OREGON DEPARTMENT OF AGRICULTURE

Southern Willamette Valley Agricultural Water Quality Management Area Plan

May 2024

Developed by the

Oregon Department of Agriculture

and the

Southern Willamette Valley Local Advisory Committee

with support from the

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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 603-095-2100). 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

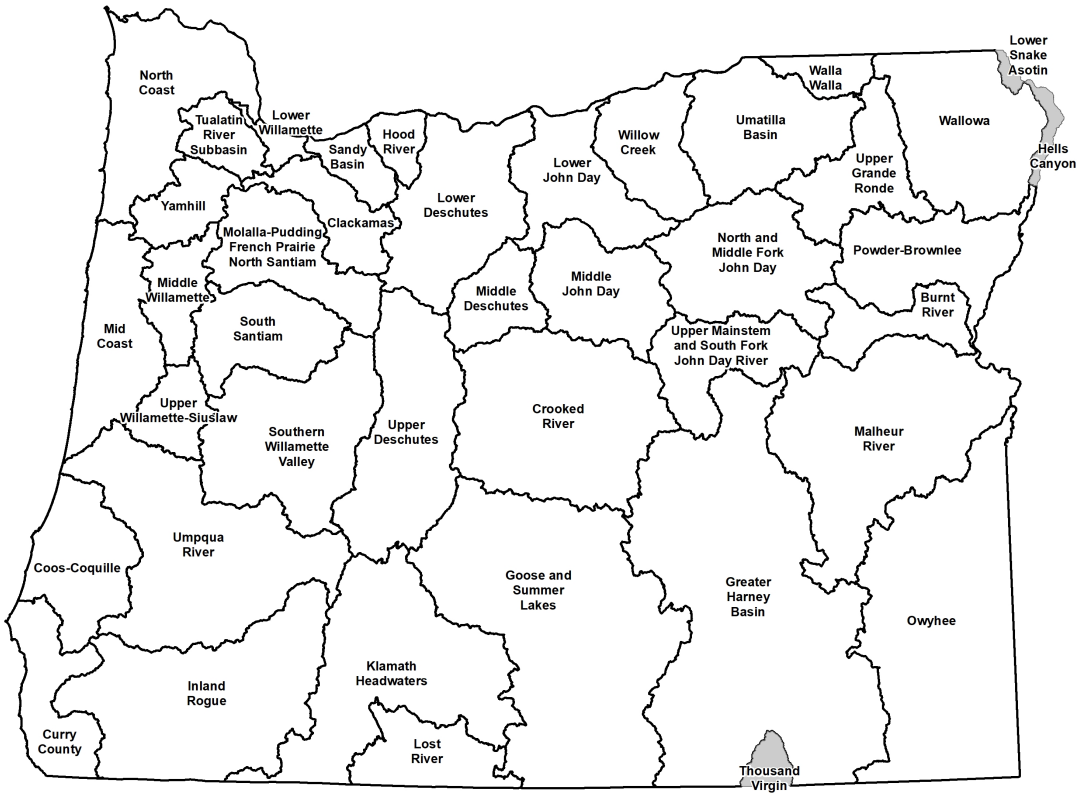
In 1993, the Oregon Legislature passed the Agricultural Water Quality Management Act directing ODA to develop plans to prevent and control water pollution from agricultural activities and soil erosion and achieve water quality standards and to adopt rules as necessary (ORS 568.900 through ORS 568.933). 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.

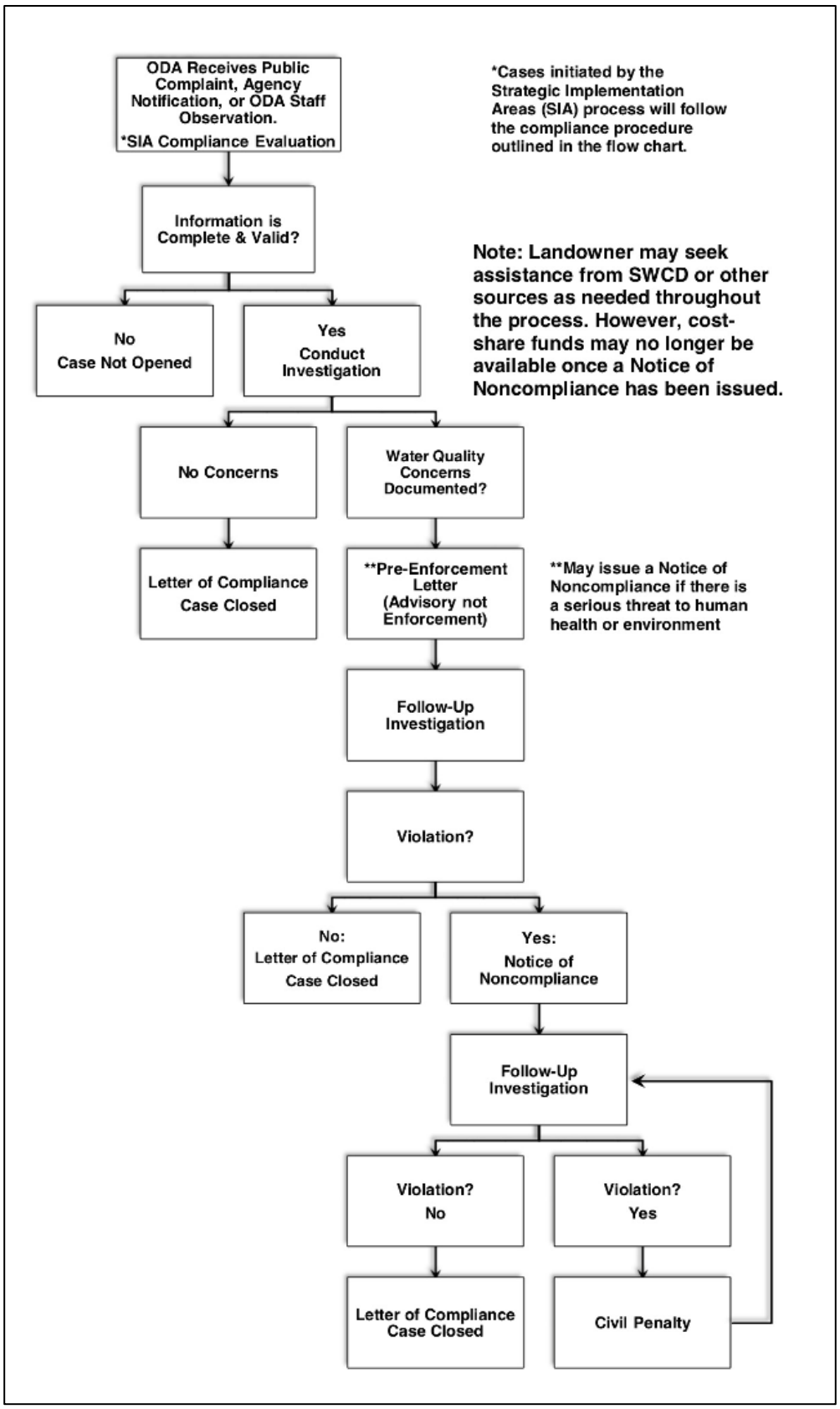
1.3.1.1 ODA Compliance Process

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 1.3.1.1).

Figure 1.3.1.1 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. For more information, visit www.oregon.gov/deq/wq/tmdls/Pages/default.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 Local 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 2023 (www.oregon.gov/oda/shared/Documents/Publications/NaturalResources/WaterQualityGoalsMOA.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.

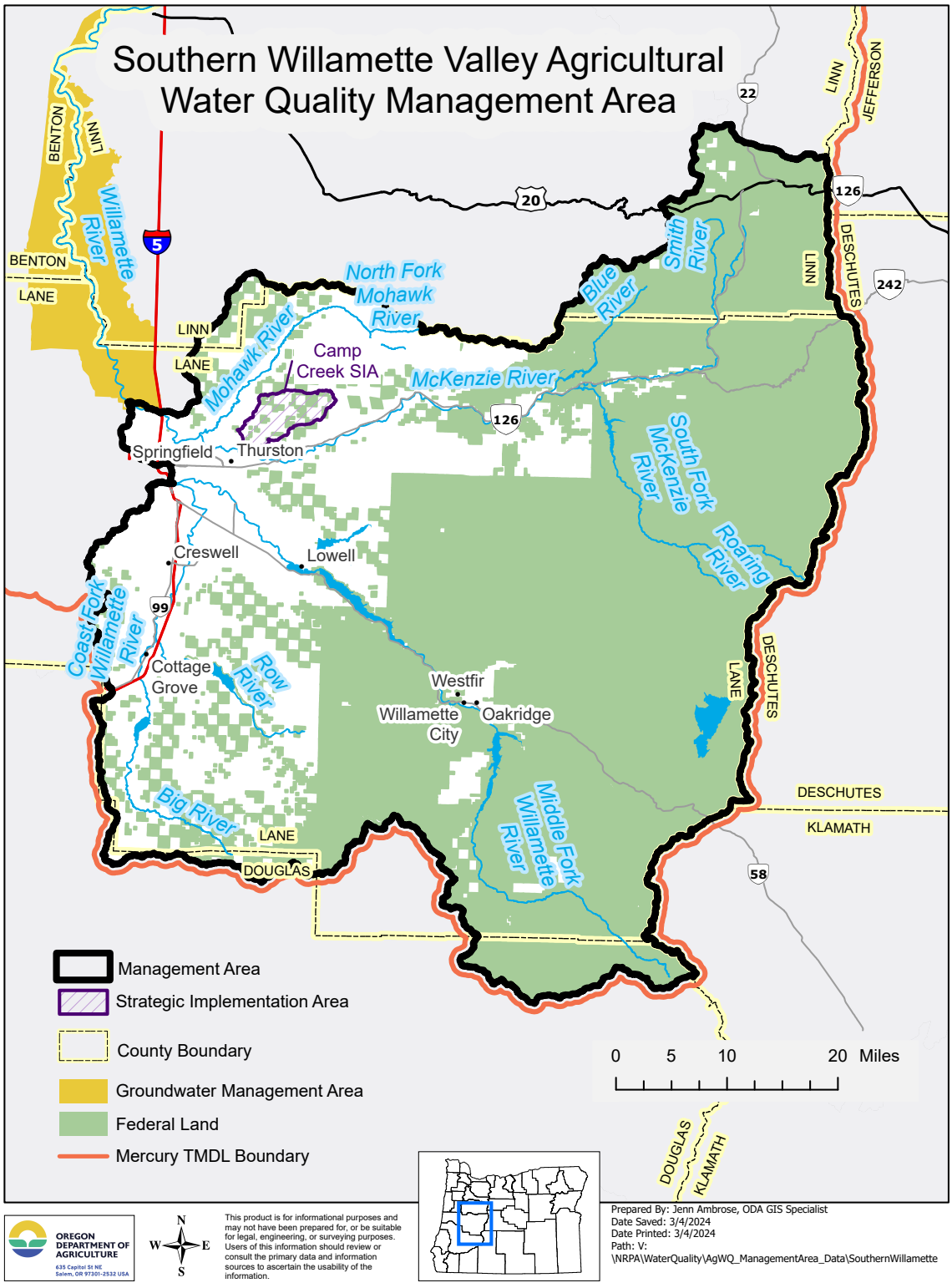
Water quality monitoring efforts in this Management Area are described in Chapter 3, and the data are summarized in Chapter 4.

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.

The Southern Willamette Valley Agricultural Management Area has range in Lane, Linn, and Douglas counties. Lane and Linn are the primary SWCDs in the area due to distribution of agricultural lands. The McKenzie, Willamette, Blue, Smith, Mohawk, Big and Row Rivers run throughout this Management Area. The map (Figure 2) on the following page shows the Management Area boundaries and range. It also contains the Camp Creek SIA.

Figure 2 Southern Willamette Valley 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.

Table 2.1.1 Current LAC members

Name	Geographic Representation	Description
Alan Petersen (Chair)	Springfield, McKenzie	Cattle, hay, timber
Dave Daniel	Pleasant Hill, Middle Fork Willamette	Nursery
Donald Hansen	Creswell, Coast Fork Willamette	Grass seed, strawberries, hazelnuts
Steve Houston	Eugene, Coast Fork Willamette	Wine grapes
Glenn Miller	Eugene, Willamette	Filberts
Karl Morgenstern	Management Area	Eugene Water & Electric Board
Garry Rodakowski	Vida, McKenzie	Filberts
Jim Sly	Creswell, Coast Fork Willamette	Cattle, hay
Vacant		
Vacant		
Vacant		
Vacant		

2.1.2 Local Management Agency

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

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 2002.

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

Physical Features

The headwaters of the McKenzie River and Middle Fork Willamette River are in the Cascade Mountains. The Coast Fork Willamette River originates in the Calapooya Mountains. The Coast

Fork and Middle Fork meet near Goshen to form the Willamette River mainstem. The Willamette River's confluence with the McKenzie River is approximately 15 miles farther downstream near Coburg.

The McKenzie River originates from Clear Lake and flows westward through a narrow valley down a steep gradient. It has eight main tributaries: Lost Creek, Horse Creek, McKenzie South Fork, Quartz Creek, Smith River, Blue River, Gate Creek, and Mohawk River. The Mohawk River has the flattest gradient of the tributaries and there is some relatively level land along it. Level land also extends along the main stem of the McKenzie River.

The Middle Fork Willamette River begins at Timpanogas Lake and flows northwest down a steep gradient until it reaches the Willamette Valley floor. Most of its tributaries, including Hills Creek, Salt Creek, Salmon Creek, North Fork, Fall Creek, and Little Fall Creek, flow into the mainstem from the north. Lost Creek flows into the Middle Fork from the south.

The Coast Fork Willamette River begins in the Calapooya Mountains, as do several of its tributaries, Brice Creek, Row River, Sharps Creek, Layng Creek, and Mosby Creek. Layng, Sharps, and Brice creeks have relatively steep gradients from headwaters to confluence with the Coast Fork, while Mosby Creek, Row River, and the mainstem Coast Fork have relatively flat gradients. The gradient of the Coast Fork flattens further after it reaches the Willamette Valley floor. Several tributaries, including Camas Swale Creek and Silk Creek, flow into the Coast Fork as it flows north through the valley.

Geology and Soils

Western and High Cascade Mountains

The Cascade Mountains consist of two adjacent mountain ranges, the Western and High cascades. Both ranges are predominantly composed of basaltic lava flows, with lesser amounts of andesite and rhyodacite (Orr et al, 1992). Depending on the hardness of the underlying material, the mainstem and tributaries of the upper Middle Fork and McKenzie rivers have created both steep gorges and gently sloping plateaus. The upper reaches of the McKenzie River have been glaciated, at least as far west as Blue River Reservoir (Boer, personal communication, 2000).

Calapooya Mountains

The Calapooya Mountains are a mixture of sedimentary and older volcanic rocks. They have been deeply dissected by the Coast Fork and its tributaries. Soils are deep, well-drained silty clay loams and clay loams from sandstone, sediment, and igneous rock (Patching, 1987).

Willamette Valley

Much of the lowlands in the Willamette Valley are alluvium, or material deposited by the rivers and their tributaries. Alluvial materials include sands, gravels, and silts transported from the Calapooya and Cascade mountains. Depending on the composition of the deposited material, soils in bottomlands and terraces range from excessively drained gravelly sandy loam to poorly drained silty clay loam and silty clay (Patching, 1987).

Climate

The McKenzie, Middle Fork, and Coast Fork watersheds experience the same general climate with wet winters and dry summers. Precipitation generally increases with elevation in the watersheds, ranging from an average of 40 to 50 inches per year on the valley floor to 70 to 80

inches per year at the summit of the Calapooya Mountains, 80 inches per year at the headwaters of Little Fall Creek in the Middle Fork watershed, and 110 inches per year at the headwaters of Blue River in the McKenzie watershed (University of Oregon Department of Geography, 1999). In the upper portions of the watersheds, above 4,000 to 5,000 feet, snow is a significant portion of the precipitation.

Land Use

Agriculture and Forestry

Its predominant land use, forestry, characterizes the Management Area. This is a significant aspect, with forestlands making up approximately 86 percent of the land within the three watersheds (Table 2.3a). Most of these forestlands are situated in the upper portions of the three watersheds, spanning the Cascade and Calapooya Mountain ranges and extending down the eastern side of the valley floor. Notably, the U.S. Forest Service, the Bureau of Land Management, and private industrial landowners play a significant role as forestland holders in the watersheds (Table 2.3b).

Agricultural and rural residential land uses in the Management Area are found in the lower valley regions of the three watersheds. These lands account for approximately 4 percent of the Management Area (Table 2.3c). In the McKenzie watershed, diverse agricultural lands are found, including floodplain areas where well-drained sandy loam soils have accumulated by fluvial (rivers and streams) processes. Notably, hazelnuts are a significant crop in the watershed. Other commercial crops include blueberries, Christmas trees, and row crops, showcasing the agricultural diversity of the area. Livestock and pasturelands are the primary land used in the Mohawk tributary.

Most of the agricultural land in the Middle Fork watershed is in the lower portion adjacent to the Willamette River. There is minimal land for agricultural use above Dexter Reservoir because the land above the reservoir is federally managed public land. The dominant agricultural land uses are pasture and hay land. Some row crops are grown near Jasper, Lowell, and Pleasant Hill. There are also several nurseries, Christmas tree farms, and orchards in that area.

The Coast Fork watershed, known for its agricultural productivity, supports agricultural lands from the confluence of the Coast Fork and Middle Fork upstream beyond Cottage Grove. Grass seed, pasture, and hay land are the predominant commodities in the watershed, reflecting the area's focus on livestock and forage production. Other agricultural land uses include nurseries, small grains, orchards, vineyards, and field crops, demonstrating the diverse agricultural activities in the area.

The Holiday Farm Fire, a devastating event that burned 173,000 acres and destroyed more than 430 structures in the middle McKenzie watershed, was met with a resilient response from the Management Area. Despite the significant damage and the threat it posed to Eugene's long-term viability as a sole source of drinking water, the area has shown remarkable strength and determination in its recovery efforts.

Table 2.3a Land uses and land cover in the three watersheds

Land Use/ Land Cover Category	Acres	Percent of Land Use by Category
Agriculture	82,000	4
Forestry	1,858,000	86
Urban/Residential/Other	216,100	10
TOTAL	2,156,100	100

Table 2.3b Land ownership in the three watersheds

Landowner/Manager	Acres	Percent of Land
U.S. Forest Service	1,044,600	48
Private Landowners	690,200	32
Forest Service Wilderness Area	255,300	11.80
Bureau of Land Management	142,660	6.60
U.S. Army Corps of Engineers	17,600	0.80
Lane County	2,200	0.10
State of Oregon	2,130	0.10
State Scenic Waterway	1,120	0.10
Joint Corps of Engineers/Lane County	160	0.01
State Parks and Recreation	130	0.01
TOTAL	2,156,100	100

Table 2.3c Agricultural Lands in the McKenzie, Middle Fork, and Coast Fork

Watershed	Agricultural Land (acres)	Agricultural Land (percent of all land)
McKenzie	34,000	3.9
Middle Fork	14,000	1.6
Coast Fork	34,000	7.9
TOTAL	82,000	4.0

Cities, Roads, Recreation, and Watershed Functions

Cities/Urban

There is one major metropolitan area in the Management Area (Springfield), as well as smaller cities and rural communities. Most cities are located along the mainstems of the Middle Fork, Coast Fork, and McKenzie rivers. Rural communities co-exist with agricultural areas and are situated on or near the rivers or their tributaries. Both the Willamette and McKenzie flow through the Eugene/Springfield area and their confluence is just north of Eugene.
According to 2024 US census data , Lane County has a population of 382,971 people.
The population of the Eugene/Springfield is 276,805.Rural communities include Marcola in the Mohawk watershed; and Blue River, Walterville, Leaburg, Vida, Nimrod, Finn Rock, and McKenzie Bridge along the McKenzie River. Most of these communities have populations of less than 500. Two incorporated cities exist along the Coast Fork watershed: Cottage Grove, with 19,830residents, and Creswell, with 10,294 residents. Rural communities in the Coast Fork watershed include Disston, Culp Creek, Dorena, London, Latham, Saginaw, Walker, Delight Valley, Cloverdale, and Goshen. Along Highway 58, the cities of Oakridge (pop. 4,570), Lowell (pop. 5,485) and Westfir (pop. 258) are located centrally in the Middle Fork watershed . Rural communities in the Middle Fork watershed include Dexter, Fall Creek, and Jasper.

Roads

There is an extensive network of public and private roads within the three watersheds. Heavily traveled public roads include Interstate 5, which runs north-south through Eugene-Springfield, Creswell, and Cottage Grove; Highway 126, the main route through the McKenzie watershed over the Cascade Mountains; and Highway 58, which begins near Goshen and travels southeast over the Cascades.

Recreation

Recreation within the Management Area relates closely to the scenic landscape. Activities such as camping, hiking, fishing, hunting, skiing, and boating draw thousands of visitors to the three watersheds every year. Several reservoirs provide recreational opportunities in the summer months, including Dorena Reservoir on the Row River, Dexter Lake on the Middle Fork, and Cougar Reservoir on the McKenzie. Table 2.3e provides a complete list of recreational reservoirs in the Management Area.

Watershed Functions

Other functions of land in the watersheds include retention and slow release of rainwater, flood control, groundwater recharge, and filtration of pollutants. All watersheds provide these functions to some degree depending on local conditions and the amount and types of developments.

Water Resources

Water Availability

Both rainwater and snowmelt contribute to water supplies in the three watersheds. More surface water is supplied by snowmelt in the McKenzie and Middle Fork watersheds than in the Coast Fork because their headwaters are in the High Cascades. Flows in the McKenzie and Middle Fork are less variable than in the Coast Fork. Coast Fork seasonal flow patterns are more similar to streams originating in the Coast Range, with flows in the winter greatly exceeding summer flows even with human-caused changes to the flow regime. Summary flow data for the McKenzie, Middle Fork, and Coast Fork are listed in Table 2.3d.

Table 2.3d Average annual, summer, and winter flows in cubic feet per second (cfs) for the McKenzie, Middle Fork and Coast Fork

Watershed	Average Annual Flow (cfs)	Average Summer Flow (cfs)	Average Winter Flow (cfs)
Coast Fork at Goshen	1,611	416	3,342
McKenzie at Coburg	5,897	3,183	9,582
Middle Fork at Jasper	4,154	2,318	6,433

Source: U.S. Geological Survey, 2000

Groundwater is most plentiful in the three watersheds in areas with alluvial deposits and porous lava flows. The High Cascades store a great deal of water from snowmelt, and the release of this water during the summer helps keep flows relatively constant in the McKenzie and Middle Fork watersheds. Alluvial deposits from the mouth of the Middle Fork to Dexter Dam, at the mouth of the McKenzie, along the McKenzie to Belknap Springs, and along the Coast Fork on the Willamette Valley floor, store large quantities of groundwater.

Dams and Reservoirs

Thirteen dams and reservoirs in the three watersheds are used for flood control in the winter and flow augmentation in the summer. They also provide recreation, irrigation, and power generation. Table 2.3e summarizes the uses of each dam and reservoir, storage capacities, and priority for augmentation of summer flows in the Willamette River.

The reservoirs influence seasonal water availability and flow patterns in the three watersheds. Summer water releases boost flows in the McKenzie to one-third higher than normal (Lane Council of Governments, 1996). The Coast Fork, once an ephemeral river, now flows year-round because of summer water releases from Dorena and Cottage Grove reservoirs.

Table 2.3e Uses, Capacities, and Drawdown Priority for Reservoirs in the Management Area

Watershed	Project	Uses of Water	Summer Reservoir Storage Capacity (acre feet)	Summer Drawdown Priority
Coast Fork	Cottage Grove	Recreation, flood control	28,700	5
Coast Fork	Dorena	Recreation, flood control	65,000	5
McKenzie	Blue River	Recreation, summer flow augmentation, flood control	78,800	3
McKenzie	Carmen	Hydropower	261	N/A
McKenzie	Cougar	Hydropower, recreation, summer flow augmentation, flood control	143,900	2
McKenzie	Leaburg	Hydropower, recreation	345	N/A
McKenzie	Smith	Hydropower	15,000	N/A
McKenzie	Trail Bridge	Hydropower	2,263	N/A

McKenzie	Walterville	Hydropower	100 (Intake) 345 (S. Pond)	N/A
Middle Fork	Dexter	Re-regulate flow from Lookout Point Reservoir, recreation	N/A	N/A
Middle Fork	Fall Creek	Recreation	108,200	5
Middle Fork	Hills Creek	Recreation	194,600	4
Middle Fork	Lookout Point	Flood control, hydropower	324,200	1

Source: U.S. Army Corps of Engineers, 2000; Oregon Water Resources Department, 2000

Water Use

Consumptive uses of water in the three watersheds include irrigation, municipal use, and commercial use. Irrigation is the primary consumptive use for which water rights are issued. Municipal water rights supply drinking water to several hundred thousand people in Lane County. Non-consumptive uses include recreation, power generation, and fish and wildlife habitat. Sources of appropriated water are reservoirs, surface water, and groundwater. Table 2.3f summarizes water allocations in the three watersheds. Actual water use is typically lower than water appropriated.

Table 2.3f Appropriations of surface water, groundwater, and reservoir water in the three watersheds

Water Use	McKenzie		Middle Fork		Coast Fork	
	cfs	af	cfs	af	cfs	af
Irrigation	274	49,000	52	10,173	110	21,507
Fish and Wildlife	292	45	93	47	6	35
Agriculture	1	3	1	11	4	11
Industrial	10,078	18,493	30	620	45	793
Municipal	338	0	50	0	40	1
TOTALS	10,983	67,541	226	10,851	205	22,347

Source: Oregon Water Resources Department, 2000. Appropriations are in cubic feet per second (cfs) and acre-feet (af)

In the McKenzie, more than 9,975 cubic feet per second of industrial water rights are appropriated for hydropower, a non-consumptive use.

2.4 Agricultural Water Quality

2.4.1 Water Quality Issues

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

Surface Water
The Integrated Report is a reporting of the status of water quality in Oregon and a list of waters considered to be impaired. Some waterbodies in the Management Area are impaired for pollutants including temperature, toxic substances, and dissolved oxygen. The 2022 EPA approved Integrated Report and the Draft 2024 Integrated Report can be accessed here: https://www.oregon.gov/deq/wq/Pages/WQ-Assessment.aspx

Pollutants from agricultural land uses that can contribute to impairments include the following parameters:

Nutrients
Nutrients can occur naturally in streams and rivers, but elevated concentrations are often the result of pollution due to human activities. Phosphorus and nitrates have been nationally identified as the most important nutrients to prevent from reaching surface water bodies and groundwater. Nitrate is the primary form in surface water and groundwater because it readily dissolves in water and is easily transported. Studies conducted by the U.S. Geological Survey (USGS) National Water Quality-Assessment (NAWQA) Program estimate that about 90 percent of nitrogen and 75 percent of phosphorus originates from nonpoint sources; the remaining percentages are from point sources.

Excess nutrients can promote the growth of algae, which can reduce beneficial uses of the stream. Biological processes (such as algal production) in surface waters are controlled by the availability of temperature, light, and nutrients. Abundant algae cause wide fluctuations in pH and dissolved oxygen, impacting aquatic life. Nuisance algae and plant growth impair aesthetics and can cause odor problems.

Temperature
Water temperature is primarily a summer concern, a season characterized by low flow and high air temperature, for rearing of salmonids including anadromous fish species, resident trout, and bull trout. Water temperatures above 70°F can be immediately lethal to salmonids due to a breakdown in their respiration and circulation systems. Temperatures between the mid-60s°F to 70°F are stressful to salmonids and fish survival is reduced as the salmonids are more susceptible to a variety of other agents. The sublethal effects associated with higher than optimum temperatures are disease, reduced metabolic energy for feeding, and reduced growth or reproductive behavior due to avoidance of areas with high temperatures.

The temperature standard (OAR 340-041-0028) provides numeric and narrative temperature criteria. Maps and tables provided in OAR 340-041-0315 specify where and when the criteria apply. Biologically based numeric criteria, as measured using the seven-day average maximum stream temperature, include:

- 12.0° C (53.6° F) during times and at locations of bull trout spawning and juvenile rearing;
- 13.0° C (55.4° F) during times and at locations of salmon and steelhead spawning;
- 16.0° C (60.8° F) during times and at locations of core cold water habitat identification;
- 18.0° C (64.4° F) during times and at locations of salmon and trout rearing and migration.

Determining whether the stream temperature is above or below the temperature standard is based on the average of the maximum daily water temperatures for the stream's warmest,

consecutive seven-day period during the year. Water temperature measurements must be taken with continuous recording temperature sensors in well-mixed and representative stream locations.

A one-time measurement above the standard is not a violation of the standard. When stream flow is exceptionally low or air temperature is exceptionally high, the temperature criterion is waived (an example is when the flow is less than the expected 10-year low flow or the air temperature is above the 90th percentile of a seven-day average).

Sediment
Sediment includes fine silt and organic particles suspended in the water column, settled particles, and larger gravel and boulders that move at high flows. Sediment movement and deposition is a natural occurrence 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 cause physical damage to fish and other aquatic life, modify behavior, and increase temperature by absorbing incoming sunlight. Sediment comes from erosion on range, forestland and croplands, erosion from streambanks and streambeds, and runoff from roads and developed areas. Nutrients, pesticides, and toxic substances can also be attached to sediment particles.

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

pH and Dissolved Oxygen
Extremes in water pH and low levels of dissolved oxygen can harm fish and other aquatic life. Both conditions can be caused by the availability of nutrients, warm temperatures, and light, all of which stimulate aquatic plant or algae growth. Excessive aquatic plant growth can increase water pH, which may harm fish. The death and subsequent decomposition of aquatic plants can deplete the water of dissolved oxygen resulting in the death of fish and other aquatic animals as well. These conditions are usually aggravated by low stream flow. For waters identified as providing cold-water aquatic life, the dissolved oxygen shall not fall below 8.0 mg/l unless environmental conditions (barometric pressure, altitude, and temperature) preclude attainment (OAR 340-041-0016). The water quality standard for pH (hydrogen ion concentrations) values range from 6.5 to 9.0. (OAR 340-041-0315).

Bacteria
Bacteria counts are used to determine the safety for human contact, recreation, and domestic water supplies. High levels of *E. coli* bacteria can cause severe gastric illness and even death. Potential sources of bacteria include animal manure and septic systems. Streams may be listed as violating this criterion during the summer period (the highest use period for water contact recreation), or for the fall-winter-spring period. The DEQ standard sets a maximum level allowable over a 90-day period (126 *E. Coli* per 100mL), as well as a single sample maximum of 406 *E. coli* organisms per 100 ml. (OAR 340-041-0009).

Biological Criteria
Biological criteria refer to the support of plants and animals that live at least part of the life cycle in water. Factors that affect biological criteria are stream disturbances, excessive heat inputs, and excessive sediment. The biologic condition is assessed through sampling of streambed insects and fish counting.

Waters of the state shall be of sufficient quality to support aquatic species without detrimental changes in the resident biological communities. (OAR 340-041-0011)

Aquatic Weeds and Algae
Both rooted aquatic plants and algae are a natural part of stream systems. They grow by taking in nutrients from the water column and sunlight. When water temperatures are warm enough and sufficient nutrients are present, excessive growth can occur; this can be a problem for both aquatic life and recreational beneficial uses. Excessive growth can affect aquatic life in several ways. During sunlight hours, plants and algae remove carbon dioxide from the water column as part of photosynthesis. With excessive growth, this can result in increased pH (alkaline conditions). During the night, plant growth removes oxygen from water and releases carbon dioxide, resulting in both low pH (acidic conditions) and low dissolved oxygen. In addition, when algae die and decompose, they remove oxygen from the surrounding water. Low dissolved oxygen can lead to decreased fish habitat and even fish kills. Additionally, low dissolved oxygen levels can lead to changes in water chemistry that allow mercury to be more able to enter the food chain. Algal blooms also often create odors and coloration that are objectionable to recreational users.

Harmful algal blooms (HABs) occur when excessive amounts of the naturally occurring blue-green algae, cyanobacteria, reach levels that create toxins that can be dangerous to animals and humans.

Cyanobacterial blooms cause taste and odor problems, decreased aesthetics, depleted dissolved oxygen, and harmful toxins. Physical factors that contribute to the creation of HABs include the availability of light, meteorological conditions, alteration of water flow, vertical mixing, and temperature. Chemical factors include pH changes, nutrient loading (principally in various forms of nitrogen and phosphorus), and trace metals.

2.4.1.3 TMDLs and Agricultural Load Allocations

Table 2.4.1.3: Pollutants with Approved TMDLs* and Load Allocations for the Southern Willamette Valley Management Area

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

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

- Coast Fork Subbasin (HUC 17090002): 97 percent mercury reduction
- McKenzie Subbasin (HUC 17090004): 88 percent mercury reduction
- Middle Fork Subbasin (HUC 17090001): 88 percent mercury reduction

Surrogate: Total Suspended Solids (TSS). TSS is used as a surrogate because (1) the focus is on controlling soil erosion and (2) sampling mercury is complex and expensive. The target is a 75-reduction 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.
Temperature: Applies to perennial and/or fish bearing waterbodies in the Management Area **Load Allocation:** All nonpoint sources collectively (agriculture's allocation is not separate): background solar radiation loading based on system potential vegetation near the stream; maximum increase of 0.05°C **Surrogate:** Effective shade. **TMDL:** Willamette Basin TMDL, Chapters 4, 11, 12, and 14 (DEQ; approved 2006) **TMDL Revisions:** DEQ is under a court order to update and replace the Willamette Basin temperature TMDL to be consistent with current temperature standards. For more information: https://www.oregon.gov/deq/wq/tmdls/Pages/tmdlreplacement.aspx
Bacteria (*E. coli*): Applies to all waterbodies in the Management Area. **Load Allocation:** 66 to 83 percent reduction as a planning target. **TMDL:** Willamette Basin TMDL, Chapters 2, 11, 12 and 14 (DEQ; approved 2006). For more information: https://www.oregon.gov/deq/wq/tmdls/pages/willamette2006.aspx

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.

There are six public water systems within the past 10 years that received one or more alerts for nitrate levels that exceed 5 milligrams per liter.

There are 188 public water systems within the Southern Willamette Valley Agricultural Water Quality Management Area that obtain domestic drinking water from combinations of surface and groundwater sources. Drinking water is an important beneficial use under the Clean Water Act. Agricultural land uses (e.g., wheat, irrigated crops, livestock) are present near many of the public water system wells and springs in the area. The western portion of the Management Area is mainly comprised of lands designated for either agricultural practices or urban and private rural use. The central and eastern portions of the Management Area are mainly comprised of forestland.

There are 102 public water systems within the past 10 years that received one or more alerts for exceeding the maximum contaminant level (MCL) for total coliform bacteria. None of the public water systems had MCL violations within the past five years. The MCL for total coliforms is zero.

The MCL for nitrate is 10 mg/L. Nitrate contamination is often related to animal and cropland agriculture. The locations of nitrate contamination of private domestic wells and public drinking water sources mostly occur in the western portion of the Management Area near areas classified for agricultural, urban, or private rural use.

Of the soils assessed in the Management Area, the western portion is made up of moderately high to high leaching potential. No data is available for the eastern portion of the Management Area. Nitrate leaching potential is based on the area's slope, precipitation, and land use. Nitrate from fertilizers and septic systems can readily penetrate aquifers used for drinking water when

leaching potential is high. Additionally, bacteria removal through soil filtration can be less effective in sandy soils. Measures to reduce leachable nitrate in soils would reduce risk to groundwater sources of drinking water.

Other contaminants potentially related to agriculture include a pentachlorophenol alert at the City of Wilsonville.

2.4.2 Sources of Impairment

Many factors may affect surface water quality in the Management Area. Sources impacting temperature include wastewater treatment plants, industrial operations, removal and/or lack of riparian vegetation, seasonal reductions in stream flow, and stream channel and floodplain alteration. Contributors to bacteria and nutrient concerns include wastewater treatment plant overflows during heavy rains, legal and illegal waste dumping sites, leaching from septic systems, runoff from residential areas, runoff and leaching from agricultural lands, and natural sources such as wildlife. Mercury can enter waterbodies from industrial and municipal wastewater discharges, erosion of soils that naturally contain mercury, runoff of atmospherically deposited mercury, and runoff from abandoned mines.

2.5 Regulatory and Voluntary Measures

2.5.1 Area Rules

Southern Willamette Valley
OAR **603-095-2140**
Characteristics to Achieve
(1) All landowners or operators conducting activities on lands in agricultural use shall comply with the following criteria. A landowner shall be responsible for only those conditions caused by activities conducted on land controlled by the landowner. A landowner is not responsible for violations of the characteristics to achieve resulting from actions by another landowner. Conditions resulting from unusual weather events (equaling or exceeding a 25-year, 24-hour storm event) or other exceptional circumstances are not the responsibility of the landowner. Limited duration activities may be exempted from these conditions subject to prior written approval by the department.

Waste
(2) Waste: Effective upon rule adoption, no person subject to these rules shall violate any provision of ORS 468B.025 or ORS 468B.050.

Riparian Areas
(3) Riparian areas. By January 1, 2004, agricultural management shall allow establishment and maintenance of vegetation along perennial streams consistent with the capability of the site to provide riparian functions necessary to help moderate solar heating and for streambanks to withstand flows resulting from a 25-year, 24-hour storm event.

Landowners are not responsible for streambank erosion resulting from natural channel migration and meander formation (OAR 603-095-2140(1)).

Erosion and Nutrients
(4) Erosion and Nutrients:

(a) By January 1, 2004, soil erosion from agricultural activities shall not exceed the tolerable soil loss T.
(b) By January 1, 2004, landowners or operators shall prevent pollution from irrigation surface water return flow to waters of the state.

Pesticides
Issue: The intent of this condition is to prevent introduction of pesticides, which include herbicides and fungicides, into waters of the state. Pesticide users should always read the label prior to storing, mixing, or applying pesticides. ORS 634.372 (2) and (4) require users to follow label recommendations for all pesticides.

2.5.2 Voluntary Measures

2.5.2.1 Waste Management

Animal and human wastes are a potential source for many diseases (Terrell and Perfetti, 1989). The most commonly used indicator of biologic pollution in a waterbody, the organism *Escherichia coli* (*E. coli*), is a member of a group of fecal coliform bacteria. These bacteria reside in the intestines of warm-blooded animals, including humans, livestock, and wild birds and mammals. The presence of *E. coli* alone does not confirm the contamination of waters by pathogens but it can indicate contamination by sewage or animal manure and the potential for health risks.

Sources of *E. coli* include discharge from wastewater treatment plants, leakage from failing septic systems, runoff of domestic animal manure from agricultural lands, yards, and other facilities, and runoff of manure from wild animals such as geese and elk.

Numerous factors influence the nature and amount of bacteria that reach waterways. Some of these factors are climate, topography, soil types and infiltration rates, animal species, and animal health.

When bacteria reach a waterway, they may settle into sediments in a streambed and can live there for an extended period. If sediments are disturbed by increased stream turbulence following a runoff event (human or animal traffic or other means), sediment-bound bacteria may be re-suspended into the water column (Sherer et al 1992). Sediment disturbance likely accounts for erratic bacteria levels typically measured in water quality monitoring programs.

Oregon's water quality standard for bacteria was established to protect the most sensitive beneficial use affected by bacteria levels, which is water contact recreation.

Livestock manure is a potential source of bacteria and is also a potential source of nutrients and vegetative material. If stored properly and applied at agronomic rates, manure can be a beneficial source of nitrogen and phosphorus, as well as organic matter (Mikkelsen and Gilliam, 1995). Nothing in this Prevention and Control Measure is intended to discourage the use of manure or other amendments; rather, it seeks to ensure that they are applied correctly. Also, this Prevention and Control Measure is not intended to hold landowners responsible for water quality problems beyond their control, such as runoff of wildlife or wildfowl manure from agricultural lands into waterways.

This Prevention and Control Measure does not prohibit grazing in riparian areas. As long as grazing is conducted at appropriate times of year, stocking rates, duration, and intensity, and in compliance with the riparian Prevention and Control Measure, it should not violate this Prevention and Control Measure. However, unlimited, or concentrated livestock access to streams resulting in waste accumulation may lead to violations.

Landowners with livestock should be aware that rules for confined animal feeding operations (CAFOs) might apply to their facilities if they confine animals for part of the year. For more information, please contact the ODA.

Table 2.5.2.1 Riparian/Streamside Area Management

Resource Concerns Addressed	Practice	Potential Costs of Practice to Producer
Helps establish desirable riparian vegetation, promotes streambank integrity; helps filter nutrients and sediment from runoff; helps reduce stream temperatures by providing shade.	a. Light rotational grazing in riparian area; timed when growth is palatable to animals and when riparian areas are not saturated (Adams, 1994; Chaney, Elmore and Platts, 1993; Rogers and Stephenson, 1998).	May require time and financial investment for livestock control and off-stream watering facilities. Practice may be eligible for cost-sharing programs.
Helps promote desirable riparian vegetation; promotes streambank integrity; helps filter nutrients and sediment from runoff; may help narrow channel and reduce erosion in channel.	b. Livestock exclusion from riparian area; establish off-stream watering facilities (Natural Resources Conservation Service, 1997g and 1997h).	May require higher weed control costs than seasonal riparian grazing. May require financial investment for livestock control and off-stream watering facilities. Practice may be eligible for cost-sharing programs.
Helps establish perennial riparian vegetation rapidly; promotes streambank integrity; may help narrow channel and reduce erosion in channel.	c. Plant perennial vegetation in riparian area. Recommend using native vegetation, or if using non-native vegetation, avoid using invasives (Guard, 1995; Pojar and MacKinnon, 1994).	Costs of vegetation and weed control. May require financial investment for riparian fencing and off-stream watering facilities while vegetation establishes. Practice may be eligible for cost-sharing programs.

2.5.2.2 Soil Erosion Prevention and Control

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

Healthy upland areas provide several important ecological functions, including:

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

Table 2.5.2.2 Erosion, Sediment, and Mercury Control

Resource Concerns Addressed	Practice	Benefits to Producer	Costs to Producer
Helps prevent sediment, nutrient, and bacteria runoff into waters of the state. Helps protect streamside areas.	a. Grazing management: graze pasture plants to appropriate heights, rotate animals between several pastures; provide access to water in each pasture (Ko, 1999; Lundin, 1996; Hirschi, 1997).	May improve pasture production; easy access to water may increase livestock production as well. May improve composition of pasture plants and help prevent weed problems. Practice may be eligible for cost-sharing programs.	Cost of installing fencing, watering facilities for rotational grazing system; time involved in moving animals through pastures. Practice may be eligible for cost-sharing programs.
Helps prevent sediment runoff to waters of the state.	b. Farm road construction: construct fords appropriately, install water bars or rolling dips to divert runoff to roadside ditches (Blinn, 1998; U.S. Forest Service, 1998).	May help prevent water damage on farm roads. Practice may be eligible for cost-sharing programs.	Cost of installation and maintenance. Practice may be eligible for cost-sharing programs.
	c. Plant appropriate vegetation along drainage ditches; seed ditches following construction (Natural Resources Conservation Service, 1997a).	May help prevent ditch bank erosion and slumping. Practice may be eligible for cost-sharing programs.	Costs of establishing vegetation. Practice may be eligible for cost-sharing programs.
Helps prevent sediment runoff into waters of the state; filters nutrients and slows runoff.	d. Plant cover crops on erosion-sensitive areas (Natural Resources Conservation Service, 1997b; Hirschi, 1997).	May reduce weed problems; prevents loss of applied nutrients. Practice may be eligible for cost-sharing programs.	Costs of establishing cover crops; cover crops may compromise primary crop. Practice may be eligible for cost-sharing programs.
Helps prevent irrigation return flow and associated nutrients and sediment to waters of the state.	e. Irrigate pasture or crops according to soil moisture and plant water needs (Hansen and Trimmer, 1997; Trimmer and Hansen, 1994).	May reduce costs of irrigation; may help crop or pasture production. Practice may be eligible for cost-sharing programs.	Installation/ maintenance cost. Monitoring time. Practice may be eligible for cost-sharing programs.
Helps prevent nutrient runoff into waters of the state.	f. Install/maintain diversions or French drains to prevent unwanted drainage into barnyards and heavy-use areas (Natural Resources Conservation Service, 1997e).	Decreases muddiness and shortens saturation period in protected areas. Practice may be eligible for cost-sharing programs.	Cost of installation. Practice may be eligible for cost-sharing programs.

Prevents gully erosion and sediment runoff to waters of the state.	g. In areas where gullies repeatedly appear, install underground outlet or grassed waterway to capture and convey water (Natural Resources Conservation Service, 1997j and 1997k; Hirschi, 1997).	Prevents loss of soil and fertilizers, lessens inconvenience of driving equipment over gullies. Practice may be eligible for cost-sharing programs.	For underground outlet, costs of installing inlets and plastic pipe; for grassed waterways, costs of installation, seeding, weed control, and any land put out of production. Practice may be eligible for cost-sharing programs.
Controls sediment and nutrient movement to waters of the state. Erosion control during high water events.	h. Install and manage field borders/filter strips along field boundaries (Natural Resources Conservation Service, 2001**)**	Prevents loss of soil and fertilizers, lessens inconvenience of driving equipment in wet areas. Practice may be eligible for cost-sharing programs.	Cost of management and installation. Practice may be eligible for cost-sharing programs.

2.5.2.3 Pesticides

Table 2.5.2.3 Pest Management

Resource Concerns Addressed	Practice	Benefits to Producer	Costs to Producer
Reduces risk of pesticide runoff to streams or other water resources.	Apply pesticides according to the label. Comply with label restrictions and precautions.	Compliance with Oregon law; reduces health risks to applicator, may decrease costs.	
Reduces risk of pesticide runoff to streams.	Triple rinse pesticide application equipment and apply rinsates to sites; dispose of or recycle clean containers according to Oregon law.	Compliance with Oregon law. Eliminates disposal costs of collected rinsates identified as hazardous waste.	
	Calibrate, maintain, and correctly operate application equipment.	May reduce use and therefore cost of pesticides; reduces health risks to applicator.	
Reduces risk of pesticide runoff to streams, may reduce loss of non-target species.	Integrated pest management practices such as pheromone traps, beneficial insect release, and field monitoring. (Either in combination with pesticide use or as a replacement to pesticide use).	May improve effectiveness of pest control system.	Time involved by producer to scout fields is usually offset by reduced or more effective pesticide use.

Reduces risk of pesticide runoff to streams or soil contamination.	Store and mix pesticides in leak-proof facilities.	Helps protect drinking water; reduces health risks to applicator.	Cost of installation and maintenance.

2.5.2.4 Irrigation Management

All irrigators within the region should have an irrigation management plan to match irrigation application quantities and rates to the crop and environmental demands. A companion nutrient management plan should match fertilizer and nutrient applications to agronomic demand.

Irrigation management aims at increasing food production and contributes to economic development through improvements in performance, productivity, and sustainability of irrigated agriculture and irrigation systems.

An irrigation management plan should consist of:

- Soil types and map
- Crop types, acreage, schedules, and critical moisture period
- Irrigation system types, efficiencies
- Estimated water use (evapotranspiration-ET) and peak ET, weekly
- Irrigation rate, frequency and total, weekly

Characteristics of an irrigation system that has minimal effect on water quality include:

- Operation based on an irrigation and nutrient management plan,
- Delivery of water efficiently to the land within legal water rights,
- Minimal overland return flows,
- Return flow routing that provides for settling, filtering, and infiltration,
- Minimal effect on stability of streambanks and minimal soil erosion,
- Scheduling of water application appropriate to the site including consideration of soil conditions, crop needs, climate, and topography,
- Installation and management of diversion structures that control erosion and sediment delivery and protect the stability of streambanks,
- Diversions that are adequately screened and which provide for fish passage. (Refer to ORS 498.268 for screening requirements),
- Sediment is captured from irrigation runoff before it enters rivers and streams.

Table 2.5.2.4 Nutrient and Irrigation Efficiencies

Resource Concerns Addressed	Practice	Benefits to Producer	Costs to Producer
Reduces the risk of excess nitrogen in the soil at the end of the growth season.	Apply fertilizer at the correct rate and time applications for crop uptake.	Precise application saves money in fertilizer costs.	Time related to precision application.
Prevents the application of excess nutrients.	Sample soil prior to fertilizer application to know existing nutrients.	Precise application saves money in fertilizer costs.	Cost of soil sampling and analysis.

Takes up extra nitrogen and limits potential for leaching into ground water.	Plant winter cover crops to take up excess nitrogen left over after crops are harvested.	Stores extra nitrogen in plant matter for later release when cover crop is incorporated into the soil.	Cost of seed and fuel to plant cover crop.
Prevents leaching of excess nitrogen past the root zone.	Properly maintain irrigation systems to prevent over-irrigation.	Uniform irrigation application and save producer money on nitrogen costs.	Replacement nozzles at least every four years is recommended.
Prevents over-irrigation and leaching of excess nitrogen past the root zone.	Monitor soil water content and adjust irrigation schedules to maintain soil water content in an appropriate range in the root zone.	Allows accurate irrigation application and keeps nutrients available to crops.	Soil monitoring equipment and time to evaluate soil water content.
	Schedule irrigation applications based on expected evapotranspiration rates.	Allows accurate irrigation application and keeps nutrients available to crops.	Time to evaluate expected evapotranspiration rates.

2.5.2.5 Nutrient and Farm Chemical Management

Crop nutrient applications, including manure, sludge, commercial fertilizer, and other added nutrient inputs, should always be done at a time and in a manner that reduces the possibility of runoff into any nearby stream or waterway as well as leaching to groundwater. Fertilizers should be applied according to a nutrient management plan.

A nutrient management plan should consist of:

- Soil and water tests
- Fertilizer type and storage
- N, P, and K fertilizer concentrations
- Field map
- Application equipment and method
- Crop N utilization, by month
- N, P, K application, by month

Surface applied nutrients should not be applied to frozen soil, on snow, or when significant rainfall (more than one-inch) is predicted as imminent. Extra care shall be used when utilizing surface (rill or flood) irrigation to minimize nutrient contamination of tailwater. In no case, should chemigated or fertigated irrigation waters be applied in a manner such that a direct hydraulic connection occurs with waters of the state.

Table 2.5.2.5 Nutrient and Manure Management

Resource Concerns Addressed	Practice	Benefits to Producer	Costs to Producer
Helps prevent nutrient runoff into waters of the state and leaching into groundwater.	e. Prevent silage leaching and/or store and manage leachate from silage and other vegetative materials (Bruneau, Hodges, and Lucas, 1995; Feise, Adams, and LaSpina, 1993).	Preventing leaching maintains higher nutrient content of ensiled feed material. Practice may be eligible for cost-sharing programs.	May require cost of facility development and purchase of moisture-absorbing materials. Practice may be eligible for cost-sharing programs.
	a. Apply nutrients according to soil test results (Hart, Pirelli, and Cannon, 1995; Marx, Hart, and Stevens, 1999; Natural Resources Conservation Service, 1997i; Sullivan, 1998; Waskom, 1994).	May help reduce fertilizer costs; ensures that plants receive needed nutrients for growth; makes plants more competitive against weeds. Practice may be eligible for cost-sharing programs.	Costs of soil testing; time associated with taking soil samples. Practice may be eligible for cost-sharing programs.
Helps prevent nutrient and bacteria runoff into waters of the state and leaching into groundwater.	b. Store manure under a tarp or roof; preferably on an impervious surface such as concrete or plastic (Gamroth and Moore, 1996; Godwin and Moore, 1997; Moore and Wilrich, 1993).	Prevents nutrient leaching so manure applied on crops or pasture has higher nutrient content; may save some fertilizer costs; producers may be eligible for cost-sharing programs.	Cost of constructing manure storage facilities. Practice may be eligible for cost-sharing programs.
Helps prevent sediment, nutrient and bacteria runoff into waters of the state and leaching into groundwater. Helps protect streamside areas.	c. Establish animal heavy-use areas where animals are confined during the winter to protect other pastures from trampling and compaction. Limit livestock access to pastures when soils are saturated; cover heavy-use areas with rock, hogged fuel, and/or geotextile. Clean manure regularly from heavy-use area (Natural Resources Conservation Service, 1997d).	Protects pastures from compaction during the winter, improving growth. May improve animal health by covering heavy-use areas with material so animals are not wading in mud. Practice may be eligible for cost-sharing programs.	Cost of fencing heavy-use area; cost of feeding hay during the winter; cost of materials for protecting heavy-use area. Practice may be eligible for cost-sharing programs.
Helps prevent sediment, nutrient and bacteria runoff into waters of the state. Helps protect streamside areas.	f. Installing gutters and downspouts in areas with high livestock use. Connect downspout water to drainage system or, if possible, route clean downspout to a location where it can soak into the ground (Natural	May improve animal health by lessening mud during the winter, so animals are not wading in mud. Practice may be eligible for cost-sharing programs.	Cost of installation and maintenance of gutters and downspouts. Practice may be eligible for cost-sharing programs.

	Resources Conservation Service, 1997f).		
	d. Site barns and heavy-use areas away from streams (Godwin and Moore, 1997).	Helps prevent flooding in barns and heavy-use areas. Practice may be eligible for cost-sharing programs.	Need either off-stream watering facility or other source of water for livestock. Practice may be eligible for cost-sharing programs.
	g. Cover heavily used animal walkways with sand, rock, and/or geotextile (Natural Resources Conservation Service, 1997c).	Can improve animal health because animals are not wading in mud. Can help prevent animal health problems such as scratches, hoof or foot rot, and worms. Practice may be eligible for cost-sharing programs.	Cost of sand, rock or other materials. Owners should be aware that feeding equine species on sand may result in sand colic. Practice may be eligible for cost-sharing programs.

Chapter 3: Implementation Strategies

Chapter 3 describes efforts to make and track progress towards 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 following conditions on agricultural lands contribute to good water quality in this Management Area:

1. Sufficient site-capable vegetation is established along streams to stabilize streambanks, filter overland flow, and moderate solar heating,
2. Crop lands are covered throughout the year with either production crops, crop residues, or cover crops,
3. Pastures have minimal bare ground,
4. Irrigation runoff does not deliver sediment, nutrients, or chemicals to streams,
5. Leachate and residues from livestock manure are not entering streams or groundwater.

LAC Mission

The mission of this Area Plan is to develop a framework of strategies for agricultural lands within the McKenzie, Middle Fork, and Coast Fork watersheds (the Management Area) that will contribute to desirable water quality and to develop programs to achieve the goals of the Plan while maintaining the economic sustainability of agriculture. To make clear the watershed wide conservation goals of the Management Area as described by local ag producers.

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

ODA is working with SWCDs and LACs throughout Oregon toward establishing long-term measurable objectives to achieve desired conditions. Currently, ODA and the Upper Willamette SWCD do not have a measurable objective established for this Management Area. The SVA measurable objective for the SIA is being used in leiu.

3.1.2 Focus Areas and Other Coordinated Efforts in Small Watersheds

There are currently no focused efforts in small watersheds in this Management Area.

3.1.3 Strategic Implementation Areas (SIA)

Camp Creek SIA (Initiated 2017)

The Camp Creek 6th field watershed is located in the foothills northeast of the most eastern tip of the city of Springfield in Lane County. It is made up of approximately 17,000 acres with 2,550 agricultural acres including pasture/hay, livestock, orchard, and row crops. Camp Creek has a stream reach of approximately 755,000 linear stream feet, with 102,000 agriculturally influenced stream feet. Camp Creek is the main tributary of the watershed starting at an eastern elevation of 2,667 feet flowing through the middle of the watershed discharging into the McKenzie River at mile 16 at an elevation of 531 feet above sea level.

Typical of most watershed tributaries in the region, Camp Creek contains seven feeder streams that contribute to its flow. Resource concerns include limited riparian vegetation along stretches of the creek and elevated nutrient, temperature, and bacteria levels. Community engagement partners include the McKenzie Pure Water Partners program, USDA Natural Resources Conservation Service, McKenzie Watershed Council, Eugene Water and Electric Board, Lane Council of Governments, Department of Environmental Quality, and Metropolitan Wastewater Management Commission.

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 January 18, 2022, all 8 tax lots identified as a Potential Violation or a Compliance Opportunity will be downgraded to Restoration Opportunity or Likely in Compliance.

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 2024-2029 throughout the Management Area by Upper Willamette SWCD and McKenzie River Watershed Council

Activity	6-year Target	Description
Landowner Engagement		
# events that actively engage landowners (workshops, demonstrations, tours)	20	Annual meetings, farm tours, agricultural-focused community events, workshops, trainings
# landowners participating in active events	600	An average of 50 participating landowners per event.
Technical Assistance (TA)		
# landowners provided with TA (via phone/walk-in/email/booth/site visit)	800	200 landowners per year; equates to approxiamtely 66 landowners per organization annually providing TA.
# site visits	200	Averages approxiamtely 33 site visits per year and 11 site visit per year per organization.
# conservation plans written*	36	Averages 6 per year in total.
On-the-ground Project Funding		
# funding applications submitted	24	Averages 4 per year in total.
* 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.		

3.3 Additional Agricultural Water Quality and Land Condition Monitoring

3.3.1 Water Quality

3.3.1.1 DEQ Monitoring

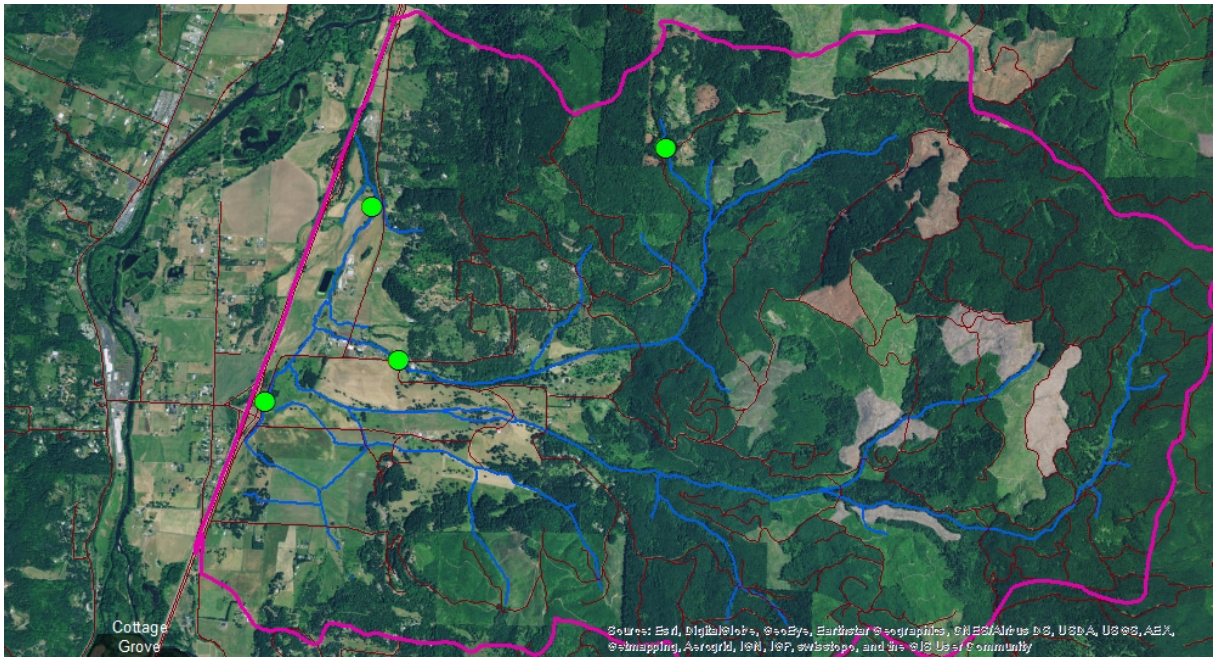
DEQ monitors water quality in the Management Area as part of its ambient monitoring network.

3.3.1.2 ODA Temperature Monitoring

In 2017, ODA began working with 13 local organizations to collect data on stream temperature, air temperature, stream flows, and riparian vegetation on agricultural lands. This monitoring will be carried out for 20 years. Data will be used by ODA to determine whether improved stream temperatures can be measured as a result of improved riparian vegetation on agriculture lands. In addition, the local organizations will use the data to answer their own questions relating to stream temperature. Oregon's DEQ will use the data to assess whether the monitored stream reaches are meeting water temperature standards.

As part of this project, the Upper Willamette SWCD deployed equipment at four locations in the Gettings Creek watershed (Figure 3.3.1.2). Data collected will enable the SWCD to understand the effects of current implemented projects in the Gettings Creek Focus Area compared with pre-project data and to assist in future project planning and implementation.

Figure 3.3.1.2 Gettings Creek Temperature Monitoring Locations



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 (2020-2023). See Chapter 3.1 for background and assessment methods.

4.1.1 Management Area

ODA is working with SWCDs and LACs throughout Oregon towards establishing long-term Measurable Objectives to achieve desired conditions. At the current time, ODA and the SWCDs are using the Camp Creek SIA to serve as a means to show progress in this Management Area. Results for these are described below.

4.1.2 Focus Areas and Other Focused Efforts in Small Watersheds

There are currenly no focused efforts in small watersheds in this Management Area.

4.1.3 Strategic Implementation Areas

Table 4.1.3 2017 Camp Creek SIA

Evaluation Results		
As of January 18, 2018, 8 tax lots were identified as either a Potential Violation or a Compliance Opportunity. PV = 2, CO = 6, RO = 21, LC = 216		
Measurable Objective		
By January 18, 2022, all 8 tax lots identified as a Potential Violation or a Compliance Opportunity will be downgraded to Restoration Opportunity or Likely in Compliance.		
Post Evaluation		
As of January 18, 2022, 7 tax lots identified as a Potential Violation or a Compliance Opportunity were downgraded to Restoration Opportunity or Likely in Compliance. PV = 1, CO = 0, RO = 28, LC = 216. The measurable objective was not achieved. The SWCD remains in contact with the landowner to make changes and that tax lot remains a Potential Violation.		
Adaptive Management Discussion		
The compliance phase of the SIA is closed and monitoring continues. ODA and partners did not meet their measurable objective.		
Monitoring Activities		
Activity	**Accomplishment**	**Description**
ODA		
# acres evaluated	3,679	
# stream miles evaluated	30	
# landowners at Open House	35	

# landowners receiving outreach materials	191	
SWCD and Conservation Partners		
# landowners provided with technical assistance	15	
# site visits	4	
# conservation plans written	0	
SIA and Project Funding		
# funding applications submitted	0	
# funding applications awarded	0	

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 2020-2023 throughout the Management Area by by Upper Willamette SWCD and McKenzie River Watershed Council

Activity		5-year result	Discussion
Landowner Engagement			
# events that actively engage landowners (workshops, demonstrations, tours)		40	Annual meetings; ag water quality-focused workshops on soil health, pasture management, grazing management, cover cropping, well and septic maintenance, weed management, habitat establishment. Table at Mt. Misgah Arboretum Mushroom Festival; plastics reduction-willow DIY workshop; tables at farmers market events; ODA continued credit courses for Oregon pesticide applicators license, etc.
# landowners participating in active events		3,156	Based on event recordkeeping and sign-in sheets.
Technical Assistance (TA)			
# landowners provided with TA (via phone/walk-in/email/site visit)*		600	
# site visits		250	
# conservation plans written*		60	
On-the-ground Project Funding			
# funding applications submitted		14	OWEB Small Grants, NOAA Habitat Restoration Funds, OWEB Restoration

			Grants, ODFW Habitat Recovery Funds, FEMA Fire Relief Funds.
# funding applications awarded		12	

* 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 (OWRI data include most, but not all projects, implemented in the Management Area.)

Landowners	OWEB	DEQ	NRCS *	NPO	Conservation	Lane County	All other sources**	TOTAL
158,849	5,561,588	145,670	56,830	522,490	681,999	203,683	3,870,226	11,201,335

* 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		1,821		
Road	43		440	
Streamside Veg	71	1,199		
Wetland		420		
Instream Habitat	21			
Instream Flow	0		0 cfs	
Fish Passage	10		19	
TOTAL	**102**	**1,619**		

* This table may not include all NRCS projects due to privacy concerns.
** # hardened crossings, culverts, etc.

4.3 Additional Agricultural Water Quality and Land Condition Monitoring

4.3.1 Water Quality

4.3.1.1 DEQ Monitoring

For this biennial review, DEQ reviewed data from 58 monitoring stations, of which four had sufficient data for this status and trends analysis (https://www.deq.state.or.us/SC/WQWebReporting/wqst_map/willamette/will_mck_forks_map.html). Water quality at the McKay Creek site is driven primarily by McKay Reservoir 6 miles upstream.

The main agricultural water quality concerns are discussed below. See the DEQ report for all graphs (https://www.oregon.gov/deq/wq/programs/Pages/wqstatustrends.aspx).

Table 4.3.1.1 Agricultural Water Quality Concerns: Surface Water

Site Description	Parameter					
	E. Coli	**pH**	**Dissolved Oxygen**	**Temperature**	**Total Phosphorus (mg/L)**	**Total Suspended Solids (mg/L)**
	Attainment Status and Trend				**median; maximum[1]**	**median; maximum[2]**
McKenzie River at Hendricks Bridge 10662-ORDEQ	Yes	Yes	Yes	N/A	0.03;0.05	2;14
Camp Crk @ Camp Crk Rd Bridge; 14164550	N/A	N/A	No	No	N/A	N/A
McKenzie R at Coburg Rd; 10376-ORDEQ	Yes↓	Yes	Yes↑	Yes	0.03;0.07	2;9
MF Willamette @ Jasper; 14152000	Yes↑	Yes	No	No↓	N/A	N/A
CF Willamette @ 0.7; FAMBCFW	Yes	Yes	Yes	N/A	N/A	9;12
CF Willamette @ Mt. Pisgah Park; 11275-ORDEQ	Yes	Yes	Yes↑	N/A	0.03;0.06	2;9
Row River Near CG; 14155500	-	-	-	No↓	N/A	N/A
CF Willamette BLW CG Dam; 14153500	-	-	-	No↓	N/A	N/A

[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

E. coli
Data collected generally indicate compliance. Most assessed stations were near the cities, with a few in the forest lands.

Temperature
Stream temperatures are high throughout the Management Area. Stream temperature does not seem to be attributable to agriculture, however, elevated stream temperatures in the Management Area continue to be a concern.

4.3.2 Land Conditions

There is no additional land condition monitoring.

4.4 Biennial Reviews and Adaptive Management

ODA, the LAC, the LMA, and other partners met on May 8, 2024, 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
• A lot of work has been done to establish contacts with local landowners who are willing to work with conservation partners. These relationships beget further relationships. The most effective communicatioin strategy in this area seems to be via email. • Funding from Pure Water Partners has been used for recovery in fire affected areas. The Fresh Water Trust began a shade credit program in 2020 for landowners in the area.
Impediments
• Progress has been impeded by an historic lack of funding, especially for implementation of projects. There is already a lot of competition for funding that exists, and agricultural projects can seem less appealing or urgent to grant review boards versus whole watershed restoration projects by larger applicants. There is a need for more grant funding specifically for ag management practices that will not be competed against by larger restoration projects or larger nongovernmental organizations. • The $15K OWEB small grants are not enough for any one project to be planned and completed. Working with federal programs means working with federal agencies which is a barrier for some landowners wanting to work with them. Working with federal agencies can be seen as intimidating, slow, requiring a lot of paperwork, and including a lot of difficult-to-understand “jargon” by some ag producers. • Funding types that do exist can tend to be narrow or so specific in focus, that landowners have difficulty understanding their eligibility. These funding sources can also tend to require upfront costs, which are later reimbursed. This can mean that landowners have to apply for additional loans or funding sources just to begin ostensibly “funded” work.”
Recommended Modifications and Adaptive Management
• The LAC recommends that state agencies work together to determine how the gap in funding sources for ag practices can be bridged. Suggestions include providing technical assistance with filling out grants, understanding grant conditions, and helping navigate assistance programs. • The LAC also suggests an email distribution list to contact landowners and inform them of events and resources, indicating the subject in the email heading.

Table 4.4b Number of ODA compliance activities in 2020-2023

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	2	3	12	1	1	6	1	0
Within SIA	0	1	2	0	0	1	0	0

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