OREGON DEPARTMENT OF AGRICULTURE

Tualatin River Watershed Agricultural Water Quality Management Area Plan

May 2023

Developed by the

Oregon Department of Agriculture

and the

Tualatin River Watershed Local Advisory Committee

with support from the

Tualatin Soil and Water Conservation District

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Acronyms and Terms

Ag Water Quality Program – Agricultural Water Quality Program
Area Plan – Agricultural Water Quality Management Area Plan
Area Rules – Agricultural Water Quality Management Area Rules
CAFO – Confined Animal Feeding Operation
CWA – Clean Water Act
DEQ – Oregon Department of Environmental Quality
GWMA – Groundwater Management Area
HUC – Hydrologic Unit Code
LAC – Local Advisory Committee
LMA – Local Management Agency
Management Area – Agricultural Water Quality Management Area
NRCS – Natural Resources Conservation Service
OAR – Oregon Administrative Rules
ODA – Oregon Department of Agriculture
ORS – Oregon Revised Statute
OWEB – Oregon Watershed Enhancement Board
OWRI – Oregon Watershed Restoration Inventory
PSP – Pesticide Stewardship Partnership
SIA – Strategic Implementation Area
SWCD – Soil and Water Conservation District
TMDL – Total Maximum Daily Load
US EPA – United States Environmental Protection Agency

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Foreword

This Agricultural Water Quality Management 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 through a combination of outreach programs, suggested land treatments, management activities, compliance, and monitoring.

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 practices to address water quality issues.

Chapter 3: Implementation Strategies. Describes activities to make and track progress towards the goals of the Area Plan. Presents goals, measurable objectives, strategic initiatives, proposed activities, and monitoring efforts.

Chapter 4: Progress and Adaptive Management. Describes progress toward achieving Area Plan goals and measurable objectives by summarizing accomplishments and monitoring results.

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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 603-095-0540). 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

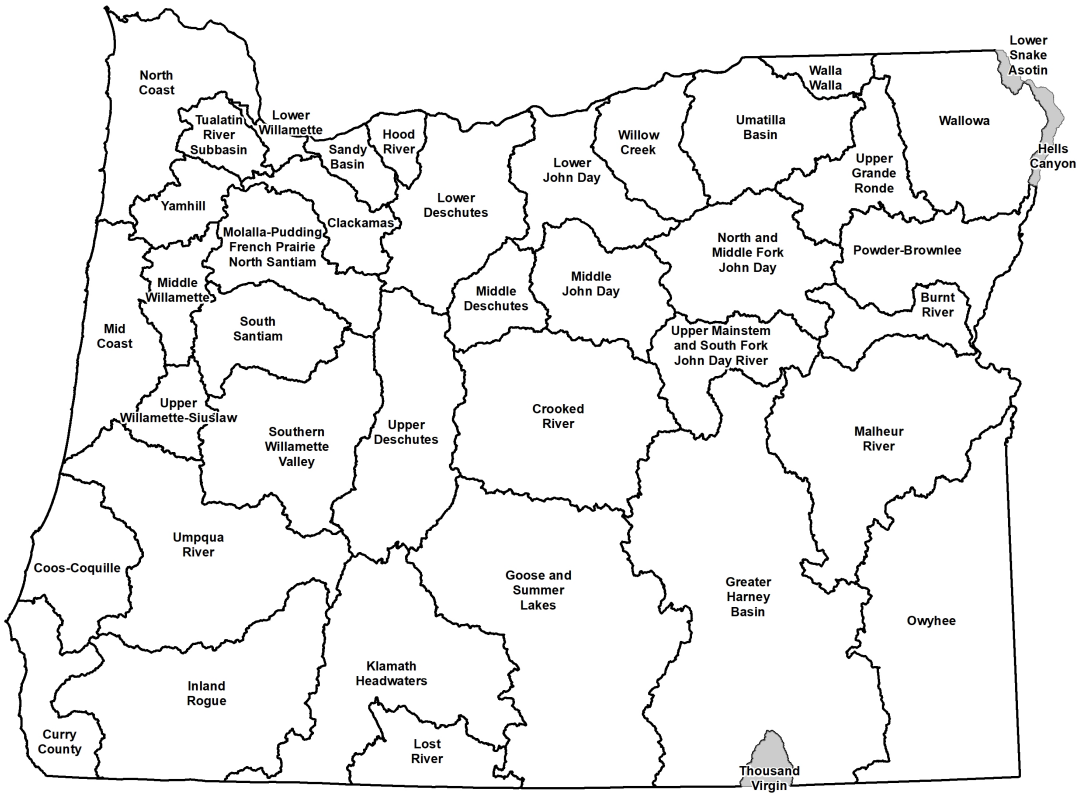
In 1993, the Oregon Legislature passed the Agricultural Water Quality Management Act directing ODA to develop plans to prevent and control water pollution from agricultural activities and soil erosion and achieve water quality standards and to adopt rules as necessary (ORS 568.900 through ORS 568.933). 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). The Area Plan and Area Rules were developed and subsequently revised pursuant to these statutes.

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.

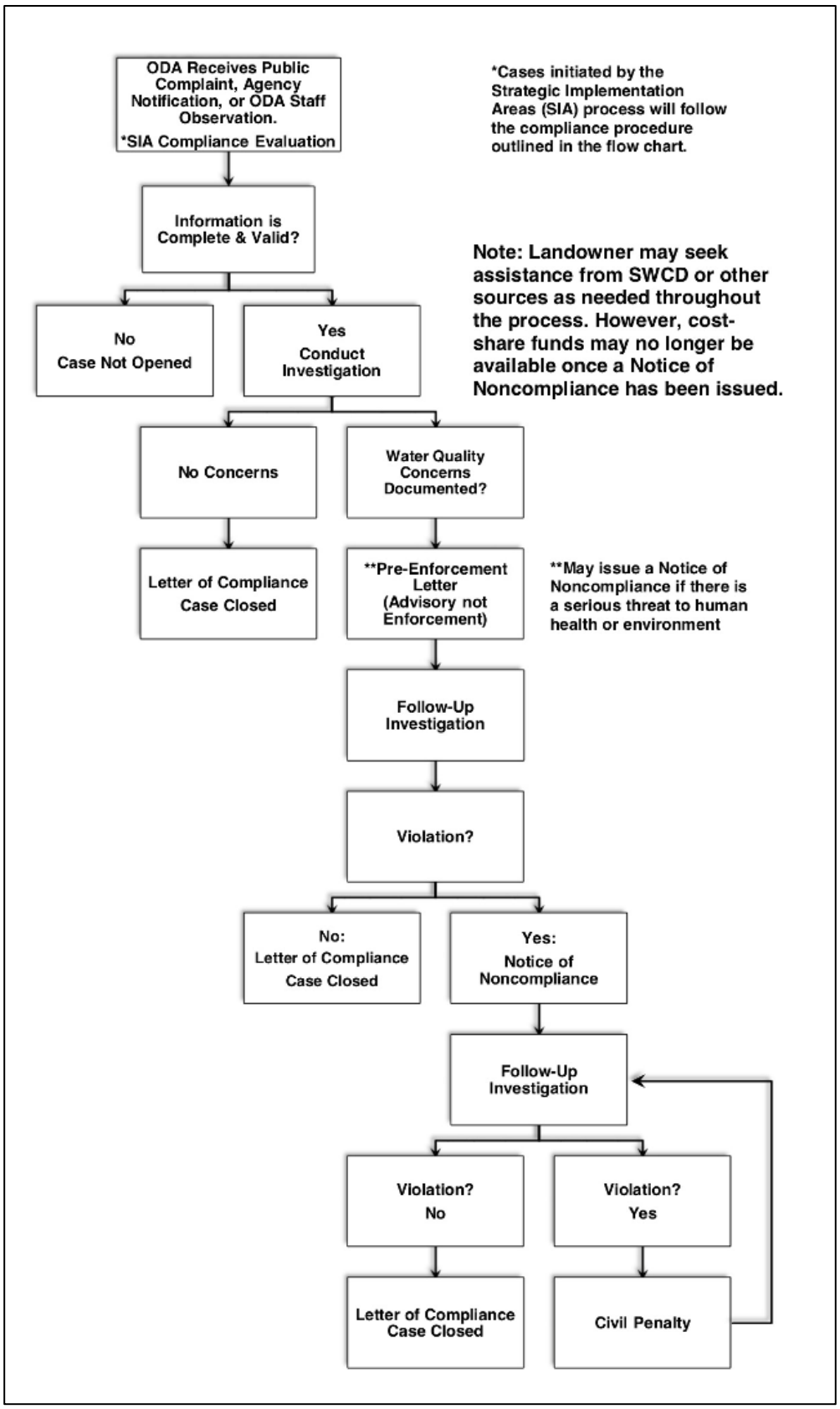
1.3.1.1 ODA Compliance Process

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 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,
- Wildfires and other natural disasters,
- 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

The public was encouraged to participate when ODA, LACs, and SWCDs initially developed the Area Plan and Area Rules. In each Management Area, ODA and the LAC held public information meetings, a formal public comment period, and a formal public hearing. ODA and the LACs modified the Area Plan and Area Rules, as needed, to address comments received. The director of ODA adopted the Area Plan and Area Rules in consultation with the Board of Agriculture.

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 2.4.1.1.

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, 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 2.4.

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 "impaired" waters that do not meet water quality standards. The resulting list is commonly referred to as the "303(d) list" (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 (www.oregon.gov/deq/wq/tmdls/Pages/default.aspx). DEQ has issued TMDLs for a portion of these waterbodies that identify pollutant reductions needed to meet Oregon's water quality standards. The associated water quality management plans identify responsible entities and document management strategies needed to meet pollutant reduction targets.

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. Water bodies are categorized as achieving water quality standards when data show the standards have been consistently attained.

In the TMDL, point sources are assigned waste load allocations that are then incorporated into National Pollutant Discharge Elimination System permits. Nonpoint sources (agriculture, forestry, and urban) are assigned a load allocation to achieve. The agricultural sector is responsible for helping achieve the pollution limit by achieving the load allocation assigned to agriculture specifically, or to nonpoint sources in general, depending on how the TMDL was written.

As part of the TMDL issuance process, DEQ identifies Designated Management Agencies and Responsible Persons, which are parties responsible for submitting TMDL implementation plans. For the agricultural sector, ODA is the Designated Management Agency, and the local Area Plans are recognized as the implementation plan for 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 2.4.1.

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 sets of Area Rules.

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.

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. (Note that the beneficial effects on water quality vary based on factors such as soil type and ecoregion.) 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.

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.

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.

1.5.2 Groundwater Management Areas

Groundwater Management Areas (GWMAs) 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 GWMAs 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.

Any GWMA in this Management Area is described in Chapter 2.4.1.5. Any Measurable Objectives for the GWMA will be described in Chapter 3.1.5.

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). 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, and 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 to expand efforts to improve water quality in Oregon related to pesticide use. This team facilitates and coordinates activities such as monitoring, analysis and interpretation of data, effective response measures, and management solutions. The team relies on monitoring data from the Pesticide 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). 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.

Any PSPs in this Management Area are described in Chapter 3.1.4.

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). 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. The program provides individuals and communities with

information on how to protect the quality of Oregon's drinking water. DEQ and the Oregon Health Authority 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.

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 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 National Pollutant Discharge Elimination System permits for point sources, the CWA Section 319 grant program, the Source Water Protection Program (in partnership with the Oregon Health Authority), 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).

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 NRCS and United States Department of Agriculture 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 effective 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 (Chapter 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 3.1 and progress toward achieving the measurable objective(s) and milestone(s) is summarized in Chapter 4.1.

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.

Any Focus Areas in this Management Area are described in Chapter 3.1.2. SWCDs will also continue to provide outreach and technical assistance to the entire Management Area.

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 3.1.3.

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.

1.8.2 Agricultural Water Quality Monitoring

In addition to monitoring land 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 more than 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, chlorophyll a, specific conductance, dissolved oxygen, bacteria (*E. coli)*, ammonia, nitrate and nitrite, pH, total phosphorus, total solids, temperature, and turbidity.

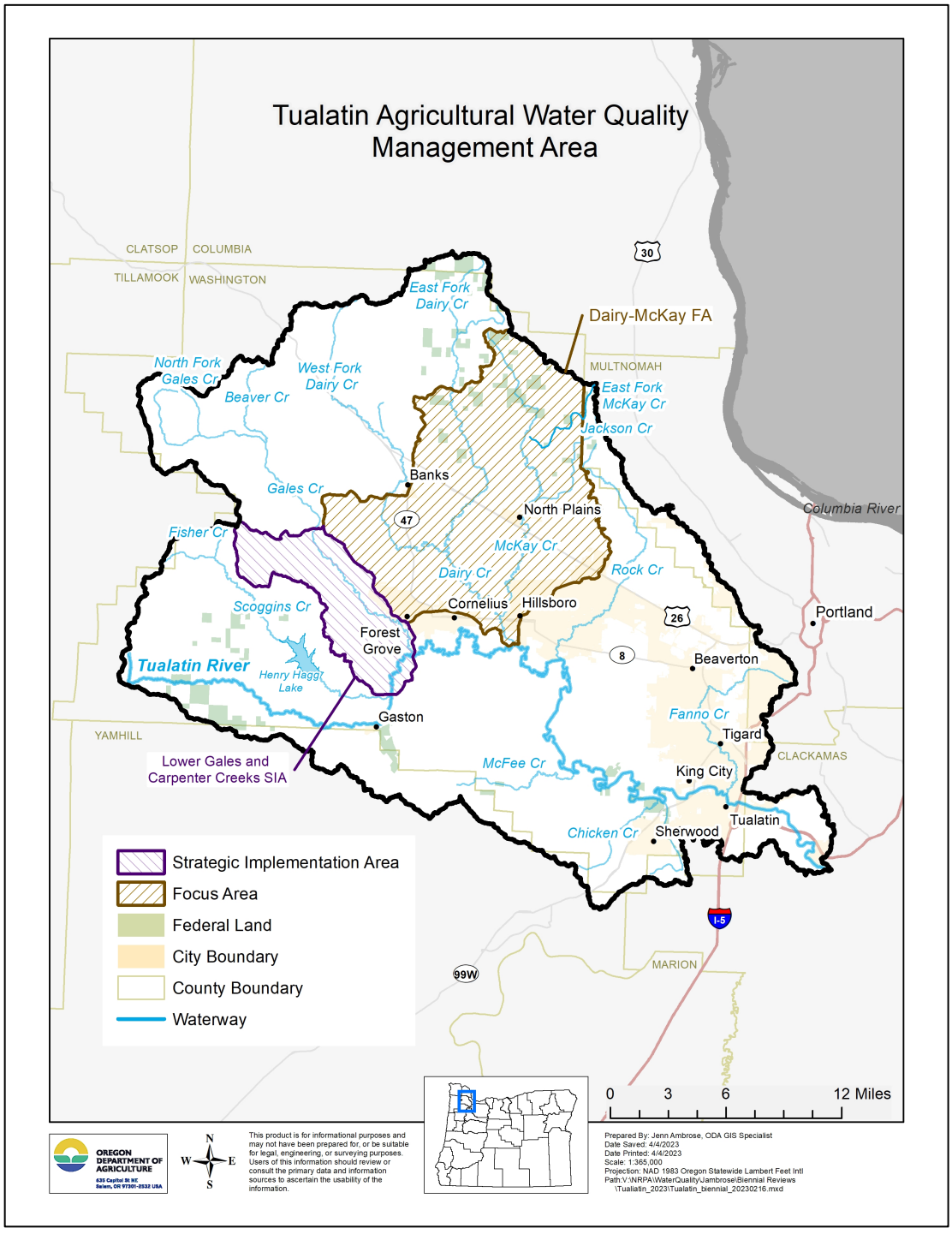
DEQ provides status and trends reports for selected parameters in relation to water quality standards. ODA will continue to work with DEQ to summarize the data results and how they apply to agricultural activities.

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

Chapter 2 provides the local geographic, water quality, and agricultural context for the Management Area. It also describes the water quality issues, Area Rules, and potential practices to address water quality issues.

Figure 2 Tualatin River Watershed Management Area



2.1 Local Roles

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. Due to recent membership changes, the LAC has lost representation from nurseries, vegetables, and OSU Extension.

Table 2.1.1 Current LAC members

Name	Geographic Representation	Description
Dan Logan (Chair)	North Plains	Christmas trees, timber
Jim Love	Forest Grove	Berries, Tualatin Valley Irrigation District
George Marsh	Cornelius	Dairy
Rich Hunter	Hillsboro	Clean Water Services
Jerry Ward	Scholls	Filberts, SWCD Board
Victoria Frankeny	Basin-wide	Tualatin Riverkeepers

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 primary LMA for this Management Area is Tualatin SWCD; some lands are under the jurisdiction of the Clackamas and West Multnomah SWCDs. These SWCDs were also involved in development of the Area Plan and Area Rules.

The ODA and the Tualatin SWCD intend to implement this Area Plan in mutual cooperation with private landowners, DEQ, USDA NRCS, Farm Service Agency, OSU Extension Service, Clean Water Services, private organizations, and federal, state, and local agencies.

The LMA implements the Area Plan by conducting 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 approved the initial Area Plan and Area Rules in 1996.

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

Location and Land Use
The Tualatin River Watershed Management Area is 453,688 acres encompassing most of Washington County and portions of Clackamas, Columbia, Multnomah, Tillamook, and Yamhill counties in northwest Oregon. Ninety one percent of the Management Area is in Washington County.

The Management Area is situated between the Coastal Mountains to the west, the Tualatin Mountains to the northeast and the Chehalem Mountains to the southeast. The elevation at the source of the Tualatin River is 1,856 feet and 160 feet at the confluence of the Tualatin and Willamette rivers in West Linn. The highest point in the Management Area is in the Coastal Mountains at 3,461 feet.

Washington County had a population of 2,652 in 1850 and a population of 26,376 in 1920, according to the census. Today, Washington County is home to over 500,000 people. The watershed is approximately 15 percent urban, 35 percent farmland/ rural and 40 percent forest. Major cities include Hillsboro, Beaverton, Forest Grove, Tigard, and Tualatin. Five percent of the watershed is managed by the state of Oregon and 2 percent is managed by the Bureau of Land Management. The remainder of the watershed is privately owned or in municipal use.

Agriculture

Most of Washington County was known by early settlers as the Twality Plains. The first pioneers became permanent settlers in 1834. As the population increased, agriculture developed rapidly. Hay, grain, and livestock were the major farm enterprises. In its early days Washington County produced a wide variety of crops such as grains, berries, orchard crops, seed crops, pasture, hay, and specialty crops.

Agriculture continues to be a significant land use in Washington County. In 2017, 104,715 acres on 1,755 farms produced $201,603,000 of agricultural products (eighth highest in Oregon) (http://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Volume_1,_Chapter_2_County_Level/Oregon/st41_2_0001_0001.pdf).

Soil Resources

In general, Management Area soils can be grouped into two groups: 1) residual soils derived from weathering and decomposition of underlying volcanic rock and 2) sedimentary or alluvial soils. Residual soils are mostly found in the uplands but can be found throughout the Management Area. Sedimentary soils were either weathered in place or transported and left as alluvial deposits. The soils are silty clay loam and silt loam with some gravelly silty clay loam or clay. These soil textures are found mainly on the valley floor and in upper terrace positions.

Soils are generally very deep, poorly to well-drained, and nearly level except for hill slopes. Runoff is primarily from bare soils. Sedimentation from runoff ranges from low to high. Maintaining maximum cover and using soil and water conservation practices on cropland minimizes soil loss. For detailed information about Management Area soils, see https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm

Water Resources

The Tualatin River is a tributary to the Willamette River. The Tualatin River is about 84 miles long. The watershed is approximately 43 miles long, 29 miles wide, and 712 square miles.

The physical characteristics of the Tualatin River vary dramatically from the headwaters to the mouth. The headwaters have narrow channels, several waterfalls, and steep gradients (74 feet per mile). Once the river reaches the valley floor, the slope decreases dramatically and the river begins to meander. The reservoir-like characteristics of the lower Tualatin are caused both by a very low natural gradient and the Oswego low-head diversion dam located at river mile 3.4.

The Management Area's western boundary is only about 23 miles inland from the Pacific Ocean and has a modified marine climate. Prevailing airflow moving across this area from the ocean greatly moderates the colder temperatures of winter and the heat of summer. The occasionally extreme temperatures are associated with outbreaks of dry continental air pushing westward through the Columbia Gorge and across the Cascade Mountains. Summers tend to be hot and dry with little rainfall. Streams are primarily fed by precipitation. Rain-on-snow events are uncommon but have occurred such as the widespread flooding that occurred in February 1996. Many streams are "flashy" when high rainfall rapidly elevates water levels in streams and then quickly returns to low flows after the storm passes. Annual rainfall ranges from 110 inches in the higher, western parts of the watershed to about 45 inches in the lower elevations. Around 70 percent of the precipitation falls between November and March. Major tributaries to the Tualatin River include Scoggins, Gales, Dairy (including East Fork, West Fork, and McKay creeks), Rock (including Beaverton Creek), and Fanno creeks. The flood plains along the Tualatin River and lower portions of major tributaries are subject to occasional to frequent flooding during winter and spring.

Many peak flows normally occur in January receding to base flow conditions in the summer months. Summer flow is supplemented with releases of water from Hagg Lake (Scoggins Reservoir) on Scoggins Creek and from Barney Reservoir, located on the Trask River, which diverts water into the upper Tualatin River. Flow augmentation has also occurred on tributaries during the summer. Effluent flow from wastewater treatment plants makes up a significant percent of downstream summer flows. Flow is also diverted from the Tualatin River to Oswego Lake in the lower portion of the river near river mile 6.7. Flow is increased by both flow augmentation of stored water and discharge from the wastewater treatment facilities in the basin (https://www.oregon.gov/deq/FilterDocs/tualatinCh1Overview.pdf).

Tualatin Valley Irrigation District releases water from Hagg Lake for irrigation and withdraws that water downstream near Forest Grove. The Joint Water Commission has stored water rights in both Barney and Hagg lakes, and releases water for municipal water supplies from both these locations. Water is withdrawn at the drinking water treatment plant near Forest Grove. While these releases provide additional water in the upper Tualatin River, the benefits of increased flow cease to occur at the points of diversion near Forest Grove in the upper basin (https://www.oregon.gov/deq/FilterDocs/tualatinCh1Overview.pdf).

2.4 Agricultural Water Quality

2.4.1 Water Quality Issues

Every water body in the Management Area contains some level of contaminants. The problem spans streams, creeks, rivers, lakes, ponds, construction sites, clearing and grading areas, and areas with septic systems. In the past, most water quality problems were traced to the most obvious cause: point source pollution. Much progress has been made in preventing additional water quality problems from point sources.

Nonpoint source pollution is more difficult to control because the sources are often hard to identify and difficult to measure. Nonpoint sources in the Management Area include contaminated agricultural lands, livestock operations, eroding stream banks and roadsides, failing septic systems, runoff from parking lots and construction sites, and irrigation and drainage systems. Pollutants from nonpoint sources are carried to the surface water or groundwater through the action of rainfall, irrigation runoff, erosion, and seepage.

Currently, water quality related to nutrients and animal waste is improving in the watershed. Most dairy owners in the area have installed conservation systems to manage nutrients. Thanks to the efforts of many individuals, ammonia is no longer a major concern. Although phosphorus levels have decreased, they remain a concern. There are also ongoing problems with low dissolved oxygen and pesticides.

While there may not be severe impacts on water quality from a single nonpoint source or activity, the combined effects from all sources contribute, along with impacts from other land uses and activities, to the impairment of beneficial uses of the Tualatin's waters. Pollutants from agricultural lands can reach the Tualatin and its tributaries through one of three means: 1) in solution in rainfall runoff or irrigation return flows, 2) attached to soil particles and transported via erosion, or 3) through solar loading due to lack of riparian vegetation.

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/wq/Pages/WQ-Standards-Uses.aspx).

2.4.1.2 Water Quality Parameters of Concern

The primary water quality concerns for agriculture in the 2022 Integrated Report are chlorophyll, stream temperature, dissolved oxygen, bacteria, biocriteria, and mercury as the primary issues in this Management Area (https://www.oregon.gov/deq/wq/Pages/epaApprovedIR.aspx). These are of concern for agriculture. There are also concerns with ammonia and other heavy metals. All these parameters are for waterbodies on the 303(d) list and/or those with an approved TMDL (Appendix A).

Temperature: Oregon's native cold-water aquatic communities, including salmonids, are sensitive to water temperature. Several temperature criteria have been established to protect various life stages and fish species. Many conditions contribute to elevated stream temperatures. On agricultural lands, inadequate streamside vegetation, irrigation water withdrawals, warm irrigation water return flows, farm ponds, and land management that leads to widened stream channels contribute to elevated stream temperatures. Elevated stream temperatures also contribute to excessive algal growth, which leads to low dissolved oxygen levels and high pH levels.

Bacteria: *Escherichia coli (E. coli)* is measured in streams to determine the risk of infection and disease to people. Bacteria sources include humans (recreation or failing septic systems), wildlife, and agriculture. On agricultural lands, *E. coli* generally comes from livestock waste, which is deposited directly into waterways or carried to waterways by livestock via runoff and soil erosion. Runoff and soil erosion from agricultural lands can also carry bacteria from other sources.

Sediment and Turbidity: Sediment includes fine silt and organic particles suspended in water, settled particles, and larger gravel and boulders that move at high flows. Turbidity is a measure of the lack of clarity of water. Sediment movement and deposition is a natural process, but high levels of sediment can degrade fish habitat by filling pools, creating a wider and shallower channel, and covering spawning gravels. Suspended sediment or turbidity in the water can physically damage fish and other aquatic life, modify behavior, and increase temperature by

absorbing incoming solar radiation. Sediment comes from erosion of streambanks and streambeds, agricultural land, forestland, roads, and developed areas. Sediment particles can transport other pollutants, including bacteria, nutrients, pesticides, and toxic substances.

Dissolved Oxygen: Dissolved oxygen criteria depend on a waterbody's designation as fish spawning habitat. Streams designated as salmon rearing and migration are assumed to have resident trout spawning from January 1 through May 15, and those streams designated core cold water are assumed to have resident trout spawning January 1 through June 15. During non-spawning periods, the dissolved oxygen criteria depend on a stream's designation as providing for cold, cool, or warm water aquatic life, each defined in OAR 340, Division 41.

Biological Criteria (Biocriteria): To assess a stream's ecological health, the community of benthic macro invertebrates is sampled and compared to a reference community (a community of organisms expected to be present in a healthy stream). If there is a significant difference, the stream is listed as water quality limited. These organisms are important as the basis of the food chain and are very sensitive to changes in water quality. This designation does not always identify the specific limiting factor (e.g., sediment, nutrients, or temperature).

Mercury: Mercury occurs naturally and is used in many products. It enters the environment through human activities such as fossil fuel combustion and from volcanoes, and it can be carried long distances by atmospheric air currents. Mercury passes through the food chain readily and has significant public health and wildlife impacts from consumption of contaminated fish. Mercury in water comes from erosion of soil that carries naturally occurring mercury (including erosion from agricultural lands and streambanks) and from deposition on land or water from local or global atmospheric sources. Mercury bio-accumulates in fish, and if ingested can cause health problems.

Nitrates: While nitrates occur naturally, the use of synthetic and natural fertilizers can increase nitrates in drinking water (groundwater and surface water). Applied nitrates that are not taken up by plants are readily carried by runoff to streams or infiltrate to groundwater. High nitrate levels in drinking water cause a range of human health problems, particularly with infants, the elderly, and pregnant and nursing women.

Harmful Algal Blooms: Some species of algae, such as cyanobacteria or blue-green algae, can produce toxins or poisons that can cause serious illness or death in pets, livestock, wildlife, and humans. As a result, they are classified as harmful algae blooms. Several beneficial uses are affected by harmful algae blooms: aesthetics, livestock watering, fishing, water contact recreation, and drinking water supply.

Phosphorous/Algae/pH/Chlorophyll a: Excessive algal growth can contribute to high pH and low dissolved oxygen. Native fish need dissolved oxygen for successful spawning and moderate pH levels to support physiological processes. Excessive algal growth can also lead to reduced water clarity, aesthetic impairment, and restrictions on water contact recreation. Warm water temperatures, sunlight, high levels of phosphorus, and low flows encourage excessive algal growth. Agricultural activities can contribute to all of these conditions.

Toxics: DEQ sampled for metals and current use pesticides in the Management Area in 2008-2010 as part of a statewide study (https://www.oregon.gov/deq/FilterDocs/2015-TMP_FinalReport.pdf). The Tualatin River receives input from major wastewater facilities as well as urban and agricultural run-off. The metals occur naturally and may also be enriched by human activities. Because of this, detections of these metals are common in water. DEQ

detected 13 metals in the Management Area, mostly in the Tualatin River. Dissolved metals concentrations will be measured to confirm potential exceedances of metals criteria during the next round of toxics monitoring in the Willamette Basin. Agricultural pesticides include herbicides, fungicides, and insecticides. DEQ sampling detected 16 pesticide compounds in the Management Area, mostly in the Tualatin River. Pentachlorophenol exceeded DEQ water quality criterion for the protection of human health (0.15 µg/L). Triclopyr, an herbicide used to control broadleaf weeds, was detected in the Tualatin River.

2.4.1.3 TMDLs and Agricultural Load Allocations

Total Maximum Daily Loads (TMDLs) for the Tualatin River watershed have been adopted for ammonia, bacteria, chlorophyll a, dissolved oxygen, pH, total phosphorus, and temperature (Table 2.4.1.3). In 1988, DEQ developed an ammonia TMDL to address problems with low dissolved oxygen (DO) and a total phosphorus TMDL to address problems with high pH and nuisance algal growth in the reservoir-like section of the Tualatin River. In 2001, the TMDLs for ammonia and total phosphorus were revised and additional TMDLs were developed for temperature and bacteria (to address elevated levels basin-wide) and for settleable volatile solids (to address low dissolved oxygen in the tributaries).

Table 2.4.1.3 Pollutants with Approved TMDLs and Load Allocations for the Management Area (www.oregon.gov/deq/wq/tmdls/Pages/TMDLs-Willamette-Basin.aspx)

Temperature: Applies to all waterbodies in the Management Area.

Load Allocation: No increase in temperature above background from May 1 through October 31.

Surrogate: Effective shade. Because thermal pollution is difficult to measure, the temperature TMDL identified streamside shade as a surrogate measure.

If system potential vegetation is present along streambanks, that reach of stream complies with the TMDL. System potential vegetation describes a condition in which vegetation density and height are defined by the kind of native vegetation that could grow in the soil, moisture, and light conditions present at the site.

TMDL: 2001 Tualatin Subbasin TMDL

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

Load Allocation: There are different allocations for bacteria in runoff depending on the season, the tributary, and whether samples were taken during a storm. Allocations apply year-round, although allocations differ for dry and wet seasons. The calculation of bacterial loads can guide the selection of management strategies that are designed to reduce the quantity and/or quality of runoff. DEQ encourages the use of management strategies that optimize reduced runoff quantity and improved quality.

Bacteria load allocations for agriculture.

Sub-Watershed	*E. coli* counts/100 mL			
	Summer (May 1 – Oct 31)		Winter (Nov 1 – April 30)	
	During Runoff Events[1]	All Other Times[2]	During Runoff Events[1]	All Other Times[2]
Gales	9500	406	3500	406
Rock	3000	406	700	406
Dairy	7000	406	3500	406
Scoggins/Upper Tualatin	9500	406	1500	406
Middle Tualatin	12000	406	11000	406
Lower Tualatin	12000	406	5000	406

[1] Measured as mean event concentration; [2] measured as grab sample.

TMDL: 2001 Tualatin Subbasin TMDL

Dissolved Oxygen: Applies to all perennial and intermittent streams in the Management Area.

Load Allocation: Load allocations for ammonia, phosphorous, temperature, and settleable volatile solids address dissolved oxygen concerns.

Surrogate: The TMDL doesn't specifically list settleable volatile solids as a surrogate. However, the TMDL does require reductions between May 1 and October 31 in the amount of erodible material that uses up oxygen once that material is delivered to streams. These limits are intended to help increase dissolved oxygen by decreasing the delivery of chemicals that will react with oxygen. These allocations can be met by controlling erosion from both fields and in-stream sources including bed and bank erosion.

Settleable Volatile Solids Load Allocations (May 1 – October 31) for Agriculture	
Stream	**Load Allocations**
Ash, Fanno, and Summer creeks	None
Gales, West Fork Dairy, Chicken, McFee, and Upper Rock creeks	30% Reduction in runoff
All other streams	20% Reduction in runoff

TMDL: 2001 Tualatin Subbasin TMDL, amended 2012

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

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

- Tualatin Subbasin (HUC 17090010): 97 percent 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 percent reduction compared to 2019 levels.

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

Reporting: ODA will report to DEQ (annually, with five-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.

Phosphorus: Applies to all perennial and intermittent streams in the Management Area.

Load Allocation: The concentration limits vary across the tributary basins in the Tualatin watershed based on the background concentrations of total phosphorus in groundwate**r** and are applicable during the dry season of May 1 through October 31. The allocations do not intend for additional total phosphorus to be delivered to streams from human sources. In general, controlling erosion and runoff from fields, using best management practices in applying fertilizers, and covering manure sources should meet the TMDL allocations from agricultural sources.

Phosphorus Load Allocations for Agriculture **Receiving Water Body**	**Total Phosphorus Concentration (May 1 – Oct 31: Median (mg/L))**	**Total Phosphorus Concentration (Daily Maximum (mg/L))**
Mainstem Tualatin below Dairy Creek (unless otherwise specified below)	0.14	0.49
Mainstem Tualatin above Dairy Creek (unless otherwise specified below)	0.04	0.14
Bronson Creek @ Mouth (205th)	0.13	0.46
Burris Cr./ Baker Cr./ McFee Cr./Christensen Cr. (all at mouth)	0.12	0.42
Cedar, Chicken, Rock (South), Nyberg, Hedges and Saum creeks (all at mouth)	0.14	0.49
Dairy Creek at mouth	0.09	0.32
Gales Creek at mouth	0.04	0.14

Rock Creek at mouth	0.19	0.67
TMDL: 2001 Tualatin Subbasin TMDL, amended 2012		

2.4.1.4 Drinking Water

DEQ summarizes drinking water issues in each Management Area prior to biennial reviews. DEQ's full report is available at: https://www.oregon.gov/deq/wq/programs/Pages/Nonpoint-Implementation.aspx.

One hundred and twelve public water systems obtain domestic drinking water from groundwater to serve approximately 210,000 people.

Fourteen public water systems had recent alerts for nitrates and/or bacteria. DEQ does not know whether the sources are related to agriculture.

Soils in the largely agricultural portion of the Management Area have a moderately high to high potential for leaching nitrate to groundwater, according to the National Cooperative Soil Survey, based on slope, precipitation, and land use. Nitrate from 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 1989-2019 indicates that out of 534 well results, only 12 wells had nitrate concentrations above 5 mg/L. Some of these wells were in urban areas. Regardless, agricultural landowners should always work to keep bacteria and nitrates from entering groundwater and surface water.

2.5 Regulatory and Voluntary Measures

2.5.1 Voluntary Measures

To improve water quality in the Management Area, phosphorus, ammonia, bacteria, and pesticide levels must be reduced. Excessive temperatures are addressed by providing shade along streams. Reducing erosion will improve water quality conditions for phosphorus, dissolved oxygen, pesticides, and mercury; dissolved oxygen is increased when reducing nutrients and increasing shade.

The Area Plan and Rules focus on controlling pollution at the source. Sources include erosion of agricultural land and streambanks, irrigation water discharges, inadequate riparian vegetation, and waste discharges.

Landowners have flexibility in choosing strategies and practices to address water quality issues on their lands. Agricultural landowners are strongly encouraged to implement practices that eliminate polluted runoff from entering waters of the state. Below is a list of recommended voluntary measures.

- Grass filter strips and waterways to filter out nutrients and pesticides from fields before entering streams.
- Nutrient management, including soil testing and applying nutrients at agronomic rates based on the soil tests.
- Pest management, including integrated pest management (IPM), scouting, and applying pesticides based on label recommendations; reduce drift, monitor weather.
- Irrigation water management, including tailwater recovery.

- Manure management, including keeping roof runoff clean, composting manure, covering manure piles, applying manure to fields outside of winter months, and preventing runoff from heavy use areas entering streams.
- Soil health principles, including minimal bare soil and cover cropping. USDA Soil Health Website: www.nrcs.usda.gov/wps/portal/nrcs/main/national/soils/health/
- Perennial cover crops between crop rows to filter runoff and reduce erosion.
- No-till on highly erodible lands.
- Livestock fenced out of streams.
- Wetland creation, maintenance, and restoration.

Streamside landowners are strongly encouraged to plant and maintain native trees and shrubs near streams, provide off-stream water, and prevent livestock from accessing streambanks. Trees and shrubs planted along streams provide multiple benefits to water quality and wildlife habitat.

1. Shade reduces thermal loading reaching the stream.
    a. Cooler water holds more dissolved oxygen for salmonids and trout.
    b. Salmon and trout eggs and fry require water that is less than 55 degrees to survive.
    c. Cooler water reduces the growth of harmful algae, bacteria, and other microorganisms.
2. Roots of trees and shrubs stabilize streambanks, reducing erosion and protecting the land base.
3. Vegetated riparian areas encourage runoff to infiltrate the soil, which helps prevent harmful nutrients, waste, and pesticides from entering surface water and groundwater.

Landowners are encouraged to develop conservation plans with the help of the Tualatin SWCD or other partners for no charge. A farm or conservation plan is a customized, detailed guide to help the farm operator manage land profitably while protecting natural resources. Plans address site-specific issues through practices to conserve soil, water, and related plant and animal resources. The purpose of a plan is to help landowners achieve objectives as land and water users and to help them meet water quality requirements.

In addition to the voluntary strategies above, ODA will use its regulatory authority where appropriate and necessary to gain compliance with required conditions. Any enforcement action will be pursued only when reasonable attempts at voluntary solutions have failed.

2.5.2 Required Conditions

All landowners must comply with the following Area Rules. A landowner or operator is responsible for only those conditions caused by activities conducted on land managed by the landowner or operator. Rules do not apply to conditions resulting from unusual weather events or other exceptional circumstances that could not have been reasonably anticipated.

The Area Rules developed with the LAC, OAR 603-095-0140(1) through 603-095-0140(5), are included in this document as a reference for landowners. ***Each Area Rule (OAR) has a border around it.***

2.5.2.1 Erosion

OAR 603-095-0140(1)
(a) There must be no visible evidence of erosion resulting from agricultural activities in a location where the eroded sediment could enter waters of the state.
(b) Visible evidence of erosion consists of one or more of the following features:
(A) Sheet wash, noted by visible pedestalling, surface undulations, and/or flute marks on bare or sparsely-vegetated ground; or
(B) Active gullies, as described in OAR 603-095-0010(1); or
(C) Multiple rills, which have the form of gullies but are smaller in cross section than one square foot; or
(D) Soil deposition that could enter surface water; or
(E) Streambanks breaking down, eroding, tension-cracking, shearing, or slumping beyond the level that would be anticipated from natural disturbances given natural hydrologic characteristics; or
(F) Underground drainage tile outlets that contribute to soil or bank erosion.
(c) Private roads used for agricultural activities, including road surfaces, fill, ditch lines, and associated structures, must not contribute sediment to waters of the state. All private roads used for agricultural activities not subject to the Oregon Forest Practices Act are subject to this regulation.

a. Indicators of Noncompliance

Clear noncompliance:

- Visible sediment that enters natural stream areas.
- Visible erosion from drainageways as a result of livestock grazing, tillage, or the destruction of riparian vegetation by the landowner or occupier.
- Underground drainage tile outlets either improperly installed or maintained allowing soil or bank erosion to actively occur.
- Visible formation and/or expansion of channels, gullies, or rills.
- Visible pedestals on bare or sparsely vegetated ground.

Likely noncompliance, requires further investigation:

- Eroding road ditches, drainageways and field borders.
- Field swales with high water flow and without crop residues, grass cover, or sediment control structures.
- Highly erodible land with minimal cover.
- Sediment deposits left from flowing water that are visible away from the ditch or channel.
- Lack of vegetation in and around drainage ditch.

b. Potentially affected TMDL parameters

Phosphorus, bacteria, dissolved oxygen, mercury.

2.5.2.2 Streamside Vegetation

OAR 603-095-0140(2)
(a) Landowners or operators must allow vegetation, consistent with site capability, to become established along perennial and intermittent streams to protect water quality by providing shade, filtering out pollutants from surface runoff, and protecting streambank

integrity during high stream flows, such as would be expected to follow a 25-year, 24-hour storm.
(b) If any agricultural activity disturbs enough streamside vegetation to impair the conditions and functions described in 603-095-0140(2)(a), the landowner or operator must replant or restore the disturbed area with vegetation that will provide the functions required in 603-095-0140(2)(a).
(c) Agricultural activities are allowed if they do not impair the conditions and functions described in 603-095-0140(2)(a).

a. Indicators of Noncompliance

Clear noncompliance:

- Active streambank erosion in conjunction with tillage, grazing, or destruction of vegetation by the landowner or occupier.
- Removal or destruction of vegetation that impedes the goals of shading water, stabilizing banks, and filtering pollutants in runoff during high rainfall.

b. Potentially affected TMDL parameters

Temperature, dissolved oxygen, bacteria, phosphorus, mercury.

2.5.2.3 Irrigation Water Discharges

OAR 603-095-0140(3)
Irrigation discharge, both surface and subsurface, that enters waters of the state must not exceed water quality standards or cause pollution of the receiving water.

a. Indicators of Noncompliance

Clear noncompliance:

- Turbid irrigation water entering waters of the state.
- Turbid irrigation water exiting underground tile outlets.

Likely noncompliance, requires further investigation:

- Irrigation application that creates surface runoff.
- Irrigation water applied at a rate that creates surface water turbidity.
- Irrigation water applied at a rate that results in ponding.
- Water exiting underground tile outlets.

b. Potentially impacted TMDL parameters

Temperature, dissolved oxygen, phosphorus, ammonia, mercury.

2.5.2.4 Nutrients

OAR 603-095-0140(4)
Landowners and operators must store and use feed, fertilizer, manure, and other sources of crop nutrients, in a manner that prevents transport of pollutants to waters of the state.

a. Indicators of Noncompliance

Clear noncompliance:

- Discolored water from a manure pile entering water.

Likely noncompliance, requires further investigation:

- Manure pile adjacent to river.

b. Potentially impacted TMDL parameters
Dissolved oxygen, phosphorus, ammonia, bacteria, mercury.

2.5.2.5 Waste

OAR 603-095-0140(5)
Persons subject to these rules must not violate any provision of ORS 468B.025 or ORS 468B.050.

OAR 603-095-0140(5) is described in Section 1.4.4

a. Indicators of Noncompliance
Clear noncompliance:

- Runoff flowing through areas of high livestock usage and entering waters of the state.
- Livestock waste located in drainage ditches or areas of flooding.
- Fill material (loose soil) placed in or near waters of the state with a visible discharge of sediment entering waters of the state.
- Livestock feed placed in or near waters of the state with a visible discharge entering waters of the state.
- Agricultural products with high nutrient residues placed in or near waters of the state with a visible discharge entering waters of the state.
- Dead animals deposited in or near waters of the state.

Likely noncompliance, needs further investigation:

- Animal confinement areas or waste from agricultural land management or earth disturbing practices located where there is a likelihood of pollutant transport to waters of the state.
- Animals confined but manure is not collected and stored in a manure storage facility that meets the requirements of field office technical guide standard for Manure Storage Facility or equivalent pollution control system.
- Animals confined in an unroofed pen that does not meet field office technical guide standard for Heavy Use Protection Area and Filter Strip or equivalent pollution control system.
- Fill material (loose soil) placed near waters of the state.
- Livestock feed placed near waters of the state.
- Agricultural products with high nutrient residues placed near waters of the state.

b. Potentially impacted TMDL parameters
Ammonia, bacteria, temperature, dissolved oxygen, phosphorus, mercury

2.5.3 Complaints and Investigations

603-095-0180
(1) When the department receives notice of an alleged occurrence of agricultural pollution through a written complaint, its own observation, through notification by another agency, or by other means, the department may conduct an investigation. The department may coordinate

inspection activities with the appropriate Local Management Agency (as defined in ORS 568.906).
(2) Each notice of an alleged occurrence of agricultural pollution will be evaluated in accordance with the criteria in ORS 568.900 through 568.933, or any rules adopted thereunder, to determine whether an investigation is warranted.
(3) Any person alleging any violation of ORS 568.900 through 568.933, or any rules adopted thereunder, may file a complaint with the department.
(4) The department will evaluate and may investigate a complaint filed by a person under section OAR 603-095-0180(3) if the complaint is in writing, signed and dated by the complainant, and indicates the location and description of:
(a) The waters of the state allegedly being damaged or impacted; and
(b) The property allegedly being managed under conditions violating criteria described in ORS 568.900 to 568.933, or any rules adopted thereunder.
(5) As used in section OAR 603-095-0180(4), “person” does not include any local, state, or federal agency.
(6) If the department determines that a violation of ORS 568.900 through 568.933 or any rules adopted thereunder has occurred, the landowner may be subject to the enforcement procedures of the department outlined in OAR 603-090-0060 through 603-090-0120.

Chapter 3: Implementation Strategies

Chapter 3 describes efforts to make and track progress toward the goals of the Area Plan. It presents the goals, measurable objectives, strategic initiatives, proposed activities, and monitoring efforts.

Goal

Prevent and control water pollution from agricultural activities and soil erosion, and to achieve applicable water quality standards.

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

1. Prevent and control water pollution from agricultural activities.
2. Minimize and control soil erosion from agricultural activities.
3. Establish sufficient vegetation along streams and rivers flowing through agricultural lands to provide shade, filtration, and bank stability.
4. Achieve and maintain applicable water quality standards

This Area Plan addresses the following water quality issues and activities:

- Erosion and surface water management
- Irrigation water management
- Nutrient management
- Pesticide management
- Livestock waste management
- Riparian area and wetlands vegetation

Strategies for Area Plan Implementation

- Control pollution as close to its source as possible.
- Base actions on sound conservation planning.

3.1 Measurable Objectives and Strategic Initiatives

Measurable objectives allow the Ag Water Quality Program to evaluate progress toward meeting water quality standards and TMDL load allocations. Any measurable objectives are stated here. Progress is reported in Chapter 4.1.

3.1.1 Management Area

Measurable objectives can 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.

3.1.1.1 Measurable Objective #1: TSS

Assessment Method:
DEQ measures TSS at stations throughout the Management Area.

Measurable Objective and Associated Milestones:
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 4.1.1.1. TSS will be reduced by additional adoption of strategies to reduce upland and streambank erosion.

3.1.1.2 Measurable Objective #2: Streamside Vegetation

Since 2006, unique partnerships among federal, state, and local agencies have provided two voluntary, incentive-based programs to landowners to vegetate streambanks. The aim is to establish riparian buffers along perennial streams, using native vegetation to reduce soil erosion, filter pollutants, provide shade to reduce in-stream temperatures, and restore natural habitat critical to biodiversity preservation.

Enhanced Conservation Reserve Enhancement Program (ECREP)
ECREP provides annual rent to landowners who enroll agricultural lands along fish-bearing streams. The program also provides cost-share for the implementation of conservation practices such as riparian tree planting, livestock watering facilities, and riparian fencing. ECREP partners are Clean Water Services, Tualatin SWCD, Farm Service Agency, Oregon Department of Forestry, and NRCS.

Vegetated Buffer Areas for Conservation Program (VEGBAC):
VEGBAC provides incentives for rural landowners within the Tualatin River watershed to plant native trees and shrubs in streamside buffer areas to provide shade to streams and cool water temperatures. VEGBAC offers a restoration alternative to landowners who either do not qualify for the USDA's Enhanced Conservation Reserve Enhancement Program (ECREP) or prefer more flexibility over higher benefits. VEGBAC partners are Clean Water Services, Tualatin SWCD, and NRCS.

Assessment Method:
Number of stream miles enrolled in ECREP or VEGBAC.

Currently 49 miles are enrolled.

Measurable Objective and Milestone:
By 2033, a total of 75 miles will be enrolled in ECREP or VEGBAC.

3.1.2 Focus Areas and Other Coordinated Efforts in Small Watersheds

Dairy-McKay Focus Area (2013)

The Dairy-McKay Focus Area was closed in 2021, primarily due to COVID-related challenges. The SWCD started work in 2013. The Focus Area is 88,795 acres; with 39 percent in agricultural use (mix of dryland and irrigated crops, including high value crops such as blueberries and nursery stock, and field crops such as grass seed and wheat). There are 166.8 miles of perennial streams.

The Tualatin SWCD decided to focus on temperature and phosphorus, both priority water quality parameters of concern (Chapter 2). The SWCD planned to improve water quality for both parameters by working with landowners to install riparian forest buffers and grass filter strips.

Assessment Method: The SWCD completed a pre-assessment, classifying stream reaches within the Focus Area using the Stream Matrix which is a GIS tool used by the SWCD and NRCS to guide restoration efforts. The Stream Matrix assesses eight water quality and habitat-related criteria. Each criterion is scored for an individual stream reach and a weighted average of all eight scores gives an overall score for the stream reach. Riparian vegetation condition was evaluated as one of the eight criteria, using aerial photos and field verification.

More weight is given to stream reaches that have poor riparian vegetation and fish presence. Sites with higher overall scores are higher priority sites for restoration projects.

Based on the Stream Matrix criteria, the SWCD placed each assessed stream reach into one of four classes. The classes are described as follows:

Class 1: No restoration needed. Streams are rated low priority in the Stream Matrix. Vegetation is likely sufficient to moderate solar heating, stabilize streambanks, and filter out pollutants consistent with site capability.

Class 2: Significant progress has been made in restoration. Vegetation is likely insufficient to moderate solar heating, stabilize streambanks, and filter out pollutants consistent with site capability.

Class 3: Filter strips (herbaceous) have been planted to stabilize streambanks and filter pollutants. Agricultural activities likely not allowing vegetation to moderate solar heating.

Class 4: Streams are rated medium or high priority in the Stream Matrix. Agricultural activities likely not allowing riparian vegetation to moderate solar heating, stabilize streambanks, and filter out pollutants consistent with site capability.

2013 Baseline: Class 4 = 132.2 stream miles

Measurable Objective:
By June 30, 2021: Decrease Class 4 from 132.2 stream miles to 123 miles.

3.1.3 Strategic Implementation Areas (SIA)

Lower Gales and Carpenter Creeks SIA (Initiated 2019)

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 evaluation and field verification from publicly accessible areas. For more information see: www.oregon.gov/oda/shared/Documents/Publications/NaturalResources/SIAProgressReport.pdf

Opportunity levels:

- **Likely in Compliance (LC):** ODA identified no likely agricultural water quality regulatory concerns, and the goals of the Area Plan are likely being achieved.
- **Restoration Opportunity (RO):** ODA identified no likely agricultural water quality regulatory concerns, but there is likely some opportunity for improvement through voluntary measures to reach the goals of the Area Plan.

- **Compliance Opportunity (CO):** ODA identified that agricultural activities may impair water quality or evaluation was inconclusive. There also may be an opportunity for improvement through voluntary measures to reach the goals of the Area Plan.
- **Potential Violation (PV):** During the Field Evaluation, ODA observed a potential violation of the Area Rules. There also may be an opportunity for improvement through voluntary measures to reach the goals of the Area Plan.

Measurable Objective:
By October 28, 2023, all 40 tax lots identified as a Potential Violation or Restoration Opportunity will be downgraded to Restoration Opportunity or Likely in Compliance through landowner engagement, technical assistance, and conservation actions.

The SWCD has started monitoring stream temperature in this SIA. The SWCD will hopefully use these data to develop measurable objectives for stream temperature.

3.1.4 Pesticide Stewardship Partnerships (PSP)

There are no PSPs in this Management Area.

3.1.5 Groundwater Management Area (GWMA)

There is no GWMA in this Management Area.

3.2 Proposed Activities

ODA, the LAC, the LMA, and other partners have identified the following priority activities to track progress toward meeting the goals and objectives of the Area Plan (Table 3.2).

Table 3.2 Planned Activities for 2023-2028 throughout the Management Area by Tualatin SWCD with its conservation partners

Activity	6-year Target	Description
Landowner Engagement		
# events that actively engage landowners (workshops, demonstrations, tours)	30	
# landowners participating in active events	600	
# landowners provided with brochures, etc.	2,000	Might move away from mass mailings.
Technical Assistance (TA)		
# landowners provided with TA (via phone/walk-in/email/booth/site visit)	500	
# site visits	400	
# conservation plans written*	66	
# of acres in conservation plans that were written	700	
On-the-ground Project Funding		
# funding applications submitted	60	TSWCD funds + NRCS/Clean Water Services/FSA
* 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. Exludes projects with weak connection to agricultural water quality.		

An essential activity to achieving the mission of the Area Plan is for ODA and the SWCDs to work with Management Area partners, local agencies, stakeholders, grower groups, and agribusiness associations as well as encourage individual agricultural landowners and operators to engage in local partnerships and efforts that work toward similar goals and objectives described in the Area Plan. There are several benefits to bringing together individuals and groups to participate in common efforts and mutual activities such as collective resources, diverse expertise, and shared funding. It is recommended that as time, opportunities, and funding allow, ODA and the SWCDs collaborate and participate in partner efforts to improve water quality in agricultural and rural lands of the Tualatin River watershed.

Two key local partners are:

- **Clean Water Services,** a utility that provides sewer and surface water management to more than 600,000 people in the urban areas of the Tualatin River watershed. It combines science and nature to clean water and return it to the Tualatin River so it can be used again.

- **Tualatin River Watershed Council,** which links land, water, and people. The council brings together all interests in the basin to promote and improve watershed health. It also works together through cooperation, collaboration, and communication.

Wingham Farms – Partnership Project Highlight

Wingham Farms is in an agricultural valley near Manning. Around 60,000 trees and shrubs were planted on 31 acres adjacent to West Fork Dairy Creek and Whitcher Creek. Part of a 10-year partnership with the Tualatin SWCD, this streamside planting is part of the ECREP program.

In 2015, the project began by clearing weeds such as non-native blackberries. The remnant vegetation along the creeks at Wingham Farms harbors a large population of Western Wahoo, a rare native shrub, which has been rescued from invasive non-native blackberries and incorporated into the buffer project. The 31-acre parcel that Wingham Farms owners are currently protecting represents the largest streamside buffer project on privately owned land in Washington County.

This project allows for multiple ecological functions on a working landscape, as the bulk of Wingham Farms' 100 acres is devoted to the production of pasture-raised meat, milk, and eggs. This production is done with primarily heritage breeds of chickens, ducks, beef and dairy cows, pigs, and goats, all chosen for their suitability to open-pasture grazing and foraging.

With assistance from NRCS, the landowners also are enhancing on-farm biodiversity by establishing pollinator hedgerows of native trees and shrubs among their pastures to serve as living fences. As they mature, these hedgerows will serve to control livestock movement, provide animal shelter, and offer year-round habitat for beneficial insects and pollinators.

Currently the project is scheduled to last until 2025, with the next few years focused on maintaining the tree and shrub plantings. Biodiversity isn't just something that happens in supposedly pristine nature; it can exist at varying scales including in landowners' backyards, and in this case farmland. From this project one can begin to recognize that conservation on working lands may be the next frontier in conservation globally, and Wingham Farms is helping to lead the way toward local solutions.

3.3 Additional Agricultural Water Quality Monitoring

3.3.1 Water Quality

DEQ monitors water quality in the Management Area as part of its ambient monitoring network.

3.3.2 Land Conditions

There is no additional land condition monitoring.

Results of these additional monitoring activities are presented in Chapter 4.3.

Chapter 4: Progress and Adaptive Management

Chapter 4 describes progress toward achieving Area Plan goals and measurable objectives by summarizing accomplishments and monitoring results. Tracking activities is straightforward; monitoring water quality or land conditions takes more effort; relating changes in land conditions to changes in water quality is important but more challenging.

4.1 Measurable Objectives and Strategic Initiatives

The following tables provide the assessment results and progress toward measurable objectives and milestones in the past four years (2019-2022). See Chapter 3.1 for background and assessment methods.

4.1.1 Management Area

Table 4.1.1.1 Measurable Objective #1: TSS

Measurable Objective
By 2049, maximum instream TSS = 4 mg/L Milestone = By 2019, maximum instream TSS = 17 mg/L
Current Conditions
Progress Toward Measurable Objectives and Milestones According to the DEQ's 2022 Status and Trends Report, most TSS samples exceeded the 2019 milestone, with a maximum of 998 mg/L (see Chapter 4.3.1).

Table 4.1.1.2 Measurable Objective #2: Streamside Vegetation

Measurable Objective
By 2033, a total of 75 stream miles will be enrolled in ECREP or VEGBAK.
Current Conditions
Progress Toward Measurable Objective Currently 49 miles are enrolled.
Assessment Results

Cumulative stream miles enrolled in ECREP and VEGBAC			
	2006	2017	2022
Stream Miles	0	47	49

Progress Toward Measurable Objectives and Milestones A previous objective of enrolling 15 stream miles between 2017 and 2020 was not met due to COVID restrictions and some landowners choosing not to renew their contracts.
Adaptive Management Discussion
The Tualatin SWCD did not reach its objective. The SWCD closed out the Focus Area because it exhausted outreach there, Focus Areas became optional, and it took on an SIA in a different subbasin and chose to focus its efforts there. Clean Water Services will also provide the reduction in thermal load (kcal/day) on agricultural lands at every biennial review to track the reduction in thermal load due to these enrollments. To date, this program has restored 97 stream miles on both urban and rural lands, blocking 1,227,500,000 kcal/day. In addition, in 2022, plantings on urban and rural lands reduced sediment by 1,316,000 pounds, nitrogen by 10,300 pounds, and phosphorus by 18,000 pounds.

4.1.2 Focus Areas and Other Focused Efforts in Small Watersheds

Table 4.1.2 Dairy-McKay Focus Area

Measurable Objective	
By June 30, 2021: Decrease Class 4 from 132.2 stream miles to 123 miles.	
Current Conditions	
Progress Toward Measurable Objectives and Milestones Class 4 was reduced to 124.1 miles. The measurable objective was not quite met.	
Community and Landowner Engagement	
# active events that target landowners/ operators	3
# landowners/operators participating in active events	98
Technical Assistance (TA)	
# landowners/operators provided with TA	91
# site visits	79
# conservation plans written	16
Ag Water Quality Practices Implemented in the Focus Area	
Tree and Shrub Establishment	75 acres
Conservation Cover	37.25 acres
Comments:	
Adaptive Management Discussion	
The Tualatin SWCD did not reach its objective. The SWCD closed out the Focus Area because it exhausted outreach there, Focus Areas became optional, and it took on an SIA in a different subbasin and chose to focus its efforts there.	

4.1.3 Strategic Implementation Areas

Table 4.1.3 2019 Lower Gales and Carpenter Creeks SIA

Evaluation Results		
As of October 23, 2019, 40 tax lots were identified as either a Potential Violation or a Compliance Opportunity. PV = 4, CO = 36, RO = 39, LC = 497		
Measurable Objective		
By October 28, 2023, all 40 tax lots identified as a Potential Violation or Restoration Opportunity will be downgraded to Restoration Opportunity or Likely in Compliance through landowner engagement, technical assistance, and conservation actions.		
The SIA is open and SIA work is continuing. An adaptive management discussion will be available at the next biennial review.		
Monitoring Activities		
Activity	**Accomplishment**	**Description**
ODA		
# acres evaluated	11,637	
# stream miles evaluated	34	
# landowners at Open House	N/A*	*Open house not held because of COVID-19
# landowners receiving outreach materials	141	
SWCD and Conservation Partners		
# landowners provided with technical assistance	94	
# site visits	36	
# conservation plans written	2	

SIA and Project Funding		
# funding applications submitted	2	$160,000 OWEB Grant for TA and monitoring; manure composting facility
# funding applications awarded	2	

4.1.4 Pesticide Stewardship Partnerships

There are no PSPs in this Management Area.

4.1.5 Groundwater Management Area

There is no GWMA in this Management Area.

4.2 Activities and Accomplishments

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

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

Table 4.2a Activities conducted in 2019-2022 throughout the Management Area by the Tualatin SWCD with its conservation partners

Activity	4-year results	Description
Landowner Engagement		
# events that actively engage landowners (workshops, demonstrations, tours)	21	
# landowners participating in active events	526	
# landowners provided with brochures, etc.	278	
Technical Assistance (TA)		
# landowners provided with TA (via phone/walk-in/email/booth/site visit)*	376	
# site visits	314	
# conservation plans written**	48	
# of acres in conservation plans that were written	495	Total of 43,568 acres since 1990
On-the-ground Project Funding		
# funding applications submitted	48	
# funding applications awarded	9	No data for 2019-2021

* 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.

Table 4.2b and 4.2c summarize information from the 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 1997-2020*, in thousands* (OWRI data include most, but not all projects, implemented in the Management Area.)

Landowners	OWEB	DEQ	NRCS*	Washington County	Tualatin SWCD	CWS	All other sources**	TOTAL
$136	1,380	0	418	830	334	397	1,651	$5,146

* This table may not include all NRCS funding due to privacy concerns.
**Includes city, county, tribal, other state and federal programs, and non-profit organizations. There were too many entities to list.

Table 4.2c Miles and acres treated on agricultural lands reported 1997-2020 (OWRI data include most, but not all projects, implemented in the Management Area.)

Activity Type*	Miles	Acres	Count**	Activity Description
Upland		402		Weed control and shrub plantings
Road	1		15	Culvert replacement
Streamside Vegetation	55	292		Weed control and plantings
Wetland		491		Weed control and plantings
Instream Habitat	6			Large woody debris
Instream Flow	0		0 cfs	
Fish Passage	18		16	Culvert replacement
TOTAL	**80**	**1,185**	**31**	

* This table may not include all NRCS projects due to privacy concerns.
** # 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 – 2020-2021 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	174	x		x
Fence	Feet	7243		x	x
Woody Plantings	Acres	80			x
Cover Plantings	Acres	32			x
Heavy Use Area	#	-		x	x
RIPARIAN					
Woody Plantings	Acres	157	x	x	x
Fence	Feet	3000	x	x	x

4.3 Additional Agricultural Water Quality and Land Condition Monitoring

4.3.1 Water Quality

DEQ analyzed data for dissolved oxygen, *E. coli*, pH, total phosphorus, temperature, and total suspended solids in the Management Area. (DEQ. 2022 Oregon Water Quality Status and Trends Report; https://www.oregon.gov/deq/wq/programs/Pages/wqstatustrends.aspx).

Data are from DEQ, US EPA, and USGS databases for 2001 through 2020. DEQ determined status for stations in five-year periods and trends for stations with at least eight years of data collected at the same time of year.

Approximately 12 locations have sufficient data to calculate recent status and trends and are most likely to help characterize agricultural water quality in the Management Area (Table 4.3.1); there are many more locations in urban and forested areas. Two sites in the table below are DEQ ambient monitoring sites: Tualatin River at Rood Bridge and at Elsner Road (upper and lowest sites on the Tualatin River below Dairy Creek).

Table 4.3.1 Attainment of water quality standards for 2016-2020, and 2001-2020 trends

Site Locations	Parameter					
	E. coli	pH	Dissolved Oxygen	Temperature	Total Phosphorus (mg/L)	Total Suspended Solids (mg/L)
	Attainment Status and Predominant Trend				median; maximum[1]	median; maximum[2]
Tualatin River watershed below Dairy Creek (multiple sites, including urban)	No ↑	Yes	Yes ↑	Yes (barely)	No data	50; 425
Dairy Creek watershed (multiple sites)	No ↑	Yes	Yes ↑	No	<0.12; 0.25	<25; 125
Gales Creek watershed (multiple sites)	No ↑	Yes ↓	No ↑	No ↓	No data	<100; 998
Tualatin River watershed above Dairy Creek (multiple sites)	No	Yes ↓	Yes	No	No data	<25;160

[1] DEQ has no benchmark for total phosphorus in this Management Area; ODA benchmark for potential water quality concerns = 0.08 mg/L
[2] DEQ has no benchmark for total suspended solids in this Management Area
↑ Statistically significant improving trend
↓ Statistically significant degrading trend

Agricultural sections of Dairy Creek and Gales Creek show some sites of improved dissolved oxygen and *E. coli*, however, all area streams show generally degrading or steady temperature and pH.

These results suggest that *E. coli* are of concern through the Dairy Creek watershed and potentially in the Tualatin watershed above Dairy Creek. Dissolved oxygen is also of potential concern in the upper agricultural reaches of Dairy Creek, Gales Creek, and Scoggins Creek. Temperature is of concern throughout the Management Area.

Data from more locations are needed to pinpoint agricultural issues. It would be helpful to have a comprehensive evaluation of all data, including those not provided to DEQ, and develop and implement a monitoring plan for determining agricultural water quality and identifying issues throughout the Management Area.

4.3.2 Land Conditions

There is no additional land condition monitoring.

4.4 Biennial Reviews and Adaptive Management

ODA, the LAC, the LMAs, and other partners met on May 16, 2023, 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

Progress
• Agriculture has been changing its practices to reduce erosion and runoff, resulting in great progress in improving water quality. • VEGBAC program, partnerships, and relationships and communication among partners is good. • SWCD has been growing its program. • Washington County and residents really support the SWCD. • Outreach is working: website is helping reach out to large numbers of people.
Impediments
• COVID severely restricted interactions with landowners and partners. • It takes a lot of SWCD capacity to manage projects, especially federal projects, which have cumbersome application processes and long timelines before money is actually available. • SWCD staff spends time on re-enrollment processes that take time away from new projects. Staff is maxed-out. • NRCS staff has had a large turnover; producers get frustrated when they have to work with new staff instead of staff who know them. • Landowners have tried something in the past that didn't work for them, and then the community thinks it won't work for them either. • Need a more comprehensive analysis of water quality data. For example, DEQ's Status and Trends Report only evaluates six parameters. • Fields are still eroding into streams, although erosion rates are less than they used to be. • Emerald ash borer is killing riparian trees.
Recommended Modifications and Adaptive Management
• Increase incentives for landowners to enroll in programs. • Make it easier to use federal programs (ease application process, increase financial incentives that are way out-of-date, decrease timeline between start of application process and project implementation). • More face-to-face, targeted outreach. • Comprehensive evaluation of all data, including those not provided to DEQ, and develop and implement a monitoring plan for determining agricultural water quality and identifying issues throughout the Management Area. • Adopt more practices to reduce field erosion and prevent it from entering waterways. • ODA staff work with the SWCD and other partners to reduce TSS in waterways by developing measurable objectives for land conditions other than streamside vegetation along perennial streams.

Table 4.4b Number of ODA compliance activities in 2019-2022

Location	Cases		Site Visits	Agency Actions				
				Letter of Compliance		Pre-Enforcement Notification	Notice of Noncompliance	Civil Penalty
	New	Closed		Already in compliance	Brought into compliance			
Outside SIA	14	19	30	7	7	13	0	0
Within SIA	10	12	22	5	3	8	0	0

Appendix A: Water-Quality Limited Waters

Parameters of concern in the Management Area

ASSESSMENT UNIT	EXISTING TMDL	NEEDS TMDL
RIVERS		
Beaverton Creek: Cedar Mill Creek to confluence with Rock Creek	Temperature- Year-Round; E. coli; Dissolved Oxygen- Spawning; Dissolved Oxygen- Year-Round	Iron (total)- Aquatic Life; BioCriteria
Cedar Creek: Headwaters to confluence with Tualatin River	Temperature- Year-Round; E. coli; Dissolved Oxygen- Spawning; Dissolved Oxygen- Year-Round; Fecal Coliform	Iron (total)- Aquatic Life; BioCriteria; Ammonia- Aquatic Life
Dairy Creek: Highway 6 to confluence with Tualatin River	Temperature- Year-Round; E. coli; Dissolved Oxygen- Year-Round	Iron (total)- Aquatic Life; Ammonia- Aquatic Life
East Fork Dairy Creek: Campbell Creek to Denny Creek		BioCriteria
East Fork Dairy Creek: Denny Creek to confluence with Dairy Creek	Temperature- Year-Round; Temperature-Spawning; Dissolved Oxygen- Spawning	
Fanno Creek: Carter Creek to confluence with Tualatin River	Temperature- Year-Round; Temperature-Spawning; E. coli; Dissolved Oxygen-Spawning; Dissolved Oxygen- Year-Round	Copper- Aquatic Life; Iron (total)-Aquatic Life; Dieldrin- Human Health; Tetrachloroethylene-Human Health
Gales Creek: Bateman Creek to confluence with Tualatin River	Temperature- Year-Round; Temperature-Spawning; E. coli; Dissolved Oxygen-Spawning	Iron (total)- Aquatic Life; Chromium VI- Aquatic Life
Heaton Creek: Fir Clearing Creek to confluence with McFee Creek	Fecal Coliform	
McFee Creek: Headwaters to Heaton Creek	E. coli; Fecal Coliform; Dissolved Oxygen-Year-Round; Dissolved Oxygen- Spawning	Iron (total)- Aquatic Life
McFee Creek: Heaton Creek to confluence with Tualatin River	Fecal Coliform; Dissolved Oxygen- Year-Round	
McKay Creek: Headwaters WA Unit to tributary to McKay Creek		Arsenic, Inorganic- Human Health
McKay Creek: Tributary to McKay Creek to confluence with Dairy Creek	E. coli; Dissolved Oxygen- Spawning; Dissolved Oxygen- Year-Round; Temperature- Year-Round	Iron (total)- Aquatic Life; Ammonia- Aquatic Life
Rock Creek: Abby Creek to Beaverton Creek	E. coli; Chlorophyll-a; Dissolved Oxygen-Year-Round; Dissolved Oxygen- Spawning; Temperature- Year-Round	BioCriteria; Ammonia- Aquatic Life
Rock Creek: Beaverton Creek to confluence with Tualatin River	Temperature- Year-Round; E. coli; Dissolved Oxygen- Spawning; Dissolved Oxygen- Year-Round	Iron (total)- Aquatic Life; Ammonia- Aquatic Life; BioCriteria
Scoggins Creek: Headwaters to Henry Hagg Lake	Dissolved Oxygen- Spawning	BioCriteria
Scoggins Creek: Henry Hagg Lake to confluence with Tualatin River	Temperature- Year-Round; Temperature-Spawning	Ammonia- Aquatic Life
Tualatin River: Dairy Creek to McFee Creek	E. coli; Methylmercury- Human Health; Fecal Coliform; Temperature- Year-Round	Iron (total)- Aquatic Life
Tualatin River: McFee Creek to confluence with Willamette River		Temperature- Year-Round; Chlorophyll-a; Iron (total)- Aquatic Life; Dissolved Oxygen- Year-Round; Methylmercury- Human Health; BioCriteria; Harmful Algal Blooms
Tualatin River: Sunday Creek to Wapato Creek	Chlorophyll-a	
Tualatin River: Wapato Creek to Dairy Creek	E. coli; Chlorophyll-a	Iron (total)- Aquatic Life

Wapato Creek: Hill Creek to confluence with Tualatin River	Temperature- Year-Round; Dissolved Oxygen- Spawning; Dissolved Oxygen- Year-Round	
West Fork Dairy Creek: Headwaters to Williams Creek	E. coli; Dissolved Oxygen- Year-Round; Temperature- Year-Round	
West Fork Dairy Creek: Williams Creek to Highway 6	E. coli; Dissolved Oxygen- Year-Round; Temperature- Year-Round	
WATERBODIES		
Hagg Lake	None	Arsenic, Inorganic- Human Health
WATERSHEDS		
HUC12 Name: Christensen Creek-Tualatin River	Chlorophyll-a; Dissolved Oxygen- Year-Round; Fecal Coliform	
HUC12 Name: Davis Creek-Tualatin River	Dissolved Oxygen- Year-Round; Fecal Coliform	BioCriteria
HUC12 Name: Lower Rock Creek	E. coli; Dissolved Oxygen- Spawning; Dissolved Oxygen- Year-Round	BioCriteria
HUC12 Name: Roaring Creek-Tualatin River	Dissolved Oxygen- Year-Round; Fecal Coliform	BioCriteria
HUC12 Name: Rock Creek-Tualatin River	None	BioCriteria
HUC12 Name: Middle West Fork Dairy Creek	Temperature- Year-Round	None
HUC12 Name: McFee Creek	Fecal Coliform	None
HUC12 Name: Upper West Fork Dairy Creek	E. coli; Temperature- Year-Round	None
HUC12 Name: Upper East Fork Dairy Creek	None	BioCriteria
HUC12 Name: Fanno Creek	Temperature- Year-Round; Temperature- Spawning; E. coli; Dissolved Oxygen- Spawning; Dissolved Oxygen- Year-Round; Fecal Coliform, Methyl Mercury	Iron (total)- Aquatic Life; Aquatic Weeds; Chromium VI- Aquatic Life; BioCriteria
HUC12 Name: Saum Creek-Tualatin River	E. coli; Chlorophyll-a; Dissolved Oxygen- Spawning; Dissolved Oxygen- Year-Round	Copper- Aquatic Life; Zinc- Aquatic Life; BioCriteria; Enterococci
HUC12 Name: Upper Gales Creek	None	BioCriteria
HUC12 Name: Lower McKay Creek	Dissolved Oxygen- Spawning	None
HUC12 Name: Chicken Creek	E. coli; Dissolved Oxygen- Year-Round; Fecal Coliform; Temperature- Year-Round	Ammonia- Aquatic Life; Iron (total)- Aquatic Life; BioCriteria
HUC12 Name: Council Creek-Dairy Creek	Dissolved Oxygen- Year-Round	None
HUC12 Name: Upper McKay Creek	None	Arsenic, Inorganic- Human Health
HUC12 Name: Carpenter Creek-Tualatin River	E. coli	None
HUC12 Name: Upper Rock Creek	E. coli; Chlorophyll-a; Temperature- Year-Round	BioCriteria
HUC12 Name: Beaverton Creek	Temperature- Year-Round; E. coli; Chlorophyll-a; Dissolved Oxygen- Spawning; Dissolved Oxygen- Year-Round; Fecal Coliform	BioCriteria