



**OREGON  
DEPARTMENT OF  
AGRICULTURE**

# **Clackamas Subbasin Agricultural Water Quality Management Area Plan**

**January 2022**

**Developed by the**

**Oregon Department of Agriculture**

**and the**

**Clackamas Local Advisory Committee**

**with support from the**

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## Acronyms and Terms

**Ag Water Quality Program** – Agricultural Water Quality Management Program

**Area Plan** – Agricultural Water Quality Management Area Plan

**Area Rules** – Agricultural Water Quality Management Area Rules

**CAFO** – Confined Animal Feeding Operation

**CFS** – Cubic Feet Per Second

**CWA** – Clean Water Act

**DEQ** – Oregon Department of Environmental Quality

**EQIP** – Environmental Quality Incentives Program

**FSA** – USDA Farm Services Agency

**GWMA** – Groundwater Management Area

**HUC** – Hydrologic Unit Code

**IPM** – Integrated Pest Management

**LAC** – Local Advisory Committee

**LMA** – Local Management Agency

**Management Area** – Agricultural Water Quality Management Area

**MOA** – Memorandum of Agreement

**NPDES** – National Pollution Discharge Elimination System

**NRCS** – Natural Resources Conservation Service

**OAR** – Oregon Administrative Rules

**ODA** – Oregon Department of Agriculture

**ODFW** – Oregon Department of Fish and Wildlife

**Oregon Plan** – Oregon Plan for Salmon and Watersheds

**ORS** – Oregon Revised Statute

**OWEB** – Oregon Watershed Enhancement Board

**OWRD** – Oregon Water Resources Department

**PMP** – Pesticides Management Plan

**PSP** – Pesticides Stewardship Partnership

**SIA** – Strategic Implementation Area

**SWCD** – Soil and Water Conservation District

**TMDL** – Total Maximum Daily Load

**TSS** – Total Suspended Solids

**USDA** – United States Department of Agriculture

**US EPA** – United States Environmental Protection Agency

**WQPMT** – Water Quality Pesticides Management Team

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## Foreword

This Agricultural Water Quality Area Plan (Area Plan) provides guidance for addressing water quality related to agricultural activities in the Agricultural Water Quality Management Area (Management Area). The Area Plan identifies strategies to prevent and control water pollution from agricultural lands.

The Area Plan is neither regulatory nor enforceable (Oregon Revised Statute (ORS) 568.912(1)). The Area Plan refers to associated Agricultural Water Quality Management Area Rules (Area Rules). The Area Rules are Oregon Administrative Rules (OARs) and are enforced by the Oregon Department of Agriculture (ODA).

## Required Elements of Area Plans

Area Plans must describe a program to achieve the water quality goals and standards necessary to protect designated beneficial uses related to water quality as required by federal and state law (OAR 603-090-0030(1)).

## Plan Content

Chapter 1: Agricultural Water Quality Program Purpose and Background. Presents consistent and accurate information about the Ag Water Quality Program.

Chapter 2: Local Background. Provides the local geographic, water quality, and agricultural context for the Management Area. Describes the water quality issues, Area Rules, and potential management strategies to address water quality issues.

Chapter 3: Implementation Strategies. Presents goal(s), measurable objectives, strategic initiatives, proposed activities, and monitoring.

Chapter 4: Progress and Adaptive Management. Describes progress toward achieving the goal of the Area Plan and summarizes results of water quality and land condition monitoring.

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# Chapter 1: Agricultural Water Quality Program

## 1.1 Purpose of Agricultural Water Quality Program and Applicability of Area Plans

As part of Oregon's Agricultural Water Quality Program (Ag Water Quality Program), the 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 and rural lands within the boundaries of this Management Area (OAR 603-090-0000(3)) and to achieve and maintain water quality standards (ORS 561.191(2)). The Area Plan has been developed and revised by ODA and the Local Advisory Committee (LAC), with support and input from the SWCD and the Oregon Department of Environmental Quality (DEQ). The Area Plan is implemented using a combination of outreach, conservation and management activities, compliance with Area Rules, monitoring, evaluation, and adaptive management.

The provisions of the Area Plan do not establish legal requirements or prohibitions (ORS 568.912(1)).

Each Area Plan is accompanied by Area Rules that describe local agricultural water quality regulatory requirements. ODA will exercise its regulatory authority for the prevention and control of water pollution from agricultural activities under the Ag Water Quality Program's general regulations (OAR 603-090-0000 to 603-090-0120) and under the Area Rules for this Management Area (OAR 603-095-1200 to 603-095-1280). The general regulations guide the Ag Water Quality Program, and the Area Rules for the Management Area are the regulations with which landowners must comply. Landowners are encouraged through outreach and education to implement conservation and management activities.

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

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

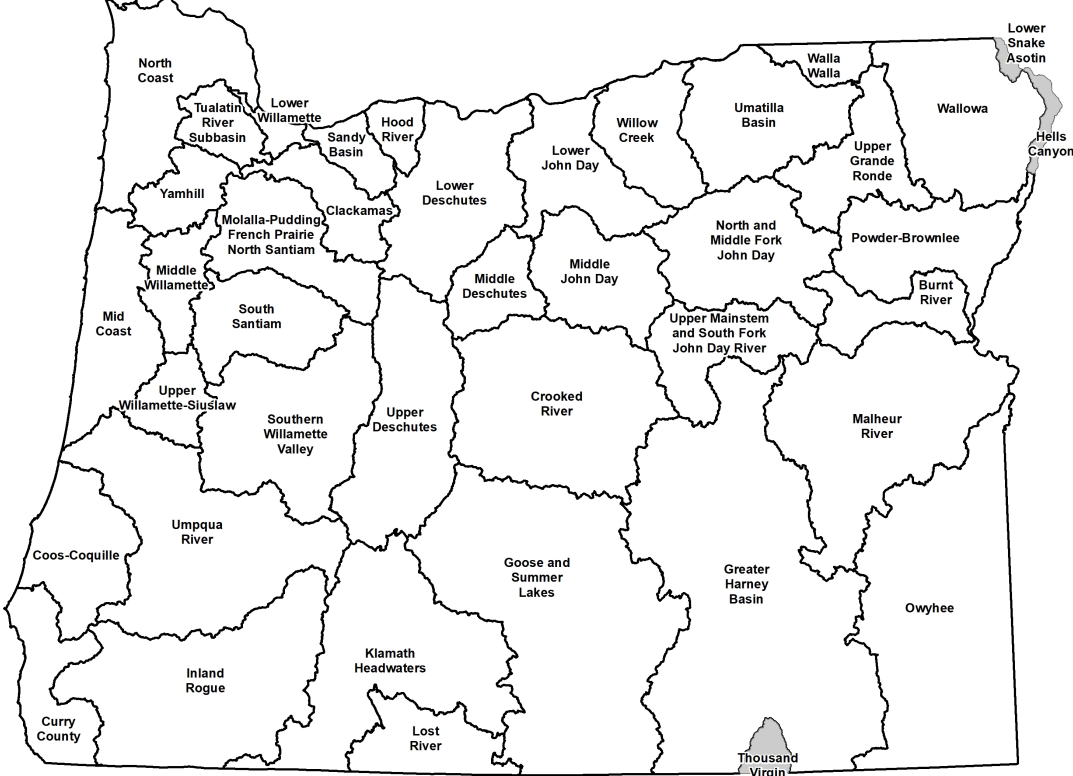
## 1.2 History of the Ag Water Quality Program

In 1993, the Oregon Legislature passed the Agricultural Water Quality Management Act directing ODA to develop plans to prevent and control water pollution from agricultural activities and soil erosion and to achieve water quality standards (ORS 568.900 through ORS 568.933). The Oregon Legislature passed additional legislation in 1995 to clarify that ODA is the lead agency for regulating agriculture with respect to water quality (ORS 561.191).

Between 1997 and 2004, ODA worked with LACs and SWCDs to develop Area Plans and Area Rules in 38 watershed-based Management Areas across Oregon (Figure 1.2). Since 2004, ODA, LACs, SWCDs, and other partners have focused on implementation including:

- Providing education, outreach, and technical assistance to landowners,
- Implementing projects to improve agricultural water quality,
- Investigating complaints of potential violations of Area Rules,
- Conducting biennial reviews of Area Plans and Area Rules,
- Monitoring, evaluation, and adaptive management,
- Developing partnerships with state and federal agencies, tribes, watershed councils, and others.

**Figure 1.2 Map of 38 Agricultural Water Quality Management Areas\***



\*Gray areas are not included in Ag Water Quality Management Areas

**1.3 Roles and Responsibilities**

**1.3.1 Oregon Department of Agriculture**

ODA is the agency responsible for implementing the Ag Water Quality Program (ORS 568.900 to 568.933, ORS 561.191, OAR 603-090, and OAR 603-095). The Ag Water Quality Program was established to develop and implement water quality management plans for the prevention and control of water pollution from agricultural activities and soil erosion. State and federal laws that drive the establishment of an Area Plan include:

- State water quality standards,

- Load allocations for agricultural or nonpoint source pollution assigned under Total Maximum Daily Loads (TMDLs) issued pursuant to the federal Clean Water Act (CWA), Section 303(d),
- Approved management measures for Coastal Zone Act Reauthorization Amendments (CZARA),
- Agricultural activities detailed in a Groundwater Management Area (GWMA) Action Plan (if DEQ has established a GWMA in the Management Area and an Action Plan has been developed).

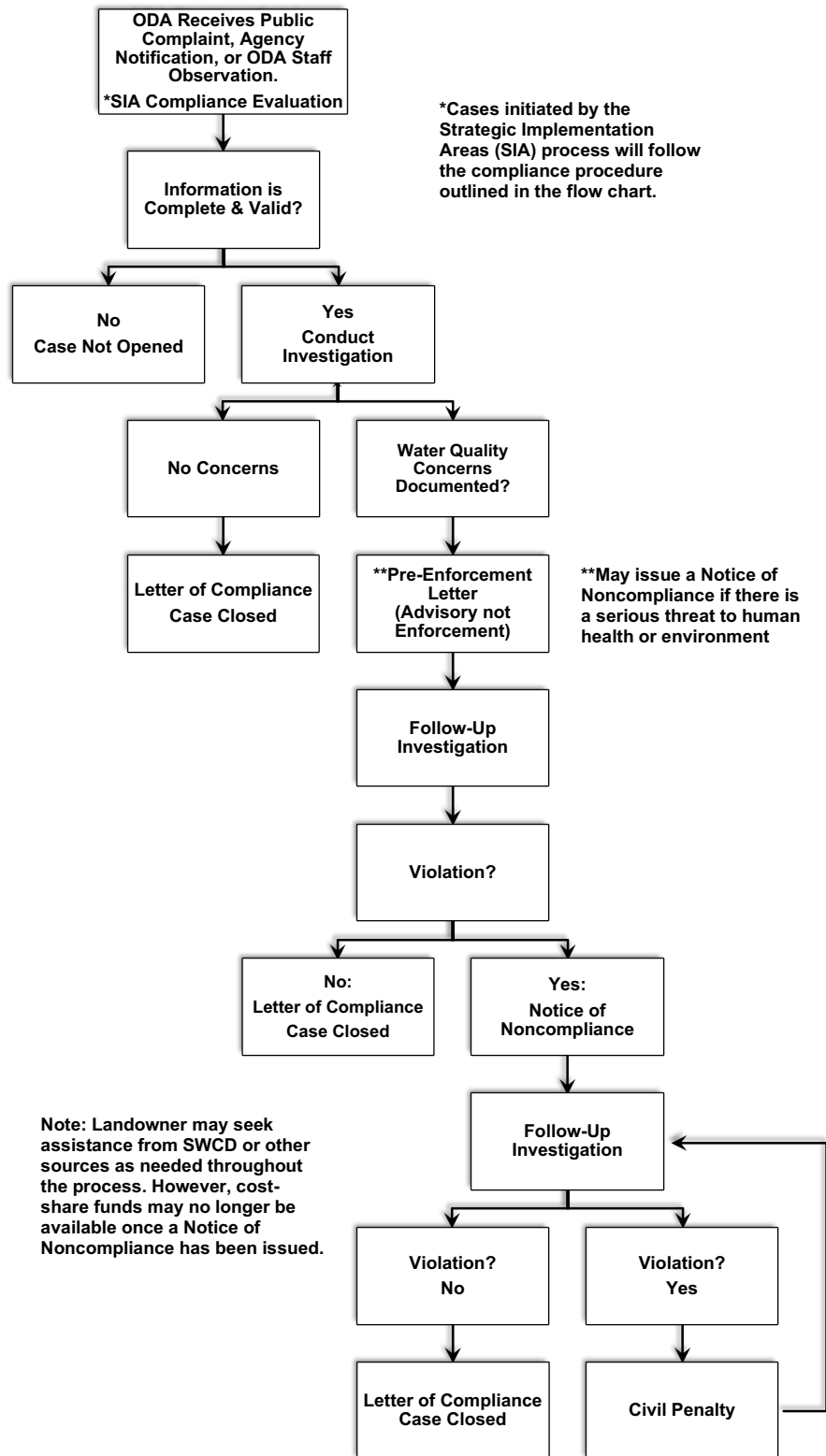
ODA bases Area Plans and Area Rules on scientific information (ORS 568.909). ODA works in partnership with SWCDs, LACs, DEQ, and other partners to implement, evaluate, and update the Area Plans and Area Rules. If and when other governmental policies, programs, or rules conflict with the Area Plan or Area Rules, ODA will consult with the appropriate agencies to resolve the conflict in a reasonable manner.

ODA is responsible for any actions related to enforcement or determination of noncompliance with Area Rules (OAR 603-090-0080 through OAR 603-090-0120). ORS 568.912(1) and ORS 568.912(2) give ODA the authority to adopt rules that require landowners to perform actions necessary to prevent and control pollution from agricultural activities and soil erosion.

The Area Rules are a set of standards that landowners must meet on all agricultural or rural lands. "Landowner" includes any landowner, land occupier, or operator per OAR 603-95-0010(24). All landowners must comply with the Area Rules. ODA will use enforcement where appropriate and necessary to achieve compliance with Area Rules. Figure 1.3.1 outlines ODA's compliance process. ODA will pursue enforcement action only when reasonable attempts at voluntary solutions have failed (OAR 603-090-0000(5)(e)). If a violation is documented, ODA may issue a pre-enforcement notification or an enforcement order such as a Notice of Noncompliance. If a Notice of Noncompliance is issued, ODA will direct the landowner to remedy any conditions through required corrective actions under the provisions of the enforcement procedures outlined in OAR 603-090-060 through OAR 603-090-120. If a landowner does not implement the required corrective actions, ODA may assess civil penalties for continued violation of the Area Rules.

Any member of the public may file a complaint, and any public agency may file a notification of a potential violation of the Area Rules. ODA also may initiate an investigation based on its own observation or from cases initiated through the Strategic Implementation Area process (See Figure 1.3.1).

**Figure 1.3.1 Compliance Flow Chart**



### **1.3.2 Local Management Agency**

A Local Management Agency (LMA) is an organization designated by ODA to assist with the implementation of an Area Plan (OAR 603-090-0010). The Oregon Legislature intended that SWCDs be LMAs to the fullest extent practical, consistent with the timely and effective implementation of Area Plans (ORS 568.906). SWCDs have a long history of effectively assisting landowners to voluntarily address natural resource concerns. Currently, all LMAs in Oregon are SWCDs.

The day-to-day implementation of the Area Plan is accomplished through an Intergovernmental Grant Agreement between ODA and each SWCD. Every two years, each SWCD submits a scope of work to ODA to receive funding to implement the Area Plan. Each SWCD implements the Area Plan by providing outreach and technical assistance to landowners. SWCDs also work with ODA and the LAC to establish implementation priorities, evaluate progress toward meeting Area Plan goals and objectives, and revise the Area Plan and Area Rules as needed.

### **1.3.3 Local Advisory Committee**

For each Management Area, the director of ODA appoints an LAC (OAR 603-090-0020) with up to 12 members. The LAC serves in an advisory role to the director of ODA and to the Board of Agriculture. The role of the LAC is to provide a high level of citizen involvement and support in the development, implementation, and biennial reviews of the Area Plan and Area Rules. The LAC's primary role is to advise ODA and the LMA on local agricultural water quality issues as well as evaluate the progress toward achieving the goals and objectives of the Area Plan. LACs are composed primarily of agricultural landowners in the Management Area and must reflect a balance of affected persons.

The LAC is convened at the time of the biennial review; however, the LAC may meet as frequently as necessary to carry out its responsibilities, which include but are not limited to:

- Participate in the development and subsequent revisions of the Area Plan and Area Rules,
- Recommend strategies necessary to achieve the goals and objectives in the Area Plan,
- Participate in biennial reviews of the progress of implementation of the Area Plan and Area Rules,
- Submit written biennial reports to the Board of Agriculture and the ODA director.

### **1.3.4 Agricultural Landowners**

The emphasis of the Area Plan is on voluntary action by landowners to control the factors affecting water quality in the Management Area. In addition, each landowner in the Management Area is required to comply with the Area Rules. To achieve water quality goals or compliance, landowners may need to select and implement an appropriate suite of measures. The actions of each landowner will collectively contribute toward achievement of water quality standards.

Technical assistance, and often financial assistance, is available to landowners who want to work with SWCDs or other local partners, such as watershed councils, to achieve land conditions that contribute to good water quality. Landowners may also choose to improve their land conditions without assistance.

Under the Area Plan and Area Rules, agricultural landowners are not responsible for mitigating or addressing factors that are caused by non-agricultural activities or sources, such as:

- Hot springs, glacial melt water, unusual weather events, and climate change,
- Septic systems and other sources of human waste,
- Public roadways, culverts, roadside ditches, and shoulders,
- Dams, dam removal, hydroelectric plants, and non-agricultural impoundments,
- Housing and other development in agricultural areas,
- Impacts on water quality and streamside vegetation from wildlife such as waterfowl, elk, and feral horses,
- Other circumstances not within the reasonable control of the landowner.

However, agricultural landowners may be responsible for some of these impacts under other legal authorities.

### **1.3.5 Public Participation**

ODA, LACs, and LMAs conduct biennial reviews of the Area Plan and Area Rules. Partners, stakeholders, and the general public are invited to participate in the process. Any revisions to the Area Rules will include a formal public comment period and a formal public hearing.

## **1.4 Agricultural Water Quality**

The federal CWA directs states to designate beneficial uses related to water quality, decide on parameters to measure to determine whether beneficial uses are being met, and set water quality standards based on the beneficial uses and parameters.

### **1.4.1 Point and Nonpoint Sources of Water Pollution**

There are two types of water pollution. Point source water pollution emanates from clearly identifiable discharge points or pipes. Point sources are required to obtain permits that specify their pollutant limits. Agricultural operations regulated as point sources include permitted Confined Animal Feeding Operations (CAFOs), and all permitted CAFOs are subject to ODA's CAFO Program requirements. Irrigation return flow from agricultural fields may drain through a defined outlet but is exempt under the CWA and does not currently require a permit.

Nonpoint-source water pollution originates from the general landscape and is difficult to trace to a single source. Nonpoint water pollution sources include runoff from agricultural and forest lands, urban and suburban areas, roads, and natural sources. In addition, groundwater can be polluted by nonpoint sources including agricultural amendments (fertilizers and manure).

### **1.4.2 Beneficial Uses and Parameters of Concern**

Beneficial uses related to water quality are defined by DEQ for each basin. The most sensitive beneficial uses usually are fish and aquatic life, water contact recreation, and public and private domestic water supply. These uses generally are the first to be impaired because they are affected at lower levels of pollution. While there may not be severe impacts on water quality from a single source or sector, the combined effects from all sources can contribute to the impairment of beneficial uses in the Management Area. Beneficial uses that have the potential to be impaired in this Management Area are summarized in Chapter 2.

Many waterbodies throughout Oregon do not meet state water quality standards. The most common water quality concerns statewide related to agricultural activities are temperature, bacteria, biological criteria, sediment, and turbidity, phosphorous, nitrates, algae, pH, dissolved oxygen, harmful algal blooms, pesticides, and mercury. Water quality impairments vary across the state; they are summarized for this Management Area in Chapter 2.

### **1.4.3 Impaired Waterbodies and Total Maximum Daily Loads**

Every two years, DEQ is required by the CWA to assess water quality in Oregon, resulting in the “Integrated Report.” CWA Section 303(d) requires DEQ to identify waters that do not meet water quality standards. The resulting list is commonly referred to as the “303(d) list” ([www.oregon.gov/deq/wq/Pages/WQ-Assessment.aspx](http://www.oregon.gov/deq/wq/Pages/WQ-Assessment.aspx)). In accordance with the CWA, DEQ must establish TMDLs for pollutants on the 303(d) list. For more information, visit [www.oregon.gov/deq/wq/tmdls/Pages/default.aspx](http://www.oregon.gov/deq/wq/tmdls/Pages/default.aspx).

A TMDL includes an assessment of conditions (based on water quality data, land condition data, and/or computer modeling) and describes a plan to achieve water quality standards. TMDLs specify the daily amount of pollution a waterbody can receive and still meet water quality standards. TMDLs generally apply to an entire basin or subbasin, not just to an individual waterbody on the 303(d) list. In the TMDL, point sources are assigned waste load allocations that are then incorporated into National Pollutant Discharge Elimination System (NPDES) permits. Nonpoint sources (agriculture, forestry, and urban) are assigned a load allocation.

As part of the TMDL process, DEQ identifies Designated Management Agencies and Responsible Persons, which are parties responsible for submitting TMDL implementation plans. TMDLs designate ODA as the lead agency responsible for implementing the TMDL on agricultural lands. ODA uses the applicable Area Plan(s) as the implementation plan for the agricultural component of the TMDL. Biennial reviews and revisions to the Area Plan and Area Rules must address agricultural or nonpoint source load allocations from relevant TMDLs.

The 303(d) list, the TMDLs, and the agricultural load allocations for the TMDLs that apply to this Management Area are summarized in Chapter 2.

### **1.4.4 Oregon Water Pollution Control Law – ORS 468B.025 and 468B.050**

In 1995, the Oregon Legislature passed ORS 561.191. This statute states that any program or rules adopted by ODA “shall be designed to assure achievement and maintenance of water quality standards adopted by the Environmental Quality Commission.”

To implement the intent of ORS 561.191, ODA incorporated ORS 468B.025 and 468B.050 into all 38 of the Area Rules in Oregon.

ORS 468B.025 (prohibited activities) states that:

“(1) Except as provided in ORS 468B.050 or 468B.053, no person shall:

- (a) Cause pollution of any waters of the state or place or cause to be placed any wastes in a location where such wastes are likely to escape or be carried into the waters of the state by any means.
- (b) Discharge any wastes into the waters of the state if the discharge reduces the quality of such waters below the water quality standards established by rule for such waters by the Environmental Quality Commission.

(2) No person shall violate the conditions of any waste discharge permit issued under ORS 468B.050.”

ORS 468B.050 identifies the conditions when a permit is required. A permit is required for CAFOs that meet minimum criteria for confinement periods and have large animal numbers or have wastewater facilities. The portions of ORS 468B.050 that apply to the Ag Water Quality Program state that:

“(1) Except as provided in ORS 468B.053 or 468B.215, without holding a permit from the Director of the Department of Environmental Quality or the State Department of Agriculture, which permit shall specify applicable effluent limitations, a person may not:

(a) Discharge any wastes into the waters of the state from any industrial or commercial establishment or activity or any disposal system.”

Definitions used in ORS 468B.025 and 468B.050:

‘ “Pollution” or “water pollution” means such alteration of the physical, chemical, or biological properties of any waters of the state, including change in temperature, taste, color, turbidity, silt or odor of the waters, or such discharge of any liquid, gaseous, solid, radioactive, or other substance into any waters of the state, which will or tends to, either by itself or in connection with any other substance, create a public nuisance or which will or tends to render such waters harmful, detrimental or injurious to public health, safety or welfare, or to domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial uses or to livestock, wildlife, fish or other aquatic life or the habitat thereof.’ (ORS 468B.005(5)).

‘ “Water” or “the waters of the state” include lakes, bays, ponds, impounding reservoirs, springs, wells, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Pacific Ocean within the territorial limits of the State of Oregon and all other bodies of surface or underground waters, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters which do not combine or affect a junction with natural surface or underground waters), which are wholly or partially within or bordering the state or within its jurisdiction.’ (ORS 468B.005(10)).

‘ “Wastes” means sewage, industrial wastes, and all other liquid, gaseous, solid, radioactive or other substances, which will or may cause pollution or tend to cause pollution of any waters of the state.’ (ORS 468B.005(9)). Additionally, the definition of “wastes” given in OAR 603-095-0010(53) ‘includes but is not limited to commercial fertilizers, soil amendments, composts, animal wastes, vegetative materials or any other wastes.’

#### **1.4.5 Streamside Vegetation and Agricultural Water Quality**

Across Oregon, the Ag Water Quality Program emphasizes streamside vegetation protection and enhancement. Streamside vegetation can provide three primary water quality functions: shade to reduce stream temperature warming from solar radiation, streambank stability, and filtration of pollutants. Other water quality functions from streamside vegetation include: water storage in the soil for cooler and later season flows, sediment trapping that can build streambanks and floodplains, narrowing and deepening of channels, and biological uptake of sediment, organic material, nutrients, and pesticides. In addition, streamside vegetation provides habitat for numerous species of fish and wildlife. Streamside vegetation conditions can be monitored to track progress toward achieving conditions that support water quality.

##### **Site-Capable Vegetation**

The Ag Water Quality Program uses the concept of “site-capable vegetation” to describe the streamside vegetation that can be expected to grow at a particular site, given natural site factors (e.g., elevation, soils, climate, hydrology, wildlife, fire, floods) and historical and current human influences that are beyond the program’s statutory authority (e.g., channelization, roads, modified flows, previous land management). Site-capable vegetation can be determined for a



specific site based on current streamside vegetation at the site, streamside vegetation at nearby reference sites with similar natural characteristics, Natural Resources Conservation Service (NRCS) soil surveys and ecological site descriptions, and/or local or regional scientific research.

The goal for Oregon's agricultural landowners is to provide the water quality functions (e.g., shade, streambank stability, and filtration of pollutants) produced by site-capable vegetation along streams on agricultural lands. The Area Rules for each Management Area require that agricultural activities allow for the establishment and growth of streamside vegetation to provide the water quality functions equivalent to what site-capable vegetation would provide.

Occasionally, mature site-capable vegetation such as tall trees may not be needed along narrow streams. For example, shrubs and grass may provide shade, protect streambanks, and filter pollutants. However, on larger streams, mature site-capable vegetation is needed to provide the water quality functions.

In many cases, invasive, non-native plants, such as introduced varieties of blackberry and reed canarygrass, grow in streamside areas. This type of vegetation has established throughout much of Oregon due to historic and human influences and may provide some of the water quality functions of site-capable vegetation. ODA's statutory authority does not require the removal of invasive, non-native plants, however, ODA encourages landowners to remove these plants voluntarily. In addition, the Oregon State Weed Board identifies invasive plants that can impair watersheds. Public and private landowners are responsible for eliminating or intensively controlling noxious weeds, as described in state and local laws. For more information, visit [www.oregon.gov/ODA/programs/weeds](http://www.oregon.gov/ODA/programs/weeds).

#### **1.4.6 Soil Health and Agricultural Water Quality**

An increasingly important concept in Oregon and across the United States is soil health. The Ag Water Quality Program promotes soil health to reduce erosion and keep sediment out of surface waters, thereby helping to maintain and improve water quality. Healthy soils have relatively high organic matter and well-formed soil structure. These characteristics may resist erosion and increase water infiltration, leading to less surface runoff and greater groundwater recharge; the resultant groundwater flows in some cases can help moderate stream water temperatures. According to the NRCS and others, there are four Soil Health Principles that together build highly productive and resilient soils: minimize disturbance and maximize cover, continuous living roots, and diversity above and below the surface.

Healthy soils make farms and ranches more resilient. The western United States is experiencing higher temperatures, more weather variability, and greater storm intensity. Forecasts predict continued high-intensity storms in the winter and spring, combined with more frequent droughts, which may result in more erosion, especially on bare ground. Building soil health increases resiliency to extreme weather, protects water quality, and helps keep farms and ranches viable. Incorporating soil health practices can help landowners adapt and reduce risks. For more information, visit [www.nrcs.usda.gov/wps/portal/nrcs/detail/or/soils/health](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/or/soils/health).

### **1.5 Other Water Quality Programs**

The following programs complement the Ag Water Quality Program and are described here to recognize their link to agricultural lands.

### **1.5.1 Confined Animal Feeding Operation Program**

ODA is the lead state agency for the CAFO Program, which was developed to ensure that operators do not contaminate ground or surface water with animal manure or process wastewater. The CAFO Program coordinates with DEQ to issue permits. These permits require the registrant to operate according to a site-specific, ODA-approved, Animal Waste Management Plan that is incorporated into the CAFO permit by reference. For more information, visit [oda.direct/CAFO](http://oda.direct/CAFO).

### **1.5.2 Groundwater Management Areas**

Groundwater Management Areas (GWMA) are designated by DEQ where groundwater is polluted from, at least in part, nonpoint sources. After designating a GWMA, DEQ forms a local groundwater management committee comprised of affected and interested parties. The committee works with and advises the state agencies that are required to develop an action plan to reduce groundwater contamination in the area.

Oregon DEQ has designated three GWMA because of elevated nitrate concentrations in groundwater: Lower Umatilla Basin, Northern Malheur County, and Southern Willamette Valley. Each GWMA has a voluntary action plan to reduce nitrates in groundwater. After a scheduled evaluation period, if DEQ determines that voluntary efforts are not effective, mandatory requirements may become necessary.

If there is a GWMA in this Management Area, it is described in Chapter 2.

### **1.5.3 The Oregon Plan for Salmon and Watersheds**

In 1997, Oregonians began implementing the Oregon Plan for Salmon and Watersheds, referred to as the Oregon Plan ([www.oregon-plan.org](http://www.oregon-plan.org)). The Oregon Plan seeks to restore native fish populations, improve watershed health, and support communities throughout Oregon. The Oregon Plan has a strong focus on salmonids because of their great cultural, economic, and recreational importance to Oregonians, and because they are important indicators of watershed health. ODA's commitment to the Oregon Plan is to develop and implement Area Plans and Area Rules throughout Oregon.

### **1.5.4 Pesticide Management and Stewardship**

ODA's Pesticides Program holds the primary responsibility for registering pesticides and regulating their use in Oregon under the Federal Insecticide Fungicide Rodenticide Act. ODA's Pesticide Program administers regulations relating to pesticide sales, use, and distribution, including pesticide operator and applicator licensing as well as proper application of pesticides, pesticide labeling, and registration.

In 2007, Oregon formed the interagency Water Quality Pesticide Management Team (WQPMT) to expand efforts to improve water quality in Oregon related to pesticide use. The WQPMT facilitates and coordinates activities such as monitoring, analysis and interpretation of data, effective response measures, and management solutions. The WQPMT relies on monitoring data from the Pesticides Stewardship Partnership (PSP) program and other federal, state, and local monitoring programs to assess the possible impact of pesticides on Oregon's water

quality. Pesticide detections in Oregon's streams can be addressed through multiple programs and partners, including the PSP.

Through the PSP, state agencies and local partners work together to monitor pesticides in streams and to improve water quality ([www.oregon.gov/ODA/programs/Pesticides/Water/Pages/PesticideStewardship.aspx](http://www.oregon.gov/ODA/programs/Pesticides/Water/Pages/PesticideStewardship.aspx)). ODA, DEQ, and Oregon State University Extension Service work with landowners, SWCDs, watershed councils, and other local partners to voluntarily reduce pesticide levels while improving water quality and crop management. Since 2000, the PSPs have made noteworthy progress in reducing pesticide concentrations and detections.

ODA led the development and implementation of a Pesticides Management Plan (PMP) for the state of Oregon ([www.oregon.gov/ODA/programs/Pesticides/water/pages/AboutWaterPesticides.aspx](http://www.oregon.gov/ODA/programs/Pesticides/water/pages/AboutWaterPesticides.aspx)). The PMP, completed in 2011, strives to protect drinking water supplies and the environment from pesticide contamination, while recognizing the important role that pesticides have in maintaining a strong state economy, managing natural resources, and preventing human disease. By managing the pesticides that are approved for use by the US EPA and Oregon in agricultural and non-agricultural settings, the PMP sets forth a process for preventing and responding to pesticide detections in Oregon's ground and surface water.

### **1.5.5 Drinking Water Source Protection**

Oregon implements its drinking water protection program through a partnership between DEQ and the Oregon Health Authority (OHA). The program provides individuals and communities with information on how to protect the quality of Oregon's drinking water. DEQ and OHA encourage preventive management strategies to ensure that all public drinking water resources are kept safe from current and future contamination. For more information, visit [www.oregon.gov/deq/wq/programs/Pages/dwp.aspx](http://www.oregon.gov/deq/wq/programs/Pages/dwp.aspx).

## **1.6 Partner Agencies and Organizations**

### **1.6.1 Oregon Department of Environmental Quality**

The US EPA delegated authority to DEQ to implement the federal CWA in Oregon. DEQ is the lead state agency with overall authority to implement the CWA in Oregon. DEQ works with other state agencies, including ODA and the Oregon Department of Forestry (ODF), to meet the requirements of the CWA. DEQ sets water quality standards and develops TMDLs for impaired waterbodies, which ultimately are approved or disapproved by the US EPA. In addition, DEQ develops and coordinates programs to address water quality including NPDES permits for point sources, the CWA Section 319 grant program, the Source Water Protection Program (in partnership with OHA), the CWA Section 401 Water Quality Certification, and Oregon's Groundwater Management Program. DEQ also coordinates with ODA to help ensure successful implementation of Area Plans.

A Memorandum of Agreement between DEQ and ODA recognizes that ODA is the state agency responsible for implementing the Ag Water Quality Program. ODA and DEQ updated the Memorandum of Agreement in 2012 and reviewed and confirmed it in 2018 ([www.oregon.gov/ODA/shared/Documents/Publications/NaturalResources/DEQODAmoa.pdf](http://www.oregon.gov/ODA/shared/Documents/Publications/NaturalResources/DEQODAmoa.pdf)).

The Environmental Quality Commission, which serves as DEQ's policy and rulemaking board, may petition ODA for a review of part or all of any Area Plan or Area Rules. The petition must allege, with reasonable specificity, that the Area Plan or Area Rules are not adequate to achieve applicable state and federal water quality standards (ORS 568.930(3)(a)).

### **1.6.2 Other Partners**

ODA and SWCDs work in close partnership with local, state, and federal agencies and other organizations, including: DEQ (as described above), the United States Department of Agriculture (USDA) NRCS and Farm Service Agency, watershed councils, Oregon State University Agricultural Experiment Stations and Extension Service, tribes, livestock and commodity organizations, conservation organizations, and local businesses. As resources allow, SWCDs and local partners provide technical, financial, and educational assistance to individual landowners for the design, installation, and maintenance of effective management strategies to prevent and control agricultural water pollution and to achieve water quality goals.

## **1.7 Measuring Progress**

Agricultural landowners have been implementing conservation projects and management activities throughout Oregon to improve water quality for many years. However, it has been challenging for ODA, SWCDs, and LACs to measure progress toward improved water quality. ODA is working with SWCDs, LACs, and other partners to develop and implement strategies that will produce measurable outcomes. ODA is also working with partners to develop monitoring methods to document progress.

### **1.7.1 Measurable Objectives**

A measurable objective is a numeric long-term desired outcome to achieve by a specified date. Milestones are the interim steps needed to make progress toward the measurable objective and consist of numeric short-term targets to reach by specific dates. Together, the milestones define the timeline and progress needed to achieve the measurable objective.

The Ag Water Quality Program is working throughout Oregon with SWCDs and LACs toward establishing long-term measurable objectives to achieve desired conditions. ODA, the LAC, and the SWCD will establish measurable objectives and associated milestones for each Area Plan. Many of these measurable objectives relate to land conditions and primarily are developed for focused work in small geographic areas (section 1.7.3). ODA's longer-term goal is to develop measurable objectives, milestones, and monitoring methods at the Management Area scale.

The State of Oregon continues to improve its ability to use remote-sensing technology to measure current streamside vegetation conditions and compare these to the conditions needed to meet stream shade targets. As the State's use of this technology moves forward, ODA will use the information to help LACs and LMAs set measurable objectives for streamside vegetation. These measurable objectives will be achieved through implementing the Area Plan, with an emphasis on voluntary incentive programs.

At each biennial review, ODA and its partners will evaluate progress toward measurable objectives and milestone(s) and why they were or were not achieved. ODA, the LAC, and LMA will evaluate whether changes are needed to continue making progress toward the measurable objective(s) and will revise strategies to address obstacles and challenges.

The measurable objective(s) and associated milestone(s) within the Management Area are in Chapter 3 and progress toward achieving the measurable objective(s) and milestone(s) is summarized in Chapter 4.

### **1.7.2 Land Conditions and Water Quality**

Land conditions can serve as useful surrogates (indicators) for water quality parameters. For example, because shade blocks solar radiation from warming the stream, streamside vegetation, or its associated shade, generally is used as a surrogate for water temperature. In some cases, sediment can be used as a surrogate for pesticides or phosphorus, which often adhere to sediment particles.

The Ag Water Quality Program focuses on land conditions, in addition to water quality data, for several reasons:

- Landowners can see land conditions and have direct control over them,
- Improved land conditions can be documented immediately,
- Water quality impairments from agricultural activities are primarily due to changes in land conditions and management activities,
- It can be difficult to separate agriculture's influence on water quality from other land uses,
- There is generally a lag time between changes on the landscape and the resulting improvements in water quality,
- Extensive monitoring of water quality would be needed to evaluate progress, which would be expensive and may not demonstrate improvements in the short term.

Water quality monitoring data will help ODA and partners to measure progress or identify problem areas in implementing Area Plans. However, as described above, water quality monitoring may be slower to document changes than land condition monitoring.

### **1.7.3 Focused Implementation in Small Geographic Areas**

#### Focus Areas

A Focus Area is a small watershed with water quality concerns associated with agriculture. The Focus Area process is SWCD-led, with ODA oversight. The SWCD delivers systematic, concentrated outreach and technical assistance. A key component is measuring conditions before and after implementation to document the progress made with available resources. The Focus Area approach is consistent with other agencies' and organizations' efforts to work proactively in small watersheds.

Focus Areas have the following advantages: a proactive approach that addresses the most significant water quality concerns, multiple partners that coordinate and align technical and financial resources, a higher density of projects that may lead to increased connectivity of projects, and a more effective and efficient use of limited resources.

The current Focus Area for this Management Area is described in Chapter 3.

#### Strategic Implementation Areas

Strategic Implementation Areas (SIAs) are small watersheds selected by ODA, in consultation with partners, based on a statewide review of water quality data and other available information.

ODA conducts an evaluation of likely compliance with Area Rules and contacts landowners with the results and next steps. The Oregon Watershed Enhancement Board (OWEB) and other partners make funding and technical assistance available to support conservation and restoration projects. These efforts should result in greater ecological benefit than relying solely on compliance and enforcement. Landowners have the option of working with the SWCD or other partners to voluntarily address water quality concerns. ODA follows up, as needed, to enforce the Area Rules. Finally, ODA completes a post-evaluation to document progress in the SIA.

Any SIAs in this Management Area are described in Chapter 3.

## **1.8 Progress and Adaptive Management**

### **1.8.1 Biennial Reviews**

The ODA, LAC, LMA, and partners evaluate progress of Area Plan implementation through the biennial review process. At each biennial review, they discuss: 1) progress toward meeting measurable objectives and implementing strategies, 2) local monitoring data from other agencies and organizations, including agricultural land conditions and water quality, and 3) ODA compliance activities. As a result of these discussions, ODA and partners revise implementation strategies and measurable objectives in Chapter 3 as needed.

ODA provides information from the Oregon Watershed Restoration Inventory (OWRI) on restoration project funding and accomplishments at biennial reviews and uses the information for statewide reporting. The majority of OWRI entries represent voluntary actions of private landowners who have worked in partnership with federal, state, and local groups to improve aquatic habitat and water quality conditions. OWRI is the single largest restoration information database in the western United States. For more information, visit [www.oregon.gov/oweb/data-reporting/Pages/owri.aspx](http://www.oregon.gov/oweb/data-reporting/Pages/owri.aspx).

### **1.8.2 Water Quality Monitoring**

In addition to monitoring landscape conditions, ODA relies on water quality monitoring data where available. These data may be provided by other state or federal agencies or local entities; ODA seldom collects water quality samples outside of compliance cases.

As part of monitoring water quality status and trends, DEQ regularly collects water samples every other month throughout the year at over 130 sites on more than 50 rivers and streams across the state. Sites are located across the major land uses (forestry, agriculture, rural residential, and urban/suburban). Parameters measured include alkalinity, biochemical oxygen demand (BOD), chlorophyll a, specific conductance, dissolved oxygen (DO), DO percent saturation, bacteria (*E. coli*), ammonia, nitrate and nitrite, pH, total phosphorus, total solids, temperature, and turbidity.

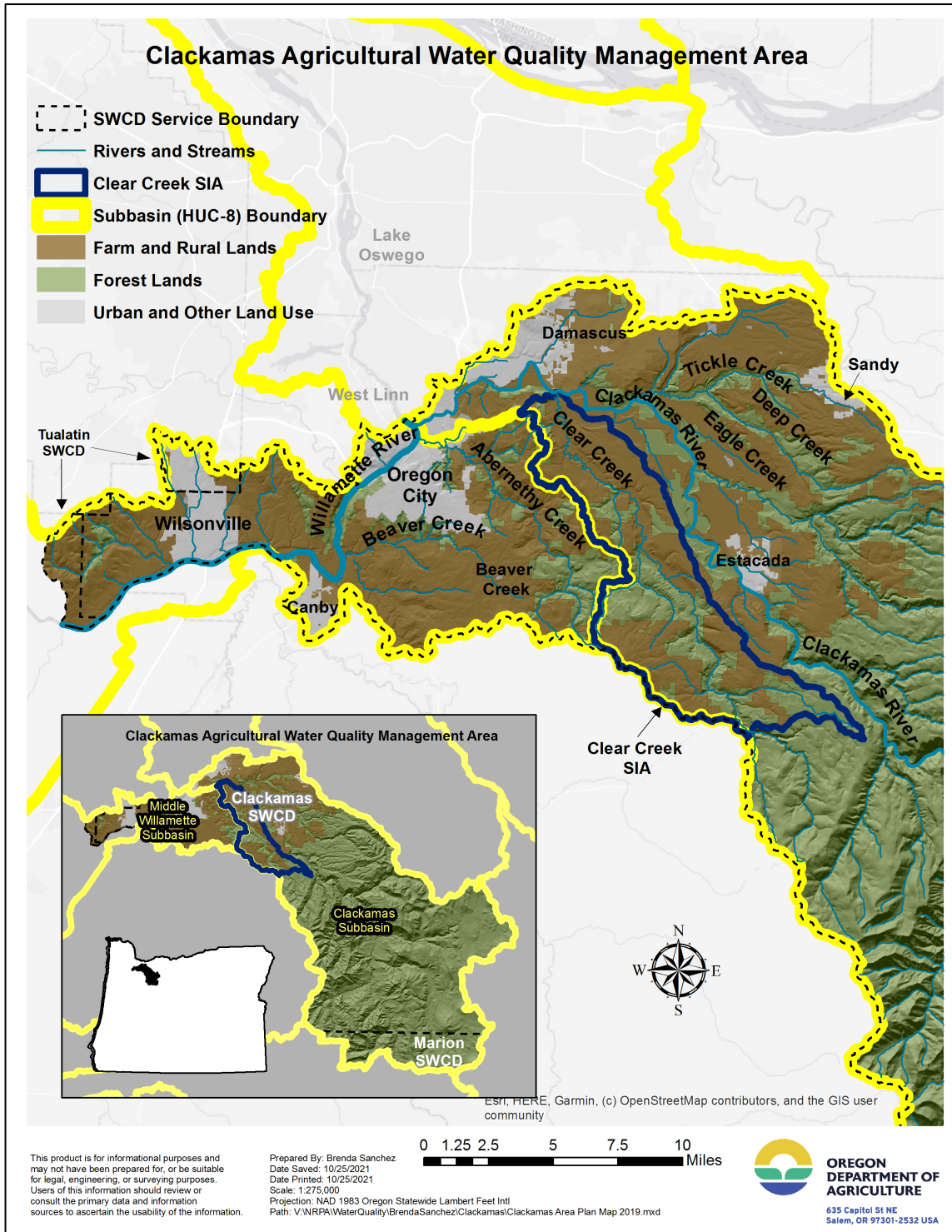
DEQ provides status and trends reports for selected parameters in relation to water quality standards. ODA will continue to work with DEQ to summarize the data results and how they apply to agricultural activities.

Water quality monitoring efforts in this Management Area are described in Chapter 3, and the data are summarized in Chapter 4.

## Chapter 2: Local Background

The Management Area includes the drainage area of the Clackamas River and several smaller watersheds near Oregon City and Wilsonville.

Figure 2. Clackamas Management Area.



## 2.1 Local Roles

This document is a plan to prevent and control water pollution from agricultural activities for the State to achieve water quality standards for water bodies in the Management Area (including the Clackamas River watershed and the neighboring Willamette River mainstem and tributaries to the west). The Area Plan was created through the joint efforts of the LAC, ODA, and the Clackamas SWCD.

### **2.1.1 Local Advisory Committee**

The LAC was formed to assist with the development of the Area Plan and Area Rules and with subsequent biennial reviews. Table 2.1.1 lists the current members of the LAC.

**Table 2.1.1 Current LAC members**

<b>Name</b>	<b>Geographic Representation</b>	<b>Agricultural Product or Interest Representation</b>
Barry Bushue (Chair)	Boring	Berries, flowers, pumpkins
Paul Staehely (Vice-Chair)	Oregon City	Dairy
Judy Bible	Oregon City	Christmas trees
Jim Calcagno	Oregon City	Fresh market vegetables
Sam Doane	Boring	Nursery; Production horticulture
Roger Fantz	Eagle Creek	Organic Christmas trees, berries, fruit, vegetables; timber; Clackamas SWCD Board
Kurt McKnight	Boring	Berries, apples
Lydon Scheeff	Oregon City	Grains
Jacqueline Tommas	Estacada	Nursery
Bob Underwood	Boring	Berries, hazelnuts, Christmas trees
Vacant		
Vacant		

Local Advisory Committees (LACs) are described in Oregon Administrative Rule (OAR) 603-090-0020. LAC membership shall reflect a balance of affected persons. Membership shall be composed primarily of landowners in the Management Area. Membership may include, but is not limited to:

- State Board of Agriculture representatives,
- Persons serving on local soil and water conservation districts,
- Private landowners,
- Representatives of local, state, and federal boards, commissions, and agencies,
- Members of Indian tribes,
- Members of the public,
- Persons associated with industry,
- Members of academic, scientific, and professional communities,
- Public and special interest groups.

### **2.1.2 Local Management Agency**

SWCDs implement Area Plans through OWEB capacity grants, with details negotiated between ODA and each SWCD. The resulting Scopes of Work define the SWCDs as the LMAs for implementation of the Ag Water Quality Program in specific Management Areas. The LMA for this Management Area is the Clackamas SWCD. This SWCD was also involved in development of the Area Plan and Area Rules.



The LMA implements the Area Plan by conducting the activities detailed in Chapter 3, which are intended to achieve the goals and objectives of the Area Plan.

## **2.2 Area Plan and Area Rules: Development and History**

The director of ODA initially approved the Area Plan and Area Rules in June 2001.

Since approval, the LAC has met biennially to review the Area Plan and Area Rules. The biennial review process includes an assessment of progress toward achieving the goals and objectives in the Area Plan.

## **2.3 Geographical and Physical Setting**

### **2.3.1 Location and Land Use**

The Management Area is approximately 680,136 acres (1,076 square miles) and includes the entire Clackamas Subbasin, an 8-digit Hydrologic Unit Code (HUC), number 17090011 (Figure 2). Most of the Clackamas Subbasin is in Clackamas County, with a small southern portion in Marion County. The Management Area also encompasses most of the Abernethy Creek-Willamette River watershed (10-digit HUC number 1709000704), located in the northeastern portion of the Middle Willamette Subbasin (HUC number 17090007). Elevation in the Clackamas Subbasin ranges from 12 feet at the mouth of the Clackamas River to 6,000 feet in the Cascade Range.

The predominant land use in the Management Area is timber, most of it occurring on federal lands in the eastern part of the Management Area. Seventy-eight percent of land in the Management Area is federal and private forestlands. In the valley portions of the Management Area, the dominant land use is rural and agriculture, with urban areas quickly expanding. In 2020, the population of Clackamas County was 418,187 ([www.census.gov](http://www.census.gov)).

Portland General Electric operates five hydroelectric facilities in the Management Area. Three facilities are on the mainstem Clackamas River. The other two facilities form Lake Harriet and Timothy Lake. The Timothy Lake facility, on the Oak Grove Fork, is the only large storage facility.

### **2.3.2 Agriculture**

Most farmland is in the western portion of the Management Area (Figure 1) on rolling hills and high terraces with somewhat- to well-drained soils. Part of the agricultural land is artificially drained. The slopes of most of the cultivated land ranges from zero to eight percent, with some up to thirty percent (Gerig, 1985).

Crop types in the Management Area shifted during the 20th century. In the mid-1800s, farming was based on subsistence, so small dairies were common. In the late 1800s, Italian prune orchards were common, especially in the Springwater area. Around 1900, a railroad reaching Estacada was built and dams on the Clackamas River were constructed. This helped change the focus of agriculture to grain, berries, and filberts. In the 1920s and 1930s, more people started specializing in dairies and potatoes and began converting grain to grass seed, especially

fine fescue. Many of these crops have been converted to Christmas trees and nursery stock, with berries still common in the Sandy/Damascus area.

Farming activities have also undergone changes. Cover cropping and field buffer strips are some of the methods used to minimize erosion. Improved equipment has allowed for fewer trips over a field, resulting in decreased compaction of soil. Subsoiling, when used appropriately, has also helped reduce runoff and compaction.

### **2.3.3 Water Resources**

The Clackamas River drains 940 square miles (600,700 acres) and flows into the Willamette River in the Gladstone / Oregon City area. This Management Area also includes the mainstem Willamette River (river miles 25 to 45) and creeks that flow directly into the Willamette River. The Abernethy Creek and Beaver Creek / Parrot Creek drainages flow into the Willamette River at Oregon City. The remaining creeks are west of the Willamette River in the Wilsonville area (Newland Creek, Boeckman Creek, Seely Ditch, Coffee Lake Creek, and Corral Creek). The 14 creeks drain 136 square miles.

Annual rainfall ranges from 46.5 inches in the Willamette Valley to an average of about 51.3 inches at Clackamas Lake (3,400 feet). Annual snowfall averages about 13.5 inches. The ratio for snowfall is 10 inches of snow per 1 inch of rain.

Water in the Management Area is appropriated and diverted primarily for municipal, fish, industrial, hydropower, and irrigation use. The amount of water appropriated in the Clackamas Subbasin is 716 cubic feet per second (cfs) and 30 cfs from the Willamette for the Wilsonville area. The primary consumptive use for which water rights are issued is municipal. In the Clackamas Subbasin, 58 cfs are allocated for irrigation. An estimated 22,150 acres were irrigated in the Clackamas Subbasin in 2012, according to the USDA National Agricultural Statistics Service. Of this, 67 percent was irrigated with surface water.

Stream flows in the Clackamas Subbasin vary widely between summer and winter. The high and low flows have different impacts on the landscape and resources. The slow release of snowmelt from the Cascades helps keep stream temperatures cool and maintain summer flows. Natural cover increases infiltration and allows a slow release of water. This in turn helps maintain summer flows and low stream temperatures. However, changes in vegetative cover or land uses can affect flow. With the removal of natural cover, runoff rates increase, and stream discharge peaks rise faster and higher with storm events, resulting in higher and sharper peak flows.

During winter high stream flows, soil erosion is a prominent concern. Higher stream temperatures associated with low flow in the summertime are a major factor affecting aquatic life, including salmonids. Additionally, flows on some of the Clackamas tributaries, such as Clear Creek, Deep Creek, and Roaring River, do not support all in-stream and out-of-stream uses year-round.

The Clackamas Subbasin includes several hot springs. Austin Hot Springs is located along the Upper Clackamas River. Numerous hot springs, including Bagby Hot Springs, are located along the Hot Springs Fork of the Collawash River.

### 2.3.4 Biological Resources

The diversity and extent of natural wildlife habitats in the Management Area has been reduced as land has been converted from natural forest, wetlands, and grasslands to managed forests, pasture, cropland, homesteads, and urban areas. As a result of these changes, some of the ecological functions of wetlands and riparian areas have been impaired. These areas filter contaminants, trap sediment, and provide fish and wildlife habitat. Wetlands and riparian areas also regulate hydrologic fluctuations by retaining water during high flows. This water replenishes groundwater and provides in-stream flows during summer low flows.

The Management Area hosts several vertebrate species that depend on aquatic habitats. Native salmonid and other fish species with a federal or state conservation status are summarized in Table 2.3.4.

<b>Species</b>	<b>Population</b>	<b>Federal Status Endangered Species Act</b>	<b>State Status Sensitive Species List or Oregon ESA</b>
<b>Steelhead Trout</b> – winter run ( <i>Oncorhynchus mykiss</i> )	Lower Columbia River	Threatened	Critical
	Upper Willamette River	Threatened	Vulnerable
<b>Chinook Salmon</b> – spring runs ( <i>Oncorhynchus tshawytscha</i> )	Lower Columbia River	Threatened	Critical
	Upper Willamette River	Threatened	Not Listed
<b>Chinook Salmon</b> – fall runs ( <i>Oncorhynchus tshawytscha</i> )	Upper Willamette River	Threatened	Critical
<b>Coho Salmon</b> ( <i>Oncorhynchus kisutch</i> )	Lower Columbia River	Threatened	Endangered
<b>Coastal Cutthroat Trout</b> ( <i>Oncorhynchus clarkii clarki</i> )	Lower Columbia River	Not Listed	Vulnerable
<b>Chum Salmon</b> ( <i>Oncorhynchus keta</i> )	Columbia River	Threatened	Critical
<b>Pacific Lamprey</b> ( <i>Lampetra tridentata</i> )	Oregon	Not Listed	Vulnerable
<b>Western Brook Lamprey</b> ( <i>Lampetra richardsoni</i> )	Oregon	Not Listed	Vulnerable
<b>Oregon Chub</b> ( <i>Oregonichthys cramerii</i> )	Oregon	Not listed	Threatened
<b>Sources:</b>			
1. National Marine Fisheries Service: ESA Status of West Coast Salmon and Steelhead (2011)			
2. Oregon Department of Fish and Wildlife: Sensitive Species List (2008)			
3. Oregon Department of Fish and Wildlife: Threatened, Endangered, and Candidate Fish and Wildlife Species in Oregon (PDF, no date, accessed 1/23/12)			

Additional native Oregon fish species include:

- Northern pikeminnow (*Ptychocheilus oregonensis*)
- Mountain whitefish (*Prosopium williamsoni*)
- Rainbow trout (*Oncorhynchus mykiss*)
- Bull trout (*Salvelinus confluentus*)
- Resident cutthroat trout (*Oncorhynchus clarki*)
- Peamouth (*Mylocheilus caurinus*)

- Red-sided shiners (*Richardsonius balteatus*)
- Three-spine stickleback (*Gasterosteus aculeatus*)
- White sturgeon (*Acipenser transmontanus*)
- Sculpins (*Cottus spp.*)

Aquatic amphibians and reptiles in the subbasin include several at-risk species (Oregon Department of Fish and Wildlife, 2008):

- Pacific giant salamander (*Dicamptodon ensatus*)
- Oregon spotted frog (*Rana pretiosa*)
- Coastal tailed frog (*Ascaphus truei*)
- Western toad (*Anaxyrus boreas*)
- Northern red-legged frog (*Rana aurora*)
- Cascades frog (*Rana cascadae*)
- Western painted turtle (*Chrysemys picta bellii*)
- Western pond turtle (~*Actinemys marmorata*)

Aquatic mammals in Clackamas County include beavers (*Castor canadensis*), muskrats (*Ondatra zibethica*), and river otters (*Lutris canadensis*). Several types of geese, ducks, and other bird species also live and feed in the Management Area's aquatic habitats.

## **2.4 Agricultural Water Quality**

### **2.4.1 Water Quality Issues**

While this Area Plan applies to all agricultural water pollution, the objectives and strategies currently emphasize parameters for which parameters are on the 303(d) list and those with an approved TMDL.

#### **2.4.1.1 Beneficial Uses**

Multiple beneficial uses in the Management Area require clean water, including drinking water, recreational activities, aquatic life, and agriculture ([www.oregon.gov/deq/Rulemaking%20Docs/table340a.pdf](http://www.oregon.gov/deq/Rulemaking%20Docs/table340a.pdf)).

While there may not be severe impacts on water quality from a single source or activity, the combined effects from all sources may contribute to the impairment of beneficial uses.

#### **2.4.1.2 WQ Parameters of Concern**

According to the 2018/20 Integrated Report, stream temperature, bacteria, and mercury are the primary water quality parameters of concern ([www.oregon.gov/deq/wq/Pages/epaApprovedIR.aspx](http://www.oregon.gov/deq/wq/Pages/epaApprovedIR.aspx)). These pollutants affect the most sensitive beneficial uses of water, which are salmonid production and survival, water contact recreation, and fish consumption.

There are also listings for aquatic weeds, biological criteria, chlorophyll a, dissolved oxygen, harmful algal blooms, iron, PCBs, and multiple pesticides.

**Temperature:** The seven-day-average maximum temperature of a stream identified as salmon and trout rearing and migration may not exceed numeric criteria.

**Bacteria:** *E. coli* are measured to determine the risk of infection and disease to people. Coliform bacteria live in soil or vegetation and in the gastrointestinal tract of animals. Coliforms enter water supplies from the direct disposal of waste into streams or lakes, or from runoff from wooded areas, pastures, feedlots, septic tanks, dog runs, and sewage plants into streams or groundwater. Bacteria sources include humans, wildlife, and livestock. Runoff and soil erosion can also carry bacteria into waterways.

**Mercury:** Primary sources in the Management Area include atmospheric deposition from global sources, land management activities and natural conditions that result in runoff or sediment erosion that can transport mercury to streams, and point sources (wastewater, stormwater, and industrial discharges). Mercury is tightly bound to organic matter in soils, and has accumulated over long periods of time, resulting in legacy concentrations in soil. Mercury is toxic to humans and aquatic life at high concentrations and can accumulate via the food chain in fish that humans consume. Mercury sources have contributed to a number of fish consumption advisories in the Clackamas Management Area.

**Dissolved Oxygen:** Dissolved oxygen is the amount of gaseous oxygen dissolved in water. Water temperature and the volume of flowing water can affect dissolved oxygen levels.

**Aquatic Weeds and Algae:** Harmful algal blooms are caused by over-production of naturally occurring cyanobacteria (blue-green algae). To date, there is no evidence that agriculture has contributed to any harmful algal bloom in the Management Area. **Chlorophyll a** is a measure of the amount of algae growing in a waterbody.

**Biological Criteria:** This listing identifies impaired communities of benthic macroinvertebrates but doesn't specify which pollutant may be affecting them.

**Pesticides:** Pesticides may harm human or animal life through acute (one-day) or chronic (lifetime) exposures. In addition, the cumulative effects of multiple pesticides at low concentrations may cause harm. US EPA has set benchmarks for acute and chronic exposures for the human populations most sensitive to exposure to pesticides that may be found in ground or surface water. In the Management Area, pesticide levels exceeding benchmarks to protect fish and invertebrates have been detected in several Clackamas River tributaries.

#### **2.4.1.3 TMDLs and Agricultural Load Allocations**

<b>Table 2.4.1.3: Pollutants with Approved TMDLs* and Load Allocations for the Clackamas Management Area</b>
<b>Temperature:</b> Applies to perennial and/or fish bearing waterbodies in the Management Area
<b>Load Allocation:</b> All nonpoint sources collectively (agriculture's allocation is not separate): background solar radiation loading based on system potential vegetation near the stream; maximum increase of 0.05°C
<b>Surrogate:</b> Effective shade
<b>TMDL:</b> Willamette Basin TMDL, Chapters 4, 6, and 7 (DEQ; approved 2006)

**TMDL Revisions:** DEQ is under a court order to update and replace the Willamette Basin temperature TMDL to be consistent with current temperature standards; DEQ must issue the updated TMDL for tributaries in the Clackamas Management Area by January 2024, and for the mainstem Willamette and Clackamas Rivers by February 2025 ([www.oregon.gov/deq/wq/tmdls/Pages/tmdlreplacement.aspx](http://www.oregon.gov/deq/wq/tmdls/Pages/tmdlreplacement.aspx))

**Bacteria (*E. coli.*):** Applies to all waterbodies in the Management Area

**Load Allocation:** 78% reduction compared to average loads in 2006

- 83% for Bargfeld Creek
- 89% for Delano Creek

**TMDL:** Willamette Basin TMDL, Chapters 2, 6, and 7 (DEQ; approved 2006)

**Mercury:** Applies to all perennial and intermittent streams in the Management Area

**Load Allocation:** For agriculture, forested, developed, and other non-urban land types:

- Clackamas Subbasin (HUC 17090011): 88% reduction in mercury
- Middle Willamette Subbasin (HUC 17090007): 97% reduction in mercury

**Surrogate:** Total Suspended Solids (TSS). TSS is used as a surrogate because (1) the focus is on controlling soil erosion and (2) sampling mercury is complex and expensive. The target is a 75% reduction.

**Timeline:** Load reductions must be achieved by 2048; the TMDL provides interim milestones

**Reporting:** ODA will report to DEQ (annually, with 5-year reviews), on progress toward implementing the TMDL for the entire Willamette Basin

**TMDL:** Willamette Basin Mercury TMDL (issued by DEQ in 2019, finalized by US EPA in 2021); the mercury TMDL was updated to reflect revised water quality standards that (1) establish safe levels of human fish consumption without unacceptable health risks and (2) protect aquatic life

\* TMDL information and documents can be found at:

[www.oregon.gov/deq/wq/tmdls/Pages/TMDLs-Willamette-Basin.aspx](http://www.oregon.gov/deq/wq/tmdls/Pages/TMDLs-Willamette-Basin.aspx)

ODA has recently initiated annual reporting to DEQ for agricultural water quality implementation related to TMDLs. See Chapter 4.2 (Table 4.2d) for results for this Management Area.

LAC members are concerned that the mercury load allocations are unrealistic and unattainable for nonpoint sources. Landowners can't control how much atmospheric mercury is being deposited on their property from the atmosphere. Legacy agriculture and upstream forest lands contribute to the mercury instream. Landowners can control the erosion coming off their property but are not getting credit for the work they have been doing.

LAC members are concerned that there is no timeline for the temperature TMDL. There are also concerns about the load allocation of the temperature TMDL and the difficulty of measuring 0.05 degrees C.

Despite the best and most earnest efforts, natural events may interfere with or delay attainment of the TMDL and/or its associated surrogates. Such events could be but are not limited to flood, fire, insect infestations, and drought. Under the prevention and control measures in the Area Rules, landowners are not responsible for mitigating or dealing with factors that do not result from agricultural activities.

#### **2.4.1.4 Drinking Water**

DEQ summarizes drinking water issues in each Management Area prior to biennial reviews. Their full report is available at: [www.oregon.gov/deq/wq/programs/Pages/Nonpoint-Implementation.aspx](http://www.oregon.gov/deq/wq/programs/Pages/Nonpoint-Implementation.aspx).

Ninety-seven public water systems obtain domestic drinking water from groundwater and surface water sources, to serve approximately 350,000 people.

Seven public water systems had recent alerts for nitrates and/or bacteria. All locations were either US Forest Service Campgrounds, small businesses, or mobile home parks, plus the City of Wilsonville. DEQ does not know whether the sources are related to agriculture, but the locations don't suggest that agriculture is a likely source of the pollutants.

Soils in the largely agricultural portion of the Management Area have a moderately high to high potential for leaching nitrate to groundwater. Nitrate from livestock manure, fertilizers, and septic systems can readily penetrate to the aquifers used for drinking water when leaching potential is high or very high, and bacteria removal through soil filtration can be less effective in sandy soils.

The Domestic Well Testing Act database (real estate transaction testing data) for 1989-2018 indicates that out of 1435 well results, only 20 wells had nitrate concentrations above 5 mg/L. Only about five of those wells were near potential agricultural contaminant sources, and all had values < 7 mg/L. Regardless, agricultural landowners should always work to keep bacteria and nitrates from entering ground and surface water.

#### **2.4.2 Sources of Impairment**

Non-point sources of pollution may include:

- Eroding agricultural and forest lands
- Eroding stream banks and roadways
- Erosion from development
- Lack of riparian shade producing vegetation
- Contaminated runoff from livestock and other agricultural operations
- Contaminated runoff from urban uses

Many of the water pollution sources are beyond the influence of agricultural landowners. Under the prevention and control measures in the Area Rules, agricultural landowners are not responsible for mitigating or dealing with factors that do not result from agricultural activities.

These factors include but are not limited to:

- Hot springs on the Clackamas River and other bodies of water in the Management Area,
- Septic systems, human waste from water-based recreation, and public sewage disposal,
- Public roadways or rights of way or easements next to streams, rivers, or other bodies of water,
- Public culverts, roadside ditches, drainage, and shoulders,
- Dams, dam removal, hydroelectric plants, and non-agricultural impoundments,
- Housing and other development in agricultural land areas,
- Extreme and/or unforeseen weather events,
- Any other factor that occurs on public or private lands outside the direct control of the landowner.

## 2.5 Regulatory and Voluntary Measures

### 2.5.1 Area Rules

The emphasis of the Area Plan is to promote voluntary actions by landowners to prevent and control water pollution from agricultural activities and soil erosion on agricultural and rural lands in the Management Area.

Prevention and control measures are a set of minimum regulatory standards that must be met on all lands in agricultural use and are defined in the Area Rules (in the boxes below). Agricultural landowners who fail to address these prevention and control measures may be subject to enforcement by ODA. Agricultural landowners should review the Area Rules and evaluate their operations to determine if they are in compliance.

**OAR 603-095-1240**

(2) Streamside Area Condition. Effective upon rule adoption.

(a) Streamside area conditions shall allow the establishment, growth, and/ or maintenance of native or non-native riparian vegetation appropriate to the site capability, that is sufficient to encourage shade and to protect the streamside area during high stream flow events up to and including those expected to occur during or following a 25-year, 24-hour storm event

**OAR 603-095-1240**

(3) Agricultural waste. Effective upon rule adoption.

(a) No person subject to these rules shall violate any provisions of ORS 468B.025 or ORS 468B.050.

If and where other governmental policies, programs, or regulations conflict with the Area Rules, ODA will consult with the agency(ies) and attempt to resolve the conflict in a reasonable manner.

The prevention and control measures do not apply to conditions resulting from unusual weather events or other exceptional circumstances that could not have been reasonably anticipated, such as fire, natural disaster, or extreme weather conditions.

### 2.5.2 Voluntary Measures

Many management strategies may be taken to prevent and control water pollution and protect watershed health. Contact the Clackamas SWCD for technical assistance. The SWCD tailors technical assistance to the needs and opportunities of each landowner and property. The strategies outlined below are not compliance measures. Conservation plans and management systems are additional tools that landowners may find helpful.

#### 2.5.2.1 Streamside Area Management

Adequate streamside vegetation provides three primary water quality functions (Council for Agricultural Science and Technology, 2012; National Council for Air and Stream Improvement, 2000; State of Oregon, 2000):

- Stream temperature moderation (vegetation blocks direct solar radiation).
- Reduced streambank erosion (roots stabilize banks and dissipate stream energy).



- Filtration of pollutants (e.g., bacteria, nutrients, toxics, sediment, mercury) from overland flows.

Beneficial strategies include:

- Rotational grazing in riparian areas, times when growth is palatable to animals and when soils are not saturated
- Exclude livestock from riparian areas
- Establish off-stream water facilities
- Plant perennial vegetation along streams

### **2.5.2.2 Agricultural Waste**

The aim of agricultural waste prevention and control is to minimize the transport of bacteria, nutrients, pesticides, pathogens, irrigation tailwater, mercury, and sediment into waters of the state. Because agricultural waste includes a broad range of substances, there are numerous conservation activities and strategies that may be taken to minimize waste inputs into waters of the state. A discussion of these strategies, broken down by pollutant, follows.

#### **2.5.2.2.1 Livestock Waste: Nutrients and Bacteria**

Manure is an important nutrient source for crop and pasture production. Proper livestock and waste management can decrease nutrient and bacteria contamination of surface and ground water. Waste should be properly collected, stored, and used. Pasture management can help maintain the integrity of pastures, thus decreasing waste runoff.

Beneficial strategies include:

- Vegetative buffer strips that capture pollutants before they enter streams
- Livestock waste: divert clean water around concentrated manure, cover manure piles, apply at agronomic rates for nitrogen and phosphorus based on soil and/or crop tissue tests
- Pasture management: temporary or permanent exclusion from waterways, prescribed grazing, off-stream water, hardened stream crossings and water gaps, limit livestock access to pastures with saturated soils
- Sacrifice areas (pens where animals are confined to protect pastures from trampling and compaction): cover with rock, hog fuel, and or/geotextiles; site away from stream
- Barns: site away from streams, install gutters and downspouts to keep water out of heavy use areas
- Silage: prevent leaching

#### **2.5.2.2.2 Crop Nutrients**

Crop nutrients are elements taken in by a plant that are essential to its growth, which are used by the plant in the production of its food and tissue. These elements include: carbon, hydrogen, oxygen, nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, zinc, iron, manganese, copper, boron, molybdenum, and chlorine. Sources of crop nutrients include, but are not limited to: irrigation water, chemical fertilizers, animal manure, compost, bio-solids, and leguminous and non-leguminous crop residues.

Over-application of crop nutrients may result in nutrients runoff to surface water or leaching into groundwater. This may cause nuisance algal growth, high pH, bacterial contamination, and a

decrease in dissolved oxygen. Landowners are encouraged to adopt sound agronomic strategies to guide crop nutrient applications, and to ensure that nutrient applications do not lead to contamination of drinking water wells.

Beneficial strategies include:

- Using fertilizer at agronomic rates,
- Setting realistic yield goals,
- Regular calibration of fertilizer application equipment,
- Appropriate application timing,
- Use of weather reports and crop growth stage to guide application timing,
- Periodic soil testing and plant tissue analysis,
- Periodic nutrient analysis of manure and/or compost products that are applied,
- Managing irrigation to prevent nutrient loss through leaching and/or surface runoff,
- Carefully managing nutrient applications and accounting for “non-fertilizer” sources of nutrients such as manure, compost bio-solids, and leguminous and non-leguminous crop residues.

### **2.5.2.2.3 Pesticides**

As required by law (ORS 634.372(2)), always apply chemicals in accordance with the label requirements in order to minimize crop damage, potential runoff, and leaching into groundwater. DEQ now requires a permit for pesticide applications in, over, or within three feet of water. This permit provides coverage for pesticide applications to control mosquitoes and other flying insect pests, weeds, algae, nuisance animals, and area-wide pest control. Please visit online for more information ([www.oregon.gov/deq/wq/wqpermits/Pages/Pesticide.aspx](http://www.oregon.gov/deq/wq/wqpermits/Pages/Pesticide.aspx)).

Beneficial strategies include:

- Calibrate, maintain, and correctly operate application equipment. Calibrate spray rigs each time you change the product and/or application rate. Nozzles need to be replaced often, particularly if an abrasive pesticide formulation (such as wettable powders) is used. Operate sprayers in the correct pressure range (dictated by the material and nozzle combination used) to prevent excess drift to non-target areas (e.g. waters of the state).
- Adopt integrated pest management (IPM) strategies. IPM promotes a diverse, multi-faceted approach to pest control. This strategy establishes an economic threshold for control actions, to guide the manager to use a variety of field/orchard sanitation and cultural practices, field scouting, beneficial insects, and other biological controls, and the use of properly selected chemical pesticides. While IPM does not exclude the use of chemical pesticides, it does seek to optimize their use and minimize off-target movement into the environment.
- Use vegetation to reduce erosion and surface runoff. Many legacy pesticides persist in the environment and adhere to soil particles, and surface runoff may contain dissolved pesticides. Examples include field borders, between-row vegetation, cover crops, and buffer strips along streams and ditches.
- Control erosion to minimize sediment entry into waterways.
- Watch for wind speed and direction to avoid drift. Get a free, calibrated windsock from the Clackamas SWCD.
- Store and handle pesticide materials correctly. Storage and handling facilities should be secure and include a leak-proof pad with curbing for mixing and loading. An alternative to a permanent, concrete pad is to always mix pesticides in the field, frequently moving sites to prevent chemical buildup. Wash/rinse water should be directly applied to the appropriate

crop. Empty liquid pesticide containers should be triple rinsed, then punctured and disposed of in an approved manner. Dry chemical bags should be emptied completely. Bundle and store paper bags until they can be disposed of in an approved manner.

- Watch for a pesticide waste collection day in your area. These events allow individuals to safely and anonymously drop off unwanted, unused, or out of date agricultural pesticides, along with some empty containers.

Contact the Clackamas SWCD for a copy of the Pesticide Stewardship Partnership (PSP) Strategic Plan for the Clackamas River Basin (Kilders and Cloutier, 2021)

#### **2.5.2.2.4 Irrigation Tailwater**

Over-application of irrigation water, resulting in tailwater entering waters of the state, can adversely impact waterbodies by contributing warm water, nutrients, pesticides, and sediment to waters of the state.

Irrigation scheduling decisions based on arbitrary considerations, such as calendar flood irrigation, should be avoided. Irrigation scheduling decisions should be based on site-specific factors that influence crop growth, such as:

- Evapotranspiration (crop type, stage of growth, percentage ground shade, weather conditions),
- Soil conditions (moisture, infiltration rate, water holding capacity),
- Irrigation system performance (uniformity, efficiency, application rate),
- Recent applications of crop nutrients and/or farm chemicals and other cultural practices (harvesting, cultivation, etc.).

Management strategies to help minimize irrigation tailwater reaching waters of the state include:

- Adopting an irrigation water management plan with irrigation soil moisture monitoring,
- Planting and irrigating crops on a contour,
- Planting sloping field edges to grasses,
- Installing sediment basins at field edges and in swales,
- Using drip irrigation when appropriate to crop type,
- Recycling return flows,
- Using no till or conservation tillage.

#### **2.5.2.2.5 Sediment**

While soil erosion is a natural process, poorly managed tillage operations and poorly managed streambanks can accelerate erosion rates to unacceptable levels. Erosion that results in sediment entering waters of the state could lead to excessively turbid water, sediment deposition in the water body, and reduced water quality. If soil is moving off the land and into waters of the state, pesticides, bacteria, mercury, and nutrients will likely accompany it. The sediment will also act to fill and widen streams, resulting in temperature increases and filled-in gravel spawning grounds for fish. Sediment entering waters of the state can disrupt a fish's respiratory process after entering a fish's gills.

Activities and strategies that landowners can use to minimize the mobilization of sediment into waters of the state include:

- Erosion prevention,
- Sediment control,

- Proper construction and maintenance of farm roads,
- Irrigation water management (described above).

Erosion prevention starts at the “top” of the hill by keeping soil particles from detaching and moving with water, wind, ice, or gravity. Sediment control is implemented at the “bottom” of the hill, after the erosion has occurred; for example, by placing straw bales in a swale to catch sediment. Landowners are encouraged to use erosion prevention techniques first and follow up with sediment control techniques if needed.

To minimize the mobilization of sediment into waters of the state, landowners are encouraged to:

- Switch from conventional tillage to conservation tillage or no till. While soil erosion is a natural process, poorly managed tillage operations have the potential to accelerate erosion rates to unacceptable levels.
- Plant or till perpendicular to slope following elevation contour lines.
- Utilize soil health principles and avoid leaving your soil bare or uncovered. Plant a cover crop. USDA Soil Health Website: [www.nrcs.usda.gov/wps/portal/nrcs/main/national/soils/health/](http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/soils/health/).
- Under certain farming conditions, sub-soiling or deep ripping a field can improve water infiltration.
- Control the timing and location of livestock grazing.
- Properly designed and maintained conservation strategies such as strip cropping, catch basins, grass-lined waterways, vegetative filter strips, straw bales, and other methods can be very effective in retaining sediment.

Roads and road-related structures (e.g., stream crossings, bridge abutments, cut slopes, etc.) have been identified in many watersheds as being significant sources of sediment input to streams. Many management methods are available for constructing and maintaining roads to increase their stability and reduce erosion. Some conservation strategies that can be used to minimize runoff from roads and staging areas are to design and construct an appropriate culvert, maintain a grass cover where appropriate, and construct water bars and/or grading roads.

While agricultural operations do not always have extensive road networks, a single poorly maintained road can comprise the vast majority of one farm’s sediment output. Consultation on conservation measures for road construction and maintenance is encouraged, especially for roads built on steeper terrain, and for roads close to or crossing streams. Landowners may be held liable for water pollution from roads constructed on their property and therefore should review the wording of any easement agreements.

#### **2.5.2.2.6 Mercury**

Agricultural landowners do not have any control over air deposition of mercury (past, present, or future), but they can adopt management strategies that reduce the runoff of sediment and water that carry mercury to stream systems. ODA has identified minimizing bare ground in winter as the strategy most likely to reduce sediment and mercury reaching streams. Additional high priority strategies are to limit livestock access to streamside areas, establish streamside vegetation for filtering, and stabilize channel banks. Addressing erosion from roads and road-related structures (Section 2.5.2.2.5) will also help prevent mercury from reaching stream

systems. Soil health strategies promote infiltration of precipitation, which reduces runoff of mercury to streams.

#### **2.5.2.2.7 Warning Signs That Agricultural Waste May Be Reaching Water**

Landowners often want to know what they need to do, or not do, to be in compliance with a rule or law. Some likely potential indicators of non-compliance with the Agricultural Waste Rule (OAR 603-095-1240(3)) include:

- Visible erosion scars in natural stream areas that would discharge soil into waterways,
- Visible sloughing from drainage ways in conjunction with livestock grazing, tillage, or other human destruction of riparian vegetation,
- Eroding road ditches, drainage ways, and field borders,
- Underground drainage tile outlets either improperly installed or maintained, allowing bank erosion to occur,
- Surface runoff from roads and staging areas that pick-up contaminants and flow to waters of the state,
- Irrigation application that creates surface runoff entering the waters of the state,
- Nutrients applied to open water,
- Visible trail of manure, compost, ash, or bio-solids to waters of the state,
- Pesticide product applied to open water unless labeled for such use and permitted,
- Chemigated waters flowing into surface waters, or flowing into or ponding around wells, cisterns, or other direct conduits to ground water,
- Runoff flowing through areas of high livestock usage and into waters of the state,
- Livestock waste located in drainage ditches or areas of flooding.

#### **2.5.2.2.8 Upland Management**

##### **Role of Upland Vegetation to Prevent and Control Pollution**

Upland areas are the rangelands, forests, and croplands located upslope from streamside areas. Upland areas extend to the ridge-tops of watersheds. With a protective cover of crops and crop residue, grass (herbs), shrubs, or trees, these areas will capture, store, and safely release precipitation, thereby reducing the potential of excessive soil erosion or delivery of soil or pollutants to the receiving stream or other body of water.

Healthy upland areas provide several important ecological functions, including:

- Capture, storage, and moderate release of precipitation reflective of natural conditions.
- Plant health and diversity that support cover and forage for wildlife and livestock.
- Filtration of sediment.
- Filtration of polluted runoff.
- Plant growth that increases root mass, utilizes nutrients, and stabilizes soil to prevent erosion.

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## Chapter 3: Implementation Strategies

### Goal

The goal of the Area Plan is to prevent and control water pollution from agricultural and rural lands within a framework of economic profitability and agricultural viability. The Area Plan is also designed to achieve applicable state water quality standards.

The LAC established these strategies to achieve the Area Plan goal:

- Prevent runoff of agricultural wastes: agricultural activities will not discharge any wastes or place waste where it is likely to run off into waters of the state.
- Prevent and control upland and cropland soil erosion using practical and available methods.
- Control active channel erosion to protect against sediment delivery to streams.
- Prevent bare areas due to livestock overgrazing near streams.
- Establish streamside vegetation along streams on agricultural properties to provide streambank stability, filtration of overland flow, and moderation of solar heating.

### **3.1 Measurable Objectives and Strategic Initiatives**

Measurable objectives allow the Ag Water Quality Program to better evaluate progress towards improved water quality and TMDL load allocations. A measurable objective is a numeric long-term desired outcome to achieve by a specified date. Milestones are the interim steps needed to make progress toward the measurable objective and consist of numeric short-term targets to reach by specific dates. Together, the milestones outline the timeline needed to achieve the measurable objective.

Any measurable objectives are stated here. Progress is reported in Chapter 4.1.

#### **3.1.1 Management Area**

For TSS, the mercury TMDL establishes a measurable objective for maximum instream TSS at 4 mg/L in 2049, with a 2019 milestone of 17 mg/L. Progress is reported in Section 4.1.1. TSS will be reduced by additional adoption of strategies to reduce upland and streambank erosion.

LAC members are concerned that the mercury load allocations are unrealistic and unattainable for nonpoint sources. LAC members are concerned how to measure progress in reducing TSS.

ODA, the LAC, and Clackamas SWCD would like to develop additional measurable objectives at the Management Area scale to track progress in meeting ODA goals, including TMDL targets.

Measurable objectives could include streamside vegetation conditions (related to shade and the temperature TMDL) and bare ground in winter (related to erosion and the mercury TMDL). ODA does not currently have methods to quantify land conditions across large geographic areas, therefore measurable objectives cannot be developed for them at this time.

#### **3.1.2 Focus Area**

There are currently no Focus Areas in the Management Area.

### **3.1.3 Strategic Implementation Area**

#### **Lower and Middle Clear Creeks SIA (Initiated 2020)**

The SIA is located near the center of the agricultural portion of the Management Area (Figure 2) and includes two sub-watersheds. ODA selected this SIA to join partner efforts in a Drinking Water Source Area and a Pesticide Stewardship Partnership (PSP). Agriculture includes livestock, horse stables, pasture, orchards, Christmas trees, nurseries, and small family farms. Agricultural water quality concerns are related to unmanaged livestock access to stream sides, manure management, soil erosion, and irrigation runoff. Water quality concerns are stream temperature, bacteria, and sediment.

#### **SIA Compliance Evaluation Method:**

ODA evaluated all agricultural tax lots within the SIA to identify opportunities to improve water quality and ensure compliance with Area Rules. The evaluation considered the condition of streamside vegetation, areas of bare ground, and potential livestock impacts (including manure management). The process involved both a remote (office-based) evaluation and field verification from publicly accessible areas. For further information see:

[www.oregon.gov/oda/shared/Documents/Publications/NaturalResources/SIAProgressReport.pdf](http://www.oregon.gov/oda/shared/Documents/Publications/NaturalResources/SIAProgressReport.pdf).

#### **Opportunity levels:**

- Limited Opportunity for Improvement (LIMITED): ODA identified no likely agricultural water quality regulatory concerns.
- Low Opportunity for Improvement (LOW): ODA identified no likely agricultural water quality regulatory concerns, but there may be an opportunity for improvement through voluntary measures to reach the goals of the Area Plan.
- Opportunity for Improvement (OPP): ODA identified that agricultural activities may impair water quality or evaluation was inconclusive.
- Potential Violation (PV): ODA observed during the Field Evaluation a potential violation of the Area Rules.

#### **Measurable Objective:**

By July 29, 2025, all 40 tax lots identified as a Potential Violation (PV) or an Opportunity for Improvement (OPP) will be downgraded to Low or Limited. This will be achieved through the SIA process. For PVs, ODA will conduct compliance site visits. For OPPs, the landowner can work on a voluntary basis with local partners to improve conditions; ODA will follow up with compliance site visits if needed.

### **3.1.4 Pesticide Stewardship Partnership**

The Clackamas Pesticide Stewardship Partnership (PSP) was initiated in 2005, after the completion of a 5-year monitoring study that showed the presence of a significant number of current use pesticides in streams and finished drinking water. The PSP has been collecting data (to determine the level of concern of these pesticides) and conducting outreach to landowners.

#### **Assessment Method:**

The PSP monitors 147 pesticides and their constituents in five tributaries to the lower Clackamas River. Currently sampled creeks are: North Fork Deep, Clear, Noyer, Sieben, and Rock. Deep and Eagle creeks were sampled for three years, but monitoring was suspended due to low detections in 2021. Pesticides are categorized as shown in Table 3.1.4.



**Table 3.1.4 Pesticide levels of concern. ALB = Aquatic Life Benchmark.**

REFERENCE LEVEL CRITERIA					
FREQUENCY OF DETECTION IN % LAST 3 YEARS	≥1 detection at or above 50% of an acute ALB	≥3 detections at or above 50% of a chronic ALB	1 to 2 detections at or above 50% of a chronic ALB	No detections over 50% of any ALB	
	100 to 65.1	High Level of Concern	High Level of Concern	High Level of Concern	Moderate Level of Concern
	65 to 35.1	High Level of Concern	High Level of Concern	Moderate Level of Concern	Moderate Level of Concern
	35 to 0	High Level of Concern	High Level of Concern	Moderate Level of Concern	Low Level of Concern

High concern pesticides for 2018-2020 are chlorpyrifos, diazinon, dimethenamid, imidacloprid, metsulfuron methyl, and oxyfluorfen. These pesticides are in products registered for use by almost all watershed users, not just agriculture.

Measurable Objectives and Associated Milestones:

By December 31, 2026, reduce all pesticides of high concern to low concern. This will be achieved through the voluntary landowner engagement via the PSP. 3.1.4 It will be difficult to meet the objective for imidacloprid because it is commonly used and will probably continue to be used as a substitute for other pesticides that are no longer available.

### 3.2 Proposed Activities

The Area Plan identified bacteria, stream temperature, and mercury as priority water quality parameters of concern. Events, activities, and technical assistance should focus on these concerns whenever possible and also inform landowners of the Area Rules.

The Area Plan can only achieve its goal through the cooperative and voluntary efforts of the agricultural community, ODA, the SWCD, the LAC, and Management Area partners. The SWCD and ODA should facilitate and collaborate with Management Area partners to conduct landowner and community engagement events, provide technical assistance, attend the biennial review of the Area Plan, assist with strategic initiatives, and conduct water quality monitoring.

ODA, the LAC, the SWCD, and other partners have identified the following priority activities, described in Table 3.2, to track progress toward meeting the goal and objectives of the Area Plan.

**Table 3.2 Planned Activities for 2022-2025 by the Clackamas SWCD.**

Activity	4-year Target	Description
<b>Community and Landowner Engagement</b>		
# events that actively engage landowners (workshops, demonstrations, tours)	6	Focus on soil health, which will address a variety of resource concerns
# landowners participating in active events	200	
<b>Technical Assistance (TA)</b>		
# landowners/managers provided with TA (via phone/walk-in/email/site visit)	75	Focus on soil health, which will address a variety of resource concerns
# site visits	40	

# conservation plans written*	10	
<b>On-the-ground Project Funding</b>		
# funding applications submitted	5	Focus on soil health, which will address a variety of resource concerns

### 3.3 Water Quality and Land Condition Monitoring

Monitoring is an essential activity to tracking the status and trend of water quality in the Management Area as well as understanding the influences land conditions have on water quality. Data collected from collaborative monitoring efforts can be useful in developing measurable objectives that measure changes in environmental conditions. Data can also be utilized in software applications that model land conditions. Additionally, data analysis and results can be informative in determining if goals and strategies of the Area Plan are being achieved.

Water quality monitoring must be performed using quality assurance procedures and specialized equipment that takes funding, time, and resources to accomplish.

#### **3.3.1 Water Quality**

DEQ monitors three sites in the Management Area as part of their ambient monitoring network.

In 2021, a temperature monitoring study was undertaken for the Clackamas River subbasin, with 80 sampling locations maintained by a combination of state, federal, and local agencies, and volunteers. Data will also be collected in the summers of 2022 and 2023. Interim results will be available annually, and overall findings and recommendations will be available in 2024.

For a description of monitoring and evaluation results, see Section 4.3.1.

# Chapter 4: Progress and Adaptive Management

## 4.1 Measurable Objectives and Strategic Initiatives

The following tables provide the assessment results and progress toward measurable objectives and milestones in the last four years. See Chapter 3.1 for background and assessment methods.

### 4.1.1 Management Area

For TSS, the mercury TMDL establishes the long-term target for maximum instream TSS at 4 mg/L in 2049, with a short-term 2019 target of 17 mg/L.

To date, the only available TSS data are from the DEQ Status and Trends Report; results are described in Section 4.3.1. The Clear Creek monitoring site is achieving the 2019 target, the Deep Creek monitoring sites are slightly above the 2019 target. The other two monitoring locations are well above the 2019 target, although most values are <19 mg/L.

ODA, the LAC, and the SWCD have not yet established other measurable objectives for the Management Area.

### 4.1.2 Focus Area

There are no Focus Areas in the Management Area.

### 4.1.3 Strategic Implementation Area

#### 2020 Lower and Middle Clear Creeks SIA

The 2020 Lower and Middle Clear Creeks SIA is still early in the SIA process. The Field Evaluation was completed in July 2021 and the Partner Meeting was held in September 2021. After the Open House (scheduled for early 2022), the SWCD can begin working with landowners in the SIA. During the next Area Plan review, accomplishments will be reported in Table 4.1.3.

**Table 4.1.3 Strategic Implementation Area**

<b>Evaluation Results</b>		
As of July 29, 2021, 40 tax lots were identified as either a Potential Violation or an Opportunity for Improvement. LIMITED = 1,998, LOW = 215, OPP = 35, PV = 5		
<b>Measurable Objective</b>		
By July 29, 2025, all 40 tax lots identified as a Potential Violation or an Opportunity for Improvement will be downgraded to Low or Limited opportunity levels.		
<b>Adaptive Management Discussion</b>		
<i>Were measurable objectives and local partner objectives achieved?</i>		
SIA is open and SIA work is continuing. Adaptive management discussion will be available at the next Area Plan review.		
<b>Activity</b>	<b>Accomplishment</b>	<b>Description</b>
<b>ODA</b>		
# acres evaluated	25,081	
# stream miles evaluated	148	

# landowners at Open House		To Be Completed
# landowners receiving outreach materials		
<b>SWCD and Conservation Partners</b>		
# landowners/managers provided with TA		To Be Completed
# site visits		To Be Completed
# conservation plans written		To Be Completed
<b>On-the-ground Project Funding</b>		
# funding applications submitted		To Be Completed
# funding applications awarded		

#### 4.1.4 Pesticide Stewardship Partnership

**Table 4.1.4 Pesticide Stewardship Partnership**

<b>Measurable Objective (established 2021)</b>
By December 31, 2026, reduce all pesticides of high concern to low concern. It will be difficult to meet the objective for imidacloprid because it is commonly used and will probably continue to be used as a substitute for other pesticides that are no longer available.
<b>Current Conditions</b>
High concern pesticides are chlorpyrifos, diazinon, dimethenamid, imidacloprid, metsulfuron methyl, and oxyfluorfen.
<b>Activities and Accomplishments</b>
<ul style="list-style-type: none"> <li>• Since 2007, 82 tons of pesticides have been turned in at collection events</li> <li>• Provided windsocks that attach to a tractor to help farmers quickly make accurate decisions to reduce pesticide drift from spraying</li> <li>• Provided cost-share for appropriate sprayer nozzles to reduce waste</li> <li>• Developed fact sheets for agricultural producers</li> </ul>
<b>Adaptive Management Discussion</b>
The PSP continues to define and reach out to target audiences. They plan the following for this biennium: <ol style="list-style-type: none"> <li>1. Create outreach materials for specific agricultural producers, starting with Christmas trees and then nurseries.</li> <li>2. Coordinate development of a Filtration Hedgerow Planting Plan for agricultural producers.</li> <li>3. Direct outreach to landowners to implement pesticide reduction strategies.</li> </ol>

#### 4.2 Activities and Accomplishments

ODA, the LAC, the SWCD, and other partners identified the following priority activities to track progress toward meeting the goal and objectives of the Area Plan.

Future Area Plans will compare results and targets in Table 4.2a.

**Table 4.2a Activities conducted in 2018-2021 by Clackamas SWCD and Clackamas River Basin Council.**

Activity	4-year results	Description
<b>Landowner Engagement</b>		
# events that actively engage landowners (workshops, demonstrations, tours)	22	Small farm school, Clackamas County Fair, Manure Horse Workshop, North Willamette Horticultural Society Meeting,
# landowners participating in active events	1,254	

Riparian restoration work parties	1,033 4,056	# volunteers; # hours
<b>Technical Assistance (TA)</b>		
# landowners/managers provided with TA (via phone/walk-in/email/site visit)	40	
# site visits	23	
# conservation plans written*	7	
<b>On-the-ground Project Funding</b>		
# funding applications submitted	3	
# funding applications awarded	?	Not reported to ODA.
* Number reported likely double-counts some landowners due to tracking methods.		
** Definition: any written management plan to address agricultural water quality concerns, such as: nutrients, soil health, grazing, irrigation, and streamside vegetation. Can include farm and ranch plans (including small acreages) and NRCS-certified plans. Excludes projects with weak connection to agricultural water quality.		

Tables 4.2b and 4.2c summarize information from OWRI on restoration project funding and accomplishments on agricultural lands in the Management Area. The majority of OWRI entries represent voluntary actions of private landowners who have worked in partnership with federal, state, and local groups to improve aquatic habitat and water quality conditions. OWRI results are provided annually in January after a year of proofing and GIS management.

**Table 4.2b Implementation funding (cash and in-kind) for projects on agricultural lands reported 1997-2018** (OWRI data include most, but not all projects, implemented in the Management Area ).

Landowners	OWEB	DEQ	NRCS	Clackamas County	ODFW	Oregon Wildlife Heritage Foundation	All other sources*	TOTAL
\$89,744	1,189,408	2,098	5,908	497,973	140,488	79,463	335,296	\$2,340,408

\* Includes city, county, tribal, other state and federal programs, and non-profit organizations. There are too many entities to list.

**Table 4.2c Miles and acres treated on agricultural lands reported 1997-2018** (OWRI data include most, but not all projects, implemented in the Management Area).

Activity Type	Miles	Acres	Count*	Activity Description
Riparian	29	31		Weed control, riparian fencing
Fish Passage	91		18	Culverts/structures/fords replaced with culverts
Instream	7			
Wetland		10		
Road			1	
Upland		12		
<b>TOTAL</b>	127	53	19	

\* # of hardened crossings, culverts, etc.

ODA has recently initiated annual reporting to DEQ for agricultural water quality implementation related to TMDLs. Table 4.2d shows a subset of key on-the-ground practices implemented in this Management Area in 2020. Practices are reported by Practice Group (suite of similar practices that use the same reporting unit). Table 4.2d also conveys which practice groups help to address the temperature, bacteria, and/or mercury TMDLs.

**Table 4.2d On-the-ground practices implemented** – 2020 annual report (data sources: SWCD Scope of Work and NRCS - duplicate reporting has been removed; additional practices may have been implemented by landowners on their own or by other conservation partners)

Practice Group	Unit	# Implemented	Temperature	Bacteria	Mercury
UPLAND					
Irrigation	Acres		x		x
Fence	Feet			x	x
Woody Plantings	Acres	0.1			x
Cover Plantings	Acres	4.6			x
Heavy Use Area	#			x	x
RIPARIAN					
Woody Plantings	Acres		x	x	x
Fence	Feet		x	x	x

### 4.3 Water Quality and Land Condition Monitoring

#### 4.3.1 Water Quality

DEQ analyzed data for *E. coli*, pH, dissolved oxygen, temperature, total phosphorus, and TSS in the Management Area (DEQ, 2020 Oregon Water Quality Status and Trends Report, [www.oregon.gov/deq/wq/programs/Pages/wqstatustrends.aspx](http://www.oregon.gov/deq/wq/programs/Pages/wqstatustrends.aspx)).

Data are from DEQ, US EPA, and USGS databases for 2000 through 2019. DEQ determined status for stations in four-year periods and trends for stations with at least eight years of data collected at the same time of year.

DEQ's three ambient monitoring sites are: Clackamas River at Memaloose Road, at McIver Park, and at High Rocks. The Memaloose site is in national forest, McIver Park is near Estacada and upstream of most of the agriculture, and High Rocks is above Gladstone near the confluence with the Willamette.

Table 4.3.1 Attainment of water quality standards for 2016-2019, and 2000-2019 trends. Yes = attaining standards; No = not attaining standards.						
Site Description (starting downstream)	Parameter					
	<i>E. coli</i>	pH	Dissolved Oxygen	Temperature	Total Phosphorus (mg/L)	TSS (mg/L)
	Attainment Status and Trend				median; maximum <sup>1</sup>	median; maximum <sup>2</sup>
Clackamas R abv Gladstone	Yes	Yes	Yes ↑	No ↓	0.02; 0.11	2; 73
Clear Creek watershed: Bargfeld Cr at Fischers Mill Rd	Mostly	Yes	No	-	-	1; 16
Deep Creek: multiple locations	No	Yes	Mixed	-	-	~2; 20
Clackamas R @ McIver Park/ Estacada	Yes	Yes	Yes	No ↓	0.02; 0.09	1; 43

<sup>1</sup> DEQ has no benchmark for total phosphorus in this Management Area; ODA benchmark for potential water quality concerns = 0.08 mg/L

<sup>2</sup> DEQ has no benchmark for TSS in this Management Area

↑ Statistically significant improving trend

↓ Statistically significant degrading trend

The Status and Trends Report did not identify many issues, especially issues attributable to agriculture. Water temperatures already exceed the water quality standard on the national forest. The main water quality concerns were *E. coli* and dissolved oxygen in some of the tributaries. Deep Creek and Clear Creek watersheds are mostly agricultural, and the issues may

be related to agricultural activities. More data are needed to determine where agriculture may be contributing to water quality problems.

For the Clackamas River subbasin temperature study, 2021 results are not available yet. A preliminary analysis indicates that most sampling locations recorded a stream temperature spike during the unprecedented “heat dome” event of late June 2021, and many sampling locations also recorded moderate to significant exceedances of temperature criteria throughout the summer.

#### 4.4 Biennial Reviews and Adaptive Management

ODA, the LAC, the SWCD, and other partners met on January 10, 2022, to review implementation of the Area Plan and provided recommendations for the future (Tables 4.4a and 4.4b).

**Table 4.4a Summary of biennial review discussion**

<b>Progress</b>
<ul style="list-style-type: none"> <li>• Strong cooperation amongst all groups (community, organizations, agencies, and SWCD)</li> <li>• Local groups have realistic understanding of what’s achievable</li> <li>• Good communication with landowners</li> <li>• Many opportunities for cost-share</li> <li>• Good networking and coming up with solutions</li> <li>• Landowners have healthy relationship with SWCD</li> <li>• There are more fish in the river so WQ must be improving</li> <li>• Some increase in water quality monitoring</li> <li>• LAC meeting and discussions are helpful</li> </ul>
<b>Impediments</b>
<ul style="list-style-type: none"> <li>• Landowners grow hundreds of specialty crops; there is not enough research and knowledge to provide plans for all these crop types (e.g., customized integrated pest management)</li> <li>• State agencies don’t communicate enough amongst themselves</li> <li>• TMDL process is not ag-friendly</li> <li>• TMDLs sets unrealistic targets</li> <li>• Landowners don’t get credit for the work they are doing on their own, e.g., planting cover crops</li> <li>• Lack of water quality monitoring data to show status of agricultural streams</li> <li>• Lack of data to show improvements in either land conditions or water quality</li> <li>• Local organizations do not have the capacity to design monitoring programs</li> </ul>
<b>Recommended Modifications and Adaptive Management</b>
<ul style="list-style-type: none"> <li>• DEQ and ODA provide TMDL information to landowners (e.g., presentations to commodity groups)</li> <li>• DEQ and ODA need to be clearer on what landowners need to do to respond to TMDLs</li> <li>• Collect baseline data to determine and set realistic goal posts</li> <li>• Need a monitoring strategy, probably led by ODA and DEQ</li> <li>• Set goals to limit erosion</li> </ul>

**Table 4.4b Number of ODA compliance actions in 2018-2021.**

Location	Letter of Compliance	Pre-Enforcement Notification	Notice of Noncompliance	Civil Penalty
Outside SIA(s)	8	11	3	0
Within SIA(s)	0	0	0	0

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