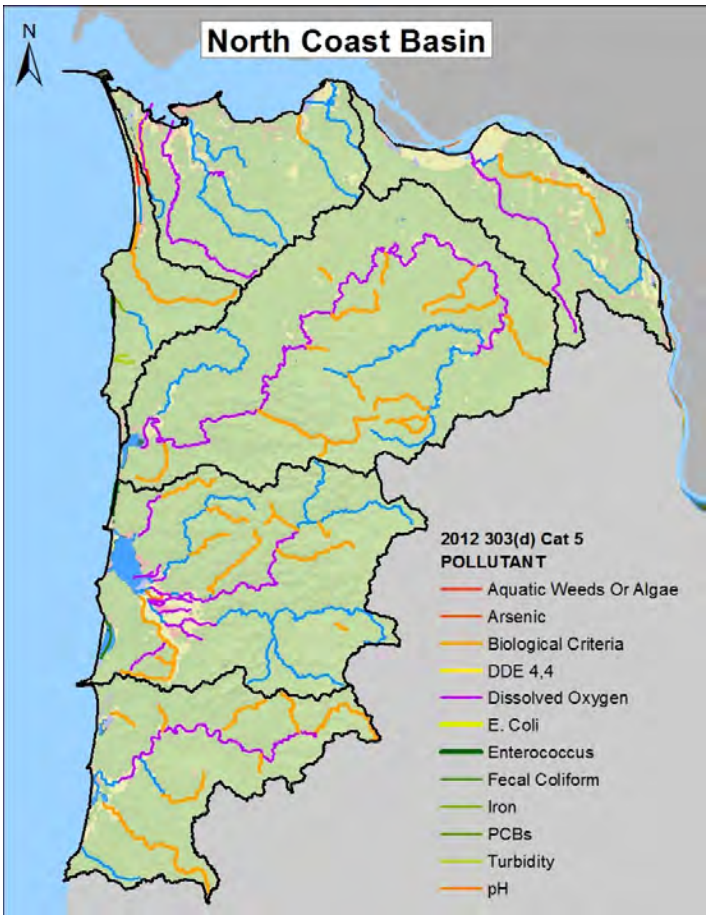
DEQ and partner agencies monitor water quality in streams throughout the North Coast Basin. Every two years, DEQ is required to assess water quality against water quality standards and report to the U.S. Environmental Protection Agency on the condition of Oregon's waters. Water bodies that do not meet standards are listed as "water quality impaired." The list of impaired streams is called the "303(d) list." Streams are removed from the list once Total Maximum Daily Loads, which are pollution limits, are complete.

Total Maximum Daily Loads, or TMDLs, for the Tillamook Bay Watershed were issued in July 2001 for temperature and bacteria. The Nestucca Bay Watershed TMDL was issued in May 2002 for temperature, bacteria and sediment.

Bacteria concentrations are particularly high during storms and tend to be highest in the lower elevations of each of the basins; the areas associated with the greatest concentrations of agriculture, urban development and roads. Based on high bacteria concentrations during high-flow storm events, the conditionally approved harvesting areas are closed when river flow or rainfall increase beyond limits specified in the Tillamook Management Plan for commercial shellfish harvesting

In the Tillamook TMDL, allocated instream bacteria concentrations reflect reductions ranging from 90 percent to 99 percent relative to current conditions. In the Nestucca, the allowable runoff concentrations range from fairly high in cleaner rivers to very low depending on land use and flow rate in the rivers.

As outlined in the temperature TMDLs, factors that affect water temperature are interrelated, and the surrogate measure (percent effective shade) that DEQ uses relies on restoring/protecting riparian vegetation to increase surface shade, reduce stream bank erosion, stabilize channels, reduce the near-stream disturbance zone width and reduce the surface area of the stream exposed to radiant processes.



Parameter/Pollutant	No. of 303(d) Listings
Dissolved oxygen	31
Metals (includes mercury)	6
Biological Criteria	36
Eutrophication	3
Sedimentation	2
Bacteria	10
Temperature	0
pH	1
Other (toxics)	0
Total	89

About the 303(d) Program

Under section 303(d) of the Clean Water Act, states, territories and authorized tribes must submit lists of impaired waters. These waters are too polluted or otherwise degraded to meet water quality standards. The law requires that states establish priority rankings for waters on the lists and develop Total Maximum Daily Loads for these waters. — Source EPA

North Coast Basin Report

319 Projects

Project	Category	Goals	Description
Riparian Restoration, Tillamook County Soil and Water Conservation District	Agricultural	Primarily livestock exclusion fencing of riparian areas.	District installs livestock exclusion fencing along riparian areas and provides off-channel watering and other agricultural needs to limit water quality issues.
Riparian Restoration, Upper Nehalem Watershed Council	Restoration and monitoring	Riparian restoration through manual control of invasive plants and native tree and shrub establishment. Water quality monitoring.	Watershed council engages in landowner outreach, riparian restoration and water quality monitoring for TMDL effectiveness, temperature and turbidity.
Backyard Planting Program Year 10, Tillamook Estuaries Partnership	Restoration	Riparian restoration through manual control of invasive plants and native tree and shrub establishment.	Watershed council engages in landowner outreach and riparian restoration on agricultural and rural residential properties.
Riparian Restoration, Nestucca-Neskowin Watershed Council	Restoration	Riparian restoration through manual control of invasive plants and native tree and shrub establishment.	Watershed council engages in landowner outreach and riparian restoration on agricultural and rural residential properties.
2012 Stream Enhancement and Restoration, Tillamook County Soil and Water Conservation District	Agricultural	Primarily livestock exclusion fencing of riparian areas.	District installs livestock exclusion fencing along riparian areas and provides off-channel watering and other agricultural needs to limit water quality issues.

About 319 Grants

The federal Clean Water Act grants states, territories and tribes grants for technical assistance, education, training, technology transfer, demonstration projects and monitoring to assess the success of specific nonpoint source implementation projects. Learn more at https://www.epa.gov/lakes/clean-water-act-section-319.

Since 2014 more than $570,000 in 319 funding has been spent in the North Coast Basin. To achieve measurable results, DEQ has placed a strong emphasis on projects that are designed, implemented and monitored to demonstrate benefits to the watershed. Quantification of instream water quality improvements, estimations of pollutant load reductions associated with innovative demonstration projects, or documenting changes in behavior from educational efforts that lead to water quality protection are all ways to achieve measurable success.

319 Projects (continued)

Project	Category	Goals	Description
South Fork Nehalem Dairy Farm Riparian Enhancement, Lower Nehalem Watershed Council	Restoration	Riparian restoration through manual control of invasive plants and establishment of native trees and shrubs. Also included livestock exclusion fencing.	Watershed council performed riparian restoration project on large dairy. Efforts included manual invasive weed control and native tree and shrub planting. Livestock exclusion fencing was also established around the riparian planting areas.
2014 Children's Clean Water Festival, Tillamook Estuaries Partnership	Education	Provide educational opportunity for fourth graders throughout Tillamook County focused on all aspects of water.	Project provided one to two primers for field event. One-day event reached around 320 fourth grade students with about 92 volunteers. Children learned about water quality, the water cycle, beneficial uses for water, etc. through activities and group discussions.
Cannon Beach Stormwater Master Plan, City of Cannon Beach	Planning	Stormwater plan development for infrastructure improvements.	City of Cannon Beach hired a contractor to perform stormwater infrastructure plan development.
Riparian Restoration, Nestucca-Neskowin Watershed Council	Restoration	Riparian restoration through manual control of invasive plants and native tree and shrub establishment.	Watershed council engages in landowner outreach and riparian restoration projects on agricultural and rural residential properties.
Backyard Planting Program, Tillamook Estuaries Partnership	Restoration	Riparian restoration through manual control of invasive plants and native tree and shrub establishment.	Watershed council engages in landowner outreach and riparian restoration projects on agricultural and rural residential properties.

319 Projects (continued)

Project	Category	Goals	Description
Riparian Restoration, Upper Nehalem Watershed Council	Restoration	Riparian restoration through manual control of invasive plants and establishment of native trees and shrubs.	Watershed council engages in landowner outreach and riparian restoration projects on agricultural and rural residential properties.
Northwest Oregon Restoration Partnership, Tillamook Estuaries Partnership	Restoration Supplies	Introduce native coastal species that are better able to compete with invasive species.	The cooperative nursery produces native trees and shrubs used by partners in riparian restoration efforts. Plants are grown to larger sizes than are generally available at commercial nurseries and are better able to compete with invasive species present in degraded riparian areas.
2015 Children's Clean Water Festival, Tillamook Estuaries Partnership	Education	Provide educational opportunity for fourth graders throughout Tillamook County focused on all aspects of water.	Project provided one to two primers for field event. One-day event reached around 320 fourth grade students with about 92 volunteers. Children learned about water quality, the water cycle, beneficial uses for water, etc. through activities and group discussions.
Riparian Restoration and Water Quality Monitoring, Upper Nehalem Watershed Council	Restoration and monitoring	Riparian restoration through manual control of invasive plants and native tree and shrub establishment. Water quality monitoring.	Watershed council engages in landowner outreach, riparian restoration and water quality monitoring for TMDL effectiveness, temperature and turbidity.

319 Projects (continued)

Project	Category	Goals	Description
Riparian Restoration, Nestucca-Neskowin Watershed Council	Restoration	Riparian restoration through manual control of invasive plants and native tree and shrub establishment.	Watershed council engages in landowner outreach and riparian restoration projects on agricultural and rural residential properties.
Riparian Restoration, Nestucca-Neskowin Watershed Council	Restoration	Riparian restoration through manual control of invasive plants and native tree and shrub establishment.	Watershed council engages in landowner outreach and riparian restoration projects on agricultural and rural residential properties.
Backyard Planting Program 2015/2016, Tillamook Estuaries Partnership	Restoration	Riparian restoration through manual control of invasive plants and native tree and shrub establishment.	Watershed council engages in landowner outreach and riparian restoration projects on agricultural and rural residential properties.
Northwest Oregon Restoration Partnership, Tillamook Estuaries Partnership	Restoration supplies	Introduce native coastal species that are better able to compete with invasive species.	The nursery produces native trees and shrubs used in riparian restoration efforts. Plants are grown to larger sizes than are generally available at commercial nurseries and are able to better compete with invasive species present in degraded riparian areas.
Northwest Oregon Restoration Partnership, Tillamook Estuaries Partnership	Restoration supplies	Introduce native coastal species that are better able to compete with invasive species.	The nursery produces native trees and shrubs used in riparian restoration efforts. Plants are grown to larger sizes than are generally available at commercial nurseries and are better able to compete with invasive species present in degraded riparian areas.

North Coast Basin Report

319 Projects (continued)

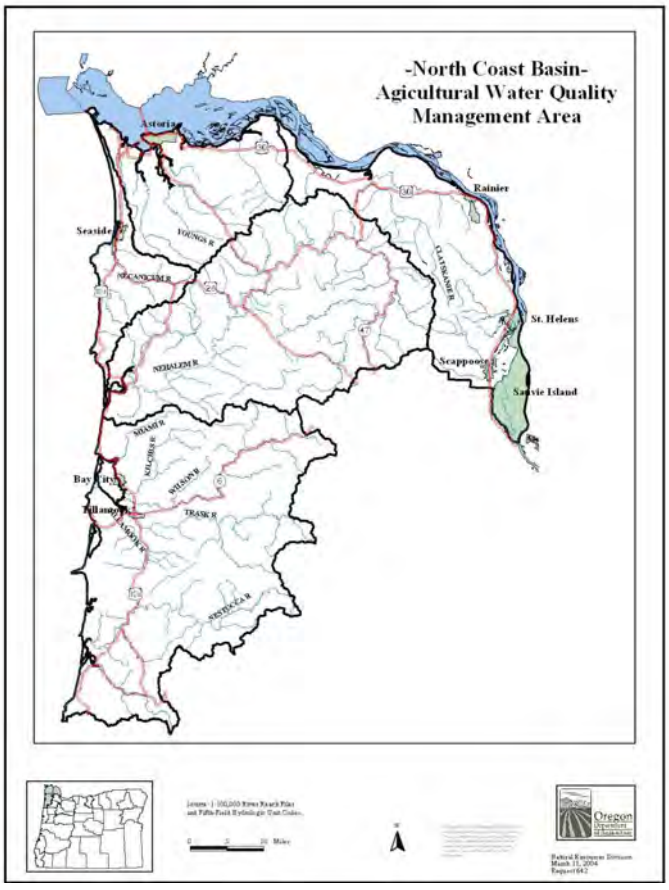
Project	Category	Goals	Description
Northwest OR Restoration Partnership, Tillamook Estuaries Partnership	Restoration Supplies	Introduce native coastal species that are better able to compete with invasive species.	The nursery produces native trees and shrubs used in riparian restoration efforts. Plants are grown to larger sizes than are generally available at commercial nurseries and are better able to compete with invasive species present in degraded riparian areas.
Northwest Oregon Restoration Partnership, Tillamook Estuaries Partnership	Restoration Supplies	Introduce native coastal species that are better able to compete with invasive species.	The nursery produces native trees and shrubs used in riparian restoration efforts. Plants are grown to larger sizes than are generally available at commercial nurseries and are better able to compete with invasive species present in degraded riparian areas.
Riparian Restoration, Tillamook County Soil and Water Conservation District	Agricultural	Primarily livestock exclusion fencing of riparian areas.	The district installs livestock exclusion fencing along riparian areas and provides off-channel watering and other agricultural needs to limit water quality issues.
Backyard Planting Program, Tillamook Estuaries Partnership	Restoration	Riparian restoration through manual control of invasive plants and native tree and shrub establishment.	Watershed council engages in landowner outreach and riparian restoration projects on agricultural and rural residential properties.
2016 Children's Clean Water Festival, Tillamook Estuaries Partnership	Education	Provide educational opportunity for fourth graders throughout Tillamook County focused on all aspects of water.	Project provided one to two primers for field event. One-day event reached around 320 fourth grade students with about 92 volunteers. Children learned about water quality, the water cycle, beneficial uses for water, etc. through activities group discussions.

Future Project Goals, Needs and Priorities

Priority projects for the North Coast basin are those projects that work to address water quality issues associated with temperature, bacteria and dissolved oxygen. These types of projects include but are not limited to: riparian and in-channel restoration (native planting, erosion control, large wood placement), implementing agriculture best management practices (includes fencing and digester projects), and stormwater planning, tools and projects.

Photo caption: The Northwest Oregon Restoration Partnership nursery grows genetically specific native trees and shrubs for riparian restoration work in the north coast of Oregon. Volunteers from the Oregon Youth Conservation Corps assist the partnership with management and propagation of native trees at the nursery.

NPS Implementation in Agricultural Lands: Highlights



North Coast Agricultural Water Quality Management Area

The Oregon Department of Agriculture is responsible for developing Agricultural Water Quality Management Area Plans to prevent and control water pollution and soil erosion from agricultural activities. DEQ continues to work closely with ODA and soil and water conservation districts to incorporate meaningful metrics and benchmarks in area plans that will help meet nonpoint source load allocations. While efforts to identify specific goals and objectives in the area plans are a work in progress, on-the-ground initiatives and projects continue to directly address nonpoint source priorities in agricultural lands.

Thirty-six restoration projects were implemented in the North Coast since the last biennial review which resulted in the establishment of 15.3 acres of riparian trees and shrubs and livestock exclusion fencing for over 31,682 feet. The need for sustained monitoring was identified by the Local Advisory Committee and the local soil and water conservation districts to further target outreach activities, technical assistance, project development and implementation of management practices in identified priority areas throughout the basin.

DEQ
State of Oregon Department of Environmental Quality

North Coast Basin Report

Watershed Plans

The U.S. Environmental Protection Agency requires that proposed watershed-based plans developed or implemented using Section 319 funds must include nine key elements. This assured public funds are used effectively and that projects make progress towards restoring waters impaired by nonpoint source pollution. These elements include identification of the causes and sources of pollutants, management measures and their expected load reductions, funding and sources, and information or education component.

NINE KEY ELEMENTS

- Causes, sources and extent of pollutants
- Description of management measures
- Load reductions expected from measures
- Funding needs and sources
- An information or education component
- An implementation schedule
- Measurable milestones of implementation
- Criteria for determining progress
- A monitoring component

Several existing watershed plans address management of the Tillamook Bay Watershed and together cover EPA's nine key elements. Existing watershed plans include:

North Coast Basin Water Quality Status and Action Plan
http://www.deq.state.or.us/wq/watershed/Docs/NorthCoastPlan.pdf

Tillamook Bay Watershed TMDL
http://www.deq.state.or.us/WQ/TMDLs/docs/northcoastbasin/wilsontrasknestucca/tillamook/tmdl.pdf

North Coast Subbasins TMDL
http://www.deq.state.or.us/WQ/TMDLs/docs/northcoastbasin/northcoast/tmdl.pdf

Nestucca Bay Watershed TMDL
http://www.deq.state.or.us/WQ/TMDLs/docs/northcoastbasin/wilsontrasknestucca/nestuccabay/tmdlwqmp.pdf

DEQ and its North Coast Basin partners will continue with status and trend (effectiveness) monitoring to look for opportunities to align the existing and emerging water quality problems with the priority actions needed to address them. DEQ will focus on improving the partnerships that are inherent for progress in addressing nonpoint source pollution. The North Coast Basin Plan employs adaptive management principles and continues to make refinements to be most effective in reducing nonpoint source pollution.

The Tillamook Estuaries Partnership's Backyard Planting Program restores native riparian trees and shrubs along Tillamook County's streams and rivers. Here the upper Tillamook River has been cleared of invasive species and the native tree and shrub have been planted along river banks.

Contact Information

York Johnson

North Coast Water Basin Coordinator

503-322-2222

johnson.york@deq.state.or.us

State of Oregon Department of Environmental Quality

North Coast Basin Report

Success Stories

Lower Wilson River: A multitude of stakeholders have been involved with reducing bacteria levels in the Wilson River watershed. Since 2002, the Tillamook Estuaries Partnership has worked with landowners to complete more than 20 on-the-ground habitat and riparian restoration and protection projects in the lower Wilson River. DEQ worked with the City of Tillamook to develop a stormwater management plan, and efforts are underway to control stormwater inputs to local rivers, including the lower Wilson and nearby Trask rivers. Data analyses demonstrate that multi-faceted efforts to reduce bacteria levels in the Wilson River are working. Nonpoint source pollution reduction efforts in the Wilson River watershed included fencing livestock away from the river, better managing manure, restoring riparian areas and restoring wetland areas while point source reductions included wastewater treatment plant upgrades. By tackling diverse pollution sources, bacteria levels have dropped significantly in the watershed. Additionally, as the new riparian vegetation matures over time, it will provide long-term benefits for seasonal problems with temperature and dissolved oxygen.

Tillamook River: By the mid-1990s, concentrations of bacteria in the waters of the rivers and the bay were often too high to allow safe shellfishing and recreation. Sources of bacteria in the watershed included rural and urban residential development (many homes have failing septic systems), urban stormwater runoff, livestock management and other agricultural activities, and several wastewater treatment plants that discharge either to the rivers or the bay. DEQ developed a Total Maximum Daily Load for the Tillamook Bay Basin in 2001.

DEQ performed trend analyses on the data from 10 monitoring stations, which are scattered through the upper and lower Tillamook River Subbasins. All but two stations on Bewley Creek show with 95 percent or greater confidence level that bacteria counts have decreased since 2003.

Kilchis River: Targeted watershed efforts to reduce bacteria levels in the Kilchis River have taken place since 2002. Local groups, including the Tillamook Estuaries Partnership, Tillamook Bay Watershed Council and Tillamook Soil and Water Conservation District and their federal, state and local partners, have implemented numerous projects aimed at restoring and protecting the Kilchis River watershed (using Clean Water Act section 319 and other funding sources). Three stations along the mainstem Kilchis River, extending from the river's mouth to mile 15.4 (the uppermost extent of the river segment that is designated as impaired for bacteria) demonstrate that all three stations have met the two-part recreational use water quality standard for bacteria since 2009.

Results indicate that this multi-faceted approach to reduce bacteria levels is working. Nonpoint source pollution reduction efforts included implementing agricultural best management practices, restoring riparian areas and addressing failing septic systems. By tackling diverse pollution sources through a variety of means, watershed partners have reduced the amount of bacteria reaching the river, which has allowed bacteria levels to drop significantly throughout the watershed. Additionally, as the new riparian and wetland vegetation matures over time, it should provide long term benefits for seasonal problems with temperature and dissolved oxygen.

Contact Information

York Johnson

North Coast Water Basin Coordinator

503-322-2222

johnson.york@deq.state.or.us

DEQ
State of Oregon Department of Environmental Quality

Watershed Characteristics

The Owyhee Basin encompasses 11,049 square miles of Southwestern Idaho, Southeastern Oregon and North Central Nevada. The Owyhee River originates in North Central Nevada and flows in a northwest direction through the southwest corner of Idaho and Southeast Oregon. It then turns north to empty into the Snake River near the town of Nyssa, Oregon. The total length of the mainstem is 280 miles. The major subbasins in Oregon are the Lower Owyhee, Middle Owyhee and Crooked/Rattlesnake. Smaller subbasins in Oregon are the Middle Snake-Succor, Jordan and East Little Owyhee/South Fork Owyhee.

A majority of the land in the Owyhee Basin is public, managed mainly by the Bureau of Land Management and the State of Oregon. Rangeland is the dominant use in the basin along with irrigated private agricultural land concentrated near the Snake River. The climate is arid to semi-arid, and agriculture is very dependent on the use of water stored in reservoirs. Owyhee Reservoir is formed behind the Owyhee Dam in the lower river. The reservoir extends along approximately 40 miles of the Owyhee River, and provides irrigation water to farms near the mouth of the Owyhee and along the Snake and Malheur Rivers. Efforts to improve water quality in the basin have mainly focused on improving irrigation efficiency and minimizing irrigation-induced erosion, along with improvements to riparian vegetation condition through improved farm and livestock management.

Subbasin	Land Cover	Public	Private	Tribal
Lower Owyhee	Grass/Pasture Hay	12%	2%	0%
	Shrub/Rangelands	76%	7%	0%
	Water/Wetlands/	2%	0%	0%
Middle Owyhee	Grass/Pasture Hay	12%	0%	0%
	Shrub/Rangelands	83%	3%	0%
Crooked-Rattle-snake	Grass/Pasture Hay	9%	1%	0%
	Shrub/Rangelands	83%	6%	0%

Land Use in the Owyhee Basin—NRCS 2006

Partners and Collaborations

The Malheur County Soil and Water Conservation District, Owyhee Watershed Council, and local irrigation districts have had many successful partnerships performing water quality monitoring in the basin and using the data to prioritize irrigation system improvements. Projects include piping of irrigation canals and improving irrigation efficiency in order to reduce irrigation induced erosion leading to significant reductions in pollutant loading to local waterbodies.

DEQ has many partners in the watershed including:

- Malheur County Soil and Water Conservation District
- Oregon State University Extension Service
- Oregon State University Malheur Experiment Station
- Natural Resource Conservation Service
- Bureau of Land Management
- U.S. Forest Service
- Oregon Department of Fish and Wildlife
- Burns Paiute Tribe
- Idaho Power
- Vale Oregon Irrigation District
- Warmsprings Irrigation District
- Owyhee Irrigation District
- Owyhee Watershed Council

DEQ
State of Oregon Department of Environmental Quality

Current impairments and TMDLS

DEQ and partner agencies monitor water quality in streams throughout the Owyhee Basin. Every two years, DEQ is required to assess water quality against water quality standards and report to the U.S. Environmental Protection Agency on the condition of Oregon's waters.

Water bodies that do not meet standards are listed as "water quality impaired." The list of impaired streams is called the "303(d) list." Streams are removed from the list once Total Maximum Daily Loads, which are pollution limits, are complete.

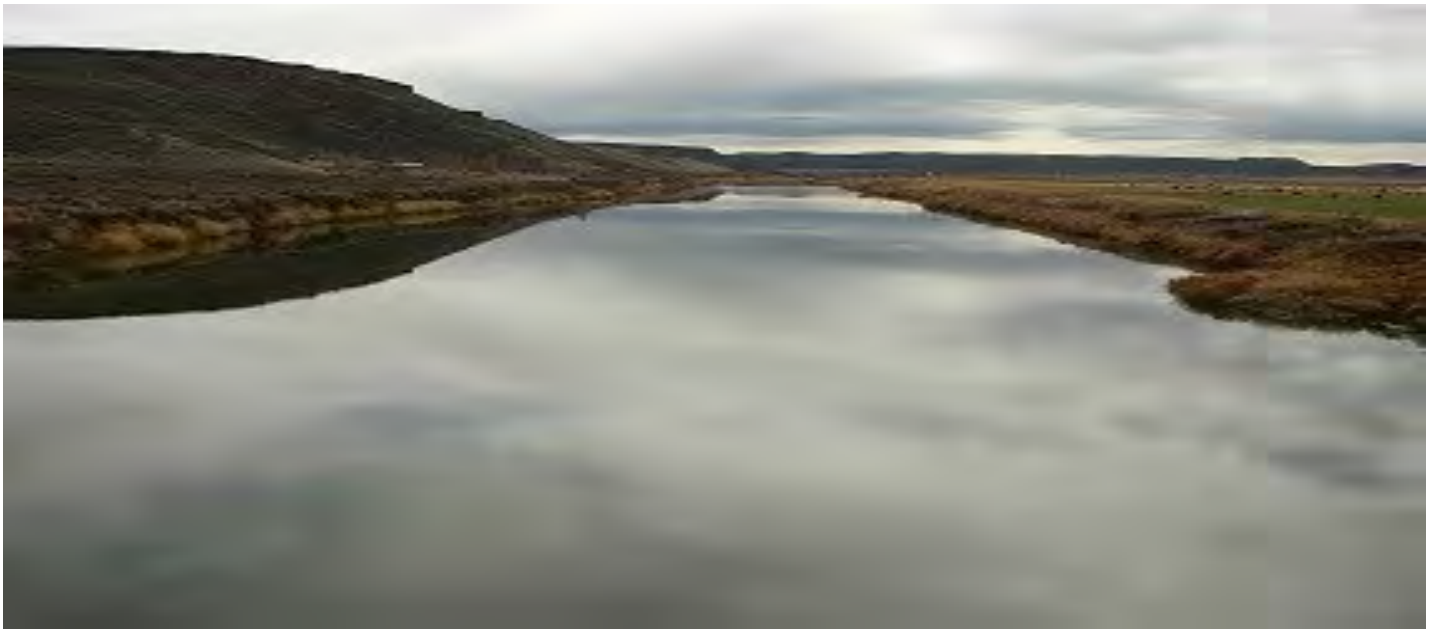
Currently, there are no Total Maximum Daily Loads, commonly called TMDLs, planned for the Owyhee basin, and there are no existing impairments identified in the Crooked -Rattlesnake Basin. In the Lower and Middle Owyhee basins, most impairment listings are for metals which include: arsenic, copper, iron, lead, mercury and thallium.

A status and trends analysis was performed on five DEQ ambient monitoring sites in the Owyhee basin in 2014. Stream conditions ranged from fair to poor or very poor at the Owyhee River at Highway 201. For four out of the five sites, there was not enough long-term data to calculate trends. Data for the Owyhee River at Highway 201showed neither an increasing or decreasing trend in overall water quality.

Parameter/Pollutant	No. of 303(d) Listings
Dissolved Oxygen	0
Metals	16
Biocriteria	0
Eutrophication	1
Sedimentation	0
Bacteria	2
Temperature	2
pH	0
Other	2
Total:	23

About the 303(d) Program

Under section 303(d) of the Clean Water Act, states, territories and authorized tribes must submit lists of impaired waters. These waters are too polluted or otherwise degraded to meet water quality standards. The law requires that states establish priority rankings for waters on the lists and develop Total Maximum Daily Loads for these waters. — Source EPA



Owyhee River at Rome (Highway 95) - DEQ Trend Station No. N0730

Owyhee Basin Report

319 Projects

Project	Category	Goals	Description
Owyhee River Improvement Project Phase 3 and 4	Monitoring/Outreach	Characterize sediment, nutrient and bacteria loading from agricultural drains and tail water delivered to the Malheur River. Increase local awareness of water quality concerns and the role of agricultural management practices in reducing pollutant loading.	Monitor more than 10 sites on local agricultural drains in the Owyhee River Basin for sediment, nutrients and bacteria. Analyze the data for pollutant loading and provide the information to local resource partners to inform implementation actions including changes in irrigation, nutrient and erosion management.
Filter Strip Water Quality Improvement	Best Management Practices/ Technical Assistance/ Outreach	Reduce sediment, nutrient and bacteria loading to the Owyhee River. Increase local awareness of water quality concerns and the role of agricultural management practices in reducing pollutant loading.	Reduce sediment and nutrient loading in 303(d) listed segments of the Lower Owyhee, Malheur and Snake Rivers by implementing best management practices on furrow irrigated cropland. Treat 4,406 acres treated for a calculated total sediment reduction of 110,150 tons/year and a calculated total phosphorus reduction of 59,040 pounds per year.

About 319 Grants

The federal Clean Water Act grants states, territories and tribes grants for technical assistance, education, training, technology transfer, demonstration projects and monitoring to assess the success of specific nonpoint source implementation projects. Learn more at https://www.epa.gov/lakes/clean-water-act-section-319. DEQ is continually seeking project proposals to address nonpoint sources of pollution in the state. In an ongoing effort to achieve measurable results, DEQ has placed a strong emphasis on projects that support drinking water source protection, groundwater management areas, TMDL development and implementation and watershed approach implementation.

Owyhee Basin Report

NPS Implementation in Agricultural Lands: Highlights

The Oregon Department of Agriculture is responsible for developing Agricultural Water Quality Management Area Plans to prevent and control water pollution and soil erosion from agricultural activities. Due to limited land and water suitable for agriculture and the large areas required to sustain livestock, the basin is sparsely populated, however the lower portions of the Owyhee and Malheur basins, along the western edge of the Treasure Valley, support rich irrigated agriculture and are particularly known for production of Spanish onions. Within the Owyhee-Malheur Reporting Basin, ODA established three Agriculture Water Quality Management Areas ─ the Owyhee, Malheur and the Greater Harney Basin. Each area has a management plan that details strategies to prevent and control water pollution from agricultural activities through education, management actions, compliance and monitoring.

Owyhee Agricultural Water Quality Management Area Plan (2015):

The 2015 agricultural management plan identified the Fletcher Gulch Focus area. This focus area is on rangeland and irrigated farmland near the mouth of the Owyhee River. Farmland along Fletcher Gulch was historically irrigated with flood irrigation that resulted in the delivery of large amounts of sediment and associated nutrients and bacteria to the Old Owyhee Ditch and eventually to the Owyhee River. Projects that pipe irrigation ditches, convert from flood irrigation to sprinklers and other practices that reduce irrigation-induced erosion have been implemented in the area with the goal of reducing nutrient and sediment loads by at least 20 percent by 2016. Water quality monitoring is being performed to determine if these goals have been met.

Watershed Plans

Three soil and water conservation districts have large portions of their areas within the Owyhee-Malheur Basins including Grant, Malheur, and Harney districts. Three watershed councils also operate within the basin including the Malheur and Owyhee watershed councils and the Bully Creek Watershed Coalition.

Water Quality Program Focus Areas are cooperative efforts by local soil and water conservation districts whose purpose is to document effectiveness of the efforts to improve agricultural water quality. The focus area process includes measuring current conditions, implementing technical assistance and projects and finally measuring improved conditions in each area. There is one area currently identified in the Owyhee-Malheur Basin: Fletcher Gulch (Owyhee – Malheur Soil and Water Conservation District).

Current watershed plans include:

- Owyhee Subbasin Assessment Plan (Northwest Power and Conservation Council, 2004)
- Malheur Basin Action Plan (Malheur Watershed Council, 2015, covers portions of lower Owyhee Basin)
- Snake River-Hells Canyon TMDL (DEQ, 2004)
- Northern Malheur County Groundwater Management Area Plan (DEQ, 1991, 2003)

Future Project Goals, Needs and Priorities

Local groups in the watershed are continuing to work on the development of projects in the Fletcher Gulch focus area and elsewhere in the basin. The major goals of these projects include increasing irrigation efficiency and the reduction of irrigation induced erosion. These actions will greatly reduce the loading of sediment, nutrients, and bacteria to the Owyhee River.

Contact Information

John Dadoly

Owyhee Basin Coordinator

541-278-4616

dadoly.john@deq.state.or.us

DEQ
State of Oregon Department of Environmental Quality

Watershed Characteristics

The Powder River is a tributary of the Snake River located in east-central Oregon along the border with Idaho. The Powder River Basin is approximately 3,500 square miles in size, and the main channel of the Powder River is approximately 144 miles long. The Powder River Basin is divided into three subbasins: Burnt River, Powder River and Brownlee. All streams in these watersheds drain into the Snake River.

Approximately 50 percent of the land in the Powder River Basin is public, managed mainly by Bureau of Land Management and the U.S. Forest Service. Rangeland is the dominant use in the basin along with forested lands in the western and northeastern portions of the basin, and irrigated pasture and other agricultural land concentrated in the central Baker Valley, Burnt River, Keating and Lower Powder valleys to the south and east. The climate is semi-arid and agriculture is very dependent on the use of water stored in reservoirs that are filled by streams draining the Blue Mountains and Wallowa Mountains. Efforts to improve water quality in the basin have mainly focused on improving irrigation efficiency and minimizing irrigation-induced erosion, limiting livestock access to streams and improvements to riparian vegetation condition and floodplain connection.

Powder River at Highway 86—DEQ Station No. 10724

Partners and Collaboration: Highlights

The Powder Basin Watershed Council, Bureau of Land Management, U.S. Forest Service, local school groups and many volunteers have had a successful partnership performing water quality monitoring in the basin that has been partially supported by 319 grants. Idaho Power has also partnered with the watershed council and other stakeholders on stream enhancement projects and the establishment of a network of flow monitoring stations.

Current partners in the Watershed include:

- Baker Valley Soil and Water Conservation District
- Keating Soil and Water Conservation District
- Eagle Valley Soil and Water Conservation District
- Burnt River Soil and Water Conservation District
- Powder Basin Watershed Council
- Natural Resource Conservation Service
- Bureau of Land Management
- U.S. Forest Service
- Oregon Department of Fish and Wildlife
- Idaho Power
- Powder Valley Water Control District
- Baker Valley Irrigation District
- Lower Powder River Irrigation District
- Burnt River Irrigation District

DEQ
State of Oregon Department of Environmental Quality

Powder Basin Report

Current impairments and TMDLS

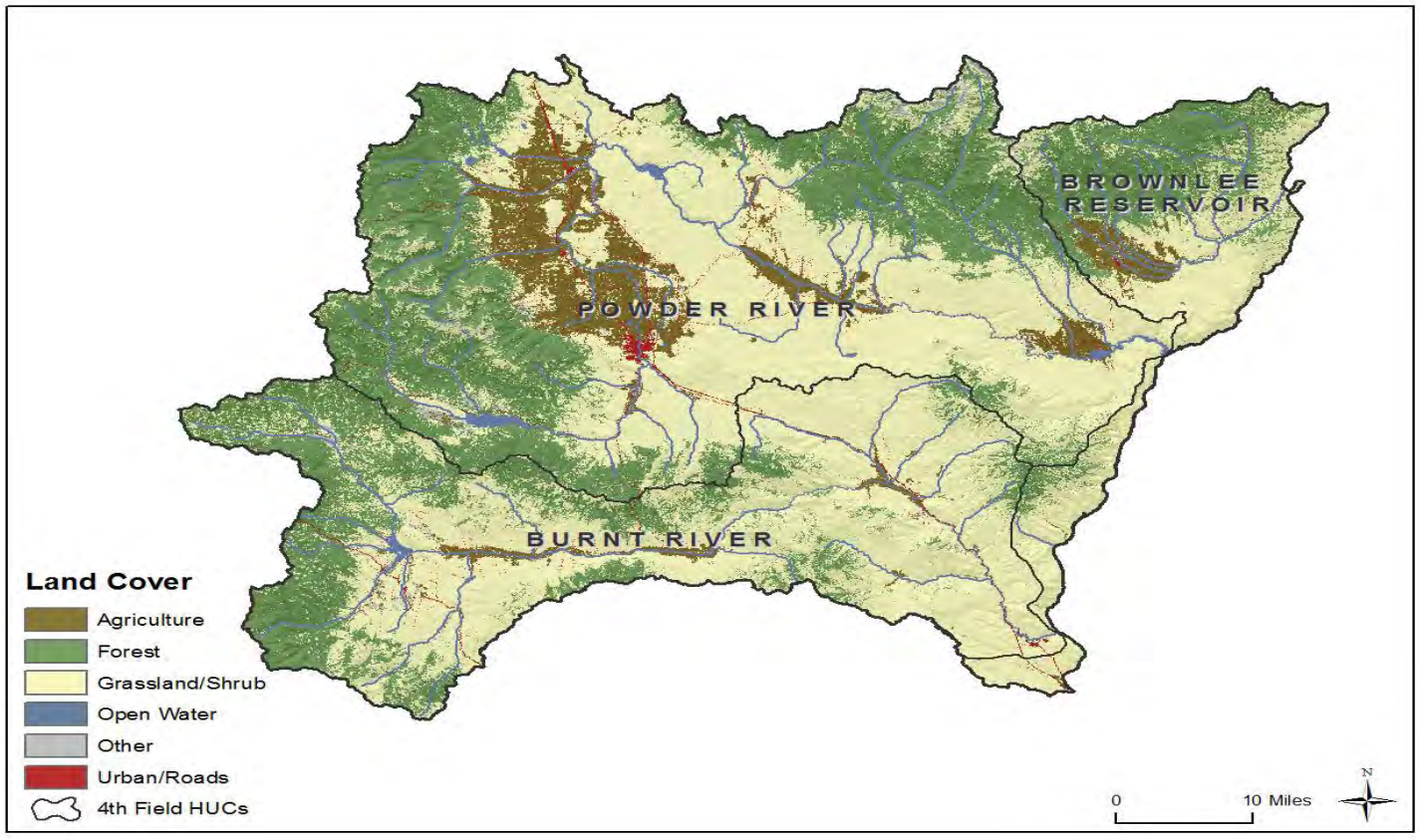
Water quality in the Powder Basin ranges from good to very poor. Of the two DEQ long-term ambient monitoring stations in the Powder River Subbasin, one station, the Powder River at Highway 7, recorded good conditions with no trend. The other station, Powder River at Highway 86, recorded very poor conditions and a declining trend in water quality in 2016. The ambient station in the Burnt River Subbasin is ranked as poor water quality with no trend. Streams in the Powder River Basin are typically impaired by temperature, bacteria and sediment.

No Total Maximum Daily Loads, or TMDLs, have yet been developed for the Powder Basin. Data collection for the development of a nutrients/dissolved oxygen and bacteria TMDL has been completed and water quality modeling has started Completion of the TMDL is expected in 2018/19.

Parameter/Pollutant	No. of 303(d) Listings
Dissolved Oxygen	8
Metals	6
Biocriteria	2
Eutrophication	1
Sedimentation	7
Bacteria	13
Temperature	39
pH	1
Other	0
Total:	**77**

About the 303(d) Program

Under section 303(d) of the Clean Water Act, states, territories and authorized tribes must submit lists of impaired waters. These waters are too polluted or otherwise degraded to meet water quality standards. The law requires that states establish priority rankings for waters on the lists and develop Total Maximum Daily Loads for these waters. — Source EPA



Powder Basin Report

319 Projects

Project	Category	Goals	Description
Powder Basin Water Quality Monitoring Program – Phase 1	Monitoring/Outreach	Characterize sediment, nutrient and temperature loading from private and public landscapes to the Powder River. Increase local awareness of water quality and the role of land management in reducing pollutant loading.	Baseline data collection at 20 sites representing stream conditions across the basin. Collection by high school students followed quality assurance protocols, engaged students and allowed access to private land.
Bureau of Land Management Nutrient Monitoring in the Powder Basin	Monitoring/Outreach/Best Management Practices	Compare and characterize existing water quality and riparian conditions relative to changes in land management practices in the basin. Increase local awareness of water quality concerns and the role of land management practices in reducing pollutant loading.	Monitor stream nutrients and bacteria at 20 locations to establish long-term condition trends. Sites were monitored in 2014, 2015 and 2016 for flow, nutrients and bacteria. Data was compared with data collected at the locations in 2003. Water quality in monitored streams has improved.
Powder Basin Water Quality Monitoring Extension and Expansion	Monitoring/Outreach	Characterize sediment, nutrient and temperature loading from private and public landscapes to the Powder River. Increase local awareness of water quality concerns and the role of land management in reducing pollutant loading.	Expands previous monitoring program to include 72 sites. Data collected includes temperature, pH, dissolved oxygen, conductivity and turbidity. Continuous automated temperature data were collected May through December. Local high school and many volunteers and partners are involved.

About 319 Grants

The federal Clean Water Act grants states, territories and tribes grants for technical assistance, education, training, technology transfer, demonstration projects and monitoring to assess the success of specific nonpoint source implementation projects. Learn more at https://www.epa.gov/lakes/clean-water-act-section-319.

Within the Powder Basin, over $120,000 has been spent since 2014 on projects that address nonpoint source pollution. Partners in the watershed continue to actively work towards reducing pollutant loads.

State of Oregon Department of Environmental Quality

Powder Basin Report

Watershed Plans

The U.S. Environmental Protection Agency requires that proposed watershed-based plans developed or implemented using Section 319 funds must include nine key elements. This assures that public funds are used effectively and that projects make progress towards restoring waters impaired by nonpoint source pollution. The elements include identification of the causes and sources of pollutants, management measures and their expected load reductions, funding and sources, and information or education.

Existing watershed plans in the Powder Basin include:

- Powder River Subbasin Assessment Plan (Northwest Power and Conservation Council, 2004)
- Burnt River Subbasin Assessment Plan (Northwest Power and Conservation Council, 2004)
- Snake River-Hells Canyon TMDL (DEQ, 2004)
- Powder Basin Status Report and Action Plan (DEQ, 2013)
- U.S. Fish and Wildlife Service Bull Trout Recovery Plan (USFWS, 2015)
- Powder Basin Watershed Council Strategic Outreach Survey Report

NINE KEY ELEMENTS

- Causes, sources and extent of pollutants
- Description of management measures
- Load reductions expected from measures
- Funding needs and sources
- An information or education component
- An implementation schedule
- Measurable milestones of implementation
- Criteria for determining progress
- A monitoring component

NPS Implementation in Agricultural Lands: Highlights

Nonpoint source implementation in the Powder River Basin is accomplished through activities on both private agricultural and federal lands. The Oregon Department of Agriculture is responsible for developing Agricultural Water Quality Management Area Plans to prevent and control water pollution and soil erosion from agricultural activities on private lands. The current plan for the Powder Basin was updated in 2016 and identified Rock Creek as a focus area:

Powder-Brownlee Agricultural Water Quality Management Area Plan (2016):

The plan identified Rock Creek as a focus area. The Baker Valley, Eagle Valley and Keating soil and water conservation districts and local area committees will work to identify the focus area and focus outreach and technical assistance work over the next biennium. Streamside vegetation conditions will be assessed and classified and within one year the district plans to offer technical assistance to lands where agricultural activities appear to be impairing streamside vegetation. In two to four years ODA and the district will assess changes to streamside vegetation in the focus area and compile information about water quality improvement projects.

Burnt River Agricultural Water Quality Management Area Plan (2014):

The goal is to establish a focus area for the district's work and offer technical assistance to all landowners in the focus area on lands where agricultural activities appear to be impairing the growth of riparian vegetation. After this period of technical assistance, ODA and the district will assess changes to streamside vegetation in the focus area and compile information about water quality improvement projects.

Contact Information

John Dadoly
Oregon Department of Environmental Quality
Malheur Basin Coordinator
541-278-4616
dadoly.john@deq.state.or.us

DEQ
State of Oregon Department of Environmental Quality

Future Project Goals, Needs and Priorities

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

Channel and Riparian Restoration:
Targeted riparian restoration projects include restoring morphologic function (increased sinuosity, decreased width/depth ratios, floodplain reconnection), revegetation of riparian area and increased instream flow. Proposed projects are expected to include an extensive portion of the stream channel over time rather than isolated small-length segments.

Nutrient Reduction:
Targeted nutrient reduction projects are those that include research, design and implementation activities that will reduce nutrient loading to waterbodies in the Powder Basin.

Agricultural Implementation:
Targeted agricultural implementation projects include riparian area restoration activities, waste management, grazing management, irrigation management and effectiveness monitoring to characterize watershed response to implementation projects.

Pollutant Source Characterization:
Targeted pollutant source characterization projects include development and implementation of monitoring programs specific to the characterization of sources of: elevated water temperatures, nutrients, bacteria, pesticide concentrations, and depressed dissolved oxygen in local surface and groundwater, and agricultural drains in support of targeting and refining TMDL implementation efforts and changes in management practices.

Improved Stream Flows:
Targeted projects are those that will increase summer instream flows (quantity and timing) to more closely mimic the natural hydrograph; result in implementation of water conservation strategies on-farm; specifically and permanently reduce stream water withdrawals and promote upland conservation measures.

Below: Powder River at McCarty Bridge

Watershed Characteristics

The Rogue Basin in southwestern Oregon consists of five subbasins that drain to the Pacific Ocean: Lower Rogue River, Middle Rogue River, Upper Rogue River, Illinois and Applegate. The subbasins are on the northeastern flank of the Siskiyou Mountains and the western flanks of the Cascade Mountains and total 3.3 million acres (5,156 square miles). Land use in the basin is 67 percent forest, 22 percent grassland/shrub, 4 percent agriculture and 4 percent urban (3 percent other) according to the U.S. Geological Survey 2001 National Land Cover Database.

WISE Effectiveness Monitoring sampling.

Streams in this watershed provide habitat for a wide variety of cold-water species including Coho salmon, spring Chinook salmon, fall Chinook salmon, summer and winter steelhead, multiple species of resident trout, amphibians and other fish including Pacific lamprey, green sturgeon, white sturgeon, Klamath small-scale 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 in the river, estuary and offshore has been an important economic resource for generations.

Partners and Collaboration: Highlights

Below are some highlights of collaborations taking place in the Rogue Basin.

- An ongoing collaboration of municipal state and local agencies, irrigation districts and landowners have invested over $39.5 million to reduce levels of phosphorus in Bear Creek by over 90 percent since 1997.
- Since 2008, four dams in the basin were either notched or removed: Gold Hill Diversion Dam (2008); Elk Creek Dam; Savage Rapids Dam (2009) and Gold Ray Dam (2010). The removed dams provide salmon and steelhead with better access to over 333 miles of high-quality spawning habitat and have improved water quality.
- Watershed monitoring program, supported by the Bear Creek Designated Management Agencies, Section 319 grant funds, and implemented by the Rogue Valley Council of Governments has been collecting water quality data in the Bear Creek Watershed since 1992.
- The WISE (Water for Irrigation, Stream & Economy) project, which is currently under development, is a regionally supported irrigation water management project designed to improve the health of the Bear Creek and Little Butte Creek watersheds by limiting nonpoint source pollution through modernized water management and irrigation infrastructure. Environmental benefits from WISE include improved water quality and habitat conditions for cold-water aquatic life by eliminating heated and pollution-laden irrigation return flows.

DEQ
State of Oregon Department of Environmental Quality

Current impairments and TMDLS

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

Total Maximum Daily Loads, or TMDLs, were developed for temperature in Lower Sucker Creek in the Illinois Subbasin and Lobster Creek in the Rogue Subbasin in 2002. In 2004, a temperature and sediment TMDL was approved for the Applegate Subbasin. In 2007, a TMDL was approved for temperature, bacteria and sedimentation for the Bear Creek Subbasin and the Rogue Subbasin TMDL for temperature and bacteria was approved in 2008.

In the Rogue TMDL, DEQ identified bacteria reductions of between 5 percent to 97 percent from major nonpoint sources of fecal contamination such as: confined animal feeding operations, livestock grazing, irrigation runoff, stormwater runoff and failing septic systems.

Temperature TMDLS developed for the Rogue Basin incorporated over 100 stream segments. In most streams, a major source of temperature impairment is the removal of near stream vegetation leading to increased solar radiation reaching the water. Removal of near-stream vegetation has resulted from various agricultural practices, logging, and urban/rural development. Shade targets were developed for streamside areas throughout the basin, and all of the Designated Management Agencies are currently implementing strategies to meet those shade targets. Dissolved oxygen listings, which are yet to be addressed through a TMDL, comprise the highest number of impairments (44 percent) in the Rogue Basin identified in the 2012 Integrated Report. DEQ expects improvements in dissolved oxygen levels will occur as a result of implementing the temperature TMDLs. Stream temperature has a significant impact on the dissolved oxygen level in a stream. It is anticipated that decreasing stream temperatures as required in the temperature TMDLs will also reduce dissolved oxygen impairments. Surrogate measures to reduce nonpoint source heat loads include percent effective shade targets and hyporheic flow percentage targets.

Temperature TMDLs for waterbodies that relied on the "natural conditions criteria" component of the temperature standard have been invalidated in federal court, however this does not affect nonpoint source shade targets. Designated Management Agencies remain committed to implementing strategies to meet those targets.

Rogue River at Rock Point Bridge.

Parameter/Pollutant	Number of 303(d) Listings*
Dissolved Oxygen	36
Metals	5
Biocriteria	18
Eutrophication	5
Sedimentation	6
Bacteria	1
Temperature	0
pH	10
Other	0
Total	**81**

* Category 5: TMDLs need to be developed

About the 303(d) Program

Under section 303(d) of the Clean Water Act, states, territories and authorized tribes must submit lists of impaired waters. These waters are too polluted or otherwise degraded to meet water quality standards. The law requires that states establish priority rankings for waters on the lists and develop Total Maximum Daily Loads for these waters. — Source EPA

DEQ
State of Oregon Department of Environmental Quality

319 Projects (2014-2016)

Project	Category	Goals	Description
Gold Hill Water Quality Improvement Coordinator Position	Technical Assistance—Watershed Study	Educate residents and increase river stewardship through awareness of water quality needs and objectives	Implement the city's Stormwater Management Program which involves a series of events aimed at educating residents and students about water quality issues and how to become a part of the solution.
Curry Cumulative Restoration for Aquatic Health	Monitoring	Demonstrate to local communities and funding agencies the benefits of restoration in the Sixes, Lower Rogue, and Chetco subbasins	Compare progress in treated and non-treated areas where nonpoint source pollution is a problem.
Western Oregon Low Impact Development Implementation Guide	TMDL Implementation	Create a Low Impact Development Implementation Guide template that is endorsed by a 10-20 member advisory committee. Within five years the guide will be referred to in the codes or ordinances of 10 communities resulting in more effective implementation of low-impact practices to control stormwater runoff.	Design a Low Impact Development Implementation Guide specific to small communities in Western Oregon that will help them implement the most environmentally beneficial and cost-effective stormwater management practices using tools designed just for them.
WISE Pre-Project Effectiveness Monitoring—Phase 1	Monitoring	To document instream conditions prior to WISE (Water for Irrigation, Streams & Economy) implementation	Provide continuous, real-time monitoring and routine water quality grab samples at locations on Bear Creek and Little Butte Creek, both upstream and downstream of the WISE project area
WISE Pre-Project Effectiveness Monitoring—Phase 2	Monitoring	To continue to document instream conditions prior to WISE implementation	Provide continuous, real-time monitoring and routine water quality grab samples on Bear Creek and Little Butte Creek, upstream and downstream of the WISE project area.

319 Projects

Project	Category	Goals	Description
Western Oregon Low Impact Development Implementation Guide: Phase II	TMDL Implementation	Assist in reducing urban runoff caused by development in communities that are currently struggling to improve their stormwater programs.	Finalize guidance and promote and train local communities in the use of the guidance and conduct pilot projects using the guidance
Thompson Creek Habitat Restoration in the Applegate River Watershed	Restoration Monitoring	Evaluate outcomes of restoration through monitoring strategies in the short (one to three years after project completion), medium (five years after project completion), and long-term (10-20 years after project completion).	Conduct post-project monitoring to determine change relative to pre-project baseline conditions and quantify success according to established benchmarks. Monitoring methods used will include: photo points, vegetation transects, aquatic habitat surveys, stream temperature, U.S. Forest Service stream shade modeling.
Little Applegate Significant Point Of Diversion Measuring Device Project	Monitoring	Help local water users install measuring devices for their water rights at their points of diversion which were deemed significant by the Oregon Water Resources Department.	Install measuring devices on the Little Applegate River and Yale Creek, a tributary of the Little Applegate River.

About Section 319 Grants

The federal Clean Water Act grants states, territories and tribes grants for technical assistance, education, training, technology transfer, demonstration projects and monitoring to assess the success of specific nonpoint source implementation projects. Learn more at https://www.epa.gov/lakes/clean-water-act-section-319.

Within the Rogue Basin, over $100,000 has been spent using 319 grants and local matching funds since 2014 on projects that address nonpoint source pollution. Partners in the watershed continue to actively work towards achieving TMDL load allocations.

State of Oregon Department of Environmental Quality

NPS Implementation in Agricultural Lands: Highlights

The Oregon Department of Agriculture is responsible for developing Agricultural Water Quality Management Area Plans to prevent and control water pollution and soil erosion from agricultural activities. DEQ continues to work closely with ODA and Soil and Water Conservation Districts to incorporate meaningful metrics and benchmarks in area plans that will help meet nonpoint source load allocations. While efforts to identify specific goals and objectives in the area plans are a work in progress, on-the-ground initiatives and projects continue to directly address nonpoint source priorities in agricultural lands.

The current Agricultural Water Quality Management Area Plan for the Inland Rogue was updated in 2015. Revisions to the plan are expected to occur in late 2017. Six restoration projects were implemented by the Illinois and Josephine counties soil and water conservation districts, and eight projects were implemented by the Jackson Soil and Water Conservation District. The projects completed included livestock exclusion from riparian areas, sediment/manure management, pasture restoration and irrigation improvement. Pesticide monitoring, as part of the DEQ/ODA Pesticide Stewardship Partnership, also occurred at the mouth of five tributaries to Bear Creek.

DEQ has received an increasing number of complaints related to the impacts of legal cannabis cultivation within the Rogue Basin. The Rogue Basin has the ideal climate for cannabis cultivation with a large percentage of the state's grow permits issued in Jackson and Josephine counties. Issues associated with cultivation include: improperly constructed roads, improperly cleared lands resulting in erosion, illegal water use, re-routing streams to create grow areas. DEQ works closely with ODA, the Jackson and Josephine County Watermaster offices, Oregon Department of Fish and Wildlife and Oregon Department of Forestry to respond to cannabis related complaints.

The WISE (Water for Irrigation Streams & Economy) Project is a regionally supported infrastructure improvement project designed to improve the health of the Bear Creek and Little Butte Creek watersheds by limiting nonpoint source pollution through modernized water management and irrigation infrastructure. It is designed to pipe nearly 250 miles of existing open, earthen canal; provide pressurized water to users and eliminate irrigation conveyance connections to streams which lose about 30,000 acre-feet of water annually. WISE will also help expedite on-farm irrigation efficiency projects implemented by the Natural Resource Conservation Service and Jackson Soil and Water Conservation District. (Check out a map of its monitoring stations on the next page.) Water quality and quantity improvements from these projects are expected to benefit aquatic species and improve water supply for municipal water providers. Environmental assessments are being completed now and project planners anticipate starting construction winter of 2017/2018.

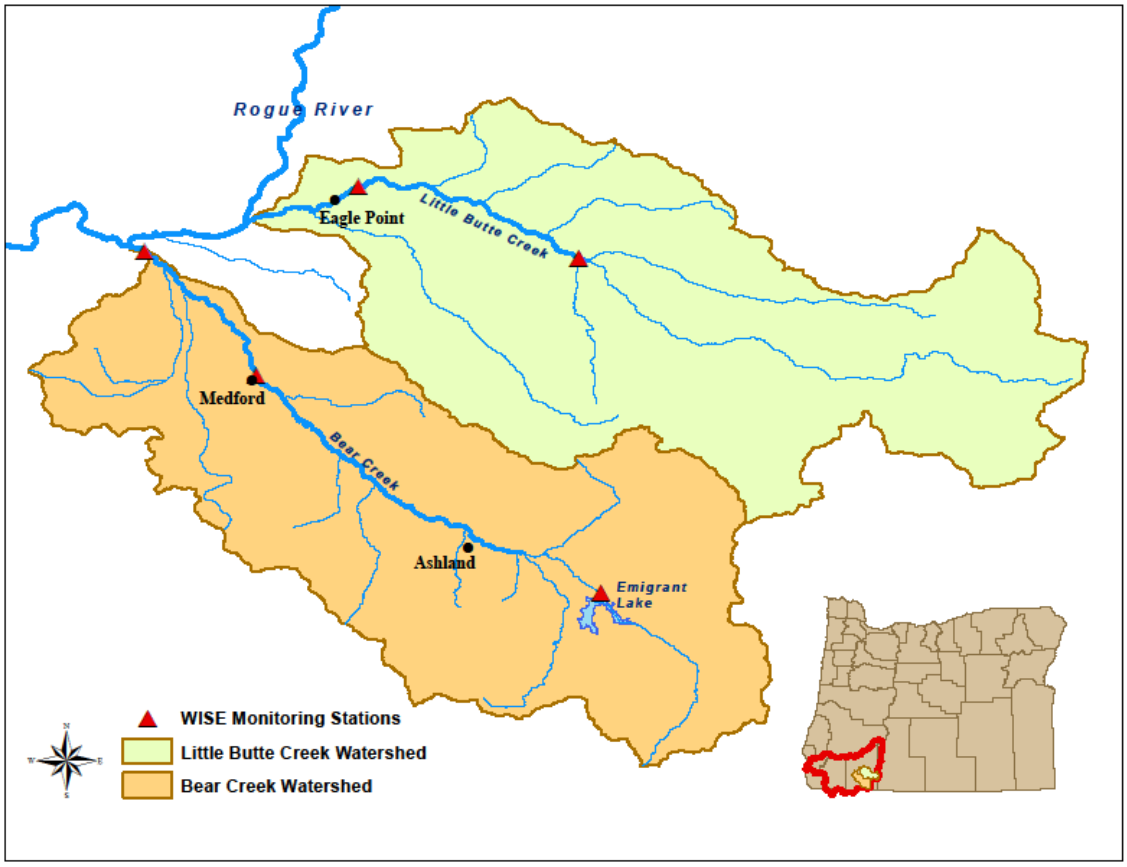
Applegate River at Highway 199 DEQ Long-term monitoring Site No. 10428.

In addition to the WISE Project and on-farm irrigation improvements, 12 cities and Jackson County are actively implementing TMDLs. These projects contribute to improved water quality conditions and the collection of useful water quality data.

DEQ
State of Oregon Department of Environmental Quality

Future Project Goals, Needs and Priorities

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



WISE monitoring stations 2015-2018

Urban Areas

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

Forest Lands

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

Agricultural Areas

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

Other Areas as Applicable

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

DEQ
State of Oregon Department of Environmental Quality

Rogue Basin Report

Watershed Plans

The U.S. Environmental Protection Agency requires that proposed watershed-based plans developed or implemented using Section 319 funds include nine key elements. This assures that public funds are being used effectively and that projects make progress towards restoring waters impaired by nonpoint source pollution. There are numerous water shed based plans for the Rogue Basin that were developed using Oregon Watershed Enhancement Board funds and guidance documents. The guidance includes identifying causes and sources of pollutants, management measures and their expected load reductions, funding and sources, and information or education component. Existing watershed based plans in the Rogue Basin include:

NINE KEY ELEMENTS

- Causes, sources and extent of pollutants
- Description of management measures
- Load reductions expected from measures
- Funding needs and sources
- An information or education component
- An implementation schedule
- Measurable milestones of implementation
- Criteria for determining progress
- A monitoring component

◊ DEQ, Total Maximum Daily Load and Water Quality Management Plan. Lower Sucker Creek, Illinois Subbasin, 2002

◊ DEQ, Total Maximum Daily Load and Water Quality Management Plan. Lobster Creek, Lower Rogue Subbasin, 2002.

◊ DEQ, Total Maximum Daily Load and Water Quality Management Plan. Applegate Subbasin, 2003.

◊ DEQ, Total Maximum Daily Load and Water Quality Management Plan. Bear Creek Watershed, 2007.

◊ DEQ, Total Maximum Daily Load and Water Quality Management Plan. Rogue River Basin, 2008

◊ Applegate River Watershed Council, Cheney Creek Watershed Assessment and Action Plan, 1998

◊ Rogue Valley Council of Governments, Bear Creek Watershed Assessment/Action Plan, 1998

◊ Applegate River Watershed Council, Slate Creek Watershed Assessment and Action Plan, 1999

◊ Rogue Valley Council of Governments, Jackson Creek Watershed Assessment and Action Plan Demo, 1999

◊ Friends of the Greensprings, Keene Creek Watershed Assessment, 2000

◊ Little Butte Creek Watershed Council, Little Butte Creek Assessment and Action Plan, 2001

◊ Seven Basins Watershed Council, Seven Basins Watershed Assessment, 2002

◊ Applegate River Watershed Council, Middle Applegate Assessment and Outreach, 2004

◊ Rogue River Watershed Council, Upper Rogue Watershed Assessment, 2005

◊ Seven Basins Watershed Council, Seven Basins Watershed Assessment, 2002

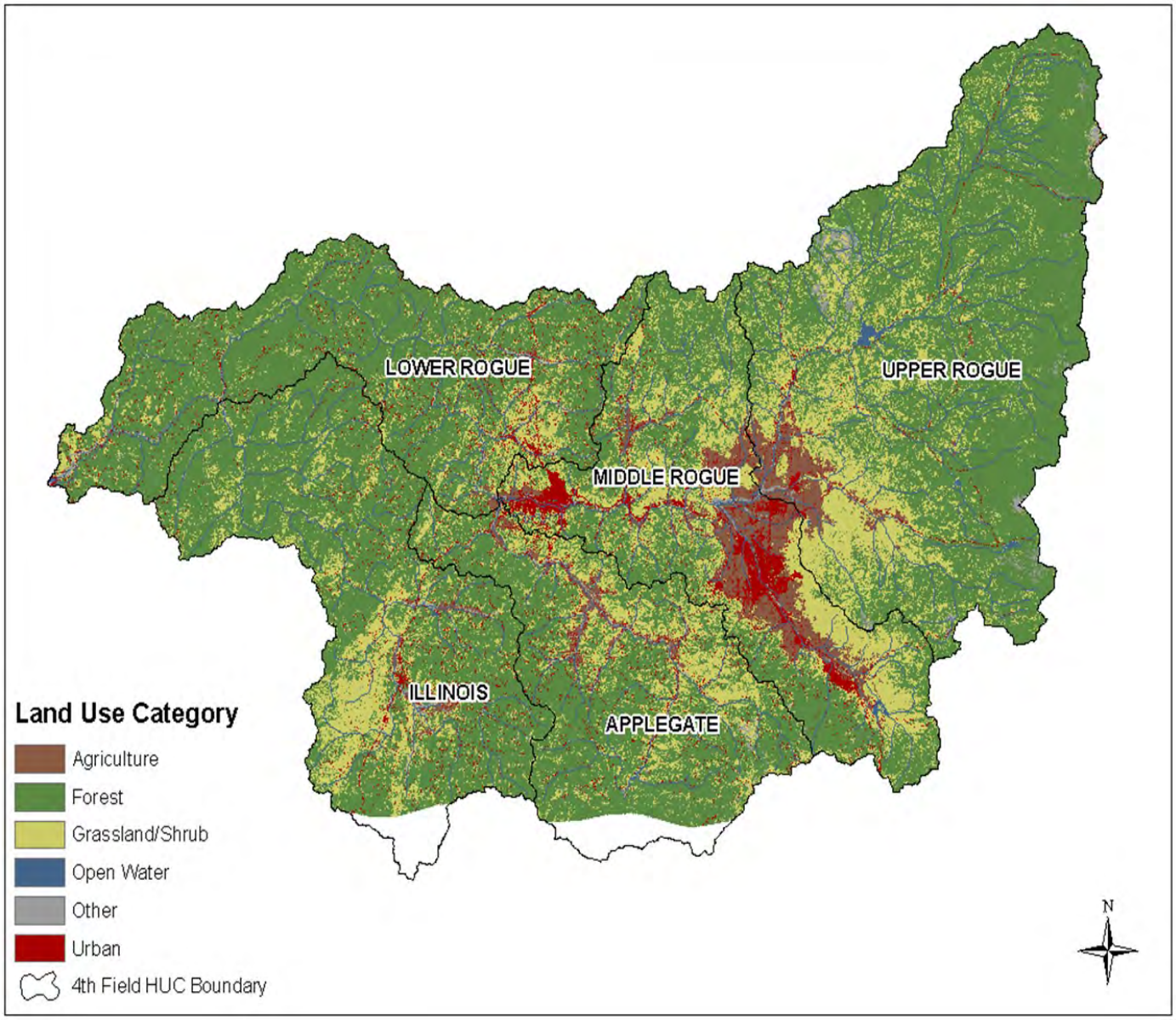
◊ Applegate River Watershed Council, Middle Applegate Assessment and Outreach, 2004

◊ South Coast Watershed Council, South Coast Watershed Assessment and Action Plan, 1998

◊ South Coast Watershed Council, Technical Assessment Lower Chetco Water Quality Management Plan, 1999

Contact Information
Bill Meyers
Rogue River Basin Coordinator
541-776-6272
meyers.bill@deq.state.or.us

Land Uses in the Rogue Basin



Watershed Characteristics

The South Coast Basin is located in southwestern Oregon and consists of five subbasins: Coos, Coquille, Sixes, Chetco and a portion of the Smith. These subbasins are on the west side of the Siskiyou Mountains and contain over 1.9 million acres.

At the north end of the basin, the Coos and Coquille rivers headwater in the Coast Range and flow across relatively flat, low gradient, marine terraces to the Pacific Ocean. In the south portion, numerous coastal frontal streams headwater primarily in the Klamath Mountain Province and discharge directly to the ocean. Ports are maintained at Coos Bay, Bandon, Port Orford, Gold Beach and Brookings Harbor. Coos Bay provides deep draft access.

Habitats in the South Coast Basin are particularly diverse and include forest, grass and shrub lands, coastal redwood forest, and most of the world's habitat for Port Orford cedar. Flat, coastal terraces, extend from Bandon south to Cape Blanco and support unique shore pine forests, wetlands and cranberry bogs. Further south, the coastal headlands and off-shore rocks are among the most spectacular and pristine in Oregon.

Streams provide habitat for a wide variety of cold-water species including Coho and spring and fall Chinook salmon, summer and winter steelhead, multiple species of residential trout, amphibians, and other fish including Pacific lamprey, green sturgeon, white sturgeon, speckled dace and prickly sculpin. The basin's estuaries provide habitat for marine mammals, birds and a wide variety of fish.

The South Coast Basin covers 2,973 square miles.

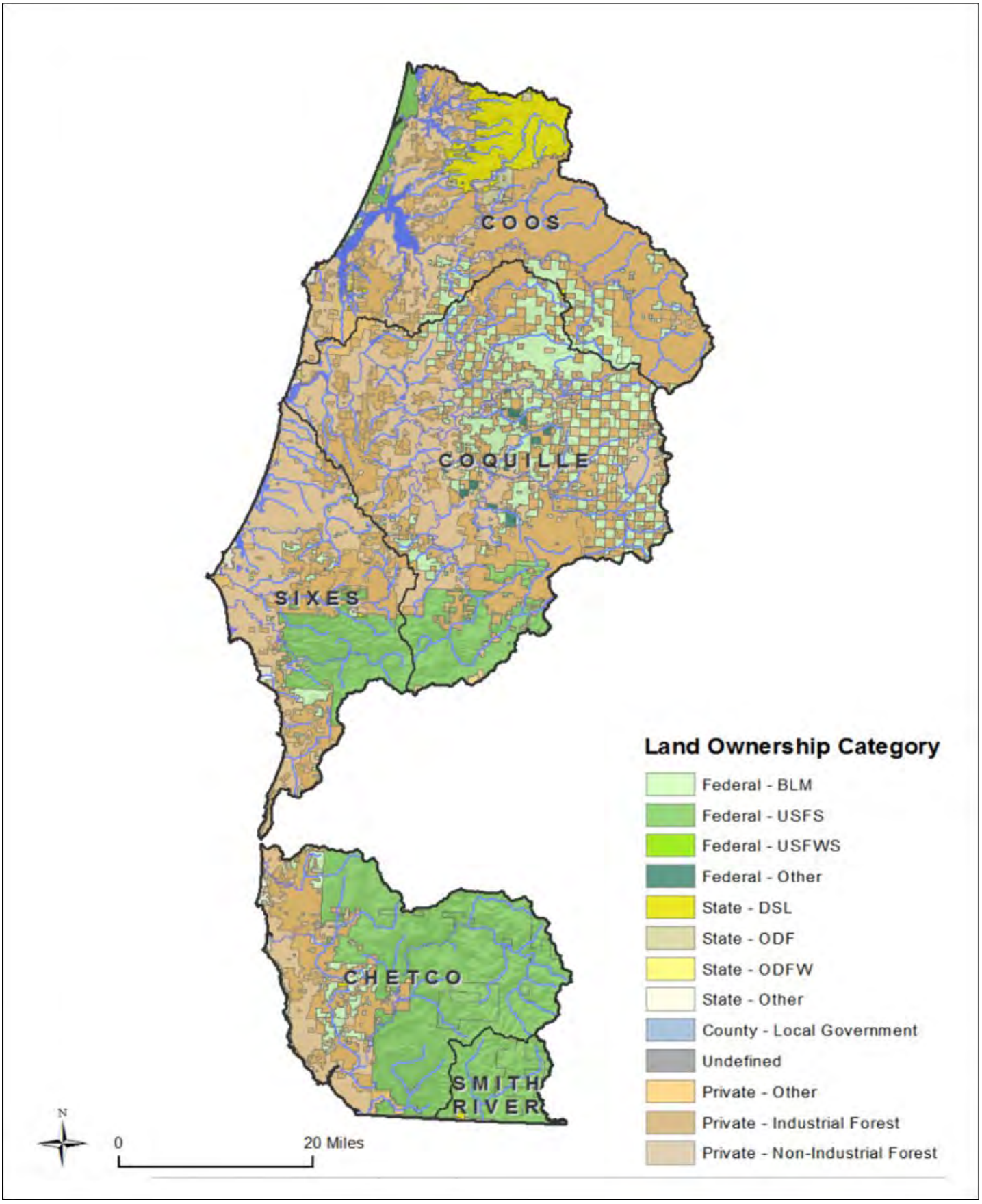
The South Coast Basin extends to the Pacific Ocean

The South Coast Basin contains several areas identified by the Oregon Department of Fish and Wildlife as core areas for the recovery of coastal Coho salmon and is comprised of two discrete evolutionarily significant units. The northern portion of the South Coast Basin is part of the Oregon Coast Coho Evolutionarily Significant Unit and the southern portion is part of the Southern Oregon/Northern California Evolutionarily Significant Unit. Coho salmon and green sturgeon are listed as threatened under the Endangered Species Act. Other species of concern include Pacific lamprey, steelhead, coastal cutthroat trout and Chinook salmon.

Forestry, ranching, agriculture, commercial and recreational fishing, and tourism drive the economy of communities in the basin. Flat marine terraces have largely been converted to cranberry or lily production. The Coos and Coquille valleys historically were large timber producers along with cattle and dairy industries. Commercial shellfish harvesting occurs in select South Coast Basin estuaries. Commercial and recreational fishing and boating have been an important economic resource for generations. The South Coast Basin also contains numerous lakes which provide fishing, boating, swimming and other recreational opportunities.

DEQ
State of Oregon
Department of
Environmental
Quality

South Coast Basin Report



South Coast Basin Report

Partners and Collaboration

The Coos Watershed Association has been a vital partner in the South Coast Basin. DEQ partnered with the Coos Watershed Association to present a "Coos Water Quality Coalition and TMDL Readiness Workshop" in Coos Bay. The workshop was designed to facilitate discussion about technical approaches that could be applied to develop an implementation-ready TMDL for the Coos Watershed. Guest speakers from DEQ, Coos Watershed Association, Oregon Department of Forestry, Oregon Department of Agriculture, South Slough and University of Oregon presented information about emerging tools (Coos Bay hydrodynamic model development, load duration curves for bacteria and dissolved oxygen, and sediment tools – high-risk landslide evaluations, bugs 101 and the PREDATOR macroinvertebrate model, and stream temperature modeling).

The Oregon Department of Forestry presented information about the role of the Forestry Practices Act in implementation of TMDLs, forest riparian protection rule revisions and voluntary forestry measures. The Oregon Department of Agriculture presented information about Agricultural Water Quality Area Management Plans in the implementation of TMDLs, how ODA is measuring progress/ compliance, what tools are used, and how riparian areas are being assessed. The workshop, which was funded in part by a 319 grant, represented an opportunity for diverse interests to discuss water quality issues in a learning environment.

The City of Coos Bay has also been an active partner in the basin. DEQ staff worked with the city to develop a Stormwater State Revolving Fund Sponsorship Option project. Because the city was applying for a State Revolving Fund loan to upgrade a wastewater treatment plant they were presented with an opportunity to secure Sponsorship Option funding. By adding a nonpoint source component, the infrastructure loan interest rate was reduced allowing the city to secure over $2 million at no additional cost. To help achieve water quality standards designed to protect public health and fishery habitat this Sponsorship Option proposal will establish a policy framework and regulatory authority in the form of stormwater design guidelines and development standards that will reduce pollutant loading. In addition, the city proposed to identify opportunities to install water quality best management practices to reduce the volume and velocity of stormwater runoff concurrent with infrastructure improvements. Products will include an updated Storrmwater Management Plan, stormwater ordinance development and the implementation of stormwater best management practices demonstrations.

DEQs South Coast Basin nonpoint source program and DEQ's laboratory hosted a macroinvertebrate monitoring training event attended by 25 people. Topics included an overview of basic instream habitat types, a demonstration of DEQ riffle sampling method and techniques, a hands on bug sampling opportunity, introduction to bug sorting, preservation, and aquatic insect identification (sensitive and tolerant taxa), and a shade assessment demonstration (solar pathfinder and densitometer).
Middle and South Coast Basin DEQ staff, partnered with

Western Oregon LID Template workshop in Coos Bay in Spring 2016

Green Girl Land Development Solutions LLC to host a Western Oregon Low Impact Development Template workshop in early spring 2016. The workshop was attended by local city, state and tribal personnel interested in learning about the just published template for Low Impact Development Stormwater Manual for Western Oregon. The template manual was created to assist coastal Oregon jurisdictions address Municipal Separate Storm Sewer Systems and TMDL regulatory requirements for water quality during the "post-construction" phase of managing stormwater. Topics of the workshop included an overview of the need for the manual and its development, introduction to the best management practices suitability matrix, information on the site scale treatment train approach, a review of the annual water balance model, a discussion of the stormwater hierarchy, and the appropriate placement and sizing of best management practices for water quality benefits.

See more partnerships on pages 4-6

South Coast Basin Report

South Coast Basin Partners

Partner	Focus Area
Indian Tribes	Cultural and other natural resource interests. Water quality monitoring. Land management (tribal, trust, fee and ceded lands) including forest, agricultural and urban landscapes.
Federal Partners	
Bureau of Indian Affairs	Administers trust responsibility program, maintains federal government-to-government relationships with recognized Indian tribes, promotes and supports tribal self-determination.
Bureau of Land Management **U.S. Forest Service**	Protects and manages national forests and grasslands in a sustainable manner for multiple-uses. Northwest Forest Plan guides land management. BLM manages Oregon and California Railroad Revested Lands.
U.S. Army Corps of Engineers	Maintains channels, harbors and waterways for transportation of commerce, support to national security and recreation. Provides technical expertise for sediment characterization, evaluation and management.. Participate in water resource development projects (navigation, flood damage, ecosystem restoration). Conduct fill and removal permitting and secure tribal and endangered species act consultations. Reduce flood risks with structural and non-structural measures.
Natural Resource Conservation Service	Works with landowners through conservation planning and assistance to benefit the soil, water, air, plants and animals to boost productive lands and healthy ecosystems. Provides financial assistance for conservation activities.
Farm Services Agency	Serves farmers, ranchers, and agricultural partners through the delivery of effective, efficient agricultural programs (commodity, loan and loan guarantee, conservation, and disaster relief programs).
National Oceanic and Atmospheric Association, National Marine Fisheries Service, U.S. Fish and Wildlife Service	Implement the Endangered Species Act. Generally, U.S. Fish and Wildlife Service manages land and freshwater species, while National Marine Fisheries Service manages marine and "anadromous" species.
U.S. Environmental Protection Agency	Develops and enforces Clean Water Act regulation, provides grant and low-interest loan assistance, studies environmental issues, sponsors partnerships, provides education, outreach and technical assistance.
State Agencies	
Oregon Department of Forestry **Board of Forestry**	Regulates water quality on non-federal forestlands through the Forest Practices Act. Supervises forest policy in Oregon. Implements the Oregon Plan by promoting private land volunteer enhancement measures. Directly oversees the management of the Elliott State Forest. Monitors and applies adaptive management.
Oregon Department of Agriculture	Develops Agricultural Water Quality Management Area Plans and enforce rules that address water quality issues on agricultural lands. Conducts water quality education and outreach, selects and implements focus area programs, partners with DEQ to identify water quality monitoring needs, applies adaptive management.

South Coast Basin Report

South Coast Basin Partners

Partner	Focus Area
Oregon Department of Transportation	Provides water quality protection measures during construction, operation, and maintenance of the state and federal transportation system. Manages vegetation and sediment.
Oregon Department of State Lands **South Slough National Estuarine Research Reserve**	Maintains jurisdiction over waterways, wetland management and protection and state forest land management. Conducts fill and removal permitting, waterway and grazing leases and provides natural resource management funding. Partners with NOAA to manage National Estuarine Research Reserve System, a network protected and managed for long-term research, education and coastal stewardship.
Oregon Department of Fish and Wildlife **Restoration and Enhancement Board** **Oregon Fish and Wildlife Commission**	Develops and applies conservation strategy for native fish and wildlife and their habitats. Regulates fishing and hunting. Provides technical assistance and funding for fish restoration and enhancement.
Oregon State Marine Board	Administers boating safety educational programs, marine law enforcement and improved boating facilities. Establishes and enforces statewide boating regulations. Provides technical training and equipment to marine patrol officers and engineering services to local governments to develop and maintain accessible boating facilities and protect water quality. Promotes safe and sustainable boating.
Oregon Department of Geology and Mineral Industries	Regulates natural resource extraction (surface mining, oil and gas, and geothermal), implements the federal Clean Water Act General Stormwater Permit and the State Water Pollution Control Facility Permit at aggregate mine sites that utilize upland sources (may include instream sources also).
Oregon Parks and Recreation Department	Manages public parks and fosters natural resource enhancement.
Oregon Water Resources Department	Administers laws governing surface and groundwater resources. Protects existing water rights, facilitates voluntary stream flow restoration, increases the understanding of the demands on water resources, provides accurate and accessible water resource data, and facilitates water supply solutions.
Oregon Department of Land Conservation and Development	Provides technical and educational assistance to local government planners and officials, the general public and interest groups. Provides financial assistance to urban and rural communities. Administers the Coastal Management Program emphasizing conservation of coastal resources (estuaries, shorelands, beaches and dunes, and ocean resources), provides financial and planning assistance to local governments, implements a coastal hazards and assessment program, supports the Oregon Ocean Policy Advisory Council, maintains an online Oregon Coastal Atlas, and has authority under federal law to review federal programs and activities for consistency with coastal program standards.
Oregon State Police	Enforces fish, wildlife, and commercial fishing laws, protects natural resources, enforces boating, livestock and environmental protection laws and responds to emergencies.

South Coast Basin Report

South Coast Basin Partners

Partner	Focus Area
Oregon Plan for Salmon and Watersheds	Implements voluntary measures to restore native fish populations and aquatic systems, coordinates state, federal, and tribal actions, monitors watershed health, and provides scientific oversight.
Oregon Watershed Enhancement Board	Implements the Oregon Plan for Salmon and Watersheds, provides grants to help Oregonians protect and improve water quality and natural areas and supports watershed council operation.
Entities Managing Corridors	
Bonneville Power, Coos Curry Electric, Pacific Power, rail lines, pipeline corridors, Port Districts, other	Provides water quality protection during construction, operation, and maintenance activities. Manages riparian vegetation and sediment.
Local Jurisdictions/Governmental Entities	
Cities (Coos Bay, North Bend, Lakeside, Coquille, Myrtle Point, Powers, Bandon, Port Orford, Gold Beach, Brookings)	Manage lands in direct ownership (parks, city buildings, roads, etc.), manage wastewater, stormwater, and drinking water, utilize land use and comprehensive planning, and develop and apply local ordinances through education, variance procedures and enforcement.
Counties (Coos and Curry)	Manage lands in direct ownership (parks, city buildings, roads, etc.), manage stormwater, land use and comprehensive planning, and develop and apply local ordinances through education, variance procedures and enforcement.
Port Authorities (Coos Bay, Coquille, Bandon, Port Orford, Gold Beach, Brookings-Harbor)	Manage ports (marinas, service and fueling areas, live aboard communities, transient communities, sub tidal ownership, etc.), dredging activities and recreational facilities
Soil and Water Conservation Districts (Coos and Curry)	Local Management Agencies conduct outreach and education, provide technical assistance, develop individual farm plans for operations, work with landowners to implement management practices, and help landowners secure funding for water quality improvements.
Special Drainage Districts	Manage conveyance systems designed to enhance drainage and control tidal influences, and in some instances salinity (tidegates).
Academia	
Oregon State University Extension	Conveys research-based knowledge to improve natural resource productivity, water quality and fishery habitat.
Non Governmental Entities	
Watershed Councils (Tenmile Lakes Basin Partnership, Coos Watershed Association, Coquille Watershed Association, Curry Watershed Partnership)	Local, voluntary, non-regulatory groups established to improve the conditions of watersheds. Plan watershed protection and restoration strategies. Collaborate to identify issues, promote cooperative solutions, focus resources, agree on goals for watershed protection and enhancement, and foster communication among all watershed interests.
Coos Waterkeepers, Audubon, Surfrider Foundation, Oregon Shores Conservation Coalition, The Nature Conservancy, Port Orford Ocean Resource Team, Friends of the Elk River, Friends of the Coquille River, Wild River Coast Alliance, Freshwater Trust, Oregon Trout, and many others	Non-governmental organizations focus activities on water quality protection, enhancement, and restoration.

South Coast Basin Report

Current impairments and TMDLS

The Oregon Department of Environmental Quality and partner agencies monitor water quality in streams throughout the South Coast Basin. Every two years, DEQ is required to assess water quality against water quality standards and report to the U.S. Environmental Protection Agency on the condition of Oregon's waters. Water bodies that do not meet standards are listed as "water quality impaired." The list of impaired streams is called the "303(d) list." Streams are removed from the list once Total Maximum Daily Loads, which are pollution limits, are complete.

Within the South Coast Basin there are 12 DEQ ambient water quality monitoring sites located in forested, agricultural and rural residential areas that are included in the Oregon Water Quality Index Summary report (2014). Four sites had excellent water quality, two good, three fair, one poor and two very poor. However, the sites on the South Fork Coos River and Pistol River identified with very poor and poor water quality, respectively, are marine-influenced tidal sites and the results may be misleading. The majority of sites had no trend detected and only one of the fair sites and the poor site showed an improving trend.

DEQ's 2013 South Coast Basin Water Quality Status and Action Plan identified temperature, dissolved oxygen, pH, bacteria, biological criteria, aquatic weeds and harmful algae blooms as the primary water quality impairments. The plan also described ongoing efforts to implement water quality improvements and action items as well as identified opportunities between DEQ programs and local partnerships.

DEQ completed the Tenmile TMDL for sediment and phosphorus n 2007 and the Upper South Fork Coquille in 2001. DEQ is currently working on additional TMDLs for the South Coast. The Coquille TMDL is in development and is on track for completion in 2017. TMDL development for the Sixes and Chetco subbasins will begin after completion of the Coquille TMDL. Groundwork to support the development of the Coos TMDL is also underway.

Parameter/Pollutant	No. of 303(d) Listings
Dissolved oxygen	32
Metals (includes mercury)	4
Biological Criteria	31
Eutrophication	3
Sedimentation	0
Bacteria	94
Temperature	112
pH	4
Other (toxics)	0
Total	**280**

Sediment complaint investigation in the Coos watershed.

About the 303(d) Program

Under section 303(d) of the Clean Water Act, states, territories and authorized tribes must submit lists of impaired waters. These waters are too polluted or otherwise degraded to meet water quality standards. The law requires that states establish priority rankings for waters on the lists and develop Total Maximum Daily Loads for these waters. — Source EPA

DEQ
State of Oregon Department of Environmental Quality

South Coast Basin Report

319 Projects

Project	Category	Goals	Description
Coos Biocriteria Assessment & Evaluation, Phase 2, Coos Watershed Association	Monitoring	Use macroinvertebrate studies to evaluate the biological response to large wood placement restoration projects in areas affected by increased sediment due to logging and agricultural practices.	Macroinvertebrate sampling in the West Fork Millicoma River and Matson Creek within the Catching Slough Subbasin in response to EPA's 2012 303(d) listings in the Coos Watershed.
10-mile Watershed Water Quality and Biological Monitoring, Tenmile Lakes Basin Partnership	Monitoring	Assess water quality conditions within the lakes and along streams adjacent to various land uses. Data generated will help show: where water quality standards are not being met, the effectiveness of previous water quality projects, and baseline conditions. Generate data to be used in support of future revisions of the TMDL, project planning, and implementation activities.	Implementation of a water quality monitoring program to address water quality impairments which include: simplified macroinvertebrate communities, elevated stream temperatures, excessive chlorophyll-*a*, hazardous algal blooms and invasive weed growth.
North Fork Coquille Watershed Riparian Restoration and Knotweed Project, Coquille Watershed Association	Outreach, education, restoration planning	Develop a landowner database for the North Fork Coquille River, conduct outreach, education, and host public meetings, create an informational flyer to be mailed to landowners with riparian restoration and knotweed information, create a map and database with potential fencing, planting, and noxious weed removal project areas and known locations of knotweed, and to develop a riparian restoration implementation strategy for the watershed.	Address water quality issues in the North Fork Coquille River by working with landowners to improve riparian conditions. The Coquille Watershed Association will identify and work with landowners in the North Fork Coquille Watershed interested in improving riparian conditions primarily through planting, fencing, and noxious weed removal with a focus on knotweed.

DEQ
State of Oregon Department of Environmental Quality

South Coast Basin Report

319 Projects

Project	Category	Goals	Description
Coquille Mainstem Cold Water Refugia Monitoring Project, Curry Soil and Conservation District	Monitoring	Monitor mainstem and tributary temperatures in the Coquille to characterize the distribution of summer cold water refugia to prioritize project activities that enhance cold water refugia.	Conduct summer stream temperature monitoring within the lower Coquille River mainstem and select tributary locations for streams designated as migration corridors or salmon and trout rearing and migration.
City of Coquille Water Quality Implementation Plan Development, City of Coquille	Planning	Develop the city's Water Quality Implementation Plan to guide activities to protect and improve water quality. As a Coquille Subbasin Designated Management Agency this plan will guide efforts to protect and improve water quality	Upon approval of the Coquille TMDL, Coquille will be identified as a Designated Management Agency and will be required to prepare a Water Quality Implementation Plan that provides a description of the management strategies the city will implement to prevent or reduce bacteria, thermal and nutrient loads leaving their properties. In addition, the city seeks to develop a post construction stormwater ordinance.

About 319 Grants

The federal Clean Water Act grants states, territories and tribes grants for technical assistance, education, training, technology transfer, demonstration projects and monitoring to assess the success of specific nonpoint source implementation projects. Learn more at https://www.epa.gov/lakes/clean-water-act-section-319.

Within the South Coast Basin, over $80,000 has been spent on projects that address nonpoint source pollution. Watershed partners continue to work towards implementing activities that protect and improve water quality. Implementation actions are focused on projects that will result in temperature, bacteria and sediment improvements on urban, agricultural and forested lands, and will address stormwater management in urban areas.

State of Oregon Department of Environmental Quality

Watershed Plans

The U.S. Environmental Protection Agency requires that proposed watershed-based plans developed or implemented using Section 319 funds include nine key elements. This will assure that public funds are being used effectively and that projects make progress towards restoring waters impaired by nonpoint source pollution. These elements include identification of the causes and sources of pollutants, management measures and their expected load reductions, funding and sources, and information or education component.

Streams provide habitat for a wide variety of cold-water species.

NINE KEY ELEMENTS

- Causes, sources and extent of pollutants
- Description of management measures
- Load reductions expected from measures
- Funding needs and sources
- An information or education component
- An implementation schedule
- Measurable milestones of implementation
- Criteria for determining progress
- A monitoring component

Several existing watershed plans address management of the South Coast Watershed and together cover EPA's nine key elements. Existing watershed plans include:

- U.S. Forest Service Bureau of Land Management Watershed Analyses
- South Coast Basin Water Quality Status and Action Plan
- Tenmile Watershed and Upper South Fork Coquille River TMDLs and Water Quality Implementation Plans

Coos Watershed Assessment Publications

- Dellwood Mainline Sediment Report
- Coos Bay Lowlands Assessment and Restoration Plan
- Coos Bay Tidal Wetlands Assessment
- Coos Water Quality Outreach Plan
- Elliott State Forest Watershed Analysis
- Lower Pony Creek Assessment
- Microbial Source Tracking Report
- Water Quantity and Quality Assessment
- Catching Slough, Daniel's Creek and Heads of Tide Assessment and Restoration Opportunities, 2008
- Appendices and References
- Environmental Indicators for the Coos Watershed 2010
- Appendix H
- Isthmus and Coalbank Slough Assessment and Restoration Opportunities, 2011

Curry Watersheds - Assessments and Action Plans

- New River Frontal Pacific Ocean
- Sixes River
- Elk River
- Euchre Creek Frontal Pacific Ocean
- Whaleshead Creek Frontal Cape Ferrelo
- Hunter Creek
- Pistol River
- Chetco River
- Winchuck River
- Summer water temperature and base flow
- Estuary and Lake Conditions
- Source search for sediment, nutrients and bacteria

- Tenmile Lakes Watershed (monitoring reports, watershed assessment, and nutrient study)
- Coquille Watershed (South Fork Action Plan, Benner Report, Subbasin Plan – Coquille Indian Tribe/NOAA)

South Coast Basin Report

NPS Implementation in Agricultural Lands: Highlights

The Curry Agricultural Water Quality Management Area Plan underwent full review in 2014. The Local Advisory Committee was introduced to standard language that the Oregon Department of Agriculture wants in area plans throughout Oregon. The committee felt that suggested changes to the plan did not fully represent the work done by the committee. Because these changes dominated the discussion, many of the issues DEQ raised were deferred to a future review. Although the Agricultural Water Quality Management Area Plan needs significant revision to fully address water quality concerns, the Local Management Agency, Curry Soil and Water Conservation District, has a very productive implementation program in partnership with the Curry Watershed organization.

Projects implemented to improve water quality on agricultural lands include:

Curry Soil and Water Conservation District: Three off stream water systems, 0.5 miles riparian livestock exclusion fence, 32.6 acres riparian tree/shrub planting, 19.5 acres riparian tree/shrub maintenance, five culvert replacement/road drainage installations, 80 acres restoration and management of rare or declining habitat, 312 total acres in implemented water quality projects.

Conservation Reserve Enhancement Program: 1.8 miles riparian livestock exclusion fence, 240.5 controlled stream access control, and 57.6 acres of riparian forest buffer.

Natural Resources Conservation Service: Irrigation System: 61.6 acres irrigation water management, 152 acres (Pasture)/161.9 acres (Cranberry), 1,053 controlled stream access, 167 acres prescribed grazing, 13 acres off channel livestock watering system, 224 acres Conservation Stewardship Program enhancements maintained to protect water quality, 9,065 acres Conservation Security Program enhancements maintained to protect water quality.

Future Project Goals, Needs and Priorities

Future project goals include proposals from Coquille Subbasin cities for development of Water Quality Implementation Plans. Upon approval of the Coquille TMDL in 2017, DEQ will identify Coquille Subbasin cities as Designated Management Agencies. These cities will be required to develop plans describing how properties and stormwater facilities will be managed to control bacteria, nutrient and thermal loading to surface waters. These plans must identify what strategies will be implemented, timelines for implementation and measurable milestones. Stormwater management measures may include public education and involvement, illicit discharge control, construction and post construction runoff control and pollution prevention. Plans developed by these small coastal communities will serve as examples for other communities facing the same task. Cities are encouraged to partner during plan development as the required components will be common to all four cities.

In addition, DEQ seeks proposals which implement or support the implementation of projects designed to reduce bacteria, nutrient and thermal loading. Projects in this category may involve action planning and project development and/or implementation. Geographical priorities include Agricultural Water Quality Management Area Plan focus areas, direct tributaries to the Coquille River and public drinking water source areas.

Habitats in the South Coast Basin are particularly diverse .

South Coast Basin Report

Success Stories

Tenmile Watershed: DEQ has supported monitoring in the Tenmile Watershed for many years using 319 funds as a match for Oregon Watershed Enhancement Board grants. The TMDL for the watershed was approved in 2007 and set a water column total phosphorus target of 7.1µg/L.

The Tenmile Lakes Basin Partnership's June 2014 monitoring report demonstrated a statistically significant decreasing trend in total phosphorus levels at two North Lake monitoring stations. Monitoring conducted in support of TMDL development found the 1998 – 2001 TP average at 38µg/L. The 2011 annual TP average was 30 µg/L. If the current decreasing trend is sustained at the same level, the TMDL total phosphorus target will be reached in 17 years. Seasonally, while winter total phosphorus levels are falling, summer levels show a statistically significant upward trend at the sample location in close proximity to residential development. Conversely, the deeper lake site more distant from development shows no significant trend.

Significant investment has been made by Oregon Watershed Enhancement Board and DEQ to implement upland sediment abatement projects as well as tributary riparian enhancement. This investment appears to be influential in the downward trend for winter total phosphorus levels. This information is useful in guiding implementation and supports focusing on projects that will reduce sources of total phosphorus during the summer months. The data collected through this partnership also supports the determination that the TMDL/Water Quality Management Plan is being implemented (June 2014 Final Report Oregon Watershed Enhancement Board No. 212-2033).

Coos Watershed Association: Restoration of Willanch Creek began in 1995 and was aimed at improving habitat conditions for salmon by addressing four main building blocks: fish passage, stream temperature, sediment inputs and general spawning, rearing, and migratory habitat. These restoration objectives were based on the necessary habitat conditions for salmon reproduction and survival. The efforts used to address these objectives are interrelated and improve multiple habitat conditions. The restoration of Willanch Creek involved a multi-pronged approach which included: planting trees, building willow walls, and building livestock exclusion fences along stream banks to reduce erosion and to filter runoff from adjacent pastures; replacing culverts with bridges at four sites to permit fish to pass and to allow gravels to move downstream; replacing the tide gate at the mouth of Willanch Creek with an improved design to allow juvenile fish access to the estuary during critical times, putting large wood in the stream to provide cover, collect gravels, and scour pools, and blocking and removing unneeded logging roads to reduce soil erosion and prevent illegal garbage dumping. Riparian conditions and floodplain connectivity were enhanced as part of the restoration effort.

Stream temperatures were monitored over 12 years. The lower site showed a decrease in temperature from 74.2 Fahrenheit to 61.9 Fahrenheit. All sites have met the DEQ rearing and migration temperature criteria during the last four years of data collection. The report hypothesizes that initial cooling was due to shading by riparian vegetation planted in 1997 and the second period of cooling was likely due to improved channel entrenchment ratio that resulted in more floodplain connectivity. In addition, beavers colonized into the area further increasing floodplain connectivity and water storage capacity (http://cooswatershed.org/Publications/Willanch%20Final%20Version.pdf).

Elk River at Highway 101.

Contact Information

Pam Blake

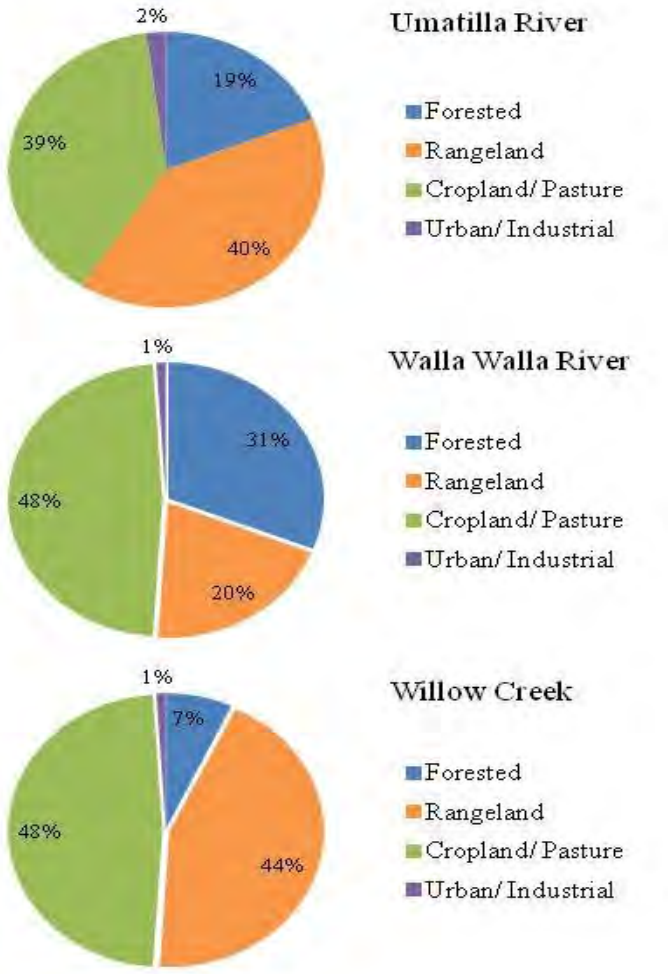
South Coast Basin Coordinator

541-269-2721, ext. 227

blake.pam@deq.state.or.us

Watershed Characteristics

Three major river systems make up the Umatilla Basin: the Umatilla River (100 miles in length), the Walla Walla River (61 miles in length) and Willow Creek (79 miles in length). All three rivers flow from their headwaters in the Blue Mountains to the Columbia River. The Umatilla River drainage and the northern portion of the Walla Walla River drainage are mostly in Umatilla County. The southern portion of the Walla Walla River drainage is in Washington State. The Willow Creek drainage is mostly in Morrow County, the confluence with the Columbia River is in Gilliam County. These rivers support bull trout, Redband trout, Pacific lamprey, fall and spring Chinook salmon, Coho salmon and steelhead. The Umatilla Basin is characterized by irrigated agriculture at lower elevations, with grazing and timber lands at higher elevations. Elevations within the basin range from less than 300 feet at the Columbia River, to above 6,000 feet at the highest peaks of the Blue Mountains. Agricultural land, both dryland and irrigated, comprise the major portion of the basin. Crops include onions, corn, dry and green peas, and potatoes. The basin also contains many fruit orchards (cherry, apple, peach, pear) and vineyards. In 1990 DEQ declared the Lower Umatilla Basin a Groundwater Management Area because nitrate-nitrogen concentrations in many area groundwater samples exceed the drinking water standards for nitrate (10 mg/l). The groundwater area covers the lower portions of the Umatilla and Willow Creek drainages. There is a Pesticide Stewardship Partnership in the Oregon portion of the Walla Walla River drainage.



Partners and Collaboration

DEQ has worked with numerous partners in the Umatilla Basin to implement Total Maximum Daily Load watershed improvements. Highlights from just a few ongoing partnerships are below.

Umatilla Basin Monitoring Cooperative and Technical Team – Partners include DEQ, Umatilla Basin Watershed Council, Confederated Tribes of the Umatilla Indian Reservation, U.S. Forest Service, Bureau of Reclamation, Oregon Water Resources Department. This partnership started in the late 1990s with the initiation of monitoring for the TMDL and continues successfully today. Cooperative efforts include water quality monitoring, flow monitoring, database maintenance, data evaluation and assessment and partnership funding. Data are collectively shared and information generated is used to direct implementation efforts basin-wide. Outreach and education programs are sponsored by team partners. Educational efforts include in-school and summer programs for kids (Watershed Field Days, Outdoor School, Salmon Walk and others) and adult and family

Continued on next page

DEQ
State of Oregon Department of Environmental Quality

Partners and Collaborations (continued)

oriented activities (Umatilla River Clean-up, Umatilla County Fair and others).

Walla Walla Basin Pesticide Stewardship Partnership and Salmon Safe Certification – Partners include DEQ, **Walla Walla Basin Watershed** Council, Oregon State University – Umatilla County Extension, local orchard growers, local vintners, local green pea and wheat producers, local irrigation districts and the Oregon Department of Agriculture. This group coordinates surface water quality monitoring and uses the data to inform and drive improvements in agricultural management practices to reduce pesticides found in local waters. It encourages the use of softer, less toxic chemicals. This successful project has resulted in a reduction in average concentrations of two priority pesticides (chlorpyrifos and diuron) by over 90 percent since the baseline monitoring for those chemicals began.

Other project partners include:

- Oregon Watershed Enhancement Board
- Umatilla County Soil and Water Conservation District
- Blue Mountain Horticultural Society
- USDA-Agriculture Research Station
- Umatilla County
- City of Pendleton

Apple harvest in orchards near Milton-Freewater

Mobile Water Resources Learning Laboratory – outreach by the Umatilla Basin Watershed Council

- City of Milton-Freewater
- National Oceanic and Atmospheric Administration – Fisheries Division
- U.S. Fish and Wildlife Service
- Bonneville Power Administration
- Milton-Freewater Chamber of Commerce
- Governor's Economic Revitalization Office
- Milton-Freewater Water Control District
- Oregon Department of Fish and Wildlife
- Oregon Department of Transportation
- U.S. Army Corps of Engineers
- Local landowners, local irrigation districts, local producers and others

Contact Information

Tonya Dombrowski

Umatilla Basin Coordinator

541-278-4615

dombrowski.tonya@deq.state.or.us

DEQ
State of Oregon Department of Environmental Quality

Current impairments and TMDLS

DEQ and partner agencies monitor water quality in streams throughout the Umatilla Basin. Every two years, DEQ is required to assess water quality against water quality standards and report to the U.S. Environmental Protection Agency on the condition of Oregon's waters.

Water bodies that do not meet standards are listed as "water quality impaired." The list of impaired streams is called the "303(d) list." Streams are removed from the list once Total Maximum Daily Loads, which are pollution limits, are complete. Current impairment listings identified in the 2012 Integrated Report include:

Parameter/Pollutant	No. of 303(d) Listings
Dissolved Oxygen	0
Metals	6
Biocriteria	1
Eutrophication	9
Sedimentation	18
Bacteria	0
Temperature	20
pH	9
Other	0
Total:	63

There are three Total Maximum Daily Load processes currently in place in the Umatilla Basin. The watershed evaluations and goals of these TMDLs are products of extensive labor, dedication and cooperation of citizens, stakeholders, tribes, state and federal agencies, cities, counties, businesses, industries and interest groups.

➢ Umatilla Basin TMDLs were issued in May 2001 for temperature, pH, sedimentation, turbidity, aquatic weeds and algae. This process was collaborative and policy and technical recommendations for the TMDL are community-based. The TMDL committee was sponsored jointly by the Umatilla Basin Watershed Council, Confederated Tribes of the Umatilla Indian Reservation and DEQ. The cooperative spirit of this basin has resulted in flow restoration and salmon re-introduction projects that have returned flow levels and fish species absent from the Basin for 75 years.

➢ The Walla Walla Subbasin TMDL for temperature was issued in September 2005. TMDL objectives seek to restore natural riparian communities throughout the subbasin. Local efforts have targeted increased riparian vegetation and irrigation efficiency. An ongoing collaborative process is evaluating opportunities for levee setbacks in the Milton-Freewater area.

➢ Willow Creek Subbasin TMDLs for temperature, pH (nutrients) and bacteria were issued in February 2007. The goal of the temperature TMDL is a natural stream temperature pattern through improved effective shade. Local partnerships in implementation have been working on improving riparian vegetation, addressing livestock issues and refining reservoir operations to reduce algal blooms.

South Fork of the Walla Walla River

About the 303(d) Program

Under section 303(d) of the Clean Water Act, states, territories and authorized tribes must submit lists of impaired waters. These waters are too polluted or otherwise degraded to meet water quality standards. The law requires that states establish priority rankings for waters on the lists and develop Total Maximum Daily Loads for these waters. — Source EPA

DEQ
State of Oregon Department of Environmental Quality

Umatilla Basin Report

319 Projects

Project	Category	Goals	Description
Milton-Freewater Levee Setback and Habitat Enhancements – Phase III	Best Management Practices/ Technical Assistance	Increase shading and channel sinuosity, improve fish passage and channel geometry, reduce diversion through enhanced irrigation efficiency and increased and enhanced fish habitat.	This project will restore fish passage access to 49 miles of spawning habitat, avoid fish stranding in an irrigation ditch, and improve habitat diversity and water quality for the Walla Walla River.
Walla Walla River Levee Setback: Smith Side Channel – Phase IV	Best Management Practices/ Technical Assistance	Increase shading and channel sinuosity, improve fish passage and channel geometry, reduce diversion through enhanced irrigation efficiency, increased and enhanced fish habitat, increased flood refugia for fish, and increased and enhanced salmonid and riparian habitat in the form of vegetated floodplains, in-stream complexity, hyporheic exchange and groundwater recharge.	This project resulted in the development a hydraulic model of the river and final designs for the Smith Side Channel specifically addressing side channel activation (frequency, period, timing, flow, fish use and stranding potential), and flood elevations.
Salmon Safe Certification in Peas/ Wheat Agronomic Crop Rotation (Phase I and II)	Pesticide Reduction/ Outreach/Best Management Practices Education	Reduce pesticide usage overall through practice changes and (in those cases where pesticide use is necessary) support and encourage the use of softer, less toxic chemicals.	Create and implement a Salmon-Safe program for green peas and wheat in Umatilla County.

DEQ
State of Oregon Department of Environmental Quality

319 Projects (continued)

Project	Category	Goals	Description
Wildhorse Creek Continuous Flow Monitoring	Monitoring/ Outreach	Maintain the long-term flow record at the Wildhorse Creek Gauging Station in support of water quality monitoring efforts and TMDL implementation.	Wildhorse Creek was identified as the major single source contributor of sediment to the Umatilla River and the watershed has been the focus of substantial efforts in riparian revegetation and conservation tillage. Flow measurement is critical to the calculation of pollutant loading and implementation of the Umatilla River Basin TMDL
Umatilla Basin Precipitation Monitoring	Monitoring/Outreach	Collect data on localized, extreme weather events to determine their relative contribution to pollutant loading and to help better characterize changes or trends in water quality in the Basin relative to local TMDL implementation efforts.	This project is collecting real-time precipitation data at two locations in the Umatilla Basin in support of the Umatilla Basin's TMDL implementation program and TMDL long-term monitoring plan.
Mobile Water Resources Learning Laboratory	Outreach/Education	Provide a hands-on, visual and touchable teaching tool that illustrates the function of surface water systems in a clear and engaging fashion available to a wide range of ages and educational groups, and accessible to a variety of outreach venues.	Construct and operate a stream simulation trailer that will demonstrate hydrologic processes and allow active participation by audiences of all ages in hands-on small-scale stream restoration. The mobile trailer is able to assist at multiple events each year throughout Umatilla, Morrow and Grant Counties.

DEQ
State of Oregon Department of Environmental Quality

319 Projects (continued)

Project	Category	Goals	Description
Walla Walla Basin Pesticide Stewardship Partnership	Pesticide Reduction/ Outreach/Best Management Practices/Education	Monitor local surface waters for common use and legacy pesticides. Use the collected information to reduce pesticide usage through informed practice changes. Monitor to track changes in presence and concentration relative to practice changes.	This project is part of a correlated effort on the part of the local orchard and vineyard communities to reduce pesticide transport through implementation of integrated pesticide management practices, use of less toxic alternatives and irrigation practices changes that reduce soil erosion.
Channel Restoration and Bioassessment in Eastern Oregon	Monitoring/Outreach	Assess the effectiveness of current restoration actions and guide plans for future actions through monitoring restoration projects designed to improve stream and river conditions in Eastern Oregon.	The project conducted bioassessments of four stream restoration sites (pre-implementation and post-implementation). The compiled results were shared with all project partners and are available in report form to any interested parties.
Preserving Umatilla's Natural Resources Through Education	Outreach/Education/Best Management Practices	Develop and implement education and outreach programs specific to the goals of the Lower Umatilla Basin Groundwater Management Area Action Plan with specific emphasis on educating the public about health risks associated with high nitrate levels in the drinking water system	This project worked directly with Lower Umatilla Basin Groundwater Management Area residents to raise awareness of the need to prevent nitrate contamination and reduce existing nitrate concentrations in groundwater.

DEQ
State of Oregon
Department of
Environmental
Quality

Umatilla Basin Report

319 Projects

About 319 Grants

The federal Clean Water Act grants states, territories and tribes grants for technical assistance, education, training, technology transfer, demonstration projects and monitoring to assess the success of specific nonpoint source implementation projects. Learn more at https://www.epa.gov/lakes/clean-water-act-section-319.

In Eastern Oregon, there are a variety of focus areas for 319 projects which include:

- **Effectiveness Monitoring and TMDL Implementation Tracking**
  Targeted effectiveness monitoring projects include monitoring and assessment of systems to characterize the effectiveness of implementation projects specific to improving water quality and habitat and to track basin-scale progress. Assessment or characterization of the impacts of water management and storage projects and TMDL implementation.
- **Pesticide Reduction Activities**
  Targeted pesticide reduction projects to reduce/remove old or unused pesticides, and encourage replacement of current use pesticides with softer alternatives. Targeted project elements include public education programs to increase public awareness of environmental quality and health concerns associated with pesticide use and storage. Projects targeting underserved areas will be given priority.
- **Riparian Restoration, including stream morphology and flow**
  Targeted riparian restoration project elements include restoring morphologic function (increased sinuosity, decreased width/depth ratios), revegetation of riparian areas, floodplain reconnection and increased instream flow. Proposed projects are expected to include an extensive portion of the stream channel over time rather than isolated small-length segments. Riparian restoration projects should target activities in the area of ongoing project work whenever possible. Projects correlated with and/or adjacent to other restoration work will be given priority.
- **Stormwater Impacts**
  Targeted projects include: water quality improvement specific to stormwater impacts including local planning, alternatives assessment, stakeholder and homeowner education and information program development, feasibility studies and similar efforts.
- **Lower Umatilla Basin Groundwater Management Area**
  Targeted projects include: Research and development of activities or products which will reduce nitrate loading to groundwater and should address one of the five potential nitrate sources identified in the Groundwater Management Area: confined animal feeding operations, irrigated agriculture, land application of food processing water, septic systems (rural residential areas) and the Umatilla chemical depot washout lagoons.

Umatilla River near Three Mile Dam

Future Project Goals, Needs and Priorities

Future project goals in the Umatilla Basin include: riparian protection and restoration, sediment and erosion reduction and bacteria reduction.

Priority riparian projects are those that will establish and protect riparian buffers, restore sustainable stream function (increased sinuosity, decreased width/depth ratios, floodplain reconnection), revegetation of riparian area and increased instream flow. Proposed projects are expected to include an extensive portion of the stream channel over time rather than isolated small-length segments, and projects correlated with and/or adjacent to other restoration work will be given priority.

Priority erosion and sediment reduction projects are those that will characterize and/or reduce fine sediment; assess erosion trends, sources, causes; and prioritization of responsible changes in management actions.

Priority bacteria reduction projects are those that will characterize and/or reduce bacteria, identify spatially targeted priorities for bacteria best management practices and projects, and *E. coli* monitoring in areas where improvements will be detectable and historic monitoring data is available.

Walla Walla Basin Watershed Council restoration in the Walla Walla River

NPS Implementation in Agricultural Lands: Highlights

The Oregon Department of Agriculture is responsible for developing Agricultural Water Quality Management Area Plans to pre-vent and control water pollution and soil erosion from agri-cultural activities. DEQ works closely with ODA and Soil and Water Conservation Districts to incorporate meaningful metrics and benchmarks in area plans that will help meet nonpoint source load allocations. While identifying specific goals and objectives in the plans is a work in progress, on-the-ground initiatives and projects continue to address nonpoint source priorities in agricultural lands.

Umatilla Basin wheat field

The highest nonpoint source priorities for agricultural lands are to: prevent runoff of agricultural wastes, control soil erosion on uplands to acceptable rates and provide adequate riparian vegetation for stream bank stability and stream shading consistent with site capability. Below is a brief summary of accomplishments from local activities:

Umatilla Agricultural Water Quality Management Area Plan

- Feedlot fencing, spring developments, riparian fencing, prescribed grazing plans, watershed field days

Walla Walla Agricultural Water Quality Management Area Plan

- Prescribed grazing plans in uplands, upland water developments, irrigation efficiency/water management

Willow Creek Agricultural Water Quality Management Area Plan

- Education and outreach programs, increased Conservation Reserve Enhancement Program acreages, livestock pipeline/spring developments, cover crops

DEQ
State of Oregon Department of Environmental Quality

Watershed Plans

The U.S. Environmental Protection Agency requires that proposed watershed-based plans developed or implemented using Section 319 funds must include nine key elements. This will assure that public funds are being used effectively and that projects make progress towards restoring waters impaired by nonpoint source pollution. These elements include identification of the causes and sources of pollutants, management measures and their expected load reductions, funding and sources, and information or education component.

Several existing watershed plans address management of the Umatilla Watershed and together cover EPA's nine key elements. Existing watershed plans include:

- Umatilla/Willow Subbasin Plan (2004)
- Walla Walla Subbasin Plan – Walla Walla Watershed Planning Unit and the Walla Walla Basin Watershed Council (2004)
- Umatilla River Vision – Confederated Tribes of the Umatilla Indian Reservation (2008)
- Lower Umatilla Basin Groundwater Management Area Plan (Action Plan 1997, 2011)
- 2008 Columbia Basin Fish Accords Memorandum of Agreement between the Three Treaty Tribes and Federal Columbia River Power System Action Agencies
- The Columbia River anadromous fish restoration plan (Columbia River Fish Mitigation Project) of the Nez Pierce, Umatilla, Warm Springs and Yakima Tribes: Part II
- Subbasin Plans. Columbia River Inter-tribal Fish Commission (1996)
- Umatilla Subbasin 2050 Water Management Plan (2008)
- Umatilla Forest Land and Resource Management Plan

Nine Key Elements

- Causes, sources and extent of pollutants
- Description of management measures
- Load reductions expected from measures
- Funding needs and sources
- An information or education component
- An implementation schedule
- Measurable milestones of implementation
- Criteria for determining progress
- A monitoring component

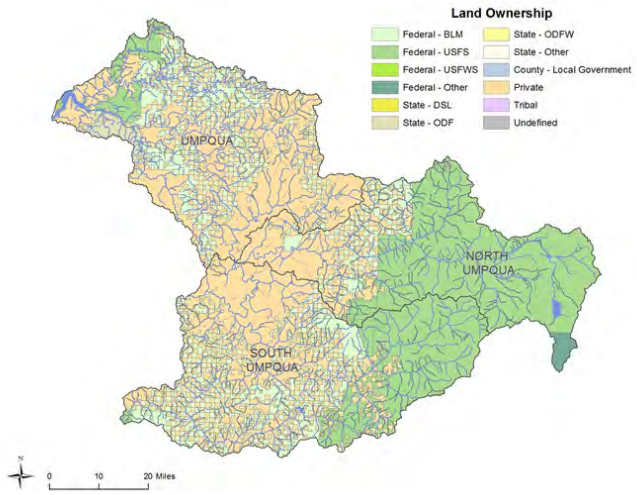
Below: Willow Creek Reservoir, near Heppner, Oregon

Watershed Characteristics

The Umpqua Basin is located in Southwestern Oregon, draining a varied landscape from steep-sloped uplands to low gradient broad floodplain. Along with the Rogue, it is one of only two Oregon rivers that extend from the Cascades to the Pacific Ocean. The basin boundary closely aligns with Douglas County's administrative boundary.

The Umpqua Basin is comprised of three subbasins: North Umpqua, South Umpqua, and the lower Umpqua. Within these three subbasins are 33 fifth-field watersheds: 13 watersheds in the South Umpqua subbasin, 12 watersheds in the North Umpqua subbasin, and 8 watersheds in the Umpqua subbasin. Watershed divides that delineate the basin are found at the crest of the High Cascade range to the east, in the Coast Range to the northwest, and the Klamath Mountains to the south.

The headwaters of the North Umpqua River and the South Umpqua River are located in the Umpqua National Forest and meet near Roseburg to become the mainstem Umpqua which flows north then west where it enters the shellfish growing areas of Winchester Bay and into the Pacific Ocean. Major land uses in the basin include private and federal forests, livestock grazing in valley pastures, rural residential development, with urban development concentrated along the I-5 corridor and at Reedsport on the coast.



Land Ownership in the Umpqua Basin

Partners and Collaboration

There are a number of parties in the Umpqua Basin whose activities contribute to improved water quality by addressing nonpoint source pollution through regulatory and voluntary efforts, including: Partnership for the Umpqua Rivers (PUR), Cow Creek Band of Umpqua Tribe of Indians, the Douglas and Umpqua Soil and Water Conservation Districts (SWCD), Umpqua Watersheds, ODA, ODF, ODFW, NRCS, USFS and U.S. BLM and others. DEQ began working with the cities of Roseburg and Reedsport to incorporate post-construction stormwater management into local development review in 2016. It would be easy to leave out important partners and if we did, it was unintentional.

The primary active impactful partnerships from 2014 to present include:

Organizations directly participating in Nonpoint Source grant projects (319) and OHA drinking water protection grants and/or volunteer monitoring efforts during that period: Partnership for the Umpqua Rivers (PUR) and the Douglas SWCD. PUR is also actively involved with federal and private forestry and agricultural landowners to conduct assessment and a wide range

DEQ
State of Oregon Department of Environmental Quality

Partners and Collaboration (continued)

of watershed and in-stream restoration activities to enhance drinking water source protection in the South Umpqua subbasin. NPS funds were used to support PUR's monitoring and BMP implementation activities.

South Umpqua PSP pilot study: Cow Creek Band of Umpqua Tribe of Indians, Partnership for the Umpqua Rivers (PUR), and the Douglas SWCD. Partners identified monitoring locations, participated in planning and organization meetings, and conducted field monitoring. NPS funds were used to support PUR's field activities. Preliminary data review and consultation regarding next steps (full PSP or pared down version) are in progress.

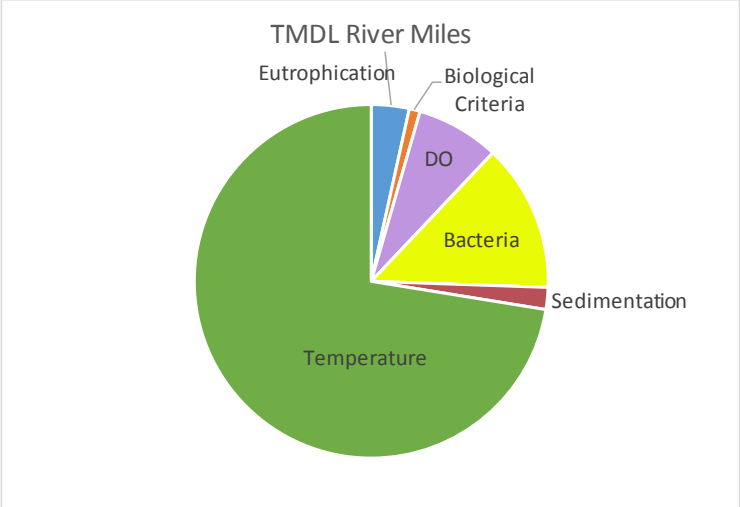
Umpqua Basin Partnership: A community-based planning effort coordinated by Bonneville Environmental Foundation's Model Watershed Program with PUR and the Cow Creek Band of the Umpqua Tribe of Indians to develop an Action Plan for the Umpqua Basin watershed improvement and protection of aquatic resources. The project is in the developmental stages and stakeholders met in March 2017 to discuss GIS analysis and identify and prioritize conservation/restoration actions.

PUR has partnered with a variety of public and private landowners and other groups to complete restoration projects around the basin. Restoration projects that have been completed since 2014 include: Camp Creek, Brush Creek, West Fork Smith River, Rock Creek, Tenmile Creek, East Fork Jackson Creek, Harrington Creek, Rice Creek, and the West Fork Cow Creek.

Camp Creek Restoration Project—photo courtesy of PUR

Current impairments and TMDLS

Water quality in the Umpqua Basin is generally considered poor to good (*based on the Oregon Water Quality index; OWQI*). Of the nine DEQ long-term ambient monitoring stations in the Umpqua Basin, four indicate good conditions, two fair conditions and three poor conditions. The South Umpqua River at HWY 42 (Winston) shows a decreasing trend in water quality. Temperature, bacteria, nutrients and fine sediment have been identified as pollutant stressors that affect fish and other aquatic life throughout the basin. TMDLs were approved by EPA for bacteria, temperature, algae/aquatic weeds, dissolved oxygen and pH for the Umpqua Basin in 2007.



Approved TMDLs and associated river miles in the Umpqua Basin

The primary control strategies for addressing temperature impairments include: increase stream shade, identify and protect thermal refugia, increase riparian wetlands, increase hyporheic flow and increase streamflow.

Control strategies for bacteria include: source identification, agriculture and rural residential controls, and urban stormwater control measures (i.e. pollution prevention in municipal operations, public education and outreach on stormwater impacts, illicit discharge detection and elimination, construction site stormwater runoff control and post-construction stormwater management.

Dissolved oxygen, nutrient and pH impairments can be controlled by reducing runoff from urban, rural, agricultural and forestry sources, address failing septic systems, prevent instream and near-stream erosion and minimize impacts from Publicly Owned Treatment Works (POTWs) and wastewater discharged from other permitted facilities.

Twelve non-state or federal entities were identified as DMAs in the 2006 TMDL. DEQ's focus in the Umpqua Basin will be to working with DMAs to ensure that implementation plans are developed, effectively implemented, reviewed and adapted as necessary over time. To date, few if any annual reports have been submitted to DEQ by the local government DMAs. DEQ will continue to work with municipal governments to review and update/revise implementation plans to address impairments and to standardize reporting format to reflect actions taken.

Parameter/Pollutant	No. of 303(d) Listings	Total Length (miles) of 303(d) Listed Segments
Dissolved Oxygen	11	206
Metals	29	269.8
Biocriteria	52	411.5
Eutrophication	5	34.2
Sedimentation	5	62.2
Bacteria	7	72.5
Temperature	3	62.8
pH	2	84.4
Other	0	0
Total	**114**	**1203.4**

About the 303(d) Program

Under section 303(d) of the Clean Water Act, states, territories and authorized tribes must submit lists of impaired waters. These waters are too polluted or otherwise degraded to meet water quality standards. The law requires that states establish priority rankings for waters on the lists and develop Total Maximum Daily Loads for these waters. — Source EPA

DEQ
State of Oregon Department of Environmental Quality

Umpqua Basin Report

319 Projects

Project	Category	Goals	Description
W14779 2015 South Umpqua Riparian and Pesticide Stewardship Program	Riparian improvement, agricultural BMPs and monitoring for the Pesticide Stewardship Program	Implement livestock exclusion, riparian restoration and fish habitat enhancement on two large parcels that total 1.1 miles of Rice Creek watershed of the South Umpqua subbasin, and conduct pesticide monitoring in the South Umpqua subbasin.	Partnership for the Umpqua River (PUR) partnered with the Kennerly Ranch to install railcar bridge crossings that enable livestock to cross the creek without accessing the waterway, thus protecting stream banks and reducing bacteria, nutrients, and sediment from entering the creek.

About 319 Grants

The federal Clean Water Act grants states, territories and recognized Tribes grants for technical assistance, education, training, technology transfer, demonstration projects and monitoring to asses the success of specific nonpoint source implementation projects. Learn more at https://www.epa.gov/lakes/clean-water-act-section-319.

Over the period 2014-2016, approximately $43,000 in Section 319 dollars have been leveraged on projects to reduce nonpoint source pollution in the Umpqua basin.

Umpqua Basin Report

NPS Implementation in Agricultural Lands: Highlights

In order to address nonpoint source pollution from agricultural impacts, DEQ works with the SWCDs and watershed councils to identify and develop the specific projects and ODA has supported many of the same efforts through the "focus area" approach to prioritize and leverage resources. This approach includes targets, milestones and measurable indicators of success for a specific watershed (in contrast the Area Plans' generic content).

Most of the Section 319 NPS Grant Agreements developed for the Umpqua Basin in the previous 4 years have involved agricultural focus areas to prioritize monitoring, project development and implementation activities to enhance drinking water source protection in the South Umpqua subbasin in coordination with other partners (e.g., NRCS, ODA, OHA). Grant funds have also been used for water monitoring and for opportunistic projects to improve conditions affecting water quality from agricultural activities (e.g., manure management) in non-focus areas.

The Umpqua Basin Ag Local Area Committee (LAC) conducted a biennial review with ODA and partners in Fall 2015. The LAC did not accept ODA's recommended changes to the format and content of the Area Plan, which resulted in a lengthy process to reach agreement. The Area Plan does not contain measurable targets and milestones, with the exception of focus areas where activities are being conducted to meet explicit objectives. DEQ will continue to be engaged in the efforts to transition the Area Plan to an adaptive management approach

Watershed Plans

Watershed analyses and plans have been developed by federal agencies (USDA-Forest Service and U.S. BLM) and the local watershed council, Partnership for the Umpqua River (PUR) to understand conditions and develop action plans where needed to guide monitoring, restoration and protection activities. The intent of the action plan is to help guide the future restoration efforts. Although the PUR operates throughout the three million acre Umpqua Basin, this action plan is limited to the areas within the Umpqua for which the PUR has completed comprehensive watershed assessments. The action plan is based on two primary elements: PUR's restoration principles – a prioritized classification of watershed restoration activities and limiting factors – watershed conditions limiting the quantity and quality of fish habitat and streamflow in the Umpqua Basin. Plans are periodically reviewed and updated.

- Calapooya Creek Watershed Assessment and Action Plan
- Deer Creek Watershed Assessment and Action Plan
- Middle Cow Creek Watershed Assessment and Action Plan
- Lower North Umpqua Watershed Assessment and Action Plan
- Lower South Umpqua Watershed Assessment and Action Plan
- Middle South Umpqua Watershed Assessment and Action Plan
- Myrtle Creek Watershed Assessment and Action Plan
- Olalla/Lookingglass Watershed Assessment and Action Plan
- South Umpqua River Watershed Assessment and Action Plan
- Tiller Region Watershed Assessment and Action Plan

Contact Information

David Waltz

Umpqua Basin Coordinator

541-687-7345

waltz.david@deq.state.or.us

Watershed Plans (continued)

- West Fork Cow Creek Watershed Assessment and Action Plan
- Rock Creek Watershed Assessment and Action Plan
- Upper Cow Creek Watershed Assessment and Action Plan
- Lower Umpqua River Watershed Assessment and Action Plan
- Middle Umpqua River Watershed Assessment and Action Plan
- Upper Umpqua River Watershed Assessment and Action Plan
- Mill Creek Watershed Assessment and Action Plan

Pre-project site survey photo of a tributary to West Fork Cow Creek—PUR

Future Project Goals, Needs and Priorities

Based on past successful projects in the Umpqua Basin, DEQ and local stakeholders have identified the following high priority categories for future Section 319 NPS grant projects:

- ◊ Water monitoring and land condition assessment by local partners (in coordination with DEQ's volunteer monitoring program);
- ◊ BMP project development and implementation on private agricultural lands to enhance drinking water source protection in the South Umpqua subbasin;
- ◊ Assisting small coastal zone municipalities with development of stormwater management programs that measurably reduce pollutant loads.

Because nearly all of the South Umpqua is a surface drinking water source area, DEQ's NPS focus will continue to be on drinking water protection in this subbasin.

Contact Information

David Waltz

Umpqua Basin Coordinator

541-687-7345

waltz.david@deq.state.or.us

DEQ
State of Oregon Department of Environmental Quality

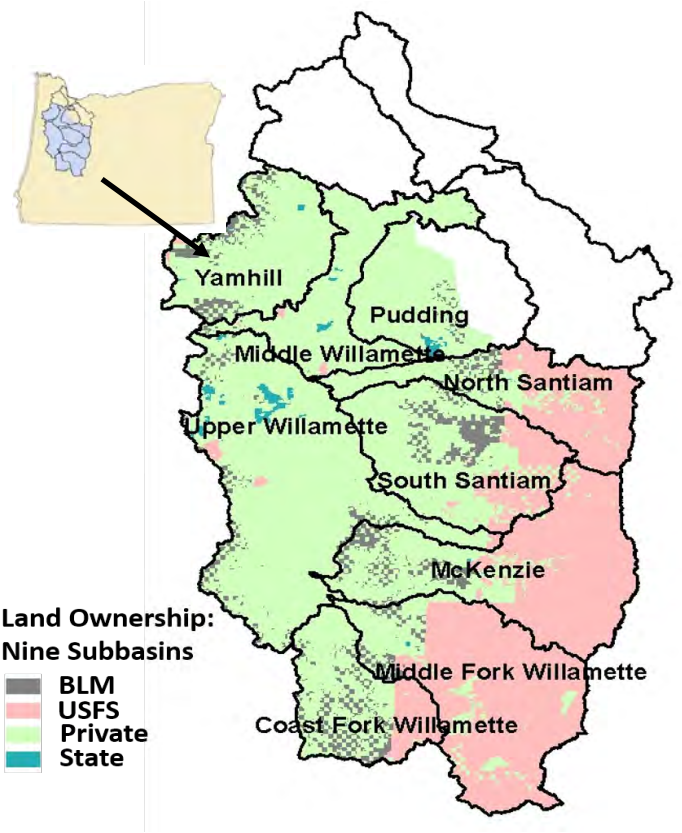
Upper Willamette Basin Report 2016

Watershed Characteristics

The mainstem Willamette River begins where the Coast Fork and Middle Fork Willamette meet. It flows north to the Columbia River, adding stream flows of 13 subbasins that together comprise the Willamette Basin. The basin encompasses the Willamette Valley, the west slope of the Cascades Range, and the east slope of the Coast Range.

There are about 187 river miles on the mainstem Willamette, 193 additional miles of side channels, and 21,317 miles of perennial tributaries, on which there are 13 major water storage reservoirs. These streams support the richest native fish fauna in the state as well as federally listed threatened or endangered species including spring Chinook salmon and summer steelhead trout.

The predominant land use surrounding Willamette streams and rivers is forest with about 60 percent of stream length. Roughly 30 percent of stream miles are in agricultural land use and about 10 percent are in urban areas. The upper reaches of the watershed are mostly federal lands in national forests or the checkerboard ownership of the Bureau of Land Management. While forestry use is active from the higher elevations to the foothills, agriculture represents the largest category of land use in the lowlands. The basin supports roughly 66 percent of Oregon's population.



Land ownership in the Willamette Basin.

Partners and Collaborations: Highlights

DEQ works with numerous partners in the Willamette Basin to implement Total Maximum Daily Loads and other watershed improvements. Here are a few highlights:

- DEQ has partnered with Oregon Department of Agriculture, U.S. Environmental Protection Agency and the Southern Willamette Groundwater Management Area Committee and stakeholders to provide technical assistance and outreach within the area. Recent efforts include modeling groundwater flow and nitrate monitoring data to prioritize and direct technical assistance and outreach to source areas of expected and potential nitrate leaching.
- Numerous partners, including DEQ, contribute to the Partnership to Improve Nutrient Efficiency.
- EPA, DEQ, local soil and water conservation districts, Willamette Partnership, National Resource Conservation Service, Lane Council of Governments, and the Southern Willamette Groundwater Management Area are supporting the development of a tool that will help land managers quantify water quality benefits of management practices.
- The Long Tom Watershed Council and the Pesticide Stewardship Partnership monitor five sites on Amazon Creek. The council, DEQ, ODA and Eugene recently reassessed methodologies and recommended refined monitoring and outreach efforts. Qualitative and quantitative two year goals include considerations to expand flow monitoring, place a continuous monitoring device in the A1 channel, perform a ground water risk analysis, and continue to provide stormwater outreach to industrial and commercial sectors.

DEQ
State of Oregon Department of Environmental Quality

Upper Willamette Basin Report

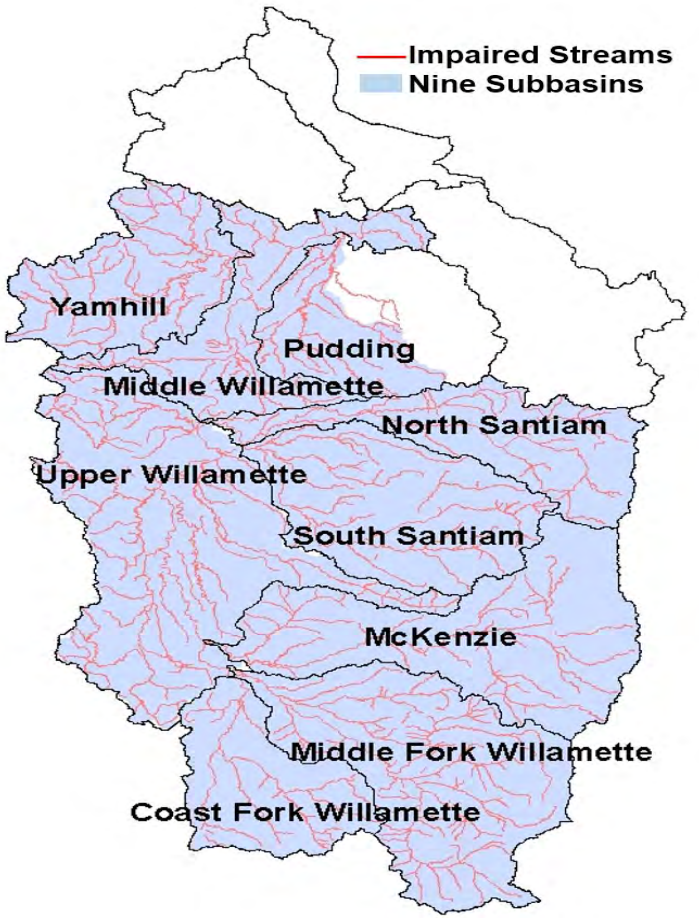
Current impairments and TMDLS

DEQ and partner agencies monitor water quality in streams throughout the nine subbasins that comprise the middle and southern Willamette Basin. Every two years, DEQ is required to assess water quality against water quality standards and report to the U.S. Environmental Protection Agency on the condition of Oregon's waters.

Water bodies that do not meet standards are listed as "water quality impaired." The list of impaired streams is called the "303(d) list." Streams are removed from the list once Total Maximum Daily Loads, which are pollution limits, are complete.

Total Maximum Daily Loads, commonly called TMDLs, for the Pudding River subbasin were issued in December 2008 for bacteria, nitrates, legacy pesticides and iron. Yamhill River TMDLs were initiated but completion has been delayed. Basin-wide TMDLs for the remaining seven subbasins were issued in September 2006 for bacteria, temperature and mercury. A number of streams in the basin are also impaired for dissolved oxygen and a TMDL for dissolved oxygen was developed for the Upper Willamette subbasin (Amazon Diversion Channel and Coyote Creek) as in 2006.

Elevated levels of fecal coliform and *E. coli* have been documented across the basin. The basin-wide bacteria TMDL identifies an 80 percent reduction in bacteria is needed to restore the beneficial use of contact recreation. Reductions in stream temperatures are also needed across the basin for the most sensitive beneficial uses of fish spawning, rearing and migration and aquatic habitat. Cooler stream temperatures can be achieved by planting riparian vegetation to shade streams from solar radiation. Shade targets vary for different stream segments based on system potential. The reduction target for mercury is 27 percent.



Parameter/ Pollutant	2012 Integrated Report 303(d) Listings
Dissolved oxygen	98
Metals	54
Biocriteria	59
Eutrophication	12
Sedimentation	6
Bacteria	22
Temperature	29
pH	3
Other	27
Total	310

About the 303(d) Program

Under section 303(d) of the Clean Water Act, states, territories and authorized tribes must submit lists of impaired waters. These waters are too polluted or otherwise degraded to meet water quality standards. The law requires that states establish priority rankings for waters on the lists and develop Total Maximum Daily Loads for these waters. — Source EPA

DEQ
State of Oregon Department of Environmental Quality

Upper Willamette Basin Report

319 Projects 2014 to Present

Project	Category	Goals	Description
Expanding the Benefit: Riparian Revegetation in the Luckiamute Basin	Riparian Restoration	Increase canopy cover and the extent of riparian forest in the Luckiamute Basin	Revegetate 100 acres of riparian corridor
Western Oregon Low-Impact Development Implementation Plan Guidance	Best Management Practices Technical Assistance	Create low impact development template and guide	Develop a manual template that multiple jurisdictions can use to help meet post construction runoff goals and requirements
Prioritizing Areas of Action Plan Implementation in the South Willamette Valley Groundwater Management Area	Mapping/ Outreach	Develop outreach priorities and materials that target residents in the Southern Willamette Valley Groundwater Management Area	Identify priority areas for outreach using monitoring data and GIS, and develop targeted outreach materials for priority areas
Storm and Drinking Water Improvement for Cities Big and Small in the Upper Willamette Watershed	Stormwater treatment outreach and technical assistance	Prevent and treat stormwater runoff from commercial businesses in drinking water source areas	Develop feasibility studies for implementing stormwater treatment practices that go beyond regulatory requirements on commercial properties

About 319 Grants

The federal Clean Water Act grants states, territories and tribes grants for technical assistance, education, training, technology transfer, demonstration projects and monitoring to assess the success of specific nonpoint source implementation projects. Learn more at https://www.epa.gov/lakes/clean-water-act-section-319.

Within the Nine Subbasins (left), watershed councils and local governments were awarded more than $92,000 between 2014-2016 in order to help with planning and implementation of water quality improvement projects. Stormwater treatment, riparian restoration, and outreach in a groundwater management area, represent the funding priorities for 2014-present.

DEQ
State of Oregon Department of Environmental Quality

Upper Willamette Basin Report

Future Project Goals, Needs and Priorities

Primary, future project goals include implementing stormwater runoff treatment strategies to address urban stormwater. It is also important to implement strategies and projects that will help to reduce post-construction stormwater runoff in urban areas.

There remains a need to increase riparian shading along streams in agricultural lands, as well as urban settings. Future project funding priorities include implementing strategies to meet temperature, bacteria and mercury Total Maximum Daily Loads basin wide. Activities that increase riparian shading and best management practices that target stormwater runoff remain funding priorities.

Luckiamute Watershed Council planting project on the Luckiamute River. Photo courtesy of Luckiamute Watershed Council.

NPS Implementation in Agricultural Lands: Highlights

The Oregon Department of Agriculture is responsible for developing Agricultural Water Quality Management Area Plans to prevent and control water pollution and soil erosion from agricultural activities. DEQ continues to work closely with ODA and soil and water conservation districts to address nonpoint source load allocations. While efforts to identify specific goals and objectives are a work in progress, on-the-ground initiatives and projects continue to address nonpoint source priorities. The highest nonpoint source priority for agricultural lands in the nine subbasins is to protect and re-establish riparian vegetation, which addresses sediment and erosion control as well as effective shade targets. Below are some activities that have been implemented within the nine subbasins:

Middle Willamette: Provided technical assistance to more than 1,500 individuals, implemented over 100 water quality improvement projects, including riparian planting, livestock manure management and irrigation. Benton and Polk soil and water conservation districts completed riparian preassessments covering 3 percent and 1 percent of their respective focus areas.

Molalla-Pudding: More than 1,400 youths attended education workshops, 91 conservation practices implemented, 25 Voluntary Conservation Plans developed, 678 acres and 1.2 miles of stream impacted by conservation efforts.

South Santiam: Linn Soil and Water Conservation District implemented 55 conservation plans covering more than 4,000 acres, controlled livestock access along eight miles of stream corridors, over 240 acres of riparian establishment through Conservation Reserve Enhancement Program, provided technical assistance to 296 landowners, installed 24,296 feet of water transference pipeline, 306 acres of irrigation upgrades and 506 acres of prescribed grazing management.

Southern Willamette: 310 people reached through workshops and presentations, 600 feet of riparian enhancement, 2,500 feet of livestock exclusion fencing, 3,000 cubic feet of manure containment installed, 32 Conservation Plans developed.

Upper Willamette: Soil testing and technical assistance for nutrient management provided to150 producers, conducted seven rain garden workshops, developed 12 water quality projects, including livestock exclusion and manure management.

Yamhill: More than 39,000 pounds of unlabeled restricted use or banned agriculture pesticides collected and disposed, 23 workshops hosted, three Conservation Plans developed, 133 site visits, 26 conservation practices implemented, 16 water quality monitoring stations meeting ODA criteria.

DEQ
State of Oregon Department of Environmental Quality

Upper Willamette Basin Report

Watershed Plans

The nine subbasins are home to numerous watershed councils that are all actively working with stakeholders to improve water quality in the Willamette Basin. Many of these councils develop watershed assessments, strategies and action plans to guide outreach and restoration efforts in their watersheds. In concert with DEQ and partner agencies' monitoring and assessment efforts, the watershed assessments and plans listed below represent a sample of the resources that have been developed to help guide efforts to improve water quality in the nine subbasins.

Riparian restoration project. Photo courtesy of Luckiamute Watershed Council.

- ◊ Long Tom Watershed Council Conservation Strategy
- ◊ McKenzie River Watershed Conservation Strategy, and McKenzie River Watershed Subbasin Action Plan
- ◊ Coast Fork Willamette Watershed Council Action Plan
- ◊ Marys River Watershed Council Action Plan
- ◊ South Santiam Watershed Assessment and associated Action Plans
- ◊ Calapooia Watershed Council Strategic Plan
- ◊ Claggett Creek , Glenn -Gibson, Claggett and Mill Creeks Watershed Assessment for the Greater Salem-Keizer Area Watershed Councils
- ◊ Rickreall Creek Watershed Council Watershed Assessment, Action Plan and Work Plan
- ◊ Greater Yamhill Watershed Council Watershed Restoration Action plan
- ◊ Pringle Creek Watershed Council
- ◊ Pudding Watershed Council Rapid Bio-assessment in the Pudding River and Final Report
- ◊ North Santiam Watershed Council Action Plan
- ◊ The Calapooia, North Santiam and South Santiam Collaboration for Strategic Watershed Restoration
- ◊ Willamette Biological Opinion July 2008, National Marine Fisheries Service
- ◊ Upper Willamette River Conservation and Recovery Plan, August 2011, Oregon Department of Fish and Wildlife
- ◊ Willamette Basin Rivers and Streams Assessment, December 2009, DEQ

Contact Information

Priscilla Woolverton

Upper Willamette Basin Coordinator

541-687-7347

woolverton.priscilla@deq.state.or.us

Nancy Gramlich

Upper Willamette Basin Coordinator

503-378-5073

gramlich.nancy@deq.state.or.us

DEQ
State of Oregon Department of Environmental Quality

Appendix A

Nonpoint Source Program Goals and Milestones Summary

DEQ continued to implement its 2014 Nonpoint Source Program Management Plan (2014 Management Plan) in FY 2016. While many of the goals listed in the Management Plan are still important to the NPS program and are being implemented, DEQ has also prioritized other program needs and shifted staff resources to them. DEQ discontinued Watershed Basin Status and Action Plan development related actions and development of TMDL Guidance or Internal Management Directives due to insufficient resources. The following table of DEQ goals and milestones does not include those additional projects, however they are included in the program updates. Additional projects include Conservation Effectiveness Partnerships and Clean Water Partnership.

Appendix A: NPS Management Plan Actions, Priorities, Milestones – 2016 Updates

Goal No.	Goals	Action/Requirement	Output/Action	Time Frame	Year 2016 Milestones
NPS PROGRAM					
NPS - 1	Update NPS Management Plan (MP) every 5 years (Maintain relevant and effective NPS Management Program for Oregon)	Update Oregon's NPS Plan that describes how the state's NPS management program achieves WQS and TMDL Las through restoration and protection	DEQ issues and submits updated Oregon NPS Plan to EPA Region 10 for review	2014-2018 (2018-2019)	DEQ's WQMP was updated in 2014 and is scheduled for update in 2019. (Page 13)
NPS - 2	Implement NPS MP (Improve and protect water quality through implementation of NPS MP)	Implement the NPS MP to achieve the NPS Program goals and priorities	Various milestones as listed in this table	2014-2018	Implementation of the NPS program is detailed in the 2016 annual report. (Begins on page 8)
NPS - 3	Issue NPS Annual Report	The NPS Annual Report describes the progress in implementing the NPS MP and achieving the NPS Program goals and objectives	DEQ issues and submits annual report to EPA	2014-2018	The FY 2015 Annual Report was approved by EPA in September 2016. (Page 9)
NPS - 4	Complete the Coastal NP Pollution Control Program	Submit to EPA and NOAA a plan for achieving additional management	DEQ and DLCD work with the other state of	2015-2016 (Ongoing until full approval of the	The State's general approach for implementing an approvable

Goal No.	Goals	Action/Requirement	Output/Action	Time Frame	Year 2016 Milestones
	(Protect coastal areas through establishing and implementing sufficient CNPCP)	measures for forestry, as needed, in response to Federal comments on the Oregon agencies' strategy	Oregon agencies for submittal to EPA and NOAA	program is obtained)	CNPCP was outlined and submitted to EPA and NOAA in February of 2016. State (ODF, DEQ) and federal (EPA, NOAA) agencies continue participation in a technical workgroup tasked with identifying solutions amenable to all agencies to meet additional management measures. (Page 6)
319 GRANT PROGRAM					
319 - 1	319 Grant Funding DEQ NPS Program	DEQ uses 319 Grant funds to implement DEQ activities that achieve the NPS Program goals and activities	DEQ NPS Program Funding	2014-2018	In 2016 DEQ continued to fund 9.23 DEQ staff positions to achieve NPS Program goals and activities. (Page 19)
319 - 2	319 Grant Funding for pass through grants	319 Grant funding of projects that address Oregon's NPS Program priorities	Continue funding NPS Program high priority projects (as described in RFP) with 319 Grants	2014-2019	See FY 2016 Annual Report (Page 19 and basin summaries)
319 - 3	Priority projects to receive 319 Grant Funding for pass through Grants	Region and HQ staff identifies and ranks projects to receive pass through 319 Grant funds for addressing NPS Program priorities	List priority projects in the 319 Grant request for proposals	2014-2018	DEQ incorporated its regional priorities in its June 2016 RFP and selected priority projects.

Goal No.	Goals	Action/Requirement	Output/Action	Time Frame	Year 2016 Milestones
					(Page 19, 29 and basin summaries)
319 - 4	319 Grant RFPs	Continue process improvement of 319 Grant RFPs for timely and efficient issuance by providing training to DEQ NPS and TMDL staff to increase efficiency and timeliness	Produce trained staff every other year (~10 TMDL/ NPS Staff)	2014-2018	In 2016, 319 program staff continued to hold conference calls with process improvement team members and worked on identifying training needs. (Page 20)
319 - 5	319 Grant Administration	Provide guidance to DEQ staff and grant administration. Guidance includes planning, contracting, invoicing, and reporting.	DEQ provide timely and efficient issuance of 319 Grant RFPs	2014-2018	In 2016 319 program staff provided guidance to regional and other program staff on grant administration. (Page 20)
319 - 6	GRTS	Continue to report 319 Grant Data into GRTS; Meet annual reporting deadlines.	Meet EPA timeline for GRTS Reporting	2014-2018	In 2016 319 program staff reported data into GRTS on schedule. (Pages 51-52)
319 - 7	NPS Implementation	Collect information from NRCS, USFS, BLM and OWEB on annual NPS Project implementation activities including 319 Grant Projects	Include information in the DEQ NPS Annual Report	2014-2018	ODA, OWEB, and NRCS are currently working on providing information related to NPS project implementation activities for ODA's biennial reviews. Due to limited staff resources in the NPS program, DEQ chose to wait for the completion of the effort to provide

Goal No.	Goals	Action/Requirement	Output/Action	Time Frame	Year 2016 Milestones
					information to EPA. (Page 39)
319 - 8	DEQ's NPS Program Website	Update DEQ NPS Program website as needed	At least update NPS Program website to reflect current RFP and NPS Annual Report and other documents as needed	2014-2018 (ongoing)	In 2016 DEQ worked on agency wide web re-design as the state of Oregon prepared to launch its new state website. (Page 10)
WATERSHED APPROACH BASIN REPORTS					
WBP – 1	Watershed Basin Status and Action Plans	Develop a template for watershed basin status and action plans. DEQ provides training to DEQ NPS and TMDL staff on its use	Make watershed basin status and action plans template available to DEQ staff	2015	In 2016 DEQ divested its resources from developing Watershed basin status and action plans and the template will not be developed. (Page 14)
WBP – 2	Watershed Basin Status and Action Plans	Develop watershed basin status and action plans within identified priority watersheds that identify priority problems and waters	DEQ issues watershed basin status and action plans	2014-2018	In 2016 DEQ divested its resources from developing Watershed basin status and action plans. Summaries of basin-wide restoration are included in Chapter 6 of the 2016 Annual Report (Pages 50 - 153). Regional priorities are identified.
WBP – 3	EPA's 9 key elements	Report on how TMDL Implementation plans and watershed basin status and action plans meet EPA's nine key elements	Include information in the DEQ NPS annual report	2014-2018	In 2016 this task was identified as a program priority. DEQ plans to complete this task during 2017-2018. (Page 20)

Goal No.	Goals	Action/Requirement	Output/Action	Time Frame	Year 2016 Milestones
WBP – 4	Volunteer monitoring	Volunteer monitoring watersheds sample plans are developed	QAPP and SAPs reviewed by DEQ	2014-2018	In 2016 Volunteer monitoring coordinator continued to provide technical assistance to watershed partners to develop QAPP and SAPs. (Page 27)
BASIN SPECIFIC PROJECTS					
BSA - 1	Basin specific activities	Basin specific activities and projects will be prioritized through various TMDL/NPS program processes	Basin specific activities are reported in DEQ's NPS annual report	2014-2018	Regional priorities are identified in the basin summaries included in Chapter 6 of the 2016 Annual Report (Pages 50 - 153).
WATER QUALITY PROGRAMS					
WQP – 1	TMDL Guidance or IMD	Develop TMDL guidance or IMD on how to produce work plans that identify data needs and how to design a monitoring study	TMDL data needs and monitoring study produces implementation ready TMDLs and WQMPs	2015	TMDL guidance document was drafted in 2012 as part of responsibility to meet the needs identified during toxics rule making. While it is a priority for DEQ, it has not been a priority for DEQ to finalize the document within available resources (Page 28).
WQP – 2	Technical Assistance	DEQ HQ and region staff will provide technical assistance to DMAs, DEQ staff, other local, state and federal staff on TMDL development and TMDL	DEQ staff provide TMDL technical assistance to ensure TMDL load allocations and WQS are met	2014-2018	In 2016 DEQ continued to provide technical assistance in various watersheds where TMDLs and NPS

Goal No.	Goals	Action/Requirement	Output/Action	Time Frame	Year 2016 Milestones
		implementation efforts			programs are implemented. (Pages 50 - 153).
WQP – 3	TMDL Implementation Plans	Work with DMAs to develop and implement TMDL implementation plans (including annual reports) as described in the TMDL/WQMP	DMAs meet TMDL/WQMP responsibilities	2014-2018	In 2016 DEQ continued to assist DMAs to develop and implement TMDL implementation plans. (Pages 27-28).
WQP – 4	TMDL Implementation Plans	DEQ reviews TMDL Implementation Plan annual reports	DMAs meet TMDL/WQMP responsibilities	2014-2018	In 2016 DEQ continued to review TMDL Implementation Plan annual reports. (Pages 27-28).
WQP – 5	TMDL Implementation Plan Guidance	Develop a process for DEQ staff to review TMDLs and TMDL Implementation Plans every 5 years	DMAs meet TMDL/WQMP responsibilities as identified in the document describing the TMDL Implementation Plan guidance	2015	DEQ plans to work on this item in conjunction with the development of TMDL guidance or IMD. (WQP-1)
WQP – 6	TMDL and NPS Implementation	Develop a spreadsheet and process for DEQ to track and report on landscape condition for achieving TMDL implementation timelines and milestones including WQ Status and Trends	Information included in the DEQ NPS Annual Report	2016-17	Technical development work for reporting on landscape conditions began in 2016 in Southern Willamette Valley. However the process will not be implementable in other parts of the state until approximately 2018. (Page 42)
WQP – 7	Reasonable Assurance	Conduct analysis during TMDL/WQMP development to provide reasonable	Information included in the DEQ TMDL Implementatio	2014-2018	DEQ continued to focus its effort to provide reasonable

Goal No.	Goals	Action/Requirement	Output/Action	Time Frame	Year 2016 Milestones
		assurance and guide implementation for TMDLs	n Plan Guidance and/or DEQ NPS Annual Report		assurance for TMDLs that were in development in 2016. (Page 27)
TOXICS					
TOX – 1	WQ Pesticide Management Team and PSPs	Continue to work with the WQ PMT and implement programs to address WQ pesticide issues including the PSP projects	Reduce, where needed, instream pesticide concentrations	2014-2018	DEQ continued to work with WQ PMT and local partners to implement PSPs. (Page 43)
TOX - 2	Public Water Systems	Continue developing contaminant specific reduction strategies for public water systems use, such as for nitrates and pesticides from urban and rural residential lands	Reduce or protect PWSs from NPSs of pollution	2014-2018	Began updated source water assessments in 2016. Approximately 300 of Oregon's community water systems (about 35% of all community public water systems) have implemented strategies to protect their drinking water (Page 28)
AGRICULTURE					
AG – 1	(Define) landscape conditions for TMDLs and WQS	Document definition of system potential and site capable vegetation	Coordination between and effective implementatio n of the TMDL/NPS programs and AgWQM Program	2014 (time frame extended)	DEQ has a definition of system potential shade in OAR. ODA and DEQ continued to discuss and refine the definition of site capable vegetation in 2016. (Pages 33-39)

Goal No.	Goals	Action/Requirement	Output/Action	Time Frame	Year 2016 Milestones
AG – 2	(Define) landscape conditions for TMDLs and WQS	Conduct effective shade assessments for evaluating implementation to achieve TMDL/WQS goals under area rules and plan	Coordination between and effective implementation of the TMDL/NPS programs and AgWQM Program	2014 (timeline extended to complete assessments)	DEQ provided advice and technical assistance as ODA established a methodology for evaluating streamside vegetation in 2014. In 2016, DEQ led shade assessments in parts of Oregon but it was not specifically designed to evaluate implementation activities to achieve TMDL/WQS goals for the statewide AgWQM program (Page 42)
AG – 3	Biennial review of area rule and plan	Participate in ODA's biennial review process by providing water quality status and trends and landscape condition in priority areas	DEQ provides input during the area rule and plan revision	2014-2018	DEQ continued to provide comments and recommendations to ODA and LAC during seventeen biennial reviews in 2016. In addition, DEQ began providing water quality status and trends analysis reports to support biennial reviews. DEQ will continue to participate in biennial reviews in 2017. (Pages 34 and 50 – 153.)
AG - 4	Update DEQ guidance for biennial reviews	Collaborate with ODA for updating DEQ guidance for	Complete updating DEQ	2015 (timeline extended due to needed	In 2016, DEQ continued to coordinate with

Goal No.	Goals	Action/Requirement	Output/Action	Time Frame	Year 2016 Milestones
		providing comment during ODA's biennial review process	guidance by end of 2015	coordination with ODA)	ODA to come to agreement on the way biennial reviews are conducted at programmatic and management area specific scales. The guidance document was not updated in 2016 due to lack of staff resources and agreement between two agencies. The two agencies will continue discussions and DEQ will work toward updating the guidance in 2017. (Page 34)
AG – 5	Grant Funding	Participate in local grant funding process to direct resources to high priority agricultural issues	Coordination between and effective implementation of the TMDL/NPS program and AgWQM Program	2014-2018	DEQ staff continued to participate in local and statewide grant funding processes to direct funding towards high priority projects on agricultural lands. In 2016 1 million of OWEB funds were earmarked for projects in Strategic Implementation Areas. (Page 32)
AG – 6	ODA Area Rule compliance	Work with ODA to prioritize and help develop assessment methodologies for addressing	Coordination between and effective implementation of the	2014-2018	DEQ began working with ODA to assess area rule for addressing

Goal No.	Goals	Action/Requirement	Output/Action	Time Frame	Year 2016 Milestones
		temperature, sediment, and sedimentation, bacteria, nutrients, and pesticides	TMDL/NPS program and AgWQM Program		temperature in 2014 and continued the work through 2016. DEQ and ODA will continue to focus on temperature in 2017. (Page 38)
FORESTRY					
FOR – 1	FPA Evaluation	Participate with ODF to jointly develop methods and study designs with funding sources to address unanswered monitoring questions from the Private Forests Monitoring Program Strategic Plan	Private and State Forestlands meet TMDL Load allocations and water quality standards	2015	More than ten joint meetings between ODF and DEQ occurred throughout 2016 to discuss the proposed riparian rule revisions and compliance auditing. (Pages 39-40)
FOR - 2	Forest Practices Act rules	Participate in FPA rule analysis and concept development for water quality issues and revisions to management plans for state forests	Private and state forestlands meet TMDL Las and WQS	2014 (2015 update?)	Revised riparian rules were completed and public hearings were held in 2016. Final adoption is proposed for the April 2017 Board meeting with a proposed effective date of July 1, 2017. (Pages 39-40)
FOR – 3	ODF/DEQ MOA	Participate with ODF on revising the current MOA between ODF and DEQ	Revision to the 1998 DEQ/ODF MOA	2015 (2017?)	The MOA was revised in 2013 and no revisions were made to it in 2016. (Page 39)
STORMWATER					
STW – 1	TMDL and Stormwater	Develop DEQ guidance to improve and establish consistent coordination between	Finalize guidance and provide training to	2014-2018	The Stormwater Integration Group (SWIG) developed iLearn training modules

Goal No.	Goals	Action/Requirement	Output/Action	Time Frame	Year 2016 Milestones
		TMDL and stormwater programs	DEQ staff and urban DMAs		on the integration between stormwater and TMDLs. (Pages 20-21)
FEDERAL LANDS					
FED – 1	USFS Annual status report	The USFS submit to DEQ a Statewide annual status report to meet the MOU and TMDL reporting requirements	USFS submittal of the document to DEQ	2014-2018	Submittal of the 2016 annual report is currently in process as a joint effort between DEQ and the USFS. (Page 40)
FED – 2	USFS/DEQ 5 year progress report	The 2013 USFS/DEQ MOU requires the preparation of a USFS/DEQ 5 year MOU progress report.	Document progress in implementing MOU actions and update MOUs	2018	The MOU was renewed in 2013, signed in 2014 and the 5-year progress report will not be applicable until 2018. (Page 40)
FED – 3	BLM Annual status report	The BLM submit to DEQ a Statewide annual status report to meet the MOU and TMDL reporting requirements	BLM submittal of the document to DEQ	2014-2018	The MOU between the BLM and DEQ was renewed in 2016 and signed in 2017. Status reports are due in years 2 to 3 of the 5-year term (Pages 40-41)
FED – 4	BLM 5 year progress report	The 2011 BLM/DEQ MOU requires the preparation of a BLM/DEQ 5 year MOU progress report	Document progress in implementing MOU actions and update MOUs	2016	The MOU between the BLM and DEQ was renewed in 2016 and signed in 2017. (Page 40)
FED – 5	Coordination of USFS and BLM with DEQ	The USFS and BLM will coordinate with DEQ for establishing priorities, strategies, and funding using a watershed approach to protect and restore water quality on BLM and USFS	Annual check in on BLM and USFS progress towards meeting TMDL Load Allocations and WQSs	2014-2018	The annual meeting between BLM and DEQ was held in August of 2016. Progress towards restoration activities and land management

Goal No.	Goals	Action/Requirement	Output/Action	Time Frame	Year 2016 Milestones
		administered lands, this will include WQRPs			changes to improve watershed health is ongoing. (Page 40)
FED - 6	USFS BMPs	As needed, USFS will develop Oregon specific land use activities BMPs and monitor implementation and effectiveness of BMPs following the USDA National BMPs for water quality national protocols	Annual check in on USFS progress towards meeting TMDL LAs and WQS	2014-2018	DEQ and the USFS met in the second quarter of 2016. In 2016, the USFS completed their first multi-year regional scale analysis of the implementation and effectiveness of WQ BMPs. (Page 40)
FED – 7	BLM BMPs	As needed, BLM will develop Oregon specific land use activities BMPs and monitor implementation and effectiveness of BMPs following the USDA National BMPs for water quality national protocols	Annual check in on BLM progress towards meeting TMDL Las and WQS	2014-2018	The BLM is developing Oregon specific land use activities BMPs as part of their revisions to their Resource Management Plans. (Page 41)
FED – 8	Pre-TMDLs and Post TMDLs	The USFS and BLM will use the USFS and BLM protocol for addressing CWA Section 303d listed waters, May 1999, ver 2	Annual check in on USFS and BLM progress towards meeting TMDL Las and WQS	2014-2018	DEQ and the USFS met in the second quarter of 2016. Progress towards meeting TMDL Las and WQS are updated as part of the NW Forest Plan Aquatic Conservation Strategy. (Pages 40)
FED – 9	Agricultural Activities	The USFS and BLM will develop and implement a programmatic	Annual check in on USFS and BLM progress	2014-2018	The annual meeting between BLM and DEQ was held in

Goal No.	Goals	Action/Requirement	Output/Action	Time Frame	Year 2016 Milestones
		strategy to address agricultural activities on federal lands, such as grazing	towards meeting TMDL Las and WQS		August of 2016. Agricultural activities are addressed through district management plans and revisions to grazing and riparian rules. (Page 41)

Appendix B

2016-2018 Performance Partnership Agreement Nonpoint Source and 319-Funded Related Water Quality Component				
Number	**DEQ Commitment**	**Outputs**	**Target Date**	**2016 Status**
Element 1: Water Quality Standards and Assessments				
1.1	Temperature Cold Water Refugia Plan for the lower 50 miles of the Willamette River. The purpose of the plan is to interpret the narrative CWR criterion and allow for implementation of the criterion through DEQ's CWA authorities.	Willamette Plan Scope of Work coordination Coordination meeting with NOAA and EPA Willamette CWR Plan	Nov. 3, 2016 By Nov. 30, 2016 Nov. 3, 2018	DEQ is developing a Scope of Work for the Lower Willamette Cold Water Refuge Plan. DEQ is identifying what work is already underway by other agencies and organizations and what data is available so it can use the available data and expertise to assist in developing the plan. DEQ is also tracking EPA's work on developing a CWR plan for the Columbia River.
1.2	Conduct a rulemaking process to revise Oregon's copper criteria. Track and comment on EPA's copper criteria promulgation	New criteria recommended to the EQC for adoption and submitted to EPA.	Dec. 30, 2016 Currently scheduled for adoption in January 2017	EQC adopted criteria in November 2016. EPA approved criteria in January 2017.
1.4	Conduct a review and prepare for rulemaking to revise Oregon's temperature water quality standard. Determine how to address natural thermal regimes and variability for temperature.	Project planning and rule development to prepare for future standard revision	March 2017	October 2016 - Judge found temperature TMDLs based on natural conditions criteria to "arbitrary and capricious"
1.5	Address water quality standards-related action needs (e.g., variances, site-specific background pollutant criteria, UAAs and/or SSC) arising from implementation of	Variances and other water quality standards revisions	Ongoing	No variances were requested in 2016. However, there are dischargers who are evaluating whether this would be an appropriate tool for certain situations. In addition, DEQ is evaluating whether a waterbody

2016-2018 Performance Partnership Agreement Nonpoint Source and 319-Funded Related Water Quality Component				
Number	**DEQ Commitment**	**Outputs**	**Target Date**	**2016 Status**
	revised human health criteria or the remaining effective portion of Oregon's temperature standard.			variance may be a useful tool for certain situations, such as temperature, where modelling demonstrates that even under natural conditions the waterbody would not meet the Biologically Based Numeric temperature criteria.
1.6	Describe antidegradation implementation procedures that address the issues raised in EPA's review of Oregon's Antidegradation Implementation guidance document (IMD).	Updates to Antidegradation Implementation IMD in form of addenda	Jan. 30, 2017	Standards is in the process of drafting the Antidegradation IMD addenda with an anticipated completion date of June 2017.
1.7	Conduct rulemaking to amend bacteria standards for coastal waters, including adopting the enterococci criteria for coastal recreation, clarifying the application of fecal coliform criteria to shellfish harvesting waters, and documenting these uses.	Revised standards recommended to the EQC for adoption and submitted to EPA	Sept. 30, 2016	EPA has not approved the bacteria standard revisions. They are currently in the approval process.
1.8	Identify and plan next set of standards work to be completed based on water quality program needs and stakeholder input (triennial review). Upon completion of this planning process, provide	Standards work plan that identifies needs, priorities and anticipated schedule for standards revisions.. Proposed standards revisions, as	March 30, 2017	The Triennial Review has been delayed, and DEQ is planning to complete the list of proposed standards revisions by the end of June 2017.

2016-2018 Performance Partnership Agreement Nonpoint Source and 319-Funded Related Water Quality Component				
Number	**DEQ Commitment**	**Outputs**	**Target Date**	**2016 Status**
	EPA with a list of possible additional water quality standards revisions that could be undertaken subject to resource availability and priorities.	time and resources allow		
1.14	DEQ will assist EPA in identifying relevant data elements and geo-referenced information to contribute to EPA's national water quality summaries and performance measure and 303(d) Vision tracking and analysis	Oregon approved 2012 Integrated Report and 303(d) list	July 29, 2016	DEQ submitting comments to EPA's partial approval/disapproval of Oregon 2012 303(d) list due in April 2017. DEQ provided updates and data elements to EPA in Fall 2016 for national water quality summaries and performance measure tracking based on DEQ's 303(d) and TMDL priority lists submitted with the 2012 Integrated Report.
1.16	DEQ's 2018 Integrated Report and 303(d) list will be submitted into EPA's ATTAINS data system. DEQ will continue its participation in ongoing ATTAINS development discussions to identify opportunities to use and build upon EPA's ATTAINS framework.	2018 Integrated Report and associated reporting data	Ongoing DEQ work with EPA ATTAINS and Water Quality Framework design team	DEQ developed a project plan and identified approaches in Fall 2016 for assessment data system, process, method, and procedure improvements to implement with Oregon's 2018 Integrated Report and 303(d) list development. The project plan targeted early 2017 for implementing improvements in the initial step to assemble data for the assessment. The project plan built on analyses received from EPA on assessment data system and reporting improvements that will be compatible with ATTAINS for future Oregon reporting.

2016-2018 Performance Partnership Agreement Nonpoint Source and 319-Funded Related Water Quality Component				
Number	**DEQ Commitment**	**Outputs**	**Target Date**	**2016 Status**
				DEQ actively participated in ongoing ATTAINS development discussion through 2016. DEQ is targeting the next assessment cycle as the first submission of Oregon assessment information into the redesigned ATTAINS.
1.18	DEQ will review and prioritize assessment process, methods, and procedures improvements. Improvements will be planned and implemented to inform and provide specifications for data system improvements	Updates/new protocols for Oregon Assessment Project plan for process and methods improvements and implementation of short-term improvements. Decision on scope and scale for next assessment effort. Revised assessment methodology for public comment.	Ongoing	DEQ consulted with EPA in August 2016 on assessment process and methods improvement priorities, developed and is implementing plans to incorporate improvements as updates into Oregon's assessment methodology, and is on track to complete those updates in 2017.
Element 2: TMDLs				
2.1	Develop TMDLs and WQMPs in accordance with 303(d) list schedule	Issuance of TMDLs for the:		
		Coquille Basin	December 2016	On track to issue in 2017
		MidCoast Basin	December 17	Plan to issue some MidCoast TMDLs in 2017/2018
		Chetco Basin	June 2017	Will be started after completion of the Coquille TMDL.

2016-2018 Performance Partnership Agreement Nonpoint Source and 319-Funded Related Water Quality Component				
Number	**DEQ Commitment**	**Outputs**	**Target Date**	**2016 Status**
		Sixes Basin	June 2017	Will be started after completion of the Coquille TMDL.
		Powder/Burnt Basins TMDL Development	Begin in Mar-18	Initial TMDL analysis has begun
		Upper Deschutes Basin TMDL Development	Ongoing	2016 data collection – TMDL will be started after completion of the Powder TMDL.
		Coos TMDL Development	December 2017	Will be started after completion of the Coquille TMDL.
		Issuance of revised TMDLs for the:		
		Upper Klamath River and Lost River TMDLs (chlorophyll-a, ammonia toxicity, phosphorus, and pH)	September 2016	On track to reissue in 2017
		Western Hood Temperature TMDL	September 16	On track to reissue in 2017
		Evaluate and develop potential approaches for the remaining category 5 and 3 listings for the Willamette Basin	December 2016	PSU graduate student working on source identification for these listings
2.2	Implement TMDL Wasteload Allocations in NPDES permits through collaboration with NPDES permit writers	Pollutant Discharge Limits that will meet WLAs for each permitted discharge.	Ongoing	WLAs continued to be implemented into permits drafted in 2016. WLAs are being implemented into general permits through the Coquille TMDL and revisions to the Hood River Temperature

2016-2018 Performance Partnership Agreement Nonpoint Source and 319-Funded Related Water Quality Component				
Number	**DEQ Commitment**	**Outputs**	**Target Date**	**2016 Status**
				and Klamath River nutrient TMDLs.
2.3	Implement the Willamette River Basin TMDL. Work with watershed councils, local governments, and other DMAs to develop appropriate management practices and plans for controlling pollutants to the Willamette River. Work with USDA agencies to leverage Farm Bill resources to implement priority best management practices in critical areas.	Completed Implementation plans throughout Willamette Basin that guide management Practices and pollutant controls to meet load allocations in TMDLs.	Ongoing	75 non-State or Federal DMAs identified. 68 DMAs are currently reporting on TMDL implementation. Approximately 88% of DMAs in the Willamette Basin are successfully implementing TMDL Plans on time, as documented through the Annual Report process.
		Facilitate projects that result in improvements in water quality.	Ongoing	Implemented BMPs that targeted riparian plantings, livestock exclusion, manure management and irrigation practices
2.4	Include robust Reasonable Assurance documentation in the TMDL and WQMP to implement TMDLs for Nonpoint Sources in subbasins where TMDLs/WQMPs have been completed or are being completed. Work with watershed councils, local governments and other DMAs to develop appropriate management practices and plans for controlling pollutants. Work with USDA agencies to leverage Farm Bill	Completed TMDL, WQMP and implementation plans that guide management practices and pollutant controls to meet load allocations in TMDLs. Facilitate projects that result in improvements in water quality.	Ongoing	TMDLs are currently being implemented in the John Day, Malheur, Grand Ronde, Rogue, Umpqua, Willamette, Snake River, Sandy River, North Coast, Middle Columbia-Hood, Umpqua and South Coast basins. DEQ worked with EPA to develop mapping tools that identify priority areas for restoration and mitigation to achieve water quality and fish habitat improvements in the Coquille TMDL which is expected to be completed in 2017.

2016-2018 Performance Partnership Agreement Nonpoint Source and 319-Funded Related Water Quality Component				
Number	**DEQ Commitment**	**Outputs**	**Target Date**	**2016 Status**
	resources to implement priority best management practices in critical areas.			
2.5	Implementation of load allocations or require TMDL implementation plans for all sources assigned load allocations.	Implementation plans that meet load allocations or management measures identified in the TMDL/WQMP. Annual reporting by DMAs of TMDL implementation and 5 year review of TMDL implementation plans by DEQ.	Ongoing	All new implementation plans that are developed meet load allocations or management measures identified in the TMDL/WQMP. Basin Coordinators currently review TMDL implementation annual reports from DMAs.
2.6	Develop and implement TMDL/WQMP/IP as one of the approaches to address the deficiencies in the CZARA Coastal Nonpoint Control Plan additional management measures for forestry identified by EPA and NOAA (7/28/2015) as described in the Governor's Natural Resource Office letter (2/10/2016). Incorporate New Development guidelines and Onsite Sewage Disposal Systems (OSDS) actions in	Completed TMDL, WQMP, and IP that guide management practices, pollutant controls, timelines and milestones for administrative outputs, and landscape, riparian, and water quality outcome status and trends to meet TMDL allocations.	At issuance of TMDLs	There were no new TMDLs, WQMPs or IPs issued in 2016.

2016-2018 Performance Partnership Agreement Nonpoint Source and 319-Funded Related Water Quality Component				
Number	**DEQ Commitment**	**Outputs**	**Target Date**	**2016 Status**
	TMDL/WQMP as described in CZARA management measures.			
2.7	Work with EPA on 303(d) Vision timelines for prioritization, assessment, protection, alternatives, engagement, and integration.	Incorporate the components of EPA's 303(d) TMDL Vision into the TMDL Program planning documents.	Ongoing	The 303(d) TMDL Vision was based on commitments in the PPA and IR so that TMDL priorities were aligned.
Element 4: Groundwater Program				
4.1	Implement the Lower Umatilla Basin Groundwater Management Area Action Plan by focusing on agricultural, residential, commercial, industrial, municipal, and public water supply activities that will prevent and reduce nitrate contamination in groundwater. Enhance engagement with Oregon Department of Agriculture, wastewater permit holders and the recent and ongoing public-private irrigation water development program, targeting reversal of the increasing groundwater nitrate	<u>Coordination</u> Meet with local stakeholders, Groundwater Management Committee, and local agencies to coordinate Action Plan activities. Provide technical support. Research BMPs and their effectiveness.	Meet as needed, typically six times per year Ongoing Ongoing	Held informational meetings in: • March 2015: Regional Solutions Coordinators Meeting • November 2015: LUBGWMA Committee • November 2015: DEQ Leadership Team • January 2016: Benton SWCD Nutrient Workshop • March 2016: Oregon Pesticide Symposium
		<u>Education and Outreach</u> Organize education and outreach efforts to increase awareness of groundwater vulnerability and BMPs, including participation at "outdoor	Annually Ongoing	DEQ conducted outreach to Outdoor Schools involving over 500 students from nine school districts in Spring and Fall 2016 DEQ staff engaged with over 100 elementary and middle school students in Outdoor School-style presentations made at the Pendleton National Weather Service Station Open House event in October 2016

2016-2018 Performance Partnership Agreement Nonpoint Source and 319-Funded Related Water Quality Component				
Number	**DEQ Commitment**	**Outputs**	**Target Date**	**2016 Status**
	concentration trend in the LUB GWMA.	schools" and farm fairs. Maintain GWMA website.		GWMA website updated
		<u>Monitoring and Data Analysis</u> Monitor groundwater quality at 32 domestic and irrigation wells to evaluate impacts and effectiveness of Action Plan. Complete groundwater nitrate trend analysis for entire GWMA (including food processor sites) Evaluate success of BMP awareness and implementation.	Quarterly Ongoing. As needed with new data Every 4 years	Approximately 38 wells were sampled quarterly in 2016. Every four years, the LUB GWMA Committee evaluates Action Plan success. The third evaluation of Action Plan success was completed in January 2013. The LUB GWMA Committee is currently working on the second LUB GWMA Action Plan with an anticipated completion date of summer 2017.
4.2	Implement the Northern Malheur County Groundwater Management Area Action Plan by focusing on agricultural, residential, commercial, industrial, municipal and public water supply activities that will prevent and reduce nitrate	<u>Coordination</u> Meet with local stakeholders, Groundwater Management Committee, and local agencies to coordinate Action Plan activities. Provide technical support.	Meet as needed; typically one meeting/ yr. Ongoing Ongoing	The NRCS and the local SWCD are working with farmers to develop water quality plans to address groundwater concerns. Alternative irrigation and fertilization management practices have been designed and recommended for the area.

2016-2018 Performance Partnership Agreement Nonpoint Source and 319-Funded Related Water Quality Component				
Number	**DEQ Commitment**	**Outputs**	**Target Date**	**2016 Status**
	contamination in groundwater.	Research BMPs and their effectiveness.		
		<u>Education and Outreach</u> Organize education and outreach efforts to increase awareness of groundwater vulnerability and BMPs	Annually	No outreach was conducted in 2016 due to resource constraints.
		<u>Monitoring and Data Analysis</u> Monitor groundwater quality at 36 domestic and irrigation wells to evaluate impacts and effectiveness of Action Plan. Complete groundwater nitrate trend analysis	Quarterly Ongoing. As needed with new data	DEQ currently samples a network of about 38 wells four times per year for analysis of nitrate and Dacthal, and does a more complete analysis approximately once a year. Nitrate trend analysis will be completed in 2017.
		Evaluate success of BMP awareness and implementation.	Every 4 years	BMPs are implemented on a voluntary basis and their effectiveness will be reassessed in 2017 when the nitrate trend analysis is redone.
4.3	Implement the Southern Willamette Valley Groundwater Management Area Action Plan by focusing on agricultural, residential, commercial, industrial, municipal	<u>Coordination:</u> Meet with local stakeholders, Groundwater Management Committee, and local agencies to coordinate Action Plan activities.	3-4 SWV GWMA Committee meetings per year Ongoing	Reduced to 2 meetings/year due to budget constraints – GWMA Committee met in Apr and Oct 2016 Working with ODA and Tetra Tech on A flow contouring model to determine 5-year flow path of groundwater

2016-2018 Performance Partnership Agreement Nonpoint Source and 319-Funded Related Water Quality Component				
Number	**DEQ Commitment**	**Outputs**	**Target Date**	**2016 Status**
	and public water supply activities that will prevent and reduce nitrate contamination in groundwater. [Note: DEQ's ability to implement this work has been temporarily impacted by a budget shortfall. We hope to be able to fully implement our SWV GWMA work in the 17-19 biennium.]	Provide technical support Research BMPs and their effectiveness	Ongoing	Working with PINE to look at nitrate leaching below vadose zone and fertilizer application
		<u>Education and Outreach</u> Organize education and outreach efforts to increase awareness of groundwater vulnerability and BMPs, Maintain GWMA website.	Ongoing outreach/education with local stakeholders Ongoing	Working with University of Oregon students on Capstone project designed to target GWMA "neighborhoods" Updated with important dates and events
		<u>Monitoring and Data Analysis</u> Monitor groundwater quality at 25 monitoring wells and 15 domestic wells to evaluate impacts and effectiveness of Action Plan Evaluate success of BMP awareness and implementation.	Two to four times per year As scheduled	Wells were monitored in Feb, May, Aug and Nov 2016 Currently looking at fertilization practices and precision agriculture techniques.
4.5	Complete federal and state groundwater	Biennial Report to the legislature	Ongoing As scheduled	Biennial report was provided to the legislature in February-March 2017.

2016-2018 Performance Partnership Agreement Nonpoint Source and 319-Funded Related Water Quality Component				
Number	**DEQ Commitment**	**Outputs**	**Target Date**	**2016 Status**
	reporting requirements	Groundwater component of 305(b) report		Will be addressed with submittal of 305(b) report.
4.6	Participate in EPA-sponsored annual groundwater meetings and conferences as workload and resources allow.	Meetings	As scheduled	No groundwater meetings were attended in 2016.
Element 7: Water Quality Data Analysis, Management, and Monitoring				
7.1	DEQ will continue to execute sustainable processes to maintain accurate data transfers from State data systems to ICIS.	Continued complete and timely data transfers to ICIS through batch upload routines and EPA's ICIS interface screens.	As scheduled by EPA	Individual Major NPDES permit setup in ICIS is 100 percent complete. Individual Minor NPDES permit setup in ICIS is over 50 percent complete
7.2	Ambient Monitoring Network -DEQ will continue to monitor approximately 130 ambient water quality station 6 times annually throughout Oregon. These stations provide status and trends data for understanding water quality.	Continue entering data into the ELEMENT repository. The Oregon Water Quality Index (OWQI) will continue to be updated annually. Annual reports will be prepared on water quality trends and indicators. Data will be used to support the 303(d) assessment process and 305(b) report.	Ongoing	Approximately 130 stations were monitored in 2016. The OWQI modified its reporting and calculation methods in 2016. Created a fully web based report used R to calculate WQ trends. DEQ data was used in EPA's partial approval/disapproval of Oregon's 2012 303(d) List and will be used to support the 2018 305(b) report.

2016-2018 Performance Partnership Agreement Nonpoint Source and 319-Funded Related Water Quality Component				
Number	**DEQ Commitment**	**Outputs**	**Target Date**	**2016 Status**
7.3	Collect water quality data to support TMDL development	TMDLs developed on schedule and supported by adequate data.	Ongoing	Data is being collected for TMDL development in the Upper Deschutes watershed, Tenmile Lake, Nehalem watershed, Tillamook watershed, Mid-Coast area, the Coquille watershed and the Santiam and Calapooya watersheds.
7.5	Reporting of biological, chemical and habitat data at reference and study locations in Western Oregon, at statewide trend sites and in the Deschutes Basin	Report/reports summarizing findings	October 2018	2016 marked the first season of the Statewide Biomonitoring Program's probabilistic sampling efforts. In 2016, the Biomonitoring program sampled 25 randomly selected sites throughout the Deschutes River Basin
7.6	Identify business requirements for migrating DEQ water quality, biology and habitat data into WQX	Business requirements for migration of water quality, biology and habitat data into WQX/STORET identifies	June 2018	DEQ purchased new database system called AWQMS in March 2017.
7.7	DEQ will collaborate with EPA, as resources allow, on EPA monitoring projects in Oregon	To be determined	As scheduled by EPA	DEQ will be cooperating with EPA on the National Lakes Assessment in 2017.
Element 8: Management of Nonpoint Sources of Pollution				
8.1	Distribute 319 grants to fund project proposals to Oregon's priority basins based on TMDL development and implementation, drinking water source areas and GWMAs.	Solicit and select projects	May 2016	20 projects were selected in 2016 and funds were disbursed in Oct 2016
8.2	DEQ develops a waiver from the 50/50 319 grant fund	DEQ waivers for 319 Grant years 2015 and 2016	August 2016	Waivers were granted to DEQ in Nov 2016.

2016-2018 Performance Partnership Agreement Nonpoint Source and 319-Funded Related Water Quality Component				
Number	**DEQ Commitment**	**Outputs**	**Target Date**	**2016 Status**
	requirement for years 2015 and 2016	submitted to EPA		
8.3	DEQ develops an approach to begin in 319 Grant year 2017 where DEQ staff time used to implement Watershed Based Plans can be used for leverage exemption from the 50/50 319 Grant Program requirements	DEQ leveraged exemption approach submitted to EPA for use in 319 Grant year 2017	December 2016	DEQ has determined that documenting staff activities eligible for watershed project funding as specified in the 2014 Guidelines is a preferred approach to meet the 50/50 spending requirement.
8.4	Prepare an annual report of NPS program accomplishments.	NPS Annual Report	August 2016 March 2017 March 2018	Annual report was finalized and approved by EPA in Sep 2016
8.5	Determine with EPA available NPS Success Stories documenting either water quality progress or full restoration under Program Activity Measure (PAM).	NPS Success Stories	September 2016 and September 2017	NPS Success Stories for 2016 - 2017 have not yet been identified
8.6	Enter GRTS 319 mandated elements to 319 project tracking data by national deadlines, including load reductions as available.	Data reflecting progress and status of CWA §319 implementation.	Enter GRTS data by February 2016 (load reduction), other GRTS data (National GRTS reporting deadlines)	GRTS data entered by Feb 2016 deadline.
8.7	Work with EPA to review TMDLs and other basins plans for meeting EPA's 9 Key Element watershed based planning guidance.	Develop for selected 12 digit HUCs Watershed Based Plans that in part rely on TMDLs and other planning documents	June 2017	Beginning crosswalk of WQMPs with EPA's 9 Key Elements of a Watershed Plan; expected completion in June 2017.

2016-2018 Performance Partnership Agreement Nonpoint Source and 319-Funded Related Water Quality Component				
Number	**DEQ Commitment**	**Outputs**	**Target Date**	**2016 Status**
8.8	Implement Agency Toxics Reduction Strategy	Implement a toxics reduction strategy that incorporates air, land and water. This effort includes the Pesticide Stewardship Partnerships, Pesticide Collection Events, and other priority activities.	Ongoing PSP work, product stewardship rules, periodic pesticide collection events	330 pesticide samples were collected in 2016. There were nine pesticide stewardship partnerships in 2016.
8.9	DEQ works with ODA, ODF and EPA on CZARA Coastal Nonpoint Control Plan	Development of an approvable CNPCP	Ongoing	State (ODF, DEQ) and federal (EPA, NOAA) agencies continue participation in a technical workgroup tasked with identifying solutions amenable to all agencies to meet additional management measures.
8.10	Ag Area Plan & Rule biennial reviews and ODA/DEQ MOA implementation	Review and comment on ODA's agricultural area rules and plans during their biennial review process.	Ongoing	During 2016 Basin Coordinators assessed and provided feedback to ODA on 18 Ag Area Plans. In fall and winter of 2016, DEQ issued status and trends reports with temperature, pH, and bacteria (E coli and enterococcus) analyses for Crooked, Coos and Coquille, and Burnt Agricultural Water Quality Management Areas.