Mid-Coast Water Resources Characteristics

Water Quality

Version 2

Mid-Coast Water Planning Partnership

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Contents

Exhibits

Appendices

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2.4 Water Quality

2.4.1 Introduction

This report addresses a range of water quality topics in the Mid-Coast, including relevant regulatory programs, water quality status of water bodies, water quality monitoring projects, data access, and "sources" that may contribute pollutants to waterbodies in the Mid-Coast. Water quality can be affected locally, such as by wastewater discharge or septic systems, or at a watershed scale by natural conditions, such as geology and climate, and many different human and animal activities. Activities that can affect water quality include land use practices, industrial activities, urban development, introduction of invasive species, construction and operation of dams/reservoirs, and human wastewater discharge and animal waste (USGS, 2017).

The Mid-Coast Place Based Planning Partnership (Partnership) created this report to help develop a common understanding of water resources characteristics, uses, and needs in the Mid-Coast region. The contents of this report are based on best readily available information about water quality obtained from state agencies. Other organizations monitoring water quality in the planning area are listed. Additional data and studies are available that help describe water quality in the planning area. This report is part of a larger report that builds a foundation of understanding of the ecology, water quality, water quantity, and water-related built systems in the Mid-Coast with the purpose of helping balance the instream and out-of-stream water needs in the region.

Many aspects of water quality are directly tied to water quantity, ecology, and built systems. Additional information is available in the Water Quantity, Ecology, and Built Systems reports of the Mid-Coast Water Resources Characteristics report.

Overall, water quality and water quality management in the Mid-Coast can be summarized as follows:

- Water quality affects the extent to which water bodies can support beneficial uses, including human consumption, industrial, agricultural, recreational, and fish and wildlife uses in the Mid-Coast.
- The Oregon Department of Environmental Quality (DEQ) through the Environmental Quality Commission (EQC) establishes water quality standards for Oregon's surface waters based on designated beneficial uses defined in OAR-340-Div 41 to protect the beneficial use and to restore surface water quality.
    - DEQ issues permits with pollutant limits and other requirements for point source discharges of wastewater, including municipal and industrial wastewater, and industrial, construction, and mining stormwater.
    - DEQ implements reductions for nonpoint source pollutants through total maximum daily loads (TMDLs; a CWA regulatory program), which establishes thresholds for pollutant levels or loads in water bodies and through voluntary actions via the nonpoint source program. TMDLs are under development in the MidCoast Basin, but none have been issued.

- The Oregon Department of Agriculture (ODA) through the Board of Agriculture develops rules that regulate agricultural practices to prevent water pollution through the Agricultural Water Quality Management Act Program, aided by the voluntary Area plans
- The Oregon Department of Forestry (ODF) through the Board of Forestry regulates forestry practices to prevent water pollution through the Forest Practices Act and by implementing regulations
    - Local governments implement several water quality or public health protection programs, including the onsite wastewater (septic) program, certain drinking water protection programs, and riparian ordinances.
- Multiple Mid-Coast water bodies have been identified as water quality limited by DEQ or EPA for not meeting one or more water quality parameters, including: dissolved oxygen, temperature, turbidity, sedimentation, biological criteria, *E. coli*, fecal coliform, weeds and algae, and pH.
- Approximately 4 miles of beaches in the Mid-Coast are listed as water quality limited for enterococcus, which can cause illness from contact recreation, such as swimming.
- Surface water is the primary source of drinking water for nearly all of the municipal and community water providers in the Mid-Coast. DEQ and OHA have completed source water assessments for many of these systems.
- Several water providers in the Mid-Coast use groundwater. Common groundwater contaminants are arsenic, lead, nitrates, and fecal coliform bacteria.
- Multiple governmental, non-governmental organizations, and various private entities conduct some monitor water quality monitoring activities in the Mid-Coast, or is done so in the past decade.

2.4.2 Water Quality Overview

Water resources in the Mid-Coast support a variety of beneficial uses, including potable (drinking) water supply, industry, tourism, fish and wildlife, and irrigated agriculture. For a full list see OAR-340-Div 41 Table 220A at: http://www.oregon.gov/deq/Regulations/Pages/OARDiv41.aspx. The availability of adequate quantity of reliably high quality water is important to all of these uses. DEQ designates beneficial uses (e.g., recreation, irrigation, industrial, wildlife, and fish life) for surface water in the state (see OAR 340 Division 41: Water Quality Standards). DEQ establishes narrative and numeric criteria based on these designated beneficial uses to protect the use and to restore surface water quality. Oregon's water quality standards and criteria in Oregon's rules include:

- Temperature[1]
- Biological criteria
- Sedimentation
- Turbidity

[1] Although temperature is the indicator and criteria, "excess thermal load" is the actual pollutant.

- Dissolved oxygen
- Fecal indicator bacteria: (E. coli, Enterococcus, fecal coliform)
- Aquatic weeds or algae
- Chlorophyll a
- pH
- Toxic compounds

In the Mid-Coast, water quality at any given time and place is determined by a complex combination of natural factors (e.g. the natural topography of the landscape, underlying geology, lithology, and soils) and human factors (e.g. wastewater discharges and land use practices). The higher elevation (eastern) portions of the Mid-Coast (Coast Range) are generally steep, forested, and considerably less populated than the lower elevation (western) areas, especially along the Highway 101 corridor. In general, water quality in the upper portions of watersheds is affected by historical and current forestry land use practices in the uplands and agricultural and rural residential land use practices in the valley floors. Water quality in the lower portions of watersheds is affected by human development in rural and urban areas, as well as forestry practices on private and state lands. Appendix A of the Context report shows land uses patterns in Lincoln County.

DEQ regulates point source pollutants through permitting programs, whereas nonpoint source pollution programs are implemented by multiple state agencies through both regulatory activities and voluntary efforts. DEQ identifies pollutant reductions and strategies for nonpoint source sectors through issuing total maximum daily loads (TMDLs). Point source and nonpoint source pollution is described in greater detail below.

Water quality in the Mid-Coast can affect both the ecology and the economy in the area. For example, poor water quality in streams used by fish can negatively affect natural resources recreation and commercial fishing, and poor water quality at beaches can negatively affect tourism. Water quality is tied directly to water quantity. For example, low streamflow can negatively affect water quality parameters that are important to aquatic species (see Ecology report), which can likewise negatively affect natural resources recreation commercial fishing.

2.4.2.1 Introduction to Point and Nonpoint Source Pollution

Point and nonpoint source pollutants are regulated through different federal and state programs. Point sources of pollutants are contaminants that can be traced back to their original source and are regulated by state permitting programs. For a list of potential or common point source pollutants, see **Exhibit 1.** Nonpoint source pollution consists of contamination that can come from multiple sources and cannot always be easily pinpointed to a specific location or activity. For instance, pollution could be caused by rainfall and snowmelt moving over and through the ground, picking up natural and human-made pollutants and depositing them into surface water and/or groundwater (EPA). However, pollutants from roads, livestock, and wildlife sources may be direct deposition and fairly easy to identify, but are still considered nonpoint source pollution. For a list of nonpoint source pollutants, see **Exhibit 2**. **Exhibit 3** provides a visual of point and nonpoint source pollutants in a watershed. DEQ sets thresholds (water quality criteria) for pollutant levels in water bodies to meet requirements in the federal Clean Water Acts. These thresholds represent water quality outcomes that must be met.

Designated agency programs, such as the Department of Agriculture's Water Quality Area Management Plan, provide rules designed to meet any applicable water quality standards.

Exhibit 1. Examples of Point Source Pollutants

• Confined Animal Feeding Operations
• Industrial wastewater
• Municipal wastewater
• Permitted Pesticides
• Stormwater outfalls
• Vessel discharges

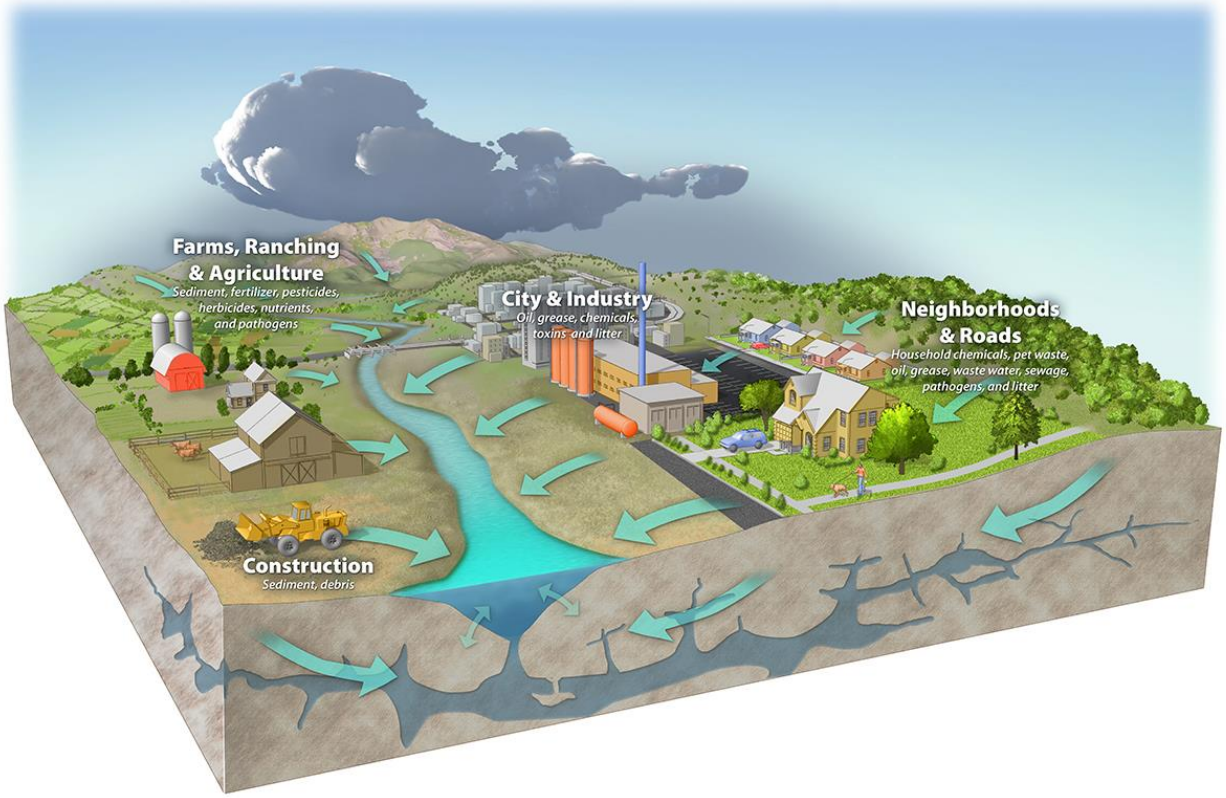
Source: www.epa.gov/npdes

Exhibit 2. Examples of Nonpoint Source Pollutants and Their Sources

• Excess fertilizers, herbicides, and insecticides from agricultural lands and residential areas
• Oil, grease and toxic chemicals from urban runoff and energy production
• Sediment from improperly managed construction sites, crop and forest lands, and eroding streambanks
• Salt from irrigation practices and acid drainage from abandoned mines
• Bacteria and nutrients from livestock, pet wastes, and faulty septic systems

Source: www.EPA.gov/nps/what-nonpoint-source

Exhibit 3. Sources of Point and Nonpoint Source Pollutants in a Watershed



Source: http://paulmirocha.com/wp/wp-content/uploads/2015/04/nonpoint-source-pollution_mirocha.jpg

2.4.3 Water Quality in the Mid-Coast

2.4.3.1 Approach

2.4.3.1.1 Report Objectives

- To gain a general understanding of water quality status in the Planning area
- To understand how to access available published information and data on water quality
- To gain a general understanding of water quality programs in the Planning area
- To understand water quality "conditions," including:
  - Water quality limitations for aquatic species
  - Water quality limitations for potable water systems
  - Frequency and locations of wastewater overflow
- To identify water quality data gaps
- To ensure that potential water management solutions consider water quality
- To gain a general understanding of actions that have been taken to improve water quality
- To build understanding of existing water quality protections and programs

2.4.3.1.2 Report Organization

This report begins by providing a brief overview of water quality related regulations and best management practices (BMPs) to prevent water pollution. To describe the water quality monitoring efforts in the Planning Area, a table summarizes the organizations that monitor water quality in the Mid-Coast and the type of monitoring that each organization conducts. This is followed by an overview of risks to drinking water, including active environmental cleanup sites, leaking underground storage tanks (USTs), and federal Superfund sites.

Surface water quality is described for eight major drainage areas in the Mid-Coast. A table of waterbodies that DEQ and EPA have designated as water quality limited is provided for each drainage area. Water quality conditions discussed include temperature, turbidity, and dissolved oxygen in DEQ-listed water quality limited streams. Other conditions are discussed in habitat assessments and water quality monitoring results. Groundwater quality is discussed for the Mid-Coast within each drainage area.

2.4.3.1.3 Report Data Sources (See Appendix A)

2.4.3.1.4 Terminology (See Appendix B)

2.4.3.1.5 Planning Area

The Partnership defines the Mid-Coast Planning Area as eight major drainage areas. See the Context report for a map of the Planning Area. From north to south, these major drainage areas include the Salmon River, Siletz Bay-Ocean Tributaries, Siletz River, Depoe Bay-Ocean Tributaries, Yaquina River, Beaver Creek-Ocean Tributaries, Alsea River, and Yachats River. In addition to spanning most of Lincoln County, the planning area extends eastward into portions of Benton County and Linn County to include the upper Salmon River, upper Siletz, and upper Alsea River watersheds. One of the Partnership's priorities is to provide information on characteristics of creeks that flow directly into the Pacific Ocean and that serve as current or potential public water source areas. The Water Quantity report contains more information about surface water and groundwater resources.

2.4.3.2 Applicable Water Quality Standards and Programs in the Mid-Coast

Multiple state and federal statutes and implementing regulations affect the management of water quality in Oregon and several agencies regulate water quality or have rules and regulations to reduce the impact of human activities on water quality. Broadly, the Oregon Health Authority (OHA) implements regulations developed to ensure drinking water meets required standards in Oregon, DEQ administers the federal Clean Water Act (CWA) at the state level, and the Oregon Department of Forestry and Department of Agriculture implement regulations that govern activities under their jurisdictions, including best management practices to limit land use impacts on water quality. The Oregon Parks and Recreation Department has a role in managing potable water supply in state parks.

2.4.3.2.1 Safe Drinking Water Act

The federal Safe Drinking Water Act (SDWA) was established in 1974 "to protect public health by regulating the nation's public drinking water supply" (USEPA, 2017) and authorizes U.S. Environmental Protection Agency (EPA) to set national standards for drinking water quality. The SDWA defines several categories of water systems and establishes requirements for consumer confidence reports, operator certifications, public information, and consultation. Most importantly, the SDWA establishes standard safe levels of contaminants and requires drinking water providers to test for those contaminants. In Oregon, SDWA is administered by the OHA. The Department of Agriculture and local county health departments also have responsibility to provide oversight over some drinking water systems (OHA, n.d.). Oregon implements public drinking water protection through a partnership between DEQ and the OHA. DEQ and OHA administer the source water protection program for surface water and groundwater systems. As part of DEQ's toxics monitoring program, DEQ and local partners have conducted source water monitoring of untreated drinking water for a wide variety of potential contaminants, including toxics for the following Mid-Coast Basin water systems: City of Siletz, City of Lincoln City and Eddyville Charter School. It is important to note that water providers are responsible for water quality at the tap, originate in areas where the water system has no jurisdiction, or be associated with. OHA administers a drinking water source protection grant program that has supported assessment, restoration, and monitoring in source water areas in the Mid-Coast Basin, including lakes (harmful algae blooms) and turbidity/fine sediment (Siletz drinking water source area). Final project reports or deliverables can be provided upon request. For more information on DEQ's Drinking Water Protection program, see:
http://www.oregon.gov/deq/wq/programs/Pages/dwp.aspx

2.4.3.2.2 Clean Water Act (CWA)

The CWA, which was amended considerably in 1972, requires states to define the beneficial uses of their waterways and to establish water quality benchmarks to maintain water quality that supports those beneficial uses. The purpose of the CWA is to protect and restore the Waters of the United States. The CWA made it unlawful for any person (defined broadly) to discharge a pollutant into waterways without a permit. The CWA establishes definitions for "point" and "nonpoint" pollutions and requires states to consider the cumulative impact from both point and nonpoint source pollutants and gives the EPA (and the states) the authority to issue permits to discharge waste into waterways. The CWA applies to toxic and organic pollutants. Section 404 of the CWA requires a permit to dredge or fill the "Waters of the United States" and authorizes states to issue secondary permits for dredge and fill. In Oregon, a permit is required from the Army Corp of Engineers as well as the state to dredge and fill.

- The CWA establishes requirements for states to manage water quality. The CWA Section 303(d) requires states to identify waters that are not meeting water quality standards and 305(c) requires states to report on the condition of water quality in their state (the 303(d) list of impaired waters) and identify progress toward improved water quality. The state also has a requirement to provide public comment on water quality assessments. EPA established the following categories for "impaired" waterways, i.e. those that are not meeting water quality standards for one or more beneficial uses (e.g., swimming, fish migration, etc.).

- Category 4A: Approved TMDLs that will lead to attaining water quality standard (TMDL approved).
- Category 4B: Other pollution control requirements that will lead to attaining water quality standards are in place.
- Category 4C: Impairment is not caused by a pollutant (flow or lack of flow is not considered a pollutant).
- Category 5. Water is impaired and a TMDL is needed. This category constitutes the section 303(d) list that EPA will approve under the CWA.

DEQ is currently prioritizing the development of TMDLs for impaired streams (Category 5) in coastal Oregon. The state is also responsible for meeting requirements of the National Coastal Zone Management Act for Oregon's Coastal Nonpoint Pollution Control Program to prevent and control nonpoint source pollutants affecting coastal waters.

DEQ is also responsible for permitting the use of pesticides in, over, or near surface waters of the state, including biological pesticides and chemical pesticides. For example, DEQ regulates pesticides used for flying insect pest control, weed and algae control, forest canopy pest control, area-wide pest control, and nuisance animal control. For more information regarding DEQ's pesticide control, see DEQ's webpage on Pesticide Applications into Surface Waters.

2.4.3.2.3 TMDL Development in the Planning Area

DEQ and local partners are currently in the process of developing TMDLs for water quality listed streams in the Mid Coast. Monitoring, data review, and modeling are all part of the TMDL development process. Local partners in the TMDL process assist with data quality assurance and source assessment, as well as identifying ongoing water quality improvement projects. Partners have continued to collect water quality data for water quality limited streams and DEQ is updating its model in coordination with designated management agencies to develop strategies to improve water quality in specific areas.

One aspect of DEQ's data review assesses the likelihood that a water quality issue will continue based on previous trends. Based on DEQ's data review, monitoring locations where Oregon's water quality criteria were exceeded in the past were more likely to continue to exceed criteria comparing past (2005-2009) with recent data at the same sites. This is particularly true for fecal indicator bacteria (*E. coli*) and for dissolved oxygen conditions.

The TMDL development process uses the best available science, which includes recent studies completed by the Lincoln County Soil and Water Conservation District (Lincoln County SWCD) on sediment and sediment sources in the Mid Coast. Lincoln County SWCD has been contracted to implement the Siletz Drinking Water Protection Grant for the Cities of Toledo and Newport, funded by OHA. Three components of that project were conducted and/or supervised by LSWCD within the drinking water source area (DWSA) for Siletz River water providers:

- Rapid road assessment (sediment source assessment; public road network)
- Siletz bank erosion study (sediment source assessment)

- Turbidity threshold sampling (TTS) monitoring at the Cities of Siletz, Toledo, and Newport drinking water intakes

For the first two components, final project deliverables communicate the project background, methods and results to local stakeholders. The information generated from the assessment work forms a solid foundation to complete additional assessment work, identify specific erosion and sediment reduction projects on the road network, or address land conditions and management practices along the Siletz River within the DWSA. The third component (water monitoring) was conducted in the winter of 2015 and the data are being analyzed by DEQ. Partners secured funds to conduct additional TTS monitoring in fall/winter 2017-2018.

Following review of current volunteer monitoring programs, future collaborative monitoring efforts may include:

- Continued trend monitoring at existing sites (no change)
- Trend monitoring at existing sites and additional sites (i.e., expand monitoring network)
- Revising trend monitoring (e.g., add and delete sites to maintain about same coverage, focus on specific land use(s) or specific geographic area, such as intensive 5th or 6th field watersheds.
- Temporal conditions shift/expansion (e.g., storm event and higher flow condition monitoring)
- Expanding target pollutant/indicators: continuous temperature/dissolved oxygen monitoring, nutrient sampling, fecal indicator bacteria source tracking, aquatic macroinvertebrate (i.e., biomonitoring)
- A combination/variation of the above strategies.

2.4.3.2.4 National Pollutant Discharge Elimination System (NPDES) Permit Program

NPDES permits are required if wastewater, stormwater, rain, or snowmelt leaves a site through a point source, which is a natural or human-made conveyance of water through pipes, culverts, ditches, catch basins, or other channels. DEQ issues NPDES permits, tracks permit compliance, and monitors pollutants in waterways. The NPDES permit specifies an acceptable level of a pollutant that can be discharged into waterways and may specify BMPs to protect water quality. Facilities that do not discharge directly into surface waters require a Water Pollution Control Facilities (WPCF) permit.

DEQ periodically conducts "mixing zone" studies related to discharge permits for municipal wastewater treatment plants (WWTPs). Results of these studies are used in evaluating water quality impacts of WWTPs and for discharge permit condition development (during permit issuance/re-issuance). Results of these studies can be provided on a case-by-case basis upon request.

NPDES permittees collect discharge monitoring data according to Schedule B of their permit and submit reports to DEQ at the required frequency (generally, monthly for NPDES Domestic permit holders). The permit program has migrated to an online reporting system for permittees and agency discharge monitoring report (DMR) review, starting with "major" dischargers.

Given that the NPDES electronic data reporting effort is actively in development, DEQ will provide more information on accessing this information for Oregon in the near future.

The EPA website/database **Enforcement and Compliance History Online (ECHO)** provides public access to data stored in EPA's compliance and enforcement data systems, including Integrated Compliance Information System (ICIS)-NPDES for facilities regulated under the CWA's NPDES program. ECHO allows users to find and download information on permit data, inspections, violations, enforcement actions, and penalties: https://echo.epa.gov/

EPA also provides a series of webinars on ECHO: https://echo.epa.gov/help/training#Series

2.4.3.2.5 Coastal Zone Management Act

In 1972, the Coastal Zone Management Act (CZMA) was passed to "preserve, protect, develop, and where possible, to restore or enhance the resources of the nation's coastal zone," (NOAA, 2016). The act created three national programs: the Coastal and Estuarine Land Conservation Program (CLEP), National Estuarine Research Reserve System (NERRS), and the National Coastal Zone Management Program (NCZMP).

The CZMA states that "land uses in the coastal zone, and the uses of adjacent lands which drain into the coastal zone, may significantly affect the quality of coastal waters and habitats, and efforts to control coastal water pollution from land use activities must be improved," (16 U.S.C. §1451 (k)). The CZMA is not mandatory for states. Instead, it establishes grant programs to reach its goals, and requires that any state that applies for a grant must have an approved Coastal Zone Management Program.

In 1990, the CZMA was amended to require that states with approved Coastal Zone Management Programs prepare and submit coastal nonpoint pollution control programs for approval by the National Oceanic and Atmospheric Administration (NOAA) and EPA. The programs are designed to integrate nonpoint source pollution programs under the CWA and land management programs developed under CZMA. EPA creates guidance documents for states to set management goals for urban areas, marinas, agricultural activities, forestry activities, hydro-modification activities, and for protecting riparian areas and wetlands (OCMP, 2017).

2.4.3.2.6 Agricultural Water Quality Management Act

Oregon has developed rules to implement water quality BMPs on Mid-Coast agricultural lands. These rules establish requirements for landowners in the Mid-Coast to "prevent and control water pollution from agricultural activities and soil erosion," (OAR 603-095-2200[2]). The rules include all agricultural lands, active and inactive, excepting federal lands. The rules are obligatory, yet broad, and require landowners conducting agricultural activities to do the following:

- Allow for the establishment and development of riparian vegetation consistent with "site capability." Vegetation must be sufficient to provide shade, streambank integrity following a 25-year storm event, and filtration of nutrients and sediment.
- Prevent nutrient applications that cause water pollution.

[2]http://www.oregon.gov/ODA/shared/Documents/Publications/NaturalResources/MidCoastAWQMAdminRules.pdf

Erosion is not allowed on farm roads, staging areas, pastures, cropland, or other areas where agricultural activities occur, to cause visible pedestalling, surface undulations, and/or flute marks on bare or sparsely vegetated land, visible gullies, or multiple rills. Across the state, the Oregon Department of Agriculture's (ODA) Agricultural Water Quality Program emphasizes streamside vegetation protection and enhancement to prevent and control water pollution from agriculture activities. Stream temperatures can be influenced by multiple factors including: riparian vegetation, air temperatures, and streamflow. ODA is working with the 14 organizations throughout the state to collect data on stream temperature, air temperature, streamflow, and riparian vegetation on agricultural lands, (Jo Morgan, personal communication August 20, 2017). ODA also administers the Pesticide Stewardship Partnerships**,** which helps identify local, pesticide-related water quality issues, shares water quality monitoring results with local communities and other stakeholders, provides context for water quality data and water quality criteria or benchmarks, helps pesticide users identify and implement solutions and disposal options, and uses long-term monitoring to measure success and progress (Jo Morgan, personal communication August 20, 2017). ODA's Waste Pesticide Collection Program collects unwanted/unusable pesticides and containers from agricultural and commercial operations, effectively removing those hazards from Oregon watersheds. Both of these programs have helped address local water quality issues across the State.

As part of Oregon's Agricultural Water Quality Management Program the Mid-Coast Agricultural Water Quality Management Area Plan (Area Plan) guides landowners and partners, such as Soil and Water Conservation Districts (SWCDs), in addressing water quality issues related to agricultural activities. The Area Plan identifies strategies to prevent and control water pollution from agricultural activities and soil erosion (ORS 568.909(2)) on agricultural lands (OAR 603-090-0000(3)) and to achieve and maintain water quality standards (ORS 561.191(2)). It establishes broad goals for agricultural water quality in the area, including strategies for addressing any legacy conditions present in the Mid-Coast. The Area Plan has been developed and revised by ODA and a Local Advisory Committee, with support and input from the Siuslaw and Lincoln SWCDs and the Oregon Department of Environmental Quality (DEQ). The Area Plan is implemented using a combination of outreach, conservation and management activities, monitoring, evaluation, and adaptive management.

The provisions of the Area Plan do not establish legal requirements or prohibitions. However, each Area Plan is accompanied by Area Rules that describe local agricultural water quality regulatory requirements. ODA's Area Rules for the Management Area are the regulations that landowners are required to follow. The Mid-Coast Area Rules require agricultural activities to allow the establishment and maintenance of streamside vegetation sufficient to provide these functions: shade, stable streambanks, and filtration of nutrients and sediment. Additional Area Rules for the Mid-Coast prohibit the placement of waste, (e.g. manure, excess sediment, nutrients and other chemicals, etc.) where it may enter a stream or ditch. Landowners are also required to prevent pollution from erosion and irrigation return flows.

The Area Plan and Area Rules apply to all agricultural activities on non-federal and non-Tribal Trust land within this Management Area including:

- Farms and ranches,
- Rural residential properties grazing a few animals or raising crops,

- Agricultural lands that lay idle or on which management has been deferred,
- Agricultural activities in urban areas, and
- Agricultural activities on land subject to the Forest Practices Act (ORS 527.610).

Water quality on federal lands in Oregon is regulated by DEQ and on Tribal Trust lands by the respective tribe, with oversight by the United States Environmental Protection Agency (US EPA).

2.4.3.2.7 Forest Practices Act

The Oregon Board of Forestry through the Forest Practices Act (FPA) establishes rules and requirements for operating plans, reforestation, water protection, forest chemicals, harvesting and slash treatment, landslide and public safety, air quality, visual and scenic quality, and fish and wildlife habitat protection. Water protection rules require landowners and operators of equipment to protect water quality and fish and wildlife habitat in and near streams and wetlands by leaving trees and vegetation near waters and minimizing disturbance to soils and water bodies (ODF, 2017). The FPA establishes a stream classification system based on stream size and according to the following beneficial use categories: Streams that are used by fish, including fish-bearing streams that have domestic water use, are classified as Type F; streams that have domestic water use but are not fish-bearing are classified as Type D; and all other streams are classified as Type N. Specific rules for vegetation retention and riparian BMPs depend on the classification of the stream where forest practices are taking place. Fish and wildlife habitat protection rules require landowners to protect (a) sensitive bird nesting, roosting, and watering resource sites, (b) threatened and endangered species resource sites, (c) biological sites that are ecologically and scientifically significant and (d) significant wetlands. The rules establish specific protection for band-tailed pigeon mineral springs; golden eagle nests; marbled murrelet nests; osprey nesting sites; great blue heron nesting sites; and bald eagle nesting, roosting, and foraging sites. The FPA and implementing rules identify best management practices and restrictions on road construction and maintenance, including stream crossings, and harvesting restrictions on steep slopes to prevent erosion. ODF has published a series of technical memos to aid operators in implementation of and compliance with of FPA requirements. Revised streamside (Riparian) buffer rules were adopted and new rules became effective on July 1, 2017. The amended rules can be accessed at Oregon Department of Forestry's website (see Division 635, 640, 645, 650, 655, and 660).

2.4.3.2.8 Onsite Wastewater Treatment Systems

DEQ has requirements for the construction, operation, and maintenance of onsite wastewater treatment (septic) systems (On-site Sewage Disposal Program Rules - OAR 340-071 and OAR 340-073). DEQ may allow local governments to permit and inspect septic systems. Site evaluations for placing septic systems consider nearby surface streams, springs, lakes, existing and proposed wells, unstable landforms, and soil properties. Septic systems are supposed to be decommissioned when a sewer system becomes available or the system is violating current maintenance standards.

2.4.3.2.9 Water Quality Restoration Programs

Many organizations in the Mid-Coast complete restoration projects that improve water quality, including watershed councils, Soil and Water Conservation Districts, private timber industry, agricultural operations, rural residential landowners, and state and federal agencies. Restoration projects that address water quality in the planning area include large woody debris placements, culvert replacements, road maintenance and decommissioning, and riparian vegetation planting. These restoration projects also benefit broader stream ecology and aquatic organisms and are included in the Ecology Report. Restoration projects included in the Ecology Report are reported by the Oregon Watershed Enhancement Board (OWEB), which finances restoration in the Mid-Coast and maintains the Oregon Watershed Restoration Inventory (OWRI) the largest database of watershed restoration projects in the western U.S. (OWEB, 2017). Due to the number of road maintenance projects in the Mid-Coast, these are not included in the Ecology Report. Road maintenance projects can help improve water quality by reducing sediment inputs to streams, reducing turbidity levels.

For more information on restoration projects, refer to the Oregon Watershed Restoration Inventory: http://tools.oregonexplorer.info/OE_HtmlViewer/Index.html?viewer=owrt/

2.4.3.2.10 Oregon DEQ Biosolids Program

Biosolids are regulated under DEQ's water quality program, specifically through an NPDES or WPCF permit, a biosolids management plan, and site authorization letters. See DEQ's website for definitions and a description of Oregon's Biosolids Program: http://www.oregon.gov/deq/wq/programs/Pages/Biosolids.aspx

During the development of this report, the Planning Partnership's Water Quality Study Group requested broad information about DEQ's Biosolids Program. Based on the group's 9/12/17 discussion and subsequent internal review, a supplemental document will be available addressing the following questions:

1. What are biosolids?
2. How is biosolids management regulated?
3. Where are the approved biosolids application sites in the Mid-Coast planning area?
4. How are the application of biosolids reported and tracked in a specific area?
5. What types of soil and water monitoring is begin/has been done in the Mid-Coast?
6. Is the planning area under the Biosolids Program?
7. What are the next steps in biosolids management in the Planning Area?

2.4.3.2.11 Other Programs With Water Quality Regulations

- Groundwater Quality Protection Rules - OAR 340-040
- Underground Injection Control Rules - OAR 340-044
- NPDES and WPCF Permits Program Rules - OAR 340-045

- Reclaimed Water Program Rules - OAR 340-055
- Hazardous Waste Management Program - OAR 340-120 and OAR 340-122
- Underground Storage Tank Program - OAR 340-150
- Municipal Solid Waste Program - OAR 340-093, OAR 340-094, OAR 340-095, and OAR 340-096
- Oregon Groundwater Quality Protection Act of 1989

Oregon Administrative Rules:
http://sos.oregon.gov/archives/Pages/oregon_administrative_rules.aspx

Information about setbacks/buffers affecting public drinking water supplies and Oregon, see: http://www.oregon.gov/deq/FilterDocs/dwpsetbacksRMAs.pdf.
Lincoln County also has riparian rules (County code): LCC 1.1935 (http://www.co.lincoln.or.us/sites/default/files/fileattachments/county_counsel/pag in the beginning e/384/lcc_chap_01.pdf).

2.4.3.3 Water Quality Monitoring Activities in the Mid-Coast

There are multiple governmental and non-governmental that have conducted monitoring of water quality in the Mid-Coast at some time in the past ~20 years. **Exhibit 5** provides a summary of these organizations, the type of water quality monitoring activities conducted, and the frequency and extent of their monitoring. This information is provided to the extent that it was attainable by the study team. The Mid-Coast Watersheds Council, Siletz Watershed Council, and the Yaquina Watershed Council collaborate with the Lincoln County SWCD, which periodically conducts much of the water quality monitoring in the Mid-Coast.

The Alsea Watershed Study is an important ongoing study in the planning area. The Alsea Watershed Study is a paired watershed study that studies the impacts of forest practices on water quality, aquatic habitat, and salmon. The paired watershed approach allows researchers to compare an undisturbed watershed (Flynn Creek) to a working landscape (Deer Creek). The study allows researchers to monitor and analyze water quality impacts from different harvesting practices over many years to capture short-term and long-term water quality effects. The Alsea Watershed Study has resulted in several academic publications, including studies on stream temperature response and fish population response to forest harvesting and aquatic organism response to herbicides.

For more information on the Alsea Watershed Study: http://watershedsresearch.org/alsea-study
For abstracts of publications from the Alsea Watershed Study:
http://watershedsresearch.org/study/alsea

Exhibit 5. Water Quality Monitoring Activities in the Mid-Coast: Past, Recent or Current Activities

Water Quality Monitoring Activities in the Mid-Coast[1]					
Organization	**Type of Monitoring**	**Purpose of Monitoring**	**Frequency/extent of Monitoring**	**Monitoring Locations**	**Publications: data access**
USGS (Oregon Water Science Center) and OPRD	-Conductance (salinity) -Temperature -Streamflow -Water level	-Understand extent of tidal and storm-surge influence -Understand flow contributions to the estuary from upland sources -Collect baseline hydrologic data to assist in evaluating restoration efforts	Monitoring completed. -Two sites instrumented with continuous water level, temperature, and specific conductance recorders -Streamflow and water level measurements three times a year	-Beaver Creek wetland, marsh and estuary -Beaver Creek	See USGS website: https://or.water.usgs.gov/proj/beaver_creek/
Salmon Drift Creek Watershed Council	-Bacteria -Temperature -Dissolved -Oxygen -Conductivity -Turbidity -pH	Create baseline status and trend data for evaluating water conditions, health of stream systems and potential need for restoration. Understand impacts to beach (Marine recreation) water quality.	Frequency and time period varies depending on site and project; many sites	-Salmon River -Slick Rock Creek -Panther Creek -Upper Panther Creek -Devil's Lake -Rock Creek -Drift Creek -Schooner Creek -Thompson Creek -Bear Creek -Anderson Creek -Deer Creek -D River -Neotsu Creek -Rowdy Creek -Fraser Creek	
Alsea Watershed Council	N/A	N/A	N/A	-Fall Creek -Cove Creek -Bull Run Creek -Erickson Creek	

Water Quality Monitoring Activities in the Mid-Coast[1]					
Organization	**Type of Monitoring**	**Purpose of Monitoring**	**Frequency/extent of Monitoring**	**Monitoring Locations**	**Publications: data access**
Lincoln Soil and Water Conservation District	-pH -E. coli -Temperature -Dissolved -Oxygen (mg/l and Sat %) -Turbidity, TSS -Precipitation	-Provide general, science-based information to inform landowners, the general public, state agencies, and Watershed Councils about the quality of freshwater streams and rivers. -Provide raw data to help determine whether water bodies are not meeting state water quality standards (status).	Monthly or Bi-Monthly Precipitation Data is taken daily The status and trends monitoring program was active in varies areas 2005 - 2015; District currently performs Project-specific monitoring includes: Siletz dissolved oxygen and supporting chemistry (2017); Siletz turbidity threshold monitoring (2014-2017)	-Salmon River Basin -Siletz River Basin -Yaquina River Basin -Beaver Creek Basin -Alsea River Basin -Yachats River Basin	
Surfrider-Newport Chapter	-Air temperature -Water temperature -Enterococcus (MPN/100 ml)	Inform public and policy makers, support coastal marine recreation opportunities	Weekly or Bi-Monthly	-Agate Beach -Big Creek Outlet at Wayside -Devil's Punch Bowl -Elizabeth Street Pipe Outfall -Happy's-Yaquina Bay Bridge -Nye Beach pipe outfall -Nye Beach South -Ona Beach Deer Creek -Seal Rock Hill Creek Ocean -Seal Rock Hill Creek Tributary -South Beach State Park	

Water Quality Monitoring Activities in the Mid-Coast[1]					
Organization	**Type of Monitoring**	**Purpose of Monitoring**	**Frequency/extent of Monitoring**	**Monitoring Locations**	**Publications: data access**
City of Newport	Fecal indicator bacteria: E. coli & enterococcus	Evaluate municipal stormwater conveyance system for potential sources of bacteria and other pathogens	Approx. weekly during 2017	Nye Creek drainage	See Storm Water Master Plan; contact City for details
Oregon Department of Agriculture	Working with 14 organizations around the state to collect data on stream temp., air temp., stream flows, and riparian vegetation on agricultural lands.	Data will be used by ODA to determine whether improved stream temperatures can be measured as a result of improved riparian vegetation on agriculture lands.	N/A	Yachats watershed	
Oregon Beach Monitoring Program (Multiple state agencies, non-governmental organizations, and research institutions)	-Fecal bacteria: -enterococcus -conductivity -salinity	Monitor recreational water quality at ocean beaches. Issue water contact advisory when bacteria levels are above normal. Protect public health by providing information about water quality, strengthen water quality standards at beaches, and promote scientific research	At least every three weeks during the Summer months; repeat sampling at sites with elevated levels	Sites have been added and removed over the life of the program. For 2015-2017, OBMP sites included: D River Beach (4 locations) Agate Beach (2 locations) Beverly Beach (4 locations) Nye Beach (4 locations) Seal Rock Beach (5 locations)	
Department of Environmental Quality	Ambient monitoring suite: Basic field parameters, nutrients,	Ambient (collect status and trends at 5 major river sites)	Ambient (20+ years) TMDLs assessment and development	Multiple locations in Planning Area:	See Section 2.4.3.3.1

Water Quality Monitoring Activities in the Mid-Coast[1]					
Organization	**Type of Monitoring**	**Purpose of Monitoring**	**Frequency/extent of Monitoring**	**Monitoring Locations**	**Publications: data access**
Ambient monitoring network	supporting chemistry (see Section 2.4.3.3.1);	TMDLs assessment and development projects (temperature, DO, sedimentation, turbidity, bacteria)	projects (as needed); multiple projects 2005-present	Salmon R (Otis); Siletz R (Ojalla Bridge); Yaquina R (Chitwood); N. Beaver Creek (Ona); Alsea (Thissell park)	
Department of Environmental Quality; TMDL development projects	Basic field parameters, Continuous temperature, Continuous DO and nutrients, supporting chemistry (see Section ____), macroinvertebrates, turbidity, bacteria	TMDLs assessment and development projects		Salmon River, Siletz, Upper Yaquina	
Department of Environmental Quality - Statewide toxics monitoring program	-Toxins (water samples, sediment samples, and fish or shellfish tissue samples); coastal focus on shellfish tissue	Identify opportunities to reduce toxic pollutants; characterize presence and concentration of chemicals of concern in Oregon's water; identify sources of chemicals; make information available to the public.	2013 (Mid-Coast Basin)	Multiple locations. Interactive maps and downloadable data are available on the Water Quality Toxics Monitoring webpage.	See Section 2.4.3.3.1
Department of Environmental Quality - Statewide groundwater monitoring program	Groundwater quality: contaminants of concern including, but not limited to: nitrate, pesticides, volatile organic compounds,	Monitor for contaminants of concern, determine areas of the state that are vulnerable, determine status of ambient groundwater	Statewide: two regional groundwater studies each year	Multiple locations; voluntary participation. Monitoring in the Mid-Coast Basin has not	See 2.4.3.3.1

Water Quality Monitoring Activities in the Mid-Coast[1]					
Organization	**Type of Monitoring**	**Purpose of Monitoring**	**Frequency/extent of Monitoring**	**Monitoring Locations**	**Publications: data access**
	arsenic, and metals.	quality, identify emerging problems, and inform users of potential risks.		been scheduled.	
Weyerhaeuser Co. (in cooperation with the Watersheds Research Cooperative)	Temperature Macroinvertebrate community assemblage and density Aquatic insect emergence rates Suspended solids (mg/L) Turbidity (FTU) Dissolved oxygen (mg/L) Nitrogen (nitrate/nitrite; ammonia, total N) (mg/L) Specific conductivity (µS/cm) Phosphorous (mg/L)	Conduct research on the effects of current and expected forest practices on intensively managed commercial forestland on water quality, fisheries and other water-related values.[2]	Continuous: Temperature, Suspended solids (mg/L), Turbidity (FTU), Dissolved oxygen (mg/L), Specific conductivity (µS/cm) Monthly: Nitrogen	Mill Creek (Siletz Tributary) Alsea River	
U.S. EPA Region 10; Western Ecology Division	Basic field parameters, nutrients, supporting chemistry	Conducts research on nutrient dynamics in Oregon's estuarine waters; and contributing watershed processes; other research	Project-specific For publications, contact EPA	Yaquina, Yachats, Tillamook estuaries	

Notes:

[1] With limited resources, organizations may shift monitoring locations and data collection from year to year for a variety of reasons. This table provides an overview of organizations that monitor water quality in the Mid-Coast and what they have monitored in the recent past. Organizations analyzing data include: Neskowin Valley School, DEQ, Nestucca-Nescowin Watershed Council, and the monitoring organizations themselves. Monitoring data are analyzed by multiple organizations and DEQ assigns a data quality grade to its own monitoring data and data reported through volunteer organizations.

[2] The Watershed Research Cooperative is also monitoring other habitat characteristics and conducting studies and analysis, in addition to monitoring. See the Ecology Report for more information.

There are approximately 4 miles of beaches in the Mid-Coast that are water quality limited (see **Exhibit 16**). All of these beach miles are listed for enterococcus can cause illness from contact recreation, such as swimming. Mile 106.9 to 107.7 is located near Roads End Beach; Mile 127.5 to 129 is near Depoe Bay; mile 133.6 to 136.8 is located at Beverly Beach State Park and south to Yachats (but not reaching Yaquina Head).

2.4.3.3.1 Oregon Department of Environmental Quality Monitoring Programs in the Mid-Coast

DEQ monitors and evaluates water quality through a variety of programs that provide information on status of Oregon's waters and protect beneficial uses of water resources. Some of these activities are geographic-specific assessments of water quality, whereas others focus on narrow categories of pollutants and/or beneficial uses. Established monitoring programs and projects include:

1. Ambient Monitoring Network and Oregon Water Quality Index (OWQI)
2. Watershed Monitoring (TMDLs)
3. Toxics Monitoring
4. Biomonitoring
5. Oregon Beach Monitoring Program (OBMP)
6. Volunteer Water Quality Monitoring
7. Groundwater Monitoring
8. National Aquatic Resource Surveys
9. Drinking Water Protection
10. NPDES permit program
11. "Special" Projects

For more information on these monitoring programs, see **Appendix C** or visit DEQ's website.

- Information about programs 1 – 8 (above) are found here: http://www.oregon.gov/deq/wq/Pages/WQ-Monitoring.aspx
- The Water Quality Assessment information can be accessed here: http://www.oregon.gov/deq/wq/Pages/WQ-Assessment.aspx
- Reports: A collection of DEQ's ambient water quality, watershed and groundwater monitoring project reports are found here: http://www.oregon.gov/deq/Data-and-Reports/Pages/Publications.aspx#_

Many Central Coast stakeholders are familiar with one or more of these programs and projects and may have participated in one or more of these efforts in the Mid-Coast Basin.

2.4.3.3.2 Monitoring Data Access and Availability

DEQ's environmental monitoring data can be accessed through several avenues, depending on the type of project, the lead organization or program, and the time period of the monitoring data of interest. Data collected by DEQ and CBOs in the VM program through December 2012 formerly were accessed through DEQ's now-defunct Web-based Laboratory Analytical Storage

and Retrieval (LASAR) application. The LASAR application was replaced by AQWMS[3]. At this time, most data must be requested directly from DEQ (see footnote below).

DEQ data and data from other sources with supporting quality control (QC) information are being migrated into AQWMS in reverse chronological order and eventually will be available via STORET[4]. Older data without QC information are not likely to be transferred. More information will be provided as DEQ implements AQWMS. Most data collected by DEQ since January 2013 are managed in DEQ's laboratory information system, and can be provided upon request. Contact DEQ for information at: http://www.oregon.gov/deq/wq/Pages/WQdata.aspx

2.4.3.3.3 DEQ Special Projects

DEQ and other organizations periodically obtain resources to conduct monitoring projects or data evaluation that address a particular issue or question at a level of detail, or at a temporal or spatial scale, not addressed by the above programs. These projects may be of statewide interest or focus on a specific issue (e.g., Riparian Function and Stream Temperature [RipStream] monitoring project[5], harmful algae blooms). Many of these projects have been supported, in part, by Oregon's Section 319 grant program or by EPA contracts. Other projects are conducted by state or federal agencies for other purposes, including assessment and habitat restoration. Contact DEQ for more information on specific studies.

2.4.3.3.4 Funding and Expenditures

Monitoring programs and data evaluation projects rely on specific (and in most cases, separate) funding sources and are designed to provide information to regulators, stakeholders, and elected officials at various spatial or temporal scales, including the Oregon Water Quality Assessment and list of impaired waterbodies (i.e., Section 303(d) list). Partners were asked to provide information regarding their organization's funding and expenditures for their water quality programs, including water quality monitoring and data analysis activities. The type of information provided varied among partners and includes specific funding concerns, unmet needs, and challenges. The following is a summary of select state and local entities and some of their challenges in funding water quality programs.

- **Department of Environmental Quality**
  Integrated Reports are reports prepared by state water quality agencies to the USEPA documenting surface water quality limitations and state actions taken to address those limitations. These reports are not monitoring programs in themselves, but rather analyze and describe existing water quality data. DEQ has produced only five Integrated Reports in the last 20 years because of insufficient data quantity, data infrastructure challenges (geospatial info), and inadequate resources. In late 2012, the LASAR database, which managed DEQ and third party data, including voluntary water quality monitoring data, was discontinued. Currently, DEQ is in the process of transferring existing data to its new data management portal, AWQMS. Three Integrated Reports have been submitted since 2004 and the last two reports were limited in scope and

[3] http://www.oregon.gov/deq/wq/Pages/WQdata.aspx
[4] https://www.epa.gov/waterdata/water-quality-data-wqx
[5] Groom, J.D., Dent, L., Madsen, L.J. 2011. Stream temperature change detection for state and private forests in the Oregon Coast Range. Water Resources Research. 47, W01501, doi:10.1029/2009WR009061

resulted in EPA adding waters to Oregon's 303(d) list. Currently, DEQ is not fully staffed, but is prioritizing staff time for improvements to its Integrated Report. See: http://www.oregon.gov/deq/wq/Pages/Integrated-Report-Improvements.aspx

- **Salmon Drift Creek Watershed Council (SDCWC)**
  The SDCWC conducts water quality monitoring throughout the Salmon, Drift Creek, and Devil's Lake watersheds. In 2016, SDCWC received $57,713 in funding, including $26,141 for a 6-month study on optical brightener, a chemical found in detergents and clothing that indicates human sources of contamination in water bodies, and $35,572 for a 9-month study of bacterial source tracking. With additional funding the SDCWC could conduct additional monitoring studies to better understand the sources of pollutants causing water quality impairments.

- **Lincoln County Soil and Water Conservation District**
  The Lincoln County SWCD monitors water quality across Lincoln County and assists smaller organizations with analyzing water quality testing. Lincoln SWCDs is funded, in part, by OWEB to accomplish agreed upon Scopes of Work. These funds pass from OWEB to ODA to the SWCD who do the work on the ground. The amount of water quality monitoring that the Lincoln County SWCD completes depends on aligning grant funding and staff timing as well as funding laboratory costs.

  The Lincoln County SWCD's annual reports include a statement of revenues and expenditures for each fiscal year as well as water quality projects completed.

  Lincoln County SWCD annual reports: http://www.lincolnswcd.org/annual-reports.html

- **Oregon Department of Agriculture**
  ODA works in partnership with the Lincoln and Siuslaw SWCDs who do work with landowners to make streamside improvements in focus areas. One challenge ODA encounters in funding restoration work is the ability to track improvements in water quality. ODA estimates a 5-year expenditures average of $32,000 for stream temperature monitoring in coordination with Lincoln County SWCD. To maintain the monitoring program for 20 years, ODA estimates a need for $100,000.

  ODA also conducts routine water quality rule compliance investigations, but estimating cost is difficult because each investigation requires a different amount of resources to complete. Any on the ground work resulting from an investigation is paid for by the landowner, or with funds from a funding entity such as OWEB. ODA relies on DEQ and other partners' monitoring to identify restoration impacts. The Mid Coast TMDLs will become a tool that can assist in tracking water quality improvements.

2.4.3.4 Point Source Pollution & Waste Materials Pollution

"Point source" pollutants are technically limited to those requiring an NPDES or WPCF permit. Some waste sites have a NPDES permit, usually for stormwater run-off. NPDES permit

discharge locations, discharging entities, and overflow events in the Planning Area are identified in the Built Systems report. Facilities that do not discharge directly into surface waters and instead have a WPCF permit were not identified for this report, but information about WPCF permit holders can be found in the following database: http://www.deq.state.or.us/wqpermitsearch/.

This section of the report focuses on solid and hazardous waste sites as potential pollutant sources. DEQ monitors several threats to water and land quality, including active environmental cleanup sites, leaking USTs, and federal Resource Conservation and Recovery Act (RCRA) sites. RCRA sites contain solid waste, such as garbage, sludge, industrial waste, or other discarded material. Wastes are categorized as nonhazardous and hazardous, and each type is regulated differently by EPA. Superfund sites refer to sites that could adversely impact communities if they were to result in contamination of land or water. Superfund sites are regulated under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), which establishes requirements for closed and abandoned waste sites and liability for release of hazardous waste, and authorizes short-term and long-term removal of materials (EPA, 2017). There are no Superfund priority sites in the Mid-Coast. **Exhibits 6 through 8** show DEQ's number of documented active environmental cleanup sites by watershed and city, the number of USTs for which leaks have been identified by watershed and city, and a basic list of the number of sites that are regulated by EPA under RCRA.

In addition, DEQ completed a Statewide Water Quality Toxics Assessment Report in 2015 (DEQ, 2015). The report assesses the presence and concentration of toxic chemicals in Oregon's water using samples from water taken between 2008 and 2013. Results were categorized into six chemical groups: ammonia, combustion by-products, consumer product constituents, current-use pesticides, industrial chemicals or intermediates, and metals. In the Mid-Coast[6], 18 sites were sampled and unique chemicals were found in all of these chemical groups, with the exception of industrial chemicals or intermediaries. The number of unique chemicals detected by chemical group were also categorized into PCB's, legacy pesticides, flame retardants, and dioxins and furans. The Mid-Coast had flame retardants and legacy pesticides, and of the sites sampled, had the overall highest number of unique chemicals in the State. However, one site of particular concern is located outside the planning area on the upper Siuslaw River.

DEQ's Statewide Water Quality Toxics Assessment Report (2015) is available here: http://www.oregon.gov/deq/FilterDocs/WQToxicsAssessmentReport.pdf

[6] DEQ's planning area In the Mid-Coast includes the Siuslaw Basin.

Exhibit 6. Active Environmental Cleanup Sites in the Mid-Coast

Active Environmental Cleanup Sites		
Drainage Area	**Location**	**Number of Sites**
Alsea River Drainage Area	Waldport	4
Alsea River Drainage Area	Chitwood	1
Yachats River Drainage Area	Yachats	1
Yaquina River Drainage Area	Newport	7
Yaquina River Drainage Area	Toledo	12
Yaquina River Drainage Area	South Beach	4
Yaquina River Drainage Area	Harlan	1
Siletz Bay-Ocean Tributaries	Lincoln City	1
Salmon River Drainage Area	Otis	1
Beaver Creek-Ocean Tributaries	Seal Rock	1
Depoe Bay-Ocean Tributaries	Depoe Bay	1

Exhibit 7. Underground Storage Tanks in the Mid-Coast

Underground Storage Tanks		
Drainage Area	**Location**	**Number of Sites**
Alsea River	Waldport	18
Yachats River-Ocean Tributaries	Yachats	6
Yaquina River	Newport	70
Yaquina River	Toledo	27
Yaquina River	Eddyville	4
Yaquina River	South Beach	1
Yaquina River	Harlan	1
Siletz River	Siletz	8
Siletz River	Logsden	1
Siletz River	Gleneden Beach	1
Siletz River	Taft	1
Salmon River	Otis	6
Siletz Bay-Ocean Tributaries	Agate Beach	1
Depoe Bay-Ocean Tributaries	Depoe Bay	2
Yachats River	Seal Rock	1
Depoe Bay-Ocean Tributaries	Otter Rock	2

Exhibit 8. RCRA Sites in the Mid-Coast

RCRA Sites
Site Name
Walmart Stores Incorporated
USDOC NOAA NMFSC Newport Research Station
ODOT Yaquina Bay Bridge
Lincoln County
Northwest Natural Gas Company, Lincoln City
Dahl * Dahl, Inc.
Lincoln County SD Bus Shop
Pacific Disc Inc.
Plum Creek Timber
Toledo City of Public Works
USDOT CG Depot Bay Station
Scott Gesiks Collision Specialists
Vanity Cleaners
Gold Motors, Inc.
Newport Dry Cleaners
Northwest Natural Gas Co. Newport LNG Plant
Power Ford Lincoln Mercury
Qwest Corporation 180
USCG-Yaquina Bay
USDOI BLM Yaquina Head Lighthouse
USEPA Coastal Ecology Branch Corvallis
Specialty Auto Body Inc.
Dahl and Dahl LNC
ODOT Rose Lodge Maintenance
Central Lincoln PUD
Lincoln County Road Department
Newport Diesel & Marine Co. Inc.

2.4.3.5 Nonpoint Source Pollution

Although the introduction to point and nonpoint source pollution (2.4.2.1) identified a number of examples of nonpoint source pollutants, only two are discussed in the section (residential onsite disposal systems wastewater management and sedimentation) based on those two having readily available information during development of this report. Other resources may be available regarding other nonpoint source pollutants in the Mid-coast.

2.4.3.5.1 Residential Onsite Disposal Systems (OSDS) Wastewater Management

Lincoln County's Department of Planning and Development On-site Waste Management Division is responsible for onsite sewage disposal systems (OSDS) (http://www.co.lincoln.or.us/planning/page/onsite-waste-management-division). In general, OSDS are assumed to serve every legal occupied structure outside of the city limits that is zoned rural residential, as well as many commercial structures. Tax lot size can be an indicator of OSDS density, and setback from streams and age are relatively good indicators of system conditions, (David Waltz, personal communication, July 21, 2017). The combined factors of OSDS density, proximity to waterways, and age are indicators of potential risks to both ground and surface water quality. Septic system problems can arise when the tank is not pumped every 3 years; the area above the septic tank is disturbed by vehicles, roots from nearby trees, or shrubs; repairs are not made by a licensed septic contractor; commercial septic tank additives are used; trash or chemicals are disposed of improperly down the toilet or drains; or too many systems are closely spaced in a limited area (OSU Extension, 2017). Evidence of contamination from septic systems includes wastewater that surfaces above ground and the detection of elevated levels of bacteria or certain chemicals (e.g., nitrates and arsenic) in well water tests or surface water (OSU Extension, 2017).

2.4.3.5.2 Sedimentation

Sedimentation is a significant risk to drinking water sources. Water with high levels of fine sediment or turbidity requires extensive treatment to reach drinking water standards, and turbidity levels can be associated with bacteria levels. Source water assessments developed by DEQ and OHA provide a comprehensive review of the risks to drinking water sources for each water provider in the Mid-Coast.

DEQ and OHA created the Oregon Drinking Water Protection Program Interactive Map Viewer, which identifies land uses and potential sources of identified pollutants within drinking water source areas.

Landslides contribute to the short- and long-term sediment supply in streams. The Oregon Department of Geology and Mineral Industries provides an interactive mapping tool that identifies landslide locations in Oregon. Each data point includes information on the data source, type of landslide, area of the landslide, slope in degrees, the date of occurrence, and comments on damage caused. For more information, consult the Statewide Landslide Information Layer for Oregon.

2.4.3.6 Surface Water Quality: Water Quality Impaired Streams and Marine Waters in the Mid-Coast

The following section provides information about that are identified on Oregon's Section 303(d) list as water quality impaired (Category 5). These are streams that have been identified on Oregon's 303(d) list for not meeting water quality standards for a specific water quality parameter. Oregon's 303(d) list was used to describe general water quality characteristics in the planning area. DEQ's water quality criteria are seasonally specific and take into account, to the extent possible, natural conditions in a water body, the designated uses of a water body, and natural variation in water quality. TMDLs (or alternate pollution control plans) are required for

all water quality-limited streams in the Mid Coast. Local stakeholders (e.g., the local stakeholder advisory committee and associated technical working groups) are collaborating with DEQ to develop TMDLs in the Mid Coast. Once established, TMDLs will set specific criteria for pollutant amounts in the stream reaches that are water quality limited. For more information on water quality in each watershed, see **Appendix D.**

2.4.3.6.1 Salmon River Drainage Area

This watershed has 36.6 miles of streams that are water quality limited (see **Exhibit 9**). Water quality impairments in the Salmon River include dissolved oxygen, fecal coliform, and temperature. Water quality concerns in Salmon River tributaries include temperature in Crowley Creek, a tributary of the Salmon River located 5.8 miles from the City of Lincoln City, and Slick Rock Creek, which flows into the Salmon River just below Rose Lodge, and biological criteria in Deer Creek. Fecal coliform levels and sources in the watershed are a major concern for the Salmon Drift Creek Watershed Council.

Exhibit 9. Salmon River Drainage Area : Water Quality Limited Streams

Salmon River Drainage Area: Water Quality Limited Streams				
Water Body (Stream/Lake)	**River Miles**	**Parameter**	**Season**	**Criteria**
Crowley Creek	0 to 1.8	Temperature	Year Around (Non-spawning)	Rearing: 17.8 C
Deer Creek	0 to 2.7	Biological Criteria	Year Around	Biocriteria: Waters of the state must be of sufficient quality to support aquatic species without detrimental changes in the resident biological communities.
Salmon River	0 to 23.1	Dissolved Oxygen	September 15 - May 31	Spawning: Not less than 11.0 mg/L or 95% of saturation
Salmon River	0 to 23.1	Fecal Coliform	Year Around	Fecal coliform median of 14 organisms per 100 ml; no more than 10% > 43 organisms per 100 ml
Salmon River	0 to 23.1	Temperature	Year Around (Non-spawning)	Rearing: 17.8 C
Slick Rock Creek	0 to 9	Temperature	Year Around (Non-spawning)	Rearing: 17.8 C

2.4.3.6.2 Siletz Bay-Ocean Tributaries

Devils Lake watershed is located north of the City of Lincoln City. There are 11.7 stream miles in Devils Lake watershed that are water quality limited (see **Exhibit 10)**. Water quality impairments include temperature, aquatic weeds and algae, pH, chlorophyll a, and fecal coliform. For more information on Devils Lake water quality, see **Appendix D.**

Schooner Creek and Drift Creek are tributaries to the Siletz River estuary, but not direct tributaries to the Siletz River. There are 14.6 miles of streams in the Schooner Creek Watershed that are water quality limited and 21.6 miles of water quality limited streams in the Drift Creek Watershed (see **Exhibit 10**).

Exhibit 10. Siletz Bay-Ocean Tributaries Water Quality Limited Streams

Siletz Bay-Ocean Tributaries				
Unnamed Stream / Devils Lake	0 to 3.1	Aquatic Weeds Or Algae	Undefined	The development of fungi or other growths having a deleterious effect on stream bottoms, fish or other aquatic life, or which are injurious to health, recreation or industry may not be allowed.
Unnamed Stream / Devils Lake	0 to 3.1	Chlorophyll a	Summer	Reservoir, river, estuary, non-thermally stratified lake: 0.015 mg/l
Unnamed Stream / Devils Lake	0 to 3.1	pH	Summer	pH 6.5 to 8.5
Rock Creek	0 to 1.9	Temperature	Year Around (Non-spawning)	Rearing: 17.8 C (64 F)
Rock Creek	1.9 to 6.6	Temperature	Year Around (Non-spawning)	Core cold water habitat: 16.0 C (60.8 F) 7-day-average maximum
Thompson Creek	0 to 2	Fecal Coliform	Fall, Winter, Spring	Fecal coliform log mean of 200 organisms per 100 ml; no more than 10% > 400 per 100 ml
Thompson Creek	0 to 2	Fecal Coliform	Summer	Fecal coliform log mean of 200 organisms per 100 ml; no more than 10% > 400 per 100 ml
Schooner Creek (near Lincoln City)	0 to 2.7	E. Coli	Summer	30-day log mean of 126 E. coli organisms per 100 ml; no single sample > 406 organisms per 100 ml
Schooner Creek (near Lincoln City)	0 to 9.7	Temperature	Year Around (Non-spawning)	Rearing: 17.8 C (64 F)
South Fork Schooner Creek	0 to 4.9	Temperature	Year Around (Non-spawning)	Salmon and trout rearing and migration: 18.0 C (64.4) 7-day-average maximum
Drift Creek	0.8 to 21.6	Temperature	Summer	Rearing: 17.8 C (64 F)
Drift Creek	0 to 21.6	Biological Criteria	Year Around	Biocriteria: Waters of the state must be of sufficient quality to support aquatic species without detrimental changes in the resident biological communities.

2.4.3.6.3 Siletz River Drainage Area

The Siletz River drainage area has 83.6 miles of streams that are water quality limited (see **Exhibit 11**). Segments of the mainstem Siletz River are listed for dissolved oxygen, temperature, and turbidity. Tributaries of the Siletz River, including Cerine Creek, Mill Creek, North Creek, Anderson Creek, and the South Fork Siletz River, are all listed for temperature impairments. The South Fork Siletz River and Anderson Creek are listed for biological criteria.

Temperature and turbidity are water quality impairments in the watershed. Temperature is an important water quality criteria for salmonids, including the only coastal origin population of summer steelhead in Oregon. Turbidity is a concern in the Siletz River because higher levels negatively affects aquatic species (see Ecology report), as well as municipal water providers. The Cities of Newport, Toledo and Siletz have water intakes on the Siletz River. The Cities of Newport and Toledo generally do not divert water during periods of elevated turbidity, given that water treatment is not cost-effective in these conditions and reservoir systems would become loaded with fine sediment.

Exhibit 11. Siletz River Drainage Area: Water Quality Limited Streams

Siletz River Drainage Area : Water Quality Limited Streams				
Water Body (Stream/Lake)	**River Miles**	**Parameter**	**Season**	**Criteria**
Cerine Creek	0 to 3.7	Temperature	Year Around (Non-spawning)	Core cold water habitat: 16.0 C (60.8 F)7-day-average maximum
Mill Creek	0 to 1.7	Temperature	October 1 - June 15	Spawning: 12.8 C (55 F)
Mill Creek	0 to 4.2	Temperature	Year Around (Non-spawning)	Core cold water habitat: 16.0 C (60.8 F) 7-day-average maximum
North Creek	0 to 3.2	Temperature	Year Around (Non-spawning)	Salmon and trout rearing and migration: 18.0 C (64.4 F) 7-day-average maximum
Anderson Creek	0 to 2.8	Temperature	Year Around (Non-spawning)	Rearing: 17.8 C (64 F)
Anderson Creek	0 to 2	Biological Criteria	Year Around	Biocriteria: Waters of the state must be of sufficient quality to support aquatic species without detrimental changes in the resident biological communities.
Siletz River	21.6 to 65.3	Dissolved Oxygen	September 1 - June 15	Spawning: Not less than 11.0 mg/L or 95% of saturation
Siletz River	7 to 46.8	Temperature	Summer	Rearing: 17.8 C
Siletz River	39.49 to 65.345	Turbidity	Undefined	The creation of tastes or odors or toxic or other conditions that are deleterious to fish or other aquatic life or affect the potability of drinking water or the palatability of fish or shellfish may not be allowed.
South Fork Siletz River	0 to 11.4	Biological Criteria	Year Around	Biocriteria (fine sediment): Waters of the state must be of sufficient quality to support aquatic species without detrimental changes in the resident biological communities.
South Fork Siletz River	0 to 11.4	Temperature	Year Around (Non-spawning)	Core cold water habitat: 16.0 C (60.8 F)7-day-average maximum

2.4.3.6.4 Yaquina River Drainage Area

The Yaquina River Drainage Area Watershed has 121.4 miles of stream that are water quality impaired (see **Exhibit 12**). Water quality challenges in the Yaquina River include temperature, fecal coliform, E. coli, and dissolved oxygen. Big Elk Creek is a large tributary to the Yaquina River that drains 89 square miles (OWRD, 2017). The Creek has several water quality concerns, including dissolved oxygen and E. coli. Several of the sloughs that feed into the Yaquina River estuary are listed for fecal coliform. Temperature is a concern on Feagles Creek, Spout Creek, and West Olalla Creek. Montgomery Creek is listed for biological criteria.

Fecal coliform, E. coli, and dissolved oxygen are major impairments in the watershed. Lincoln County SWCD has conducted water quality monitoring in the Yaquina River, Big Elk watershed, and Feagles Creek.

Exhibit 12. Yaquina River Drainage Area: Water Quality Limited Streams

Water Body (Stream/Lake)	River Miles	Parameter	Season	Criteria
Big Elk Creek	0 to 5.3	Dissolved Oxygen	January 1 - May 15	Spawning: Not less than 11.0 mg/L or 95% of saturation
Big Elk Creek	0 to 29.5	Dissolved Oxygen	Year Around	Cold water: Not less than 8.0 mg/l or 90% of saturation
Big Elk Creek	5.3 to 29.5	Dissolved Oxygen	October 15 - May 15	Spawning: Not less than 11.0 mg/L or 95% of saturation
Big Elk Creek	18.9 to 29.5	E. Coli	Summer	30-day log mean of 126 E. coli organisms per 100 ml; no single sample > 406 organisms per 100 ml
Boone Slough	0 to 2.86894	Aquatic Weeds Or Algae	Undefined	The development of fungi or other growths having a deleterious effect on stream bottoms, fish or other aquatic life, or which are injurious to health, recreation or industry may not be allowed.
Depot Creek	0 to 4.5	Dissolved Oxygen	Year Around	Cold water: Not less than 8.0 mg/l or 90% of saturation
Depot Slough	0 to 1.3	Fecal Coliform	Year Around	Fecal coliform median of 14 organisms per 100 ml; no more than 10% > 43 organisms per 100 ml
Feagles Creek	0 to 5.6	E. Coli	Summer	30-day log mean of 126 E. coli organisms per 100 ml; no single sample > 406 organisms per 100 ml
Feagles Creek	0 to 5.6	Temperature	Year Around (Non-spawning)	Rearing: 17.8 C (64 F)
Nute Slough	0 to 3.39553	Aquatic Weeds Or Algae	Undefined	The development of fungi or other growths having a deleterious effect on stream bottoms, fish or other aquatic life, or which are injurious to health, recreation or industry may not be allowed.
Nute Slough	0 to 1.5	Fecal Coliform	Fall, Winter, Spring	Fecal coliform log mean of 200 organisms per 100 ml; no more than 10% > 400 per 100 ml
Olalla Creek	0 to 3.2	Fecal Coliform	Year Around	Fecal coliform median of 14 organisms per 100 ml; no more than 10% > 43 organisms per 100 ml

Poole Slough	0 to 0.8	Fecal Coliform	Year Around	Fecal coliform median of 14 organisms per 100 ml; no more than 10% > 43 organisms per 100 ml
Poole Slough	0 to 2.6	Fecal Coliform	Year Around	Fecal coliform median of 14 organisms per 100 ml; no more than 10% > 43 organisms per 100 ml
Spout Creek	0 to 5.8	Temperature	Year Around (Non-spawning)	Rearing: 17.8 C (64 F)
West Olalla Creek	0 to 3.7	Temperature	Year Around (Non-spawning)	Core cold water habitat: 16.0 C (60.8 F)7-day-average maximum
Yaquina River	0 to 26.9	Dissolved Oxygen	January 1 - May 15	Spawning: Not less than 11.0 mg/L or 95% of saturation
Yaquina River	0 to 56.8	Dissolved Oxygen	Year Around (Non-spawning)	Cold water: Not less than 8.0 mg/l or 90% of saturation
Yaquina River	26.8 to 53.9	Dissolved Oxygen	October 15 - May 15	Spawning: Not less than 11.0 mg/L or 95% of saturation
Yaquina River	37.6 to 57.5	E. Coli	Summer	30-day log mean of 126 E. coli organisms per 100 ml; no single sample > 406 organisms per 100 ml
Yaquina River	0 to 15.5	Fecal Coliform	Year Around	Fecal coliform median of 14 organisms per 100 ml; no more than 10% > 43 organisms per 100 ml
Yaquina River	15.5 to 42	Fecal Coliform	Year Around	Fecal coliform median of 14 organisms per 100 ml; no more than 10% > 43 organisms per 100 ml
Yaquina River	0 to 57.5	Temperature	Year Around (Non-spawning)	Rearing: 17.8 C
Yaquina River	15.4 to 27.6	Temperature	Summer	Rearing: 17.8 C
Montgomery Creek	0 to 1.9	Biological Criteria	Year Around	Biocriteria: Waters of the state must be of sufficient quality to support aquatic species without detrimental changes in the resident biological communities.

2.4.3.6.5 Beaver Creek-Ocean Tributaries

There are 24.8 miles of streams in the watershed that are water quality limited (**Exhibit 13** presents the impairments, which are: temperature, dissolved oxygen, pH, E. coli, and biological criteria.)

Exhibit 13. Beaver Creek-Ocean Tributaries: Water Quality Limited Streams

Water Body (Stream/Lake)	River Miles	Parameter	Season	Criteria
Oliver Creek	0 to 2	Biological Criteria	Year Round	Biocriteria: Waters of the state must be of sufficient quality to support aquatic species without detrimental changes in the resident biological communities.
North Fork Beaver Creek	0 to 9.5	Biological Criteria	Year Round	Biocriteria: Waters of the state must be of sufficient quality to support aquatic species without detrimental changes in the resident biological communities.
North Fork Beaver Creek	0 to 9.5	E. Coli	Summer	30-day log mean of 126 E. coli organisms per 100 ml; no single sample > 406 organisms per 100 ml
North Fork Beaver Creek	0 to 9.5	Temperature	Year Round (Non-spawning)	Rearing: 17.8 C (64 F)
North Fork Beaver Creek	0 to 9.5	Dissolved Oxygen	October 15 - May 15	Spawning: Not less than 11.0 mg/L or 95% of saturation
South Fork Beaver Creek	0 to 6	Temperature	Year Round (Non-spawning)	Rearing: 17.8 C (64 F)
South Fork Beaver Creek	0 to 2.8	pH	Summer	pH 6.5 to 8.5
South Fork Beaver Creek	0 to 2.8	pH	Fall, Winter, Spring	pH 6.5 to 8.5
South Fork Beaver Creek	0 to 5.7	E. Coli	Summer	30-day log mean of 126 E. coli organisms per 100 ml; no single sample > 406 organisms per 100 ml
South Fork Beaver Creek	0 to 6	Dissolved Oxygen	Year Round (Non-spawning)	Cold water: Not less than 8.0 mg/l or 90% of saturation
South Fork Beaver Creek	0 to 6	Dissolved Oxygen	October 15 - May 15	Spawning: Not less than 11.0 mg/L or 95% of saturation
Beaver Creek	0 to 7.3	Dissolved Oxygen	October 15 - May 15	Spawning: Not less than 11.0 mg/L or 95% of saturation
Beaver Creek	0 to 7.3	Dissolved Oxygen	Year Around	Cold water: Not less than 8.0 mg/l or 90% of saturation

2.4.3.6.6 Alsea River Drainage Area

There are approximately 214.9 miles of streams in the drainage area that are water quality limited (see **Exhibit 14**). The Alsea River is listed for dissolved oxygen, fecal coliform, and temperature. Among the tributaries to the Alsea River that are listed as water quality limited, temperature is the most common water quality criterion that is not met. Large tributaries with water quality impairments include Lobster Creek, Green River, Five Rivers, and Drift Creek. EPA proposed adding Five Rivers and Lobster Creek to the 303(d) list for dissolved oxygen exceedances in 2012 cycle.

Exhibit 14. Alsea River Drainage Area: Water Quality Limited Streams

Alsea River Drainage Area: Water Quality Limited Streams				
Water Body (Stream/Lake)	**River Miles**	**Parameter**	**Season**	**Criteria**
Alsea River	15.7 to 27	Dissolved Oxygen	September 15 - June 15	Spawning: Not less than 11.0 mg/L or 95% of saturation
Alsea River	15.7 to 47.4	Dissolved Oxygen	Year Round (Non-spawning)	Cold water: Not less than 8.0 mg/l or 90% of saturation
Alsea River	27 to 47.4	Dissolved Oxygen	September 1 - June 15	Spawning: Not less than 11.0 mg/L or 95% of saturation
Alsea River	0 to 4.9	Fecal Coliform	Year Round	Fecal coliform median of 14 organisms per 100 ml; no more than 10% > 43 organisms per 100 ml
Alsea River	4.9 to 10	Fecal Coliform	Year Round	Fecal coliform median of 14 organisms per 100 ml; no more than 10% > 43 organisms per 100 ml
Alsea River	15.2 to 47.4	Temperature	Summer	Rearing: 17.8 C (64 F)
Alsea River	15.8 to 47.2	Temperature	September 1 - June 15	Spawning: 12.8 C (55 F)
Preacher Creek	0 to 2.1	Temperature	Summer	Rearing: 17.8 C (64 F)
South Fork Alsea River	0 to 2.4	Temperature	September 1 - June 15	Spawning: 12.8 C (55 F)
South Fork Alsea River	0 to 17.2	Temperature	Year Round (Non-spawning)	Core cold water habitat: 16.0 C (60.8 F) 7-day-average maximum
South Fork Lobster Creek	0 to 4.3	Temperature	Summer	Rearing: 17.8 C (64 F)
South Fork Lobster Creek	0 to 15	Temperature	Year Round (Non-spawning)	Core cold water habitat: 16.0 C (60.8 F)7-day-average maximum
North Fork Alsea River	0 to 2.4	Temperature	September 15 - June 15	Salmon and steelhead spawning: 13.0 C (55.4) 7-day-average maximum
Lobster Creek	6.8 to 17.7	Temperature	October 1 - June 15	Salmon and steelhead spawning: 13.0 C (55.4 F) 7-day-average maximum
Lobster Creek	0 to 17.7	Temperature	Year Round (Non-spawning)	Core cold water habitat: 16.0 C (60.8 F)7-day-average maximum
Little Lobster Creek	0to 6.6	Temperature	Year Round (Non-spawning)	Core cold water habitat: 16.0 C (60.8 F) 7-day-average maximum
Bummer Creek	0 to 8.2	Temperature	Year Round (Non-spawning)	Core cold water habitat: 16.0 C (60.8 F) 7-day-average maximum

Buck Creek	0 to 7.7	Temperature	Year Round (Non-spawning)	Core cold water habitat: 16.0 C (60.8 F) 7-day-average maximum
Green River	0 to 6.7	Temperature	Year Round (Non-spawning)	Core cold water habitat: 16.0 C (60.8 F) 7-day-average maximum
East Fork Green River	0 to 2	Temperature	Year Round (Non-spawning)	Core cold water habitat: 16.0 C (60.8 F) 7-day-average maximum
Five Rivers	0 to 22.4	Temperature	Year Round (Non-spawning)	Core cold water habitat: 16.0 C (60.8 F) 7-day-average maximum
Five Rivers	6.5 to 22.4	Temperature	October 15 - June 15	Spawning: 12.8 C (55 F)
Fall Creek	0 to 1	Temperature	September 15 - June 15	Salmon and steelhead spawning: 13.0 C (55.4 F) 7-day-average maximum
Fall Creek	0 to 9.8	Temperature	Year Round (Non-spawning)	Core cold water habitat: 16.0 C (60.8 F) 7-day-average maximum
Drift Creek	5.3 to 29.6	Temperature	Year Round (Non-spawning)	Core cold water habitat: 16.0 C (60.8 F) 7-day-average maximum
Drift Creek	8.6 to 22.4	Temperature	September 15 - June 15	Salmon and steelhead spawning: 13.0 C (55.4 F) 7-day-average maximum
Fall Creek	1 to 9.8	Temperature	October 1 - June 15	Salmon and steelhead spawning: 13.0 C (55.4 F) 7-day-average maximum
Bailey Creek	0 to 4.6	Habitat Modification	Undefined	The creation of tastes or odors or toxic or other conditions that are deleterious to fish or other aquatic life or affect the potability of drinking water or the palatability of fish or shellfish may not be allowed.
Flynn Creek	0 to 2.1	Biological Criteria	Year Round	Biocriteria: Waters of the state must be of sufficient quality to support aquatic species without detrimental changes in the resident biological communities.
Flynn Creek	0 to 2.5	Temperature	Year Round (Non-spawning)	Core cold water habitat: 16.0 C (60.8 F) 7-day-average maximum
Meadow Creek	0 to 1.4	Temperature	Year Round (Non-spawning)	Core cold water habitat: 16.0 C (60.8 F) 7-day-average maximum
Gopher Creek	0 to 5.1	Temperature	Year Round (Non-spawning)	Core cold water habitat: 16.0 C (60.8 F) 7-day-average maximum
Meadow Fork	0 to 2.2	Temperature	Year Round (Non-spawning)	Core cold water habitat: 16.0 C (60.8 F) 7-day-average maximum
Meadow Fork	0 to 2.2	Temperature	October 15 - June 15	Spawning: 12.8 C (55 F)
Cascade Creek	0 to 1.3	Temperature	Summer	Rearing: 17.8 C (64 F)

Cascade Creek	1.3 to 4.4	Temperature	Summer	Rearing: 17.8 C (64 F)
Canal Creek	0 to 7.2	Fecal Coliform	Year Round	Fecal coliform median of 14 organisms per 100 ml; no more than 10% > 43 organisms per 100 ml
Camp Creek	0 to 2.7	Temperature	Summer	Rearing: 17.8 C (64 F)
Peak Creek	0 to 7	Temperature	Year Round (Non-spawning)	Core cold water habitat: 16.0 C (60.8 F) 7-day-average maximum
Phillips Creek	0 to 2.1	Temperature	Summer	Rearing: 17.8 C (64 F)
North Fork Cascade Creek	0 to 2.7	Temperature	Summer	Rearing: 17.8 C (64 F)

2.4.3.6.7 Yachats River Drainage Area

There are 28.5 miles of water quality limited streams in the drainage area (see **Exhibit 15**). The water quality impairments are temperature, dissolved oxygen, and E. coli. The Yachats River is 303(d) listed for temperature and the North Fork Yachats River is listed for *E. coli*, temperature, and dissolved oxygen. Nine tributaries to the Yachats River, not including the North Fork Yachats River, are listed as water quality limited for temperature, dissolved oxygen, or *E. coli*. Another 11.5 miles of streams in Tenmile Creek, south of the City of Yachats, are listed as water quality limited for fecal coliform.

Exhibit 15. Yachats River Drainage Area: Water Quality Limited Streams

Yachats River Drainage Area: Water Quality Limited Streams				
Water Body (Stream/Lake)	**River Miles**	**Parameter**	**Season**	**Criteria**
North Fork Yachats River	0 to 6.3	E. Coli	Fall, Winter, Spring	30-day log mean of 126 E. coli organisms per 100 ml; no single sample > 406 organisms per 100 ml
North Fork Yachats River	0 to 6.3	Temperature	Year Round (Non-spawning)	Rearing: 17.8 C (64 F)
North Fork Yachats River	0 to 6.3	Dissolved Oxygen	October 15 - May 15	Spawning: Not less than 11.0 mg/L or 95% of saturation
Williamson Creek	0 to 2.7	Dissolved Oxygen	October 15 - May 15	Spawning: Not less than 11.0 mg/L or 95% of saturation
Williamson Creek	0 to 2.7	Temperature	Year Round (Non-spawning)	Rearing: 17.8 C (64 F)
Yachats River	0 to 13	Temperature	Summer	Rearing: 17.8 C (64 F)
Alder Creek	0 to 1.3	Temperature	Year Round (Non-spawning)	Core cold water habitat: 16.0 C (60.8 F) 7-day-average maximum
Carson Creek	0 to 2.9	Temperature	Year Round (Non-spawning)	Rearing: 17.8 C (64 F)
Beamer Creek	0 to 2.1	Dissolved Oxygen	October 15 - May 15	Spawning: Not less than 11.0 mg/L or 95% of saturation
Stump Creek	0 to 2	Temperature	Year Round (Non-spawning)	Rearing: 17.8 C (64 F)
Stump Creek	0 to 2	E. Coli	Fall, Winter, Spring	30-day log mean of 126 E. coli organisms per 100 ml; no single sample > 406 organisms per 100 ml
Stump Creek	0 to 2	Dissolved Oxygen	October 15 - May 15	Spawning: Not less than 11.0 mg/L or 95% of saturation
Keller Creek	0 to 2.6	Dissolved Oxygen	October 15 - May 15	Spawning: Not less than 11.0 mg/L or 95% of saturation
Keller Creek	0 to 2.6	E. Coli	Fall, Winter, Spring	30-day log mean of 126 E. coli organisms per 100 ml; no single sample > 406 organisms per 100 ml
Keller Creek	0 to 2.6	E. Coli	Summer	30-day log mean of 126 E. coli organisms per 100 ml; no single sample > 406 organisms per 100 ml
Keller Creek	0 to 2.7	Temperature	Year Round (Non-spawning)	Rearing: 17.8 C (64 F)

Keller Creek	0 to 2.6	Temperature	Year Round (Non-spawning)	Salmon and trout rearing and migration: 18.0 C (64.4 F) 7-day-average maximum
Depew Creek	0 to 1.5	Temperature	Summer	Rearing: 17.8 C (64 F)
Grass Creek	0 to 2.3	Temperature	Year Round (Non-spawning)	Rearing: 17.8 C (64 F)
School Fork	0 to 3.2	Dissolved Oxygen	October 15 - May 15	Spawning: Not less than 11.0 mg/L or 95% of saturation
School Fork	0 to 3.2	E. Coli	Fall, Winter, Spring	30-day log mean of 126 E. coli organisms per 100 ml; no single sample > 406 organisms per 100 ml
School Fork	0 to 3.2	Temperature	Year Round (Non-Spawning)	Salmon and trout rearing and migration: 18.0 degrees Celsius 7-day-average maximum
School Fork	0 to 3.2	E. Coli	Summer	30-day log mean of 126 E. coli organisms per 100 ml; no single sample > 406 organisms per 100 ml

2.4.2.6.8 Beaches

There are approximately 4 miles of marine waters adjacent the following beaches in the Mid-Coast that are water quality limited (see **Exhibit 16**). All of these beach miles are 303(d) listed for enterococcus, which is used as the fecal indicator for risk of illness from contact recreation, such as swimming. Mile 106.9 to 107.7 is located at D-River State Park; Mile 127.5 to 129 is Beverly Beach State Park; and mile 133.6 to 136.8 is Agate Beach.

Exhibit 16. Water Quality Limited Beaches

Water Body (Stream/Lake)	Beach Miles	Parameter	Season	Criteria
Pacific Ocean D River Beach	106.9 to 107.7	Enterococcus	Summer	Geometric mean of 35 Enterococci per 100 ml
Pacific Ocean Beverly Beach	127.5 to 129	Enterococcus	Summer	Geometric mean of 35 Enterococci per 100 ml
Pacific Ocean Agate Beach	133.6 to 135.2	Enterococcus	Fall, Winter, Spring	Geometric mean of 35 Enterococci per 100 ml
Pacific Ocean Agate Beach	133.6 to 135.2	Enterococcus	Summer	Geometric mean of 35 Enterococci per 100 ml
Pacific Ocean Nye Beach	135.2 to 136.8	Enterococcus	Fall, Winter, Spring	Geometric mean of 35 Enterococci per 100 ml
Pacific Ocean Nye Beach	135.2 to 136.8	Enterococcus	Summer	Geometric mean of 35 Enterococci per 100 ml

2.4.3.7 Groundwater Quality

Multiple water providers in the Mid-Coast use groundwater (see **Appendix E**). Some of these water providers have water treatment systems and others do not. Several contaminants have been identified in groundwater nationwide, including four common contaminants: arsenic, lead, nitrates, and fecal coliform bacteria (see **Exhibit 17**). According to DEQ, statewide studies of groundwater during the past 20 years have found that nitrate is the most commonly detected groundwater contaminant, followed by pesticides, volatile organic compounds, and bacteria (ODEQ, 2017). Private, domestic wells are not required to conduct routine water quality testing or to treat contaminants, although annual testing is recommended (OHA, 2017). ORS 448.271 requires testing of domestic well water during a real estate transaction. Oregon's Domestic Well Safety Program[7] partners with local health departments and water providers to promote domestic well safety and improve local and state capacity to assess and manage risks associated with private wells.

Exhibit 17. Common Groundwater Contaminants

Common Groundwater Contaminants		
Contaminant	**Description**	**Maximum contaminant level**
Arsenic	Occurs naturally; colorless and odorless; high concentrations and consumption over long periods linked to health problems	10 ppb (0.010 mg/L)
Nitrate	Naturally occurring form of nitrogen; colorless and odorless; often associated with human activities; found in animal manure, human sewage waste, and commercial fertilizers; levels may change over time; short and long-term health effects, esp. for infants.	10 ppm (10 mg/L) (occurs naturally at levels of 1-2 mg/L)
Lead	Naturally occurring element in earth's surface; used to produce items such as pipes, batteries, and machinery; produced from burning fossil fuels, manufacturing, and mining; long-term health effects for infants and children.	15 ppb
Coliform bacteria	Broad group of bacteria found in soil, water, plants, animals, and humans. Indicator for pathogenic bacteria and viruses, which can cause sickness.	Coliform should be ABSENT

2.4.3.7.1 Arsenic

Arsenic is an odorless, tasteless substance that can occur naturally in groundwater. Over periods of time, arsenic exposure can create health problems. Arsenic concentrations can differ between shallow and deep wells, and data are not available everywhere. The EPA and USGS both have national data sets of arsenic measurements. EPA data do not account for private, unregulated wells in rural areas and the USGS nationwide studies on arsenic do not collect sufficient data to estimate the concentration of arsenic at a county level in Lincoln County. For tests reported to OHA in Lincoln County, mean arsenic concentration was 0.77 parts per million (ppm). The maximum nitrate concentration in these tests was at the maximum contaminant

[7]http://www.oregon.gov/oha/PH/HEALTHYENVIRONMENTS/DRINKINGWATER/SOURCEWATER/DOMESTICWELLSAFETY/Pages/Testing-Regulations.aspx

level (MCL) of 10 ppm (0.78 percent of tests) and 5 percent exceeded nitrate concentrations of 3 ppm. Nitrate concentrations above 3 ppm indicate that human activities may be affecting ground water quality (OHA, 2017). In Lane County, nitrates were detected above the maximum contaminant level, but the locations of the wells that had higher levels are not readily available.

2.4.4 Data Gaps

Currently, DEQ is working with stakeholders in the Mid-Coast to develop TMDLs for water quality limited streams. The water monitoring, technical analysis, modeling, and technical report preparation along with community outreach that are involved in TMDL development are time-intensive. DEQ has completed several draft technical analyses for stakeholder review and comment, but has not yet distributed any draft TMDLs for public comment for the Mid-Coast. The absence of final technical reports or TMDLs documents represents an information gap, but multiple detailed reports addressing water quality in the Mid-Coast are currently being developed for stakeholder review in the next 12-24 months.

The USGS Water Quality Watch monitoring program does not currently have continuous monitoring sites in the planning area that monitor water quality. Parameters monitored in other portions of the state include water temperature, specific conductance, pH, dissolved oxygen, turbidity, nitrate, and chlorophyll.

Currently, extensive groundwater quality information is a data gap in the Mid-Coast. DEQ has begun a 10-year project to characterize groundwater quality throughout the state. A comprehensive, regional assessment of groundwater quality has not yet been completed for the Mid-Coast.

Another current data gap is an understanding of how socioeconomic status may relate to water quality.

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Appendix A

Data Sources

This report includes information from the Department of Environmental Quality (DEQ), Bureau of Land Management, Oregon Health Authority, Oregon Department of Fish and Wildlife, U.S. Geological Survey, volunteer water quality monitoring data collected by Watershed Councils, Limiting Factors Analyses conducted for the Mid Coast Watershed Council to identify core coho habitat areas (MCWC is cited, but reports are prepared by Bio-Surveys, LLC and Sialis Company), and technical reports written by the Independent Multidisciplinary Science Team (IMST) to the Governor's Natural Resources Office regarding meeting the goals of the Oregon Plan for Salmon and Watersheds. Also, the Natural Resources Conservation Service prepares 8-Digit Hydrologic Unit Profiles that discuss water quality concerns.

Several IMST reports provide context on water quality regulations and areas of scientific agreement regarding water quality needs for salmonid recovery in western Oregon. For more information about IMST and a list of reports, visit the state's webpage for the Oregon Plan for Salmon and Watersheds. To access Limiting Factors Assessments, visit MCWC's Landowner Toolbox. It is important to note that many of these assessments were created several years ago and conditions may have changed in some areas due to completed restoration and changes in land use management. Up-to-date, comprehensive assessments of smaller watersheds were not readily available.

Oregon Health Authority (OHA) keeps a database of water providers and prepares Source Water Assessments that help water providers understand risks to their water supply. OHA's website was used to identify water providers and to access Source Water Assessments. These can be found at OHA's web page on Assessment and Water Quality Monitoring. DEQ maintains information regarding water quality in a number of areas. DEQ documents water bodies that are water quality limited, leaking underground storage tanks, resource conservation and recovery act (Superfund) sites, and point-source pollutant discharge locations and permits. Various DEQ databases were used to access this water quality information, including Oregon's 2012 Integrated Report Assessment Database and 303(d) List, Environmental Cleanup Site Information Database, and the Wastewater Permits Database. Additionally, DEQ is in the process of developing water temperature models and septic source analyses for the Mid Coast. This information is included for watersheds where it is complete and available.

To collect information regarding water quality monitoring and funding and fiscal needs for water quality projects, a table was sent to organizations managing water quality to be completed. DEQ's water quality monitoring database manager was also contacted for volunteer water quality monitoring information. For state agencies managing water quality, information was collected directly from the state agency and also from Secretary of State Audit Reports. For more information, visit Oregon's Local Government Audit Report Search.

All Cities with raw water treatment plants have monitoring information for water quality. Oregon Health Authority's Drinking Water Data Online search engine allows you to access data on public water systems, including water quality testing, violations, enforcements, public notices, and basic system information.

More Information:

- Analysis of continuous dissolved oxygen data from Oregon's Mid Coast Rivers in 2008 and implications for TMDL development
- Oregon Department of Environmental Quality Mid Coast Basin

Useful Tools and Resources		
Topic	**Link to Tool**	**Purpose**
Water Quality	Oregon Drinking Water Protection Program Interactive Map Viewer	Identify land uses and potential sources of pollutants using an interactive map tool. Locate drinking water source areas, water quality limited streams, etc.
Water Quality (Beaches)	Beacon 2.0 Beach Advisory and Closing On-line Notification	Provides an interactive map with information on advisories and monitoring data, historic water quality reports that include pollutant sources found and their potential sources (if identified), and monitoring frequency for each season. The mapping tool also includes contact information for the OHA staff associated with each beach.
Water Quality	Polluted Runooff: Nonpoint Source Pollution	United State Environmental Protection Agency website with resources about nonpoint source pollution.
Water Quality (Temperature)	Interactive Stream Temperature Scenario Viewer NorWest	View observed and modeled future stream temperatures. Find summaries of observed stream temperature.
Water Quality	Basin Summary Report: Statewide Water Quality Toxics Assessment Report	Includes an overview of toxins found in the Mid Coast from 18 locations sampled in April, September, and November, 2013.

Appendix B

Terminology

- **Dissolved Oxygen:** The concentration of oxygen dissolved in water from the atmosphere and from groundwater discharging into streams. It is measured in parts per million (ppm), mg/L or percent saturation. Areas where water moves fast and turbulent, such as in riffles, tend to contain high levels of dissolved oxygen while more slow moving areas such as pools typically contain lower levels. Temperature also affects dissolved oxygen, with colder water containing more dissolved oxygen than warmer water. Aquatic vegetation affects dissolved oxygen by increasing DO when plant vegetation grows and decreasing DO when bacteria consume oxygen while decaying plants (USGS, 2017). DO levels also fluctuate on a daily basis due to temperature and aquatic vegetation respiration. DO levels are important for macroinvertebrate and fish species. In Western Oregon, DEQ requires that in basins with Salmonids, freshwater shall not be less than 90% of saturation and seasonal, or less than 95% of saturation when spawning starts.

- **Temperature:** Solar radiation is the primary factor controlling stream temperatures. . Variability in stream temperature results from the interaction of atmospheric conditions (sun's position in the sky, air temperature, wind speed, cloud cover and humidity) and local conditions such as stream channel morphology, surrounding topography, streamside vegetation, and natural and human disturbances. Other characteristics of a stream such as its volume, surface area and velocity, which influence the heat capacity, moderate the rate of thermal energy exchange between the water and its environment. Temperature and dissolved oxygen concentration are linked, and both parameters are critical to the reproduction survival of anadromous fish. Temperature affects water chemistry and impacts the species that can survive in the water. Temperature also affects biological triggers for salmon migration, spawning, and egg hatching. In lakes, cold water sinks and warmer water floats, creating layers of water with similar temperature gradients. Temperature stratifications do not always follow this simple pattern, however, and depend on seasonal temperatures and lake depth (USGS, 2017; Bladon et al., 2016).

- **Turbidity:** A measure of how clear water is, and more specifically, is "an expression of the amount of light that is scattered by material in the water when a light is shined through the water sample," (USGS, 2017). Turbidity is caused by clay, silt, inorganic and organic matter, algae, plankton, and other microscopic organisms (USGS, 2017). High turbidity levels limit plant growth, are an indicator for pathogens, and can lead to sedimentation that harms fish habitat. Turbidity is measured in nephelometric turbidity units (NTUs) (it is also measured in FTU's and FBU's). Turbidity varies naturally in different stream systems depending on the prevalent geology and soils in the system. High turbidity typically occurs during high flow events, but is also affected by the time of year and landscape characteristics. Turbidity is generally low during the summer during the absence of high flow events. DEQ completed a six-year study monitoring ambient turbidity levels in all or Oregon's eight regions and found that median turbidity levels are approximately 1 NTU (ODEQ, 2014). High turbidity levels can also be linked

to high bacteria counts because the nutrients and particles in suspended sediment provide habitat for bacteria.

- **Bacteria:** The EPA sets three main types of bacteria standards, including enterococcus for estuarine systems, E. coli (*Escherichia coli*) for freshwater systems, and fecal coliform standards for shellfish. Enterococcus concentration predicts illness in coastal waters due to contact recreation such as swimming or surfing. E. coli is a bacteria that can be used as an indicator for the presence of other bacteria that make humans and animals sick through contact recreation. The most common source for E. coli is human or animal waste, especially on-site sewage disposal systems (OSDS or Septic Tanks) and overflow from municipal wastewater treatment plants during high flow events. Fecal coliform levels indicate the risk of getting an illness from ingesting shellfish, clams, oysters, or mussels (ODEQ3, 2017). The Oregon Health Authority administers the Oregon Beach Monitoring Program, which posts advisories when bacteria levels exceed EPA standards for recreation.

- **Specific conductance:** A measure of the water's ability to conduct electricity, which is directly related to the amount of salinity in water. Specific conductance is typically measured in units called microSiemens (uS/cm). Distilled water is between 0.5 to 2 uS/cm. Salinity can increase from storm surges, pollution, road salt, or even failing septic tanks. Salinity can also increase with saltwater intrusion, which is the movement of saltwater into inland stream and groundwater systems, can occur from sea level rise, storm surges, excessive pumping of groundwater aquifers with certain characteristics. Salinity levels vary naturally based on geologic conditions, but significant changes in salinity can affect plant communities, and drinking water quality (USGS, 2017)

- **Total Maximum Daily Load (TMDL):** "The calculated pollutant amount that a waterbody can receive and still meet Oregon water quality standards," (ODEQ2, 2017). To determine water quality standards, DEQ takes into account the total amount of pollutants from point sources and non-point sources as well as background water conditions.

- **Load or loading:** An amount of man-made or natural matter or thermal energy that is introduced into a receiving water (USEPA, 2017).

- **Hazardous waste:** Waste with properties that make it dangerous or capable of having a harmful effect on human health or the environment (USEPA, 2017). Hazardous waste is sometimes referred to as "toxic waste."

- **Biological criteria**: A criteria of water quality that is measured by the aquatic life present in a water body. Macroinvertebrates, which are small, bottom-dwelling insects such as caddisflies and mayflies, are sensitive to dissolved oxygen, temperature, sediments, and other water characteristics. They serve as indicators of water quality.

- **Biosolids:** The solids derived from primary, secondary, or advanced treatment of domestic wastewater that have been treated through one or more controlled processes to significantly reduce pathogens and reduce volatile solids or chemically stabilize solids to the extent that they do not attract vectors. Almost all the biosolids generated by domestic wastewater treatment facilities in Oregon are applied to the land for agriculture, silviculture, and horticulture use. All wastewater facilities operate under either a National Pollutant Discharge Elimination System or Water Pollution Control Facility permit (ODEQ1 2017).

- **Point source pollution:** Point source pollution comes from any "discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft from which pollutants are or may be discharged. This term does not include agricultural storm water discharges and return flows from irrigated agriculture," (USEPA, 2017).

- **Nonpoint source pollution:** Nonpoint source pollution is any pollution that does not meet the legal definition of point source pollution.

Appendix C

Department of Environmental Quality

Water Quality Monitoring Programs

Watershed Monitoring (TMDLs development and implementation):

DEQ's Watershed Monitoring conducts water column and physical habitat monitoring in order to identify "current conditions" for Total Maximum Daily Loads (TMDLs) development and implementation in waters of the state that have been identified as "impaired" and placed on the Clean Water Act Section 303d list (Category 5). These monitoring projects are conducted based on the spatial and temporal scale of the impairment, including: segment (specific location or river miles), catchment or watershed, beneficial use and season. Methods and results of these monitoring projects and analyses (e.g., statistical or physical models) are documented in the draft TMDLs issued for public review. Preliminary reports for review by stakeholders, including advisory committees, are prepared in advance of issuing TMDLs. The following link is for the February 2017 MidCoast TMDL status update that was sent to the Local Stakeholder Advisory Committee: http://www.oregon.gov/deq/FilterDocs/LSACmemo0217.pdf. For more information about TMDLs and specific information for the MidCoast basin, see: http://www.oregon.gov/deq/wq/tmdls/Pages/default.aspx. At this time, all technical documents prepared for the Midcoast TMDLs are preliminary. Many of these documents have received an initial TMDLs advisory committee review and comment.

Statewide Toxics Monitoring Program:

DEQ's Statewide Water Quality Toxics Monitoring Program collected and analyzed water samples between 2008 and 2013 in order to establish baseline data on the types and prevalence of toxic chemicals in waters of the state. DEQ tested for more than 500 different chemicals in Oregon rivers and estuaries. DEQ collected samples from 177 sites within 15 water basins throughout the state. Samples were collected in 2013 at 18 sites in the Midcoast Basin in the spring, summer and fall. Basin Summary Reports are found here: http://www.oregon.gov/deq/wq/Pages/WQ-Monitoring-Statewide.aspx

Chemicals detected in the Midcoast Basin included:

- Consumer product constituents (bis(2-ethylhexyl)adipate, Carbamazepine, DEET, Sulfamethoxazole, Venlafaxine)
- Current-use herbicides Atrazine, Diuron, Fluridone, Trifluralin
- Metals, including arsenic, barium, iron, copper, lead, manganese, nickel, zinc, and chromium
- Legacy pesticides
- Plant and animal sterols (detected at all sites)
- Combustion byproducts (Anthracene, Chrysene, Fluoranthene, Phenanthrene, Pyrene)
- Flame retardants (classified as PBDEs)

DEQ has not identified the specific source(s) of most of these chemicals. General sources include:

- Increased rates of soil erosion and land disturbance exacerbate the delivery of arsenic, mercury and other metals naturally occurring in soils and underlying geologic formations.

- Consumer product constituents and animal sterols are indicative of domestic wastewater sources. Animal sterols suggest livestock and wildlife sources.
- Atrazine is labeled for use in forestry and for agricultural crops.
- Fluridone is an aquatic herbicide often used to control invasive plants.
- Trifluralin is a commonly used pre-emergent herbicide.

Statewide Biomonitoring Program:

Oregon's Statewide Biomonitoring Program is primarily collaboration between DEQ and ODFW and implemented under the Oregon Plan for Salmon and Watersheds. The program was recently expanded to include partnership with federal natural resources agencies. Funding has been variable for the program and is currently inadequate to fully implement the biomonitoring as designed. Based on results from 1997-2007 & 2012, and subsequent comparison to reference site conditions, a number of stream segments were identified as "impaired" in the MidCoast Basin and placed on Oregon's 303(d) list in the 2010 Assessment cycle by U.S.EPA. Additional sites and stream segment are proposed for placement on Oregon's 303(d) list by EPA in the 2012 cycle (not yet final).

Oregon Beach Monitoring Program (OBMP):

DEQ partners with the Oregon Health Authority (OHA) to monitor the marine waters along Oregon's coastline under the Oregon Beach Monitoring Program (OBMP). The monitoring is funded by annual grants from EPA. Marine waters are tested for enterococcus, a fecal indicator bacterium for the presence of harmful microbes. Enterococcus is present in human and animal waste and can enter marine waters from a variety of sources such as streams and creeks, storm water runoff, animal and seabird waste, failing septic systems, sewage treatment plant spills or boating waste.

Since the program began, a number of samples along the central coast beaches have exceeded OHA's criterion for triggering a recreational water contact health advisory. This has resulted in Section 303(d) listings. Most advisories have been associated with development near urban or higher rural residential density (e.g., Agate Beach, D-River, Nye Beach, and Seal Rock). In order to address these water quality problems, DEQ is evaluating monitoring techniques (e.g., chemical tracers, fluorescence, microbial source tracking) that are indicators of human sources of bacteria, particularly septic sources, in order to address the highest potential health risks. DEQ will be working with local partners and governmental entities to implement these tools in the next few years in both developed and rural landscapes. The Surfrider Foundation's Blue Water Task Force also conducts beach and freshwater monitoring. That data is reviewed by the OBMP. More information including data access portal is found here: http://www.oregon.gov/deq/wq/Pages/WQ-Monitoring-Beach.aspx

Volunteer Water Quality Monitoring (VM program):

DEQ supports community based organizations (CBOs) in developing and implementing locally based water quality monitoring programs. DEQ utilizes results from VM programs to augment data collected for assessing water quality status and TMDLs development. VM programs are often supported, in part, by Oregon's Section 319 Nonpoint Source grant program. The CBOs

have a variety of objectives for their VM programs, including collecting baseline information, prioritizing further assessment and restoration efforts, and evaluating effectiveness of management actions (e.g., agricultural best management practices) over time. Where the VM data was used as a basis for 303(d) listing, DEQ's TMDLs watershed monitoring program often conducts confirmatory sampling and/or analyses. In the MidCoast Basin, four CBOs have DEQ-supported VM programs[1]. These programs produce information useful in evaluating and understanding water quality status and trends because: (a) the monitoring networks are spatially distributed to assess patterns in relation to land use and major tributaries, and (b) for many locations, monitoring has been conducted long enough (or nearly so) to produce data to evaluate both seasonal and annual trends. DEQ and the CBOs periodically review these monitoring plans (and the data produced) in assessing water quality status, developing restoration priorities, evaluating revisions to sampling and analysis plans, and in anticipation of future OWEB grant cycles along with other fundamental considerations.

Groundwater Monitoring:

DEQ implements a Groundwater Monitoring program in collaboration with OHA and other partners. For more information, see:
http://www.oregon.gov/deq/wq/programs/Pages/GWP.aspx#groundwater

DEQ's Clean-up and underground storage tanks (UST) program collects and evaluates groundwater monitoring data from individual industrial sites or private property where contamination is likely or known to exist. For more information, see:
http://www.oregon.gov/deq/Hazards-and-Cleanup/env-cleanup/Pages/ecsi.aspx

National Aquatic Resource Surveys

These surveys are funded by U.S. EPA and designed to gather data needed to provide statistically valid inferences about the overall condition of lakes or rivers and streams in Oregon (statewide) and nationally. For more information, see:
http://www.oregon.gov/deq/wq/Pages/WQ-Monitoring-NARS.aspx

[1] Salmon-Drift Creek Watershed Council (SDCWC), Lincoln Soil and Water Conservation District (LSWCD), Siuslaw Watershed Council (SWC), Devils Lake Water Improvement District (DLWID)

Appendix D

Additional Water Quality Information

Salmon River Watershed

Turbidity

While none of the streams in the Salmon River Watershed are listed for turbidity, the Salmon Drift Creek Watershed council has listed turbidity as one of their water quality concerns.

Dissolved oxygen

Fraser Creek and Rowdy Creek, which flow into the Salmon River Estuary, are not currently listed as water quality limited, but there have been discussions regarding a possible listing for dissolved oxygen criteria on these creeks (personal communication 7/31/17, Paul Robertson).

Fecal indicator bacteria

According to the Salmon Drift Creek Watershed Council, bacteria impacts are broad in the Salmon River Watershed due to rural residential developments with onsite sewage disposal systems (septic, OSDS). The Salmon River is listed for fecal coliform bacteria year-round, but a TMDL has not yet been developed.

Other

Salmon and Drift Creek Watershed Council monitors water quality in the area and found that pH was lower than 6.5 at all of their monitoring sites in late summer and fall in 2009 (SDCWC, n.d.). Devil's Lake has experienced algal blooms since the 1950's and algae bloom advisories are frequently issued for the lake during the summertime. In 2014, the lake was closed to recreation due to a harmful blue-green algae bloom (Oregonian, 2014). In 2008, a toxin-focused cyanobacteria and harmful algal bloom monitoring program was started in Devil's lake to monitor the highly impacted freshwater system. The Devils Lake Water Improvement District monitors water quality today for Microsystin, a liver toxin, which is often the most common toxin. Other toxins of concern for recreational water quality standards include neurotoxins (anatoxin-a, cylindrospermopsin, and saxitoxin), cells, and toxic species in scum (DLWID).

The Salmon Drift Creek Watershed Council is currently monitoring optical brightener, a product that is used in clothes and many laundry detergents, in several streams in the Salmon River Basin. The focus of this research is to determine whether optical brightener can be an indicator of human influence and help to locate the sources of other pollutants, such as E. coli.

Siletz River Watershed

Temperature

The Siletz River from mile 39 to mile 65 has documented temperature concerns in the summer and SDCWC 2016 monitoring found that temperatures frequently exceeded the 18C threshold on the Siletz River from below Moonshine Park to below Cedar Creek in August and increase approximately 3 degrees Celsius from Yeck's down to Cedar Creek. Drift Creek, which has exceeded its temperature requirement of 17.8 degrees for rearing, is designated by USFS as a Tier 1 Key Watershed, meaning that it contributes to conservation of at-risk salmon populations and has a high potential to be restored. The Salmon Drift Creek Watershed Council has measured average maximum temperatures between 18 and 20 degrees Celsius (64.4 to 68

Fahrenheit) for two months in the summer. Salmon Drift Creek Watershed Council also considers Drift Creek to be a high priority restoration area (Robertson & Katen, 2017). Steer Creek, a tributary to Rock Creek, which feeds into the Siletz is not on the 303(d) list of water quality limited streams, but has temperature concerns, according to the MCWC.

Turbidity

Sedimentation and high stream temperatures are a concern throughout the Siletz watershed, especially in the South Fork Siletz sub-watershed. There is no defined turbidity parameter, however turbidity concerns were added to the DEQ database for the Siletz River between mile 39 and 65. The current criteria requires that "the creation of tastes or odors or toxic or other conditions that are deleterious to fish or other aquatic life or affect the potability of drinking water or the palatability of fish or shellfish may not be allowed," (DEQ, 2012). In the Siletz-Yaquina watersheds, there are a total of 492.71 stream miles with erodible soils, comprising 34% of soils. In Tangerman Creek 86% (2.4 miles) of soils have high soil erosion potential (DEQ, 2016). Shallow landslide risk is high in the central Siletz Basin, adding additional potential sources of turbidity (MCWC, 2001).

Dissolved Oxygen

SDCWC collected a comprehensive set of dissolved oxygen data between August 23 and August 28th from below Moonshine Park to below Cedar Creek, finding that day to night fluxes in DO increase from upstream to downstream.

Fecal indicator bacteria

In 2005, an alert was issued at the City of Siletz where significant bacteria concentrations were detected. The City of Siletz has not had any violations of drinking water standards since 2005. The Salmon Drift Creek Watershed Council has sampled total coliform in Drift Creek and found numbers occasionally above 2,400. Thompson Creek, which flows into Devils' Lake, has been listed for fecal coliform since the 1990's (personal communication 7/31/17, Paul Robertson). The first two miles of the Creek is currently listed for fecal coliform during all seasons and a TMDL needs to be developed.

Devil's Lake Watershed (A sub-watershed of the Siletz River Watershed)

Temperature

Lincoln City holds a water right on Rock Creek, which it now shares with the Confederated Tribes of the Siletz Indians for use at the Chinook Winds golf course..According to a Limiting Factors Assessment completed for the Mid Coast Watersheds Council, thermal problems exists from Devil's Lake to river mile 1.6 where land use has impacted wetland habitats and altered flow regimes and sections of marshland are exposed to direct sunlight (MCWC, 2003). A more recent assessment of Rock Creek was not available.

Biological criteria

Devil's Lake Improvement District monitors E. coli levels and harmful algal blooms in Devil's Lake and issues a weekly report of E. coli levels in the lake and issues warnings when water quality is low. In 2008, the Improvement District ranked septic tanks as the number one

priority to address excess nutrients in the lake. According to the Improvement District, approximately 33% of homes have septic systems that were installed before 1974, when permits were first required and approximately 50% are beyond their useful lifespan of 25 years. The Improvement District has mapped the distribution of septic systems along the lake and initiated a Septic Tank Revitalization Program in 2009 to inform landowners about septic tank maintenance and water quality concerns (Devil's Lake Improvement District, n.d.). Additionally, Lincoln City has an ongoing plan to provide small diameter, low-pressure sewer lines to properties on the East side of the lake that are currently on septic systems.

The Salmon Drift Creek Watershed Council (SDCWC) conducted microbial source tracking on Thompson Creek using DNA-based fingerprinting of bacteroides, an anaerobic bacteria, which is found alongside E. coli and which can determine the source locations for specific bacteria. Some of the bacteria from Thompson Creek was from human, canine, and avian sources (personal communication 7/31/17, Paul Robertson). The SDCWC is currently monitoring D-River, a river which flows 120 feet from Devil's Lake into the ocean (Oregon State Parks, n.d.), using the same monitoring technique and has found sources from seagulls, pigeons and crows, which are fed by many D-River Recreation Site visitors. Panther Creek and Rock Creek have not been listed for bacteria, but the SDCWC has monitored spikes of E. Coli above 2,400 in both systems, which they expect is from failing septic systems on Panther Creek and from the sewer treatment plant on Schooner Creek. DEQ is in the process of assessing potential septic risk in the Panther Creek watershed using detailed land ownership information, but results are not yet complete (personal communication, David Waltz, DEQ, 8/29/17).

Schooner Creek (A Tributary to Siletz River Estuary)

Schooner Creek (near Lincoln City) is a source water for Lincoln City that drains directly into the Pacific Ocean. The Creek is listed for temperature concerns for rearing from its mouth, to mile 9.7, but does not have a TMDL. Seasonal temperature in the creek is between 12 and 19 degrees Celsius (53.6 to 66.2 degrees Fahrenheit) in the summer leading to portions of the stream exceeding the 17.5 degree threshold for salmon rearing. South Fork Schooner Creek, a tributary to Schooner Creek (near Lincoln City) is also listed for exceeding the 18 degree 7-day average maximum for rearing and migration. Schooner Creek is not listed for turbidity, which ranges from 1.0 to 2.5 NTU (Lincoln City, n.d.). However, turbidity increases drastically during high flow events and during moderate rainfall events, reaching > 200 NTU (Lincoln City, n.d.).

Bacteria in Schooner Creek are a concern. Schooner Creek is listed as water quality limited due to E. coli concentrations during the summer. This may be related to sewage disposal challenges. There is a residence approximately 2 miles away from the North Fork drinking water intake for Lincoln City, but there are no residences above the South Fork intake. 17 residences are located within 50 feet of the main stem of Schooner Creek between the City's intake and the confluence of North and South Fork Schooner Creek and 11 residences between 50 and 100 feet of the stream (Lincoln City, n.d.).

Yaquina River Watershed

Turbidity/fine sediment

DEQ has not listed any streams in the Yaquina River Basin as water quality limited due to turbidity or fine sediment. The only TMDL for turbidity in the Mid Coast is on the Siletz, and the criteria are not established. Water quality monitoring in the Yaquina River Basin completed by Lincoln SWCD ranges from 0 to 103 NTU.

Alsea River Watershed

Water quality concerns in the Alsea River Watershed include suspended sediments and turbidity, water temperature, aquatic habitat suitability, and soil erosion from streambanks (NRCS, 2005). According to the NRCW 8-Digit Unit Hydrologic Profile for the Alsea River Watershed, land uses associated with these concerns include agriculture (grazing and pasture crops) and forest management (NRCS, 2005). Specifically, increases in stream temperature may be due to inadequate riparian shade and stream channel widening (NRCS, 2005). As of 2005, there was only one permitted Confined Animal Feeding Operation in the watershed with 50 permitted animals. The conversion of land from timber production to Christmas tree farming is also a concern due to increase in invasive, noxious weeds and poor management of small acreage areas (NRCS, 2005).

Beaver Creek Watershed

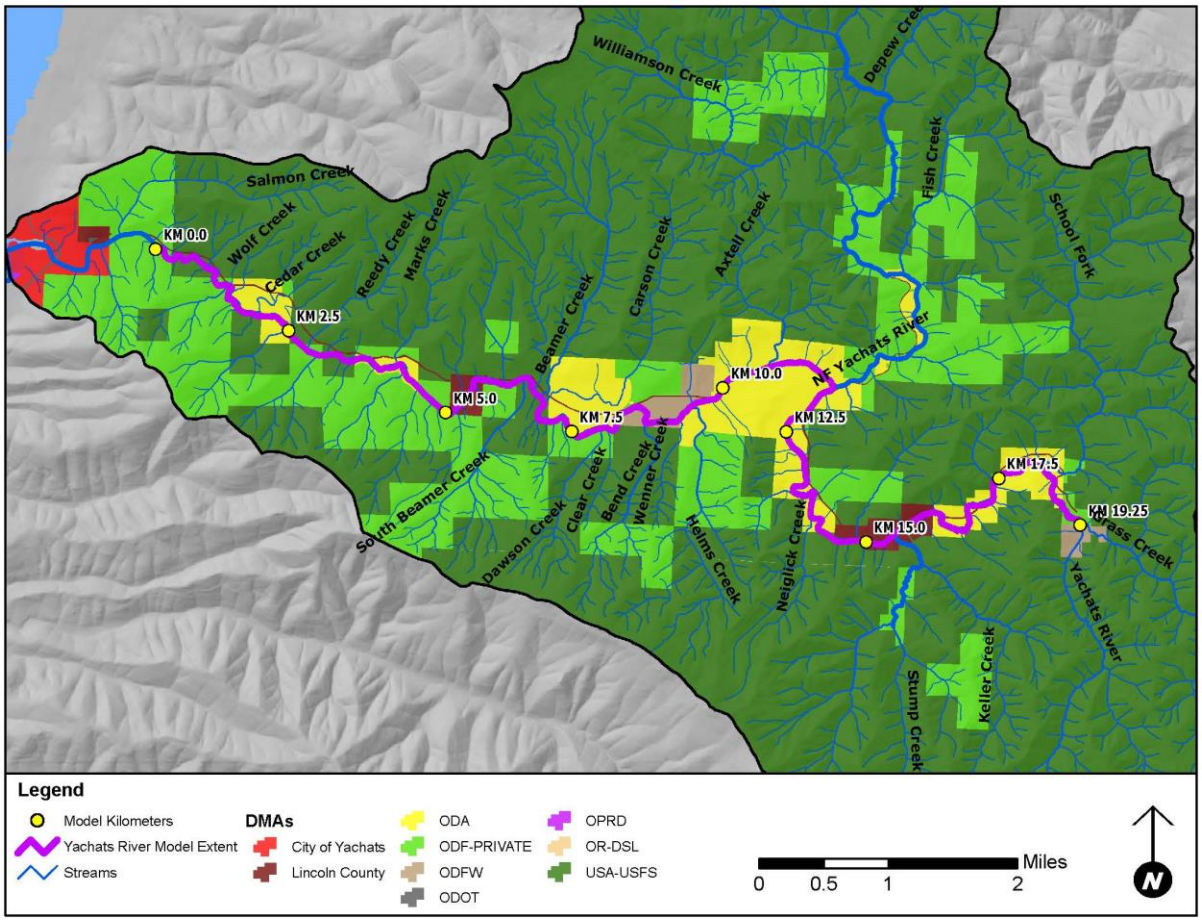
Beaver Creek, a tributary to the Pacific Ocean near Ona Beach sustained daily maximums that exceeded the 64 degree F threshold for salmonids for 37 consecutive days between July 14th and August 20th, according to 1994 monitoring (MCWC, 2003). USGS monitoring in Beaver Creek Estuary between 2010 and 2012 found that water temperatures exceeded water temperature standards at their Hwy 101 gage on 25% of monitoring days and exceeded standards on 20% of days at their South Beaver Creek monitoring site. They found no exceedances at a third monitoring site on NW beaver Valley Drive (Stonewall, 2016). High salinity occurs in Beaver Creek and Beaver Creek Estuary.

Yachats River Watershed

The Yachats River from its mouth to mile 13 is listed for temperature concerns in the summer months and a TMDL is needed. In July 1997 an Aquatic Habitat Inventory survey recorded temperatures in the main stem at the mouth of tributaries. According to a Habitat Suitability Assessment, monitoring records assessed found that temperatures usually exceed 14 degrees Celsius (57.2 degrees Fahrenheit) and the tributaries do not provide cool water input (MCWC, 2003). Main thermal concerns are on Williamson Creek and the main stem below, which contain some areas exposed to direct sunlight.

DEQ is currently developing thermal models for temperature throughout the Mid Coast and has developed a heat source model for the Yachats Watershed. They are evaluating whether waterbodies are achieving water quality temperature standards, modeling thermal inputs from tributary inflows, and assessing model performance by comparing observed stream temperature data from multiple organizations with predicted stream temperature data. DEQ is examining land use (or zoning) & land cover characteristics at both the stream segment and watershed scales to understand the potential relationships between land cover and temperature (See Figure below)[1].

[1] The Heat Source model is used to illustrate where criteria are met and where exceeded based on actual data; the calibrated model is then used to manipulate factors that could potentially be changed to impact that relationship (i.e. , shade, flow, morphology) and evaluate whether temperature can be improved through various management strategies.


Williamson Creek
Depew Creek
Salmon Creek
Wolf Creek
Cedar Creek
Reedy Creek
Marks Creek
Beaver Creek
Carson Creek
Axtell Creek
Fish Creek
School Fork
KM 0.0
KM 2.5
KM 5.0
KM 7.5
KM 10.0
KM 12.5
KM 15.0
KM 17.5
KM 19.25
NF Yachats River
South Beaver Creek
Dawson Creek
Clear Creek
Bend Creek
Wenner Creek
Helms Creek
Neiglick Creek
Grass Creek
Yachats River
Keller Creek
Stump Creek
Legend
Model Kilometers
Yachats River Model Extent
Streams
DMAs
City of Yachats
Lincoln County
ODA
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Appendix E

Drinking Water Providers
Using Groundwater
in the Mid-Coast

Drinking Water Providers Using Groundwater: Salmon River Watershed	Number of Connections	Treatment Class	Treatment
Riverbend Park Water System	78	None	
Echo Mountain Park	143	None	
Salmon River RV Park	45	None	
Road House	2	None	
Salmon River Mobile Village	38	None	
Guptil Subdivision	20	None	
Hiland WC – Westwood	81	None	Hypochlorination; calcite contractor
Westwind Stewardship Group	5	None	
Boulder Creek WS/Rose Lodge	140	1	Microscreening, filtration membrane, hypochlorination
Grand Ronde Community Water Association	950	None	

Other Water Providers Using Groundwater	Number of Connections	Treatment Class	Treatment
Lincoln City Resort	121	None	
Lincoln City KOA	81	None	Hypochlorination
Boiler Bay RV Park	28	None	
Otter Rock Water District	139	None	
Carmel Beach Water District	17	None	Hypochlorination, GWR r-Log Virus Compliance Mon

Drinking Water Providers Using Groundwater: Siletz River Watershed	Number of Connections	Treatment Class	Treatment
Coyote Rock RV Resort & Marina	10	None	Hypochlorination
Toketee Illahee RV Park	2	None	Hypochlorination; ph/alka adj-calcite contactor
Lincoln County Parks-Moonshine Park	2	None	Activated carbon; hypochlorination
Logsden Neighborhood Church	1	None	Hypochlorination

Drinking Water Providers Using Groundwater: Yaquina River Watershed	Number of Connections	Treatment Class	Treatment
Olalla Valley Golf Course	2	None	Activated carbon; hypochlorination
Lincoln County Parks: Elk City Park	1	None	Hypochlorination
Eddyville Charter School	No	None	Hypochlorination; ph/alka adj-calcine contactor
Lucas Pioneer Ranch & Lodge	2	Non	Ultraviolet radiation
OPRD: Ellmaker State Park	1	None	Hypochlorination
Fir Ridge Campground	31	None	Ultraviolet radiation

Drinking Water Providers Using Groundwater: Yahcats River Watershed	Number of Connections	Treatment Class	Treatment
USFS: Cape Perpetua Visitor Center	3	None	Hypochlorination

Drinking Water Providers Using Groundwater: Alsea River Watershed	Number of Connections	Treatment Class	Treatment
Kozy Acres Water System	19	None	Hypochlorination
Riverside Mobile Park	22	None	Hypochlorination
Westwood Village	81	None	Hypochlorination; ph/alka adj-calcite contactor
USFS Mike Bauer Picnic Grounds	1	None	Hypochlorination
USFS Blackberry Campground	11	None	Hypochlorination
Fall Creek Water District	46	None	Hypochlorination
Alsea County Service District	83	None	Hypochlorination
Benton County Parks Salmonberry Park	3	None	
Crooked Creek Trailer Park	9	None	Hypochlorination