OREGON
DEPARTMENT OF
AGRICULTURE

Umpqua Basin Agricultural Water Quality Management Area Plan

November 2020

Developed by the

Oregon Department of Agriculture

With input from the:

Umpqua Basin Local Advisory Committee
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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
BLM - Bureau of Land Management
CAFO – Confined Animal Feeding Operation
CNPCP – Coastal Nonpoint Pollution Control Program
CREP – Conservation Reserve Enhancement Program
CWA – Clean Water Act
CZARA – Coastal Zone Act Reauthorization Amendments
DEQ – Oregon Department of Environmental Quality
GWMA – Groundwater Management Area
LAC – Local Advisory Committee
LMA – Local Management Agency
Management Area – Agricultural Water Quality Management Area
NOAA - National Oceanic and Atmospheric Administration
NPDES – National Pollution Discharge Elimination System
NRCS – Natural Resources Conservation Service
OAR – Oregon Administrative Rules
ODA – Oregon Department of Agriculture
ODF – Oregon Department of Forestry
ODFW – Oregon Department of Fish and Wildlife
OHA – Oregon Health Authority
ORS – Oregon Revised Statute
OSU – Oregon State University
OWEB – Oregon Watershed Enhancement Board
OWRI – Oregon Watershed Restoration Inventory
PMP – Pesticides Management Plan
PSP – Pesticides Stewardship Partnership
PUR – Partnership for the Umpqua Rivers
RUSLE – Revised Universal Soil Loss Equation
SIA – Strategic Implementation Area
SWCD – Soil and Water Conservation District
T – Soil Loss Tolerance Factor
TMDL – Total Maximum Daily Load
USDA – United States Department of Agriculture
US EPA – United States Environmental Protection Agency
WPCF – Water Pollution Control Facility
WQPMT – Water Quality Pesticides Management Team

Preface

Attention Landowners/Operators who may be the subject of a complaint filed with Oregon Department of Agriculture regarding Agricultural Water Quality

The Local Advisory Committee would like to be available to you if you have questions regarding the Plan & Rules. Please see Chapter 3 for a list of Umpqua Local Advisory Committee Members. Phone numbers for your Local Advisory Committee Members can be obtained from the Umpqua and Douglas Soil and Water Conservation Districts (SWCDs). Contact information for the SWCDs is available on the cover page of this Plan.

Chapter 1 of the Area Plan was developed by the Oregon Department of Agriculture (ODA) to have consistent and accurate information about the Agricultural Water Quality Management Program statewide. The Local Advisory Committee and the Local Management Agency did not develop or participate in the development of Chapter 1.

The Local Advisory Committee promotes agricultural management that supports good water quality for multiple uses. However, the Local Advisory Committee also believes that some of the current numeric water quality standards referenced in this document are too high to be attained.

To: Agricultural Landowners of Douglas County

From: The Umpqua Basin Local Advisory Committee – 2001

Regarding: The Umpqua Basin Agricultural Water Quality Management Area Plan

The Umpqua Basin Local Advisory Committee (LAC) has been working hard for the last 2-1/2 years to represent the views of agricultural landowners during the development of an Agricultural Water Quality Management Area Plan for agriculture in the Umpqua Basin.

This project officially began in 1993 when the Oregon Legislature passed Senate Bill 1010, the Agricultural Water Quality Management Act, which mandated the development of agricultural water quality plans for each of the major watersheds in Oregon. The bill specified that a local committee would work with the Oregon Department of Agriculture (ODA) to develop a plan that would protect water quality while protecting the economic viability of agriculture in that region.

The Umpqua Local Advisory Committee (LAC) was appointed by the Director of the Department of Agriculture in 1997, made up of 12 agricultural producers and 2 members from conservation interests. Small and large operations are represented, and every region in the county is represented. Douglas County Farm Bureau and the Douglas County Livestock Association are both well represented and we have one representative from Umpqua Fishermen and one from the Steamboaters.

Recognizing the importance of this task, the Committee has invested a great deal of time and energy in developing a plan that would protect water quality while protecting landowners right to farm and graze livestock. After initial public review and comment in late 1999, the committee returned to work with two additional members and a great deal of public participation. The plan was essentially rewritten in order to address concerns presented during public comment and community participation.

The first task undertaken as we returned to work was to develop a Mission Statement and Statement of Goals and Intents. These statements are important groundwork for the entire plan, and should be read carefully by anyone who wants to understand the Umpqua Basin Agricultural Water Quality Management Area Plan for agriculture.

Sincerely,

Don Kruse, Chair LAC
George Sandberg, Chair of the Working Committee

Members of the Umpqua LAC: Vern Bare, Web Briggs, Ken Ferguson, JoAnn Gilliam, Janice Green, Bob Hall, Dave Harris, Don Kruse, James Mast, Kathy Panner, George Sandberg, Carol Whipple. Alternates: Joe Brumbach, Jim Donnellan, Stan Hendy, and Jan Tetreault

Foreword

This Agricultural Water Quality Area Plan (Area Plan) provides guidance for addressing water quality related to agricultural activities in the Agricultural Water Quality Management Area (Management Area). The Area Plan identifies strategies to prevent and control water pollution from agricultural lands, 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. Presents goal(s), measurable objectives, strategic initiatives, proposed activities, and monitoring.

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

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 603-095-0740). The general regulations guide the Ag Water Quality Program, and the Area Rules for the Management Area are the regulations with which landowners are required to comply. Landowners are encouraged through outreach and education to implement conservation and management activities.

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

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

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

1.2 History of the Ag Water Quality Program

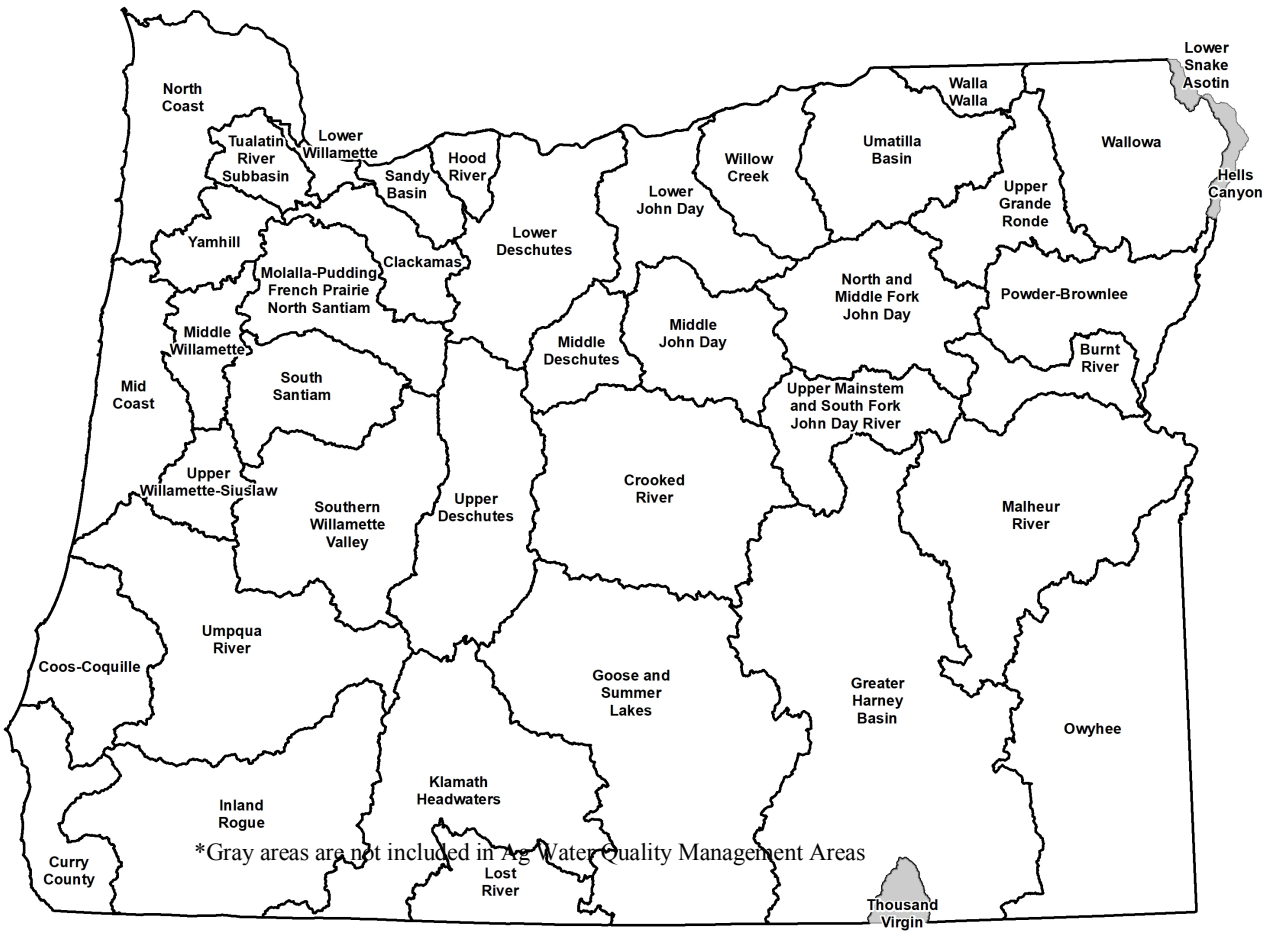
In 1993, the Oregon Legislature passed the Agricultural Water Quality Management Act directing ODA to develop plans to prevent and control water pollution from agricultural activities and soil erosion and to achieve water quality standards and to adopt rules as necessary (ORS 568.900 through ORS 568.933).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

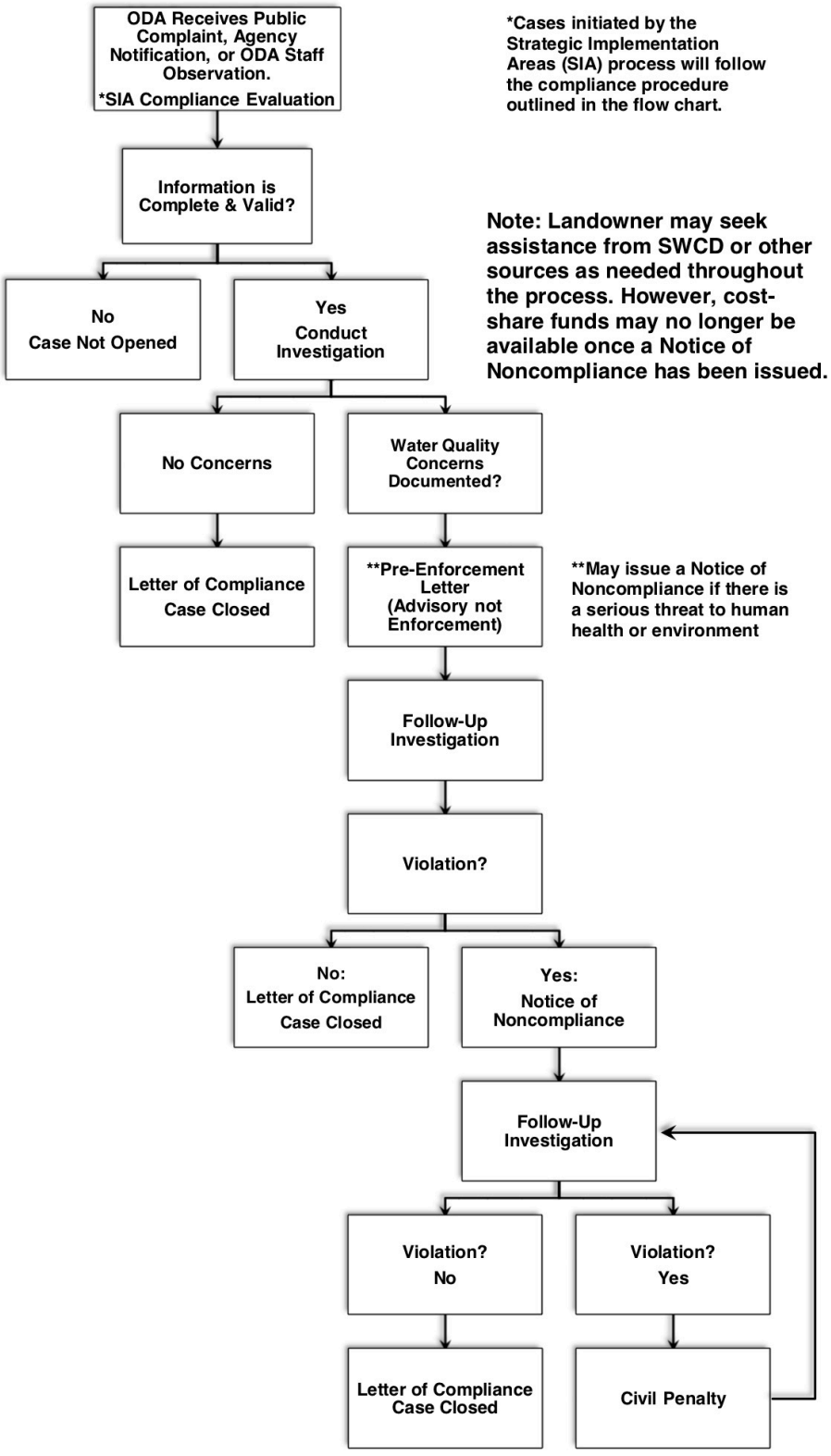
1.3.1.1 ODA Compliance Process

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 1.3.1.1 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 in the development, implementation, and biennial reviews of the Area Plan and Area Rules. The LAC's primary role is to advise ODA and the LMA on local agricultural water quality issues as well as evaluate the progress toward achieving the goals and objectives of the Area Plan. LACs are composed primarily of agricultural landowners in the Management Area and must reflect a balance of affected persons.

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

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

1.3.4 Agricultural Landowners

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

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

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

- Hot springs, glacial melt water, unusual weather events, and climate change,
- Wildfires
- 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, LMA, and SWCDs conduct biennial reviews of the Area Plan and Area Rules. Partners, stakeholders, and the general public are invited to participate in the process. Any revisions to the Area Rules will include a formal public comment period and a formal public hearing.

1.4 Agricultural Water Quality

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

1.4.1 Point and Nonpoint Sources of Water Pollution

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

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

1.4.2 Beneficial Uses and Parameters of Concern

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

Area. Beneficial uses that have the potential to be impaired in this Management Area are summarized in Chapter 2.

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

1.4.3 Impaired Waterbodies and Total Maximum Daily Loads

Every two years, DEQ is required by the CWA to assess water quality in Oregon, resulting in the "Integrated Report." CWA Section 303(d) requires DEQ to identify "impaired" waters that do not meet water quality standards. The resulting list is commonly referred to as the "303(d) list" (www.oregon.gov/deq/wq/Pages/WQ-Assessment.aspx). 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.

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

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

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

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

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

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

ORS 468B.025 (prohibited activities) states that:
"(1) Except as provided in ORS 468B.050 or 468B.053, no person shall:
(a) Cause pollution of any waters of the state or place or cause to be placed any wastes in a location where such wastes are likely to escape or be carried into the waters of the state by any means.

(b) Discharge any wastes into the waters of the state if the discharge reduces the quality of such waters below the water quality standards established by rule for such waters by the Environmental Quality Commission.
(2) No person shall violate the conditions of any waste discharge permit issued under ORS 468B.050."

ORS 468B.050 identifies the conditions when a permit is required. A permit is required for CAFOs that meet minimum criteria for confinement periods and have large animal numbers or have wastewater facilities. The portions of ORS 468B.050 that apply to the Ag Water Quality Program state that:
"(1) Except as provided in ORS 468B.053 or 468B.215, without holding a permit from the Director of the Department of Environmental Quality or the State Department of Agriculture, which permit shall specify applicable effluent limitations, a person may not:
(a) Discharge any wastes into the waters of the state from any industrial or commercial establishment or activity or any disposal system."

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

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

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

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

1.4.5 Streamside Vegetation and Agricultural Water Quality

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

Site-Capable Vegetation

The Ag Water Quality Program uses the concept of "site-capable vegetation" to describe the streamside vegetation that can be expected to grow at a particular site, given natural site factors (e.g., elevation, soils, climate, hydrology, wildlife, fire, floods) and historical and current human influences that are beyond the program's statutory authority (e.g., channelization, roads, modified flows, previous land management). Site-capable vegetation can be determined for a specific site based on: current streamside vegetation at the site, streamside vegetation at nearby reference sites with similar natural characteristics, Natural Resources Conservation Service (NRCS) soil surveys and ecological site descriptions, and/or local or regional scientific research.

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

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

In many cases, invasive, non-native plants, such as introduced varieties of blackberry and reed canarygrass, grow in streamside areas. This type of vegetation has established throughout much of Oregon due to historic and human influences and may provide some of the water quality functions of site-capable vegetation. ODA's statutory authority does not require the removal of invasive, non-native plants, however, ODA encourages landowners to remove these plants voluntarily. Voluntary programs through SWCDs and watershed councils provide technical assistance and financial incentives for weed control and restoration projects. 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 items such as parent material 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.

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

1.5.3 The Oregon Plan for Salmon and Watersheds

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

1.5.4 Pesticide Management and Stewardship

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

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

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

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

1.5.5 Drinking Water Source Protection

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

1.5.6 Oregon's Coastal Management Program

The mission of the Oregon Coastal Management Program is to work in partnership with coastal local governments, state and federal agencies, and other partners and stakeholders to ensure that Oregon's coastal and ocean resources are managed, conserved, and developed consistent with statewide planning goals. Oregon's Coastal Nonpoint Pollution Control Program (CNPCP) has been developed to comply with requirements of Section 6217 of the federal CZARA. The US EPA and the National Oceanic and Atmospheric Administration (NOAA) administer CZARA at the federal level. The federal requirements are designed to restore and protect coastal waters from nonpoint source pollution and require coastal states to implement a set of management measures based on guidance published by the US EPA. The guidance contains measures for agricultural activities, forestry activities, urban areas, marinas, hydro-modification activities, and wetlands. In Oregon, the Department of Land Conservation and Development and DEQ coordinate the program. The geographic boundaries for the CNPCP include the North Coast, Mid-Coast, South Coast, Rogue, and Umpqua basins. Oregon has identified the ODA coastal Area Plans and Area Rules as the state's strategy to address agricultural measures. The Area Plan and Area Rules are designed to meet the requirements of CZARA and to implement agriculture's part of Oregon's CNPCP. For more information, visit www.oregon.gov/lcd/OCMP/Pages/Coastal-Zone-Management.aspx.

1.6 Partner Agencies and Organizations

1.6.1 Oregon Department of Environmental Quality

The US EPA delegated authority to DEQ to implement the federal CWA in Oregon. DEQ is the lead state agency with overall authority to implement the CWA in Oregon. DEQ works with other state agencies,

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

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

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

1.6.2 Other Partners

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

1.7 Measuring Progress

Agricultural landowners have been implementing 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 (section 1.7.3). ODA's longer-term goal is to develop measurable objectives, milestones, and monitoring methods at the Management Area scale.

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

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

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

1.7.2 Land Conditions and Water Quality

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

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

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

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

1.7.3 Focused Implementation in Small Geographic Areas

Focus Areas

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

Focus Areas have the following advantages: a proactive approach that addresses the most significant water quality concerns, multiple partners that coordinate and align technical and financial resources, a

higher density of projects that may lead to increased connectivity of projects, and a more effective and efficient use of limited resources.

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

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

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

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

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

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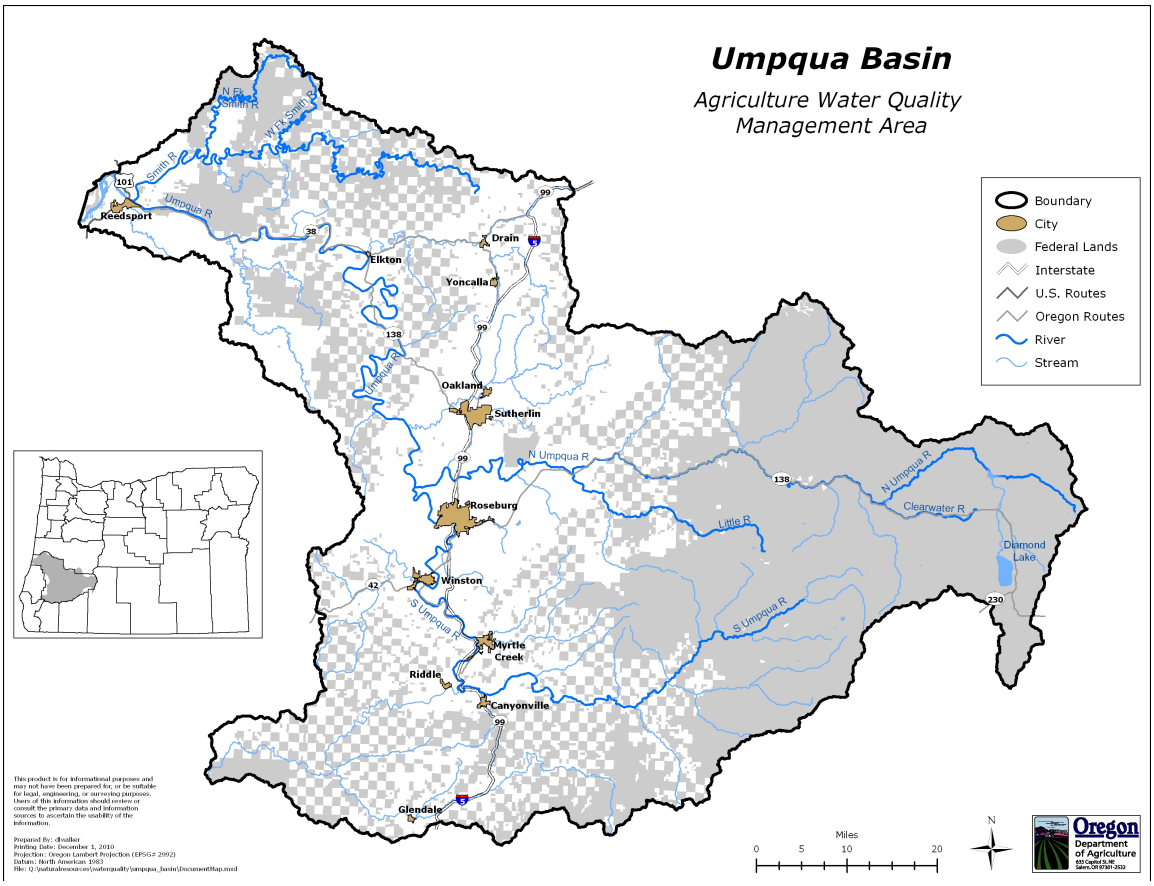
Chapter 2: Local Background



2.1 Local Roles

2.1.1 Local Advisory Committee

The Area Plan was developed with the assistance of the LAC. The LAC was formed in 1999 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	Agricultural Product or Interest Representation
George Sandberg (Chair)	Central Douglas County	Cattle
Jan Tetreault	Ash Valley	Native Plant Nursery
Ken Ferguson	Umpqua Basin	Steamboaters: Fishing Advocacy Group
James Mast	Elk Creek	Agriculture
Paul Heberling	Central Douglas County	Cattle
Walt Gayner	Central Douglas County	Small Scale Livestock
Bill Hoyt	Northern Douglas County	Sheep, Cattle, Crops
Kelly Coates	Roseburg	Cow Creek Tribe
Tom Black	Reedsport	Cattle
Lee Russell	Elk Creek	Elk Creek Watershed Council

Former LAC Members:

Amy Amoroso	Jo Ann Gilliam
Web Briggs	Dave Harris
Janice Green	Vern Bare
Kathy Panner	Bob Hall
Don Kruse	Don Wilkinson
Joe Brumbach	Jim Donnellan
Stan Handy	Donna Fouts
Carol Whipple	

2.1.2 Local Management Agency

Implementation of the Area Plan is accomplished through an Intergovernmental Grant Agreements between ODA and the Douglas & Umpqua SWCDs. This Intergovernmental Grant Agreement defines the SWCDs as the LMAs for implementation of the Ag Water Quality Program in this Management Area. The SWCDs were also involved in development of the Area Plan and Area Rules.

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

2.2 Area Plan and Area Rules: Development and History

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

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

2.3 Geographical and Physical Setting

2.3.1 Location, Water Resources, Land Use, Land Ownership, Agriculture

The Umpqua Basin includes the drainage area for the South Umpqua, the North Umpqua, the mainstem Umpqua, and the Smith River. The land base under this Plan includes all agricultural and rural lands within the Umpqua Basin except for public lands managed by federal agencies (Bureau of Land Management (BLM), US Forest Service and US Fish and Wildlife Service), and activities subject to the Forest Practices Act.

Of the 2,876,000 acres in Douglas County, 16 percent is classified as agricultural lands, 74 percent as forest, and 10 percent as urban and other (Douglas County Planning Department). The majority of the agricultural lands is used for grazing and permanent hay fields. In 2006, the total estimated agricultural gross receipts for Douglas County were 75.1 million for animal and crop sales[1]. Agricultural production includes livestock, hay and silage, wine grapes, small grains, fruit crops, Christmas trees, and vegetables (truck crops).

The South Umpqua Subbasin and the mainstem Subbasin lie between the Coast Range to the west and the Cascade Range to the east. Valleys associated with tributaries to these rivers are mostly narrow and widely scattered. The South Umpqua River is generally wide, shallow, and slow moving close to the

[1] From *Oregon Agripedia*, Oregon Department of Agriculture, 2007.

mainstem but can be in a steep gradient channel higher in the watershed. The South Umpqua has a very strong fall Chinook salmon run that has adapted to spawning in mainstem reaches. Coho salmon in the Subbasin tend to utilize tributaries for spawning. Most of the agricultural activities in the Umpqua Basin take place in the central valley.

The entire eastern portion of the Umpqua Basin is along the west slope of the Cascade Range. Beginning in the foothills east of the central valley, the terrain rises quickly, eventually reaching elevations over 9,000 feet. The North Umpqua River tends to be in an incised channel with a steep gradient. The water in the North Umpqua remains cooler than the South Umpqua and is an important source of cooler water to the main stem Umpqua where the North Umpqua and South Umpqua join. The North Umpqua geology and flow regime supports very strong steelhead runs. Agriculture is limited in the North Umpqua Basin as most of the land is in public ownership and is poorly suited for agriculture, although there is some area below Little River linked to agriculture.

The Smith River Subbasin is on the west side of the Coast Range and is characterized by a 25-mile long estuary whose tributaries provide important Coho salmon habitat. The headwaters of the Smith River tend to have high gradient, steeply incised channels that widen out into meandering, wide channels in the floodplains. Agriculture primarily occurs in the lower reaches of the Subbasin along these floodplains.

2.4 Agricultural Water Quality

2.4.1 Water Quality Issues

2.4.1.1 Beneficial Uses

Beneficial Uses	Umpqua River Estuary to Head of Tidewater and Adjacent Marine Waters	Umpqua River Main Stem from Head of Tidewater to Confluence of N & S Umpqua Rivers	North Umpqua River Main Stem	South Umpqua River Main Stem	All Other Tributaries to Umpqua, North & South Umpqua Rivers
Public Domestic Water Supply*		X	X	X	X
Private Domestic Water Supply*		X	X	X	X
Industrial Water Supply	X	X	X	X	X
Irrigation		X	X	X	X (upstream of tidal salt water zone)
Livestock Watering		X	X	X	X
Fish & Aquatic Life	X	X	X	X	X
Wildlife & Hunting	X	X	X	X	X
Fishing	X	X	X	X	X
Boating	X	X	X	X	X
Water Contact Recreation	X	X	X	X	X
Aesthetic Quality	X	X	X	X	X
Hydro Power			X	X	X
Commercial Navigation & Transportation	X				

*With adequate pretreatment (filtration and disinfection) and natural quality to meet drinking water standards

The Oregon Environmental Quality Commission has adopted numeric and narrative water quality standards to protect these designated *beneficial use*s. In the Umpqua Basin, monitoring has indicated that a number of water quality standards are regularly exceeded. When a water quality standard is exceeded for a specific type of pollution or parameter, that water body is considered "impaired" and is required to

be placed on the 303(d) list. TMDLs are then developed to establish a pollution budget for impaired waterbodies.

2.4.1.2 WQ Parameters and 303(d) list

For the Umpqua Basin, the 2012 Integrated Report/303(d) list identifies impairments for the following parameters:

- Bacteria
- Nutrients
- Temperature
- Sedimentation
- Toxics: iron, mercury, arsenic, cadmium, chlorine, copper, lead, nickel, zinc
- Flow Modification
- Habitat Modification
- Total Dissolved Gases
- Chlorophyll a
- Dissolved Oxygen
- pH
- Aquatic Weeds and Algae
- Phosphorus
- Ammonia
- Biological Criteria (pollutant may be fine sediment, temperature, or other)

This Plan will directly address sedimentation, nutrients, bacteria, and temperature, knowing that by improving in those areas on agricultural lands, there will be improvement in other related parameters (flow modification, dissolved oxygen, pH, aquatic weeds and algae, total dissolved gas, biological criteria and chlorophyll a).

2.4.1.3 TMDLs and Agricultural Load Allocations

Completed TMDLs for the Umpqua Basin:

- In January 2002, the TMDL for the Little River Watershed in the Umpqua Basin was approved for temperature, pH, sediment, and habitat modification. The Little River TMDL can be found at DEQ's website: https://www.oregon.gov/deq/wq/tmdls/Pages/TMDLs-Umpqua-Basin.aspx
- In April 2007, TMDLs for water quality limited streams in the Umpqua Basin were approved. The 181 water quality limited segments in the TMDL approval includes the following:
    - 139 Temperature TMDLs for perennial streams within the Umpqua Basin.
    - 14 pH TMDLs for perennial streams and lakes within the Umpqua Basin. The pH TMDL applies year round.
    - 18 Bacteria TMDLs for perennial streams of the Umpqua Basin. The bacteria TMDL applies year round.
    - 5 Dissolved Oxygen TMDLs for perennial streams within the Umpqua Basin.
    - 3 Aquatic Weed TMDLs for perennial streams and lakes within the Umpqua Basin.
    - 1 Chlorophyll a TMDL for the South Umpqua River.
    - 1 Phosphorus TMDL for the South Umpqua River.

The Area Plan is local agriculture's plan to achieve the non-point source load reductions called for in the TMDLs. It is the responsibility of ODA, through the Water Quality Program, to address the parameters listed in the TMDL document and implement a water quality management plan for agricultural and rural lands to achieve TMDL targets. This management plan does not establish numeric targets of water column parameters but instead facilitates the development of land conditions on the land that, according

to the best available research, will reduce non-point source pollutant loads (achieve load reductions for agriculture) identified in the TMDL. This Area Plan is incorporated into the DEQ Umpqua Basin Water Quality Management Plan.

DEQ Umpqua Basin TMDL website: https://www.oregon.gov/deq/wq/tmdls/Pages/TMDLs-Umpqua-Basin.aspx

2.4.1.4 Drinking Water

The following information is a summary provided by DEQ's Drinking Water Program. 115 public water systems utilize surface and/or groundwater for domestic drinking water and serve approximately 87,973 persons in the Management Area. 91 active public water systems obtain domestic drinking water from primarily groundwater sources and 24 active public water systems obtain domestic drinking water primarily from surface water sources in the Umpqua Agricultural Water Quality Management Area.

Several public water systems have had recent alerts for bacteria. Three have had recent violations.

The Domestic Well Testing Act database (real estate transaction testing data) for 1989-2018 shows that 25 of the 858 private well tests had elevated nitrate concentrations (5 mg/L). Four of these wells had nitrate concentrations over the maximum contaminant limit (10 mg/L).

Based on an assessment by the Oregon Health Authority, the management area has a mix of wells that have moderate and high susceptibility to contamination. Many of the wells are in soils with high and medium leaching potential. Nitrate from fertilizers and septic systems can readily penetrate to aquifers used for drinking water when leaching potential is high or very high, and bacteria removal through soil filtration can be less effective in sandy soils. Measures to reduce leachable nitrate in soils would reduce risk to groundwater sources of drinking water.

Agricultural activities are potential sources of sedimentation, bacteria, and nutrients. Other anthropogenic and natural sources can contribute contaminants as well. Agricultural land uses (hay/pasture, livestock, grapes, Christmas trees) are present near many of the public water system wells and springs in the Management Area.

Based on the above information, agriculture does not appear to be having a significant impact on drinking water in this Management Area. There are a relatively low number of exceedances. However, landowners should always properly manage manure and fertilizer to minimize leaching of nitrates and *E. coli* to groundwater. Protecting groundwater from contamination will protect human health, property values, as well as any future need for a Ground Water Management Area to be developed.

2.4.2 Local Issues of Concern, Sources of Impairment, Pollution Prevention/Control

This section describes potential pollution sources and provides a plan to reduce and prevent water pollution. When combined with other provisions of this Plan and pollution control efforts for other land uses, it will help achieve water quality standards. This section has been developed around the water quality parameters listed in the Umpqua Basin, which are directly affected by agricultural activity: sedimentation, nutrients, bacteria, and temperature. For each of these parameters, the committee identified:

- Information about the parameter to provide basic understanding of the reason for concern.
- A statement identifying the unacceptable condition, which will be reflected in the Umpqua Basin Area Rules.

- Examples of situations, which could lead to an unacceptable condition. These examples are provided to alert landowners and managers to potential problems, rather than to prescribe particular treatments.

TEXT OUTLINED BY A BOX IS A PART OF THE ADMINISTRATIVE RULE.

These rules have been developed to implement a water quality management Area Plan for the Umpqua Basin Agricultural Water Quality Management Area pursuant to authorities vested in the Department through ORS 568.900-568.933 and ORS 561.190 - 561.191, due to a determination by the Environmental Quality Commission to establish Total Maximum Daily Loads (TMDL) and allocate a load to agricultural nonpoint sources. The Area Plan is known as the Umpqua Basin Agricultural Water Quality Management Area Plan. After adoption of the TMDLs, these rules will be reviewed and modified as needed to provide reasonable assurance that the load allocations for agriculture will be met.

Nothing in the Umpqua Basin Agricultural Water Quality Management Area Plan or Rules adopted by the Department will allow the Department to implement this Plan or in a manner that is in violation of the U.S. Constitution, the Oregon Constitution or other applicable state laws.

All landowners or operators conducting activities on lands in agricultural use shall be in compliance with the following criteria (refers to unacceptable conditions in boxes). A landowner is responsible for only those conditions caused by agricultural activities conducted by the landowner. A landowner is not responsible for unacceptable conditions resulting from the actions of another landowner. Conditions resulting from unusual weather events or other exceptional circumstances are not the responsibility of the landowner.

Thus, landowners are responsible only for an unacceptable condition caused by management activities on their lands. For example, stream bank erosion can and will occur and may be outside the landowner's control.

Following are the pollution prevention and control measures for the listed parameters of concern that agriculture may affect in the Umpqua Basin.

2.5.1 Nutrient Management

Nutrients, such as nitrogen, phosphorous, potassium, and sulfur are critical to plant growth. In fact the beautiful sub-clover pastures for which Douglas County is known are made possible by annual applications of phosphorous and sulfur. For many landowners, fertilizer is a significant budget item and managing those nutrients effectively is essential to productive and profitable farming and ranching in Douglas County. However, if fertilizers are over applied and nutrients like nitrogen and phosphorous enter streams, they can have a very negative impact. Excess nitrogen and phosphorus contribute to increased aquatic weeds and algae growth. This growth results in a large pH fluctuation that can be harmful to fish. During the day, algae absorb carbon dioxide from the water for cell growth, raising pH. At night, photosynthesis stops and algae continue to respire, releasing carbon dioxide and lowering pH. Excessive aquatic weeds can also affect dissolved oxygen levels. If dissolved oxygen drops too low enough levels, it can result in fish kills. Minimizing fertilizer applications based on plant needs, with the goal of keeping nutrients in the soil and out of waterways is a win–win situation.

It is the responsibility of the Umpqua Basin LAC to identify those situations resulting from agricultural activities that would seriously impact water quality in the Umpqua Basin and identify them as "unacceptable conditions."

Unacceptable Condition Addressing Nutrients

Substantial amounts of phosphorous (i.e. in excess of water quality standards[2] moving from agricultural lands into waters of the state as a result of agricultural activities is identified as an unacceptable condition.

When a condition comes to the attention of ODA, which appears to be in violation of the nutrient rule, every practical means shall be used to make a proper determination of the source of the nutrient, the cause of the nutrient movement, and the degree of the problem. Appropriate testing will be conducted to verify that phosphorous levels of waters leaving agricultural land are in excess of water quality standards (see footnote 2 for a description of the phosphorous standard).

Landowners, to assess their own situations, can monitor water quality. Help is available through OSU Extension Service, Oregon Cattlemen's Association, the Partnership for Umpqua Rivers (PUR), DEQ, and others. ODA and Umpqua Basin LAC encourage landowners to get involved in water quality monitoring.

Situations which could contribute to nutrient contamination of waterways:
(This list is not intended to cover all possibilities, nor will these situations always result in violation of the "nutrient rule." It is provided to help landowners assess the potential problems on their lands.)

- Placement of fertilizer in a waterway, or so near to a waterway that runoff carries it into the waterway.
- Location of an animal feeding area, or other concentration of animals so near to a waterway that animal waste is carried into the waterway.
- Placement of barn maintenance waste so near to a waterway that runoff moves nutrients into the waterway.
- Irrigation practices which result in nutrient laden surface runoff returning to the waterway.
- Soil erosion that carries soils high in nitrogen or phosphorus into a waterway.
- Over-irrigation that moves nitrogen into the ground water, returning to waterways through subsurface runoff.

MANY OF THE PRACTICES WHICH WOULD CONTRIBUTE NUTRIENTS TO A WATERWAY ARE ALREADY COVERED BY REGULATIONS IN ORS 468B. HOWEVER, THEY ARE INCLUDED IN THIS PLAN SO THAT ENFORCEMENT ACTION IS HANDLED BY ODA UNDER THE SAME ENFORCEMENT PROCEDURES AS THE UMPQUA BASIN ADMINISTRATIVE RULES VIOLATIONS. THUS, LANDOWNERS ARE AFFORDED THE SAME OPPORTUNITY FOR TESTING AND APPEAL AS DESCRIBED IN THIS PLAN.

2.5.2 Riparian/Streamside Area Management

Riparian areas are important in influencing water quality. Managing riparian areas separately from upland areas can increase agricultural productivity and improve water quality. Healthy riparian areas perform many functions:

- Stabilize streambanks and reduce erosion potential,
- Provide vegetation and shade to moderate stream temperature,
- Provide forage for grazing livestock,
- Provide wildlife habitat and connecting corridors for wildlife movement,
- Add large woody debris and fine organic matter to the stream channel,

[2] When levels of P exceed 0.08 mg per liter, they are above the acceptable water quality benchmark.

- Slow overland runoff into streams and filter out nutrients and sediment before they reach the stream.

Good management of riparian areas in conjunction with farming and grazing is possible! Many ranchers in Douglas County have successfully protected stream banks and riparian vegetation while farming and grazing. Sensitive areas can be protected with managed, timely riparian grazing, proper stocking rates, off-channel watering, buffer strips, and temporary or permanent fences where appropriate.

2.5.3 Soil Erosion Prevention and Control

Sediment

Soil erosion is a natural process but land management practices can accelerate the process or slow it down. For a farmer or rancher, soil loss means a loss of their land productivity. When soil moves into a stream and is deposited along the streambed, it is called sedimentation. Excess sediment in streams creates a number of problems, including negatively impacting drinking water quality, fish spawning grounds, and harbor management. It is in everyone's best interest to keep soil on agricultural land.

It is the responsibility of the Umpqua Basin LAC to identify those conditions, resulting from agricultural activities, which would seriously impact water quality in the Umpqua Basin and identify them as "unacceptable conditions."

Unacceptable Condition Addressing Sediment

Substantial amounts of sediment (i.e. in excess of water quality standards for sedimentation[3]) moving from agricultural lands into waters of the state as a result of agricultural activities is identified as an unacceptable condition. Off stream ponds, which do not contribute to the downstream system under normal weather conditions, are exempt as they are often used to trap and contain sediment.

When a condition comes to the attention of ODA, which appears to be in violation of the sediment rule, every practical means shall be used to make a proper determination of the source of the sediment, the cause of the sediment movement, and the degree of the problem. Appropriate testing will be conducted to verify that sediment levels of waters entering waters of the state are in excess of water quality standards[3]. Turbidity testing may be the best available test for locating the sources of fine sediment.

Water quality monitoring can be done by landowners to assess their own situation. Help is available through OSU Extension Service, Oregon Cattlemen's Association, DEQ, and others to develop an appropriate monitoring program. ODA and the Umpqua Basin LAC encourage landowners to become involved in water quality monitoring.

Situations which could contribute to a violation of the sediment rule:

(This list is not intended to cover all possibilities, nor will these situations always result in violation of the "sediment rule." It is provided to help landowners assess the potential problems on their lands.)

- Land disturbing farming activities such as plowing, discing, or rototilling so close to a waterway that the remaining near stream vegetation does not have the capacity to filter sediment adequately;
- Roads located in proximity to waterways that are not adequately surfaced or seeded;

3 OAR 340-041-0007(11) states the formation of appreciable bottom or sludge deposits or the formation of any organic or inorganic deposits deleterious to fish or other aquatic life or injurious to public health, recreation, or industry shall not be allowed.

- Intense and continual livestock use of the near stream area leading to substantial reduction of ground cover and vegetation;
- Location of livestock feeding sites in the area near a stream;
- Stream crossings whether for livestock or vehicles and equipment, which are "mudded out" (excessively muddy and unstable soil);
- Over-irrigation of soils likely to erode such as recently farmed land leading to rill or gully erosion;
- Harvest of Christmas trees, tree seedlings, or root crops during the rainy season without adequate near stream vegetation or other precautions to filter sediment adequately.

MANY OF THE PRACTICES WHICH WOULD CONTRIBUTE SEDIMENT TO A WATERWAY ARE ALREADY COVERED BY REGULATIONS IN ORS 468B. HOWEVER, THEY ARE INCLUDED IN THIS PLAN SO THAT ENFORCEMENT ACTION IS HANDLED BY THE ODA UNDER THE SAME ENFORCEMENT PROCEDURES AS THE UMPQUA BASIN ADMINISTRATIVE RULES VIOLATIONS. THUS, LANDOWNERS ARE AFFORDED THE SAME OPPORTUNITY FOR TESTING AND APPEAL AS DESCRIBED IN THIS PLAN.

Ditch maintenance and repair are presently subject to the Oregon's Removal-Fill Law (ORS 196.800-990) and associated administrative rules. This Area Plan requires no additional conditions for those sites and activities subject to the Oregon Removal-Fill Law.

2.5.4 Bacteria

Bacteria, such as *E. coli*, are indicators of fecal contamination that can represent a serious hazard to human health. People are exposed to water-borne bacteria while swimming, fishing, water skiing, etc. However, many people are at risk for bacterial infection, particularly the very young and elderly and those who have weakened immune systems due to poor health or medical treatments. Agricultural activities could be one source of bacterial contamination of water. Streams and rivers can also be contaminated by wildlife, leaking septic systems, sewage spills, etc.

It is the responsibility of the Umpqua Basin LAC to identify those situations resulting from agricultural activities, which would seriously impact water quality in the Umpqua Basin and identify them as "unacceptable conditions."

Unacceptable Conditions Addressing Bacteria
Substantial amounts of bacteria (i.e. in excess of water quality standards) moving from agricultural lands (or practices) into waters of the state as a result of agricultural activities is identified as an unacceptable condition. Off stream ponds, which do not contribute to waters where public exposure is possible, are exempt from this rule.

When a condition comes to the attention of Oregon Department of Agriculture, which appears to be in violation of the bacteria rule, every practical means shall be used to make a proper determination of the source of the bacteria, the cause of the bacterial movement, and the degree of the problem. Appropriate testing will be conducted to determine if bacteria levels in waters leaving agricultural land are in excess of water quality standards[4].

4 OAR 340-041-0009 states organisms commonly associated with fecal sources may not exceed the criteria: (a) Freshwater contact recreation: (A) A 90-day geometric mean of 126 *E. coli* organisms per 100 mL; (B) No single sample may exceed 406 *E. coli* organisms per 100 mL. (b) Coastal water contact recreation, (A) A 90-day geometric mean of 35 enterococcus organisms per 100 mL; (B) Not more than ten percent of the samples may exceed 130.

Water quality monitoring can be done by landowners to assess their own situations. Help is available through OSU Extension Service, Oregon Cattlemen's Association, DEQ, and others to develop an appropriate monitoring program. ODA and the Umpqua Basin LAC encourage landowners to become involved in water quality monitoring.

Situations which could contribute to the bacterial contamination of waterways:
(This list is not intended to cover all possibilities, nor will these situations always result in violation of the "bacteria rule." It is provided to help landowners assess the potential problems on their lands.)

- Location of an animal feeding area, or other concentration of animals, so near to a waterway so that animal waste is carried into the waterway;
- Placement of barn maintenance waste so near to a waterway that runoff moves bacteria into the waterway;
- Irrigation practices which result in bacteria laden surface runoff returning to the waterway;
- Disposing of carcasses, or any other bacteria laden debris, near a waterway.
    - Direct deposition of fecal matter into waterways by livestock with unlimited access.

MANY OF THE PRACTICES WHICH WOULD CONTRIBUTE BACTERIAL CONTAMINATION TO A WATERWAY ARE ALREADY COVERED BY REGULATIONS IN ORS 468B. HOWEVER, THEY ARE INCLUDED IN THESE RULES SO THAT ENFORCEMENT ACTION IS HANDLED BY THE ODA UNDER THE SAME ENFORCEMENT PROCEDURES AS THE UMPQUA BASIN ADMINISTRATIVE RULES VIOLATIONS. THUS, LANDOWNERS ARE AFFORDED THE SAME OPPORTUNITY FOR TESTING AND APPEAL AS DESCRIBED IN THIS PLAN.

2.5.5 Temperature

Water temperature above water quality standards is the single largest category for 303(d) listing of streams in the Umpqua Basin and in Oregon. This is also the most controversial listing parameter, as warm temperatures are often viewed as a concern solely for fish. In reality, temperature has a dramatic impact on water quality because warm water temperatures along with available nutrients encourage weed and algae growth. The end result is slower water movement further increasing in water temperature, reduced oxygen in the water, and lower pH.

River temperatures in some stream segments of the Umpqua Basin may reach temperatures in excess of 80ºF, so a goal of 64ºF when salmonid fish rearing occurs, and a goal of 55ºF when native salmonid spawning, egg incubation, and fry emergence from the egg and from the gravels occur, seems out of reach to many in agriculture. However, landowners may be able to reduce the rate of warming of water by encouraging vegetation, which will shade streams, and by using irrigation water as efficiently as possible.

Perennial Streams – those streams that flow above ground throughout the year and are contributing to the downstream system during July, August, September, or October, during the majority of years are of concern as temperature is considered.

organisms per 100 mL. (c) Shellfish harvesting (A) A fecal coliform median concentration of 14 organisms per 100 mL; (B) Not more than ten percent of the samples may exceed 43 organisms per 100 mL.

Unacceptable Condition Addressing Temperature

Agricultural management or soil-disturbing activities that preclude establishment and development of adequate riparian vegetation for streambank stability and streambank shading, consistent with site capability, along a perennial stream which has a site potential for such vegetation is considered an unacceptable condition. Minimal breaks in shade vegetation for essential management activities are considered appropriate. Irrigation practices that contribute significant amounts of warmed surface water back into a stream are considered an unacceptable condition.[5]

When a condition comes to the attention of ODA that appears to be a violation of the temperature rule, every practical means shall be used to make a proper determination as to the agricultural activity's impact on stream temperature. Appropriate analysis will be conducted to verify that agricultural activity is resulting in a loss of shade producing vegetation, that the site has the potential for effective shading vegetation; or that warmed irrigation water is returning to the stream.

Monitoring of stream temperatures, riparian vegetation, and evaluation of irrigation systems can be done by landowners to assess their own situations. Help is available through OSU Extension Service, Oregon Cattlemen's Association, DEQ, and others. ODA and the Umpqua Basin LAC encourage landowners to become involved in water quality monitoring.

Situations that could contribute to increased stream temperatures include:
(This list is not intended to cover all possibilities, nor will these situations always result in violation of the "temperature rule," it is provided to help landowners assess potential problems on their lands.)

- Removal of vegetation from the riparian area of a perennial stream that would have provided effective shading and/or bank stability.
- Grazing management that does not allow vegetation, which would provide effective shade and/or bank stability along a perennial stream to become established.
- Farming practices that do not allow vegetation to establish that would provide effective shade and/or bank stability along a perennial stream.
- Allowing surface returns of surplus irrigation water.
- Use of irrigation water in excess of crop needs or soil water-holding capacity.

2.5.6 Waste Management

ORS 468B.025 is an existing statute which was developed to address water pollution from waste discharge. As stated earlier, ORS 561.190 – 561.191 (SB 502) was passed in 1995 to ensure that ODA is the lead state agency responsible for direct regulation of farming activities for the purpose of protecting water quality. To implement ORS 561.190 - .191, ODA is incorporating ORS 468B.025 and 050 into all of the area plans in the state. ORS 468B.025 and 050 have been incorporated for the purposes of this Plan by including the following language in the rules that are part of this Plan.

Unacceptable Condition Addressing Waste Management

Effective upon adoption, no person subject to these rules shall violate any provision of ORS 468B.025 or ORS 468B.050.

[5] Irrigation systems that allow more than 3% of water pumped during any one irrigation setting to return as surface water to a stream.

ORS 468B.025(1) states:
...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.

ORS 468B.050 identifies the conditions when a permit is required. In agriculture under state rules these are referred to as Confined Animal Feeding Operations and are operations that confine animals for more than four months per year and have a wastewater treatment facility.

Definitions:
"Pollution" has the meaning given in ORS 468B.005(3) which states: "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."

"Wastes" has the meaning given in ORS 468B.005(7) which states: 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.

Other substances, which will or may cause pollution, include commercial fertilizers, soil amendments, composts, animal wastes, and vegetative materials.

Pesticide control is presently regulated by authorities granted to ODA under ORS 634 and through OAR 603.57. Water bodies in the Umpqua Basin have not been identified under 303(d) for pesticide contamination. Carefully following label instructions and implementing integrated pest management strategies can generally reduce pesticide use, increase yields, increase net returns, minimize surface and ground water exposure to pesticides, and decrease economic risk. Proper pesticide use begins with reading the label on the container and following the instructions. As required by ORS 634.372(2), users of pesticides must follow label recommendations for both restricted and non-restricted use pesticides.

2.5.7 Livestock Management, Irrigation Management, Estuarine Management

Livestock and Pasture Management
Well-managed pastures provide excellent ground cover and protect soil resources and water quality. Pastures have a relatively low requirement for applied fertilizer, which means that there is very little potential for fertilizer impact on waterways. Grazing as an agricultural practice can greatly reduce the need for broadcast pesticides. Productive pastures are high in organic matter, which improves water infiltration and water retention reducing runoff. Pasture plants have a remarkable ability to recycle nutrients from manure and urine, and a well-established, healthy pasture will utilize 90 percent of the nitrogen, phosphorous, potassium, and sulfur within the square yard where it was deposited[6]. When

[6] From Gerrish, J., 1997, Introduction to Management Intensive Grazing. In 1997 Missouri Grazing Manual,

pastures are managed so that nutrients are recycled, water quality is protected and dollars spent on fertilizer are reduced.

Irrigation Management
Landowners benefit from proper irrigation water use by maximizing water use efficiency and minimizing waste. Improved irrigation systems and irrigation management conserves water, protects water quality, and reduces pumping costs and loss of soil nutrients.

Estuarine Management
A sizable portion of agricultural ground in coastal Douglas County is protected from tidewaters with a system of dikes, ditches, and tide gates. Farmers and ranchers in these areas must maintain these systems in order to maintain the productivity of these pastures and hay fields.

University of Missouri Extension Publication.

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Chapter 3: Implementation Strategies

Goal

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

LAC Mission

To reduce agriculture's contribution to all forms of water pollution to the minimum level possible consistent with economically sound and sustainable farming and ranching.

Goals, Intent, and Responsibilities of Umpqua Basin Local Advisory Committee

It is goal of the Umpqua Basin LAC to develop a management plan for the Umpqua Basin, which will protect both the "right to farm and graze" and water quality.

It is the intent of the Umpqua Basin LAC that education be the primary driving force of the changes in agricultural practices necessary to improve water quality.

It is the intent of the Umpqua Basin LAC to help maintain the economic viability of farming and grazing in the Umpqua Basin.

It is the goal of the Umpqua Basin LAC that agricultural producers accept responsibility for agriculture's contribution to the failure to meet water quality standards, recognizing that all parts of the community must address their own contribution to the problem in order to reach our collective goal of improved water quality (sewage treatment facilities, aggregate companies, homeowners, and others).

It is the belief of the Umpqua Basin LAC that agriculture's share of the failure to meet water quality standards in the Umpqua Basin is quite small, relative to other contributions.

It is the goal of the Umpqua Basin LAC to develop a locally formulated agricultural water quality management area plan (Area Plan) that will protect farmers and ranchers from frivolous lawsuits and layers of unnecessary regulation.

It is the intent of the Umpqua Basin LAC that the Plan be flexible enough to allow landowners and land managers to use their own ingenuity and creativity to address water quality concerns. It is not the intent of the Umpqua Basin LAC to specify any particular agricultural practices.

It is the intent of the Umpqua Basin LAC to recognize the importance of voluntary associations and partnerships of farmers and landowners that join together in efforts to improve water quality (Watershed Councils, Neighborhood Associations, etc.).

It is the belief of the Umpqua Basin LAC that changes made in agricultural practices to improve water quality will also improve the economic viability of Basin farms and ranches.

It is the belief of the Umpqua Basin LAC that the majority of agricultural landowners are not major contributors to water quality problems in the Basin but that most of us could make improvements in our practices that could have a cumulative positive effect on the Umpqua River.

It is the responsibility of the Umpqua Basin LAC to assist in identifying those conditions resulting from

agricultural activities, which could adversely impact water quality in the Umpqua Basin and identify them as "unacceptable conditions."

It is the intent of the Umpqua Basin LAC to provide ODA with a basis to work with those landowners that continue to maintain conditions that clearly qualify as "unacceptable conditions" as defined by the Area Plan.

It is the intent of the Umpqua Basin LAC that fines and civil penalties be used only as a last resort, in situations where a landowner refuses to address a problem and only in cases where an operation is clearly out of compliance as demonstrated by appropriate testing. In those cases, it is the intent of the Umpqua Basin LAC that fines be in relation to the scope of the violation and the size of the operation.

It is the intent of the Umpqua Basin LAC that constitutional rights be acknowledged and that private property is entered only with owner permission or a valid search warrant.

It is the responsibility of the Umpqua Basin LAC to continue to be involved in the review of the Area Plan to be certain that their intent is fulfilled.

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.

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, in the Management Area, measurable objectives tied to the Focus Areas. These are described below. In the future, SIAs will be established in the Management Area, and will have measurable objectives associated with them. It is expected that consecutive Focus Areas and SIAs will continue to occur in the Management Area. Overtime, ag water quality concerns throughout the entire Management Area could be addressed utilizing these strategic initiatives.

3.1.2 Focus Areas and Other Coordinated Efforts in Small Watersheds

3.1.2.1 Otter Creek – Fingerboard Reach Focus Area

The following information was taken from the Umpqua SWCD's Focus Area Action Plan. The Otter Creek – Fingerboard Reach Focus Area is part of ODA's Focus Area strategic initiative. The Focus Area is 15,451 acres, composed of eight subwatersheds in the Smith River watershed, as well as a portion of the Lower Smith River. There are 45 miles of perennial and intermittent streams within the Focus Area. The land use is 20% agricultural, with pasture and hayland for livestock production. Expected improvements include riparian fencing and planting, offstream watering systems, tidegate replacement, salmonid rearing habitat enhancement, upland pasture improvements, and invasive weed control.

Assessment Method: Streamside vegetation was evaluated with ODA's Streamside Vegetation Assessment (SVA) to characterize the type of ground cover within 35 feet of the stream. The metric is the percent of different types of land cover viewed on aerial photographs. Categories are: agricultural infrastructure; water; and bare ground, grass, shrubs, and trees (designated as agricultural or not).

Measurable Objectives and Associated Milestones:

Measurable Objective:
By the end of the Focus Area, there will be 30 acres of riparian improvement.

Milestones:
By June 2023, 6.06 acres of grass ag (pasture) will be converted to tree & shrub plantings (riparian plantings associated with Tidegate Project).

By June 2023, an additional 6.06 acres of grass ag (pasture) will be converted to native grass (flash grazed native grass associated with Tidegate Project).

Other Tidegate Project components include enhancement of extensive salmonid rearing and wildlife habitat as well as extensive removal of blackberry and scotch broom. Partners include PUR, NRCS, NOAA (NMFS), Smith River Watershed Council, BLM. Funding has been provided by OWEB and other sources.

3.1.2.2 Providence Creek Focus Area

The **Providence Creek** Focus Area is part of ODA's Focus Area strategic initiative.

The following information was taken from the Umpqua SWCD's Focus Area Action Plan. The Focus Area is 1,817 acres in the Providence Creek subwatershed within the Umpqua River watershed. There are 16 miles of perennial and intermittent streams within the Focus Area. The land use is 50% agricultural, with pasture and hayland for livestock production. Expected improvements include riparian fencing and planting, offstream watering systems, tidegate replacement, salmonid rearing habitat enhancement, upland pasture improvements, and invasive weed control.

Assessment Method:
Streamside vegetation was evaluated with ODA's Streamside Vegetation Assessment (SVA) to characterize the type of ground cover within 35 feet of the stream. The metric is the percent of different types of land cover viewed on aerial photographs. Categories are: agricultural infrastructure; water; and bare ground, grass, shrubs, and trees (designated as agricultural or not).

Measurable Objectives and Associated Milestones:

Measurable Objective: by the end of the Focus Area in June 2025, there will be 6.00 acres of riparian improvement. Baseline (2019) conditions including bare, bare ag, and grass (11.83 acres) will be converted to tree and/or shrub through riparian fencing and planting.

Anticipated projects in the Providence Creek Focus Area include ag water quality and habitat improvements on a 200 acre Leed's island (McKenzie River Trust and partners).

3.1.3 Pesticide Stewardship Partnerships

The language here was taken from the final report for the South Umpqua PSP (provided by Kirk Cook, ODA PSP lead). A pesticide water quality pilot study of the South Umpqua Subbasin (USGS 8-digit HUC 17100302) was initiated in the fall of 2014. The watersheds were selected because of the multiple types of land uses in areas that use pesticides, the presence of municipal drinking water intakes, as well as existing water quality data collected by DEQ and other entities. Within the South Umpqua Subbasin, prospective local partners were contacted and expressed interest in participating in the pilot effort. Initial reconnaissance monitoring sites were selected by a group comprised of state agencies on the PUR,

Douglas SWCD, Oregon State University Extension, and the Cow Creek Band of Umpqua Tribe of Indians and private landowners. The purpose of the study was to determine to what extent pesticide applications occurring in the various watersheds were impacting nearby surface waters resulting from various types of land uses. The main land uses captured during the study were agriculture, commercial forestry, urban and other. Other is defined as either, water, scrubland, wetland, barren, or herbaceous uplands. The sampling schedule was based on the best available knowledge of timing of pesticide applications by agriculture and forestry landowners in the area. There are no measurable objectives for this PSP. A summary of results can be found in Chapter 4.

3.2 Proposed Activities

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

Table 3.2 Planned Activities for 2020-2024

Activity	4-year Target	Description
Community and Landowner Engagement		
# active events that target landowners/managers (workshops, demonstrations, tours)	10	
# landowners/managers participating in active events	100	
Technical Assistance (TA)		
# landowners/managers provided with TA (via phone/walk-in/email/site visit)	400	
# site visits	400	
# conservation plans written*	30	
On-the-ground Project Funding		
# funding applications submitted	10	
* Definition: any written management plan to address agricultural water quality. Can include NRCS-level plans. Can include: nutrients, soil health, grazing, riparian planting, forest thinning to improve upland pastures to reduce livestock pressure on riparian areas, etc. Cannot include projects with no or weak connection to agricultural water quality (weed eradication not for riparian restoration, fuels reduction, alternative energy, rain gardens/rain harvesting, non-agricultural culvert replacement, and instream habitat enhancement that does not also improve water quality)		

3.3 Water Quality and Land Condition Monitoring

3.3.1 Water Quality

3.3.1.1 DEQ monitors 10 sites in the Management Area as part of their ambient monitoring network: Calapooya Creek at mouth Umpqua River, Cow Creek at mouth (Riddle), Elk Creek at Elkton, North Umpqua River at Garden Valley Road, South Umpqua at Highway 42 (Winston), South Umpqua at Melrose Road, South Umpqua at Days Creek Cutoff Road, South Umpqua at Stewart Park Road, Smith River 4.4 miles downstream of Smith River Falls, and Umpqua River at Elkton.

3.3.1.2 PUR monitored at 63 Sites during September 2018- September 2020. These sites were monitored for temperature, conductivity, turbidity, dissolved oxygen, pH, and *E. coli* bacteria. Sampling at these locations occurred monthly.

South Umpqua Reference (17 Sites)
South Umpqua Above Elk Creek, Elk Creek Near Mouth, Days Creek At Hwy 227 bridge, South Umpqua At Hwy 227 bridge, Cow Creek Near Mouth, South Umpqua At Lawson Bar, South Umpqua Below Myrtle Creek Water Plant, South Myrtle At Neil Lane Bridge, North Myrtle At Evergreen Park Near Mouth, Myrtle Creek Upstream Railroad Trestle, South Umpqua At Brockway Road, Lookingglass Creek At Hwy 42 Bridge West of Olalla Rd., Morgan Creek At lower Dairy Loop Rd. Bridge, Lookingglass Creek At Hwy 42 Bridge Winston Near Mouth, Deer Creek at Fowler St. Bridge. South Umpqua near mouth at Singleton Park.

Umpqua Reference (8 Sites)
Umpqua At Cleveland Rapids Park, Calapooya Creek At Garden Valley Bridge, Wolf Creek Upstream Little Wolf Creek, Umpqua At Yellow Creek Boat Ramp, Umpqua At Mehl Creek Road Bridge, Elk Creek At State Hwy 138 W Bridge, Calapooya Creek At Driver Valley Road Bridge.

Lower North Umpqua (17 Sites)
North Umpqua River at River Forks Park, North Umpqua River at Hestness Park, Sutherlin Creek at Del Rio Rd., Sutherlin Creek East of Exit 135, Cooper Creek at Hwy 99, Sutherlin Creek At Hwy 99, Sutherlin Creek at South Side Rd., Trib to Sutherlin Creek West Side of I5 near Milepost 132, North Umpqua River at Amacher Park, North Umpqua River at Whistlers Bend Park, North Umpqua River At Private property 1532 Echo Dr., Jackson Creek At North Bank Rd., Huntley Creek at North Bank Rd., North Umpqua River At North Bank Rd., Little River at Hwy 138, North Umpqua River At Swiftwater Park Rd., Rock Creek At Swiftwater Park.

Umpqua River-Sawyer Rapids & Lower Umpqua (21 Sites)
Sawyer Creek At Henderer Rd., Buttler Creek At Lutsinger Creek Rd., Lutsinger Creek At Lutsinger Creek Rd., Umpqua River at Sawyer Rapids County Boat Ramp, Paradise Creek At Hwy 38 Bridge, Weatherly Creek At Hwy138 Bridge, Little Mill Creek At Scottsburg Rd. W, Umpqua River At Scottsburg Park, Dock, Luder Creek At Hwy 38, Near Mouth, Charlotte Creek At Hwy 38 Bridge, Dean Creek At 1st bridge up Dean Creek Rd., Dean Creek At end of road, Oar Creek At Scholfield Rd., Scholfield Creek At Thorton Oar Ln Bridge, Scholfield Creek At Scholfield Rd, Umpqua River At Discovery Center Dock, Smith River at Lower Smith River Bridge, Smith River at South Smith River Rd., Schofield Creek At Hwy 101, Winchester Creek At Salmon Harbor Dr., Umpqua River Pier off of Salmon Harbor Dr. before Halfmoon Bay

In addition, PUR has been conducting an effectiveness monitoring project on a ranch on Rice Creek with the landowner's permission to collect water quality samples throughout his property before and after a restoration project employing a suite of best management practices. This is the only monitoring that PUR has conducted that pinpoints a single private land. In addition to the monthly water quality parameters mentioned above, annually macroinvertebrate sampling, photo points, cross sectional data, summer 30-minute temperature, habitat surveys and sinuosity measurements were performed.

A single three-day deployment of PUR's sonde was performed on Lower Smith River at the site of a future tide-gate replacement to determine the salinity of the river at that point up the river, not far above the South Smith River Bridge. In addition to salinity, temperature, depth, dissolved oxygen, turbidity and pH were recorded every 10 minutes.

3.4 Education and Outreach

The goal of the Umpqua Basin education effort is to create a high level of awareness and an understanding of water quality issues among the agricultural community and the rural public, in a manner that encourages cooperative efforts through education and technical assistance. When agricultural land

managers recognize measures that protect water quality can also improve their profitability, progress toward improved water quality will be much more rapid.

Water quality projects will be used as educational demonstrations. Each water quality project should be reviewed with two concerns: 1) what will this do to improve water quality or fish habitat; and 2) how will this project improve the farm or ranch's productivity. For example, a new livestock watering system may reduce impact to the stream and streambank and provide clean water for livestock, or a new fence may protect a streambank and provide another pasture division, which improves grazing management. Educational programs will address the relationship of practices on water quality and agricultural productivity. ODA funds many educational events through its Local Management Agency funds distributed to each local SWCD. Some examples are listed below.

Education Plan

The Douglas and Umpqua SWCDs will lead agricultural water quality education projects within the Umpqua Basin. They will work hand in hand with NRCS, OSU Extension Service, PUR, Elk Creek Watershed Council, Smith River Watershed Council, and the Cow Creek Tribe to carry out an effective water quality education program.

To define, implement, and measure the success of the Umpqua Basin education effort, the following tasks can be pursued:

1. Conduct education programs to promote public awareness of water quality issues;
    - Hold workshops on water quality issues and the conservation practices that will help improve water quality;
    - Develop demonstration projects to highlight successful conservation practices and systems;
    - Organize tours of demonstration projects for agricultural managers and producers;
    - Produce and distribute brochures about water quality issues;
    - Prepare standard presentations for agricultural producer groups;
    - Develop detailed, one-page Umpqua Basin fact sheets for erosion control, nutrient and waste management, livestock and grazing management, and riparian and streambank management;
    - Conduct one-on-one and small group visits with landowners to discuss the Umpqua Basin Area Plan and adaptive management solutions.
2. Conduct a media program to inform Umpqua Basin agricultural operators, rural landowners, and the public of conservation issues and events.
    - Submit news articles and public service announcements to area newspapers, radio stations, and newsletters;
    - Invite media to conservation tours and workshops;
    - Include updates on the status of the Umpqua Basin Area Plan and water quality data in Umpqua Basin SWCD, OSU Extension Service and watershed council newsletters.
3. Involve the agricultural community in conservation education.
    - Create and maintain a list of experienced agricultural operators willing to share management solutions with other interested people by speaking, leading tours, and providing tour sites.
4. Build partnerships with commodity groups to promote conservation.
    - Co-sponsor workshops and tours among the Umpqua Basin SWCDs, watershed councils, and commodity groups;
    - Share education materials with commodity groups and their representatives;
    - Develop educational materials in conjunction with commodity groups and watershed councils;

- Partner with other agricultural and natural resource agencies, watershed councils, and commodity groups to access and acquire the material and financial resources to implement the Umpqua Basin Area Plan and its educational component;
- Meet with other agencies and organizations, and develop a strategy to obtain funding from traditional and nontraditional sources.

3.5 Conservation Planning and Conservation Activities

Effective water quality management depends on activities and structural measures that are the most effective, practical means of controlling and preventing pollution from agricultural activities. Appropriate management activities for individual farms may vary with the specific cropping, topographical, environmental, and economic conditions at a given site. Due to these variables, it is difficult to recommend any specific, uniform set of management activities in this document to improve agricultural water quality.

Management activities and land management changes are most effective when selected and installed as parts of a comprehensive resource management plan based on natural resource inventories and assessment of management activities.

A detailed list of specific measures that can be used to address agricultural pollution are contained in other documents such as the NRCS Field Office Technical Guide, available for reference at the local NRCS office. Landowners and operators have flexibility in choosing management approaches to address water quality issues on their lands.

The CZARA section 6217(g) agricultural measures described in Appendix B provide a menu of options that, when selected options are used together, should also prevent and control water pollution.

Voluntary conservation plans describe the management systems and schedule of conservation activities that the landowner will use to conserve soil, water, and related plant and animal resources on all or part of a farm unit. Landowners, operators, consultants, or technicians available through a SWCD or the NRCS may develop voluntary conservation plans. A conservation plan can be used to outline specific measures necessary to address the "Prevention and Control Measures" outlined in this Area Plan.

Conservation activities should:

- Identify priorities for management activities, including reasonable timelines;
- Control pollution as close to the source as possible;
- Improve irrigation water use and conveyance efficiency to reduce the potential of polluted return flows;
- Show reduction in potential sources of pollution through scientifically valid monitoring and periodic surveys of stream reaches and associated lands;
- Be flexible to adjust management based on feedback, or monitoring and changing environmental and economic conditions.

For a list of agencies and organizations to contact for more information about resource management, please refer to Appendix C: Technical and Financial Resources for Landowners in the Umpqua Watershed.

3.6 Funding

Sometimes the cost of conservation measures does not fit well with a producer's operating budget. Local, state, and federal technical and financial resources are available to improve the cost-effectiveness of protecting and improving water quality. It is not the intent of the Area Plan to impose a financial hardship on any individual. If there are potential water quality threats on their land, it is the responsibility of the landowner or operator to request technical and/or financial assistance and to develop a reasonable time frame for addressing potential water quality problems.

As resources allow, the SWCD, NRCS, and other natural resource agency staff is available to help landowners evaluate approaches for reducing runoff and soil erosion on their farms and incorporate these into voluntary conservation or water quality plans. Personnel in these offices can also design and assist with project implementation and help identify sources of cost sharing or grant funding.

Technical and financial assistance may be available through current USDA conservation programs. Other programs that stand ready to partner for conservation include the US EPA's nonpoint source implementation grants ("319 funds"), or state programs such as the OWEB grant programs, the Riparian Tax Incentive Program, and the Wildlife Habitat Conservation and Management Program.

The SWCDs will seek funding to implement the Area Plan. Funding is necessary in four main areas:

- Education: to fund workshops, tours, and development of published materials;
- Technical assistance: to hire staff to work with landowners to develop and implement solutions to agricultural water quality concerns;
- Financial assistance: to provide cost-share dollars to assist landowners to implement agricultural water quality conservation activities;
- Monitoring: to monitor land conditions and water quality and evaluate how agricultural activities are impacting streams in the Management Area.

For sources of financial assistance, see Appendix C: Technical and Financial Resources for Landowners in the Umpqua Watershed.

3.7 Monitoring and Evaluation

For a description of monitoring and evaluation activities, see Chapter 4.

Evaluation of the Area Plan's success involves several types of monitoring. These are:

- Baseline condition monitoring;
- Implementation monitoring;
- Trend monitoring;
- Effectiveness monitoring.

This section describes each type of monitoring and the activities associated with each type of monitoring.

Baseline Condition Monitoring – What are current conditions?
Baseline condition monitoring provides a starting point for assessing water quality trends and land conditions. To evaluate the effects of the Area Plan and Rules, implementation partners must collect a picture of conditions prior to implementation.

Water Quality Baseline Monitoring

To assess existing water quality conditions, ODA water quality staff review water quality data from the Oregon DEQ Laboratory Analytical Storage and Retrieval (LASAR) database. In many cases, monitoring sites included in this database are adequate to characterize and track conditions in agriculturally influenced watersheds. In other cases, ODA staff may recommend additional monitoring sites that would be useful for tracking agriculture's effects on water quality.

ODA looks at all data for trends, but focuses on the parameters of concern for the specific subbasin.

ODA applies the following criteria to water quality data used for trend monitoring:

1. Monitoring stations must have at least partial influence from agricultural lands.
2. Data must not be older than 1985.
3. Data must be a continuous record of at least two years (the frequency of monitoring was not considered).
4. Data set ideally should include at least the following constituents:
    a) Total Suspended Solids
    b) Nitrate
    c) Ammonia
    d) *E. coli* or fecal coliform
    e) Total Phosphorus or orthophosphate
    f) Dissolved Oxygen, or Chemical Oxygen Demand/Biochemical Oxygen Demand
    g) pH

The above constituents are considered needed for tracking changes in water quality related to agricultural activities. Contact the Umpqua and Douglas SWCDs for the latest information regarding their water quality baseline monitoring.

Land Condition Baseline Monitoring

Currently, ODA is focusing land condition monitoring efforts on riparian areas because these areas have such an influence over water quality. Riparian land conditions are evaluated every five years for each Management Area by sampling about five percent of the riparian agricultural land. Each stream included in the evaluation receives a riparian condition score based on cover. Because site conditions vary across the state, there is no one correct riparian index score. Rather, the index is a means to evaluate change over time on individual reaches.

Trend Monitoring – Are Conditions Changing?

Trend monitoring evaluates changes in landscape conditions and water quality over time. In general, trend monitoring activities are a continuation of baseline monitoring activities. Ideally, areas selected for baseline monitoring will also be used for trend monitoring.

Implementation monitoring – What is being accomplished?

Implementation monitoring tracks the conservation practices that have been implemented to benefit water quality. The local SWCD and NRCS track practices that have been implemented through quarterly reports to ODA and through an NRCS database. In addition, projects that have received funding from OWEB are tracked in their restoration database.

It is more difficult, if not impossible, to track beneficial practices that landowners have implemented on their own without funding or outside technical assistance. Needless to say, there are hundreds of thousands of private dollars being spent on private agricultural lands around the basin.

A complete list of accomplishments by the SWCDs and local watershed councils can be found in the most current biennial report available at the ODA web site or at the local SWCDs.

Effectiveness monitoring – Are efforts protecting and improving water quality?
Effectiveness monitoring occurs at two scales. At a management area scale, land condition data are compared against water quality data over time to determine if changes in land conditions are improving water quality. At a farm scale, ODA and local partners have initiated several projects to evaluate the effects of several management practices on water quality.

Monitoring of water quality in the Umpqua Basin is ongoing, intensive, and extensive. Watershed assessment under the direction of the Partnership for Umpqua Rivers is underway in several Subbasins including Deer Creek and Cow Creek at this time, with additional Subbasins scheduled. In addition, intensive temperature monitoring studies have been done on a number of streams in the basin, with follow-up studies continuing to provide comparison. OWEB and EPA 319 grants have funded bacterial studies and temperature studies particularly in the Smith River Watershed. The Umpqua SWCD has data on agricultural streams in their region. This has been compiled into a report available from the Umpqua SWCD.

The Umpqua Basin Explorer allows users to explore water quality in the Umpqua Basin through an interactive mapping tool that includes detailed graphs of water-quality data. The Umpqua Basin Explorer can be found at http://www.oregonexplorer.info/umpqua.

OSU Extension has trained a number of volunteer water quality monitors and a lab has been established at Umpqua Community College to facilitate testing. Landowners may request that testing be done by these volunteers. Agricultural landowners are also working with consultants associated with the Oregon Cattlemen's Association to obtain data on their stream reaches.

DEQ is continuing their water quality testing to update the Integrated Report and 303(d) list every two years, and track implementation of the basin TMDL as required by law. DEQ data is available through both LASAR database (data through end of 2012) and by request (until a new online searchable database is implemented).

All of the data from these monitoring efforts can be used to determine the areas of concern related to water quality, areas in good condition, and the effects of changes in management. Water quality monitoring can be done by landowners to assess their own situation. Help is available through OSU Extension, Oregon Cattlemen's Association, PUR, DEQ, and others. For guidelines to perform monitoring, OWEB has developed *Water Quality Monitoring: Technical Guide Book*, July 1999. This is the recommended guide for conducting water monitoring in Oregon. ODA and Umpqua Basin LAC encourage landowners to get involved in water quality monitoring.

Chapter 4: Progress and Adaptive Management

4.1 Measurable Objectives and Strategic Initiatives

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

4.1.1 Management Area

Currently, there are no management area measurable objectives.

4.1.2 Focus Areas and Other Focused Efforts in Small Watersheds

Table 4.1.2.1 Otter Creek – Fingerboard Reach Creek Focus Area

Measurable Objective

By the end of the Focus Area, there will be 30 acres of riparian improvement.

Milestones

- By June 2023, 6.06 acres of grass ag (pasture) will be converted to tree and shrub plantings (riparian plantings associated with Glover Tidegate Project).
- By June 2023, an additional 6.06 acres of grass ag (pasture) will be converted to native grass (flash grazed native grass associated with Glover Tidegate Project).

Current Conditions

Progress Toward Measurable Objectives and Milestones

The Partnership for Umpqua Rivers is the lead for the Tidegate project. Key partners include the landowner, Umpqua SWCD, NOAA, NRCS, Smith River Watershed Council, BLM, and OWEB. Beyond riparian planting, other Tidegate Project components include enhancement of extensive salmonid rearing and wildlife habitat as well as extensive removal of blackberry and scotch broom. Most of the necessary funding has been secured. The project is expected to be fully implemented by June 2023.

Assessment Results

SVA Map Category (Alphabetical)	2019: Pre-Assessment (or Conditions at Beginning of Biennium)*
Ag Infrastructure	0.4
Bare	2.09
Bare Ag	2.93
Grass	36.99
Grass Ag	125.1
Not Ag	467.85
Shrub-Ag	0
Shrub	48.1
Tree	185.63
Tree Ag	0
Water	87.06
Total Acres	956.16
Total Ag Acres Assessed (= Total Minus "Not Ag")	**488.31**

Activities and Accomplishments

Community and Landowner Engagement

# active events that target landowners/ operators	**1**

# landowners/operators participating in active events	**6**
Technical Assistance (TA)	
# landowners/operators provided with TA	**9**
# site visits	**4**
# conservation plans written	**0**
Ag Water Quality Practices Implemented in the Focus Area	
	0

Table 4.1.2.2 Providence Creek Focus Area

Measurable Objective

By the end of the Focus Area in June 2025, there will be 6.00 acres of riparian improvement. Baseline (2019) conditions including bare, bare ag, and grass (11.83 acres) will be converted to tree and/or shrub through riparian fencing and planting.

Milestones

- By June 2023, there will be 2 acres of riparian improvement.

Current Conditions

Progress Toward Measurable Objectives and Milestones

Anticipated projects in the Providence Creek Focus Area include ag water quality and habitat improvements on a 200 acre island (McKenzie River Trust and partners).

Assessment Results

SVA Map Category (Alphabetical)	2019: Pre-Assessment (or Conditions at Beginning of Biennium)*
Ag Infrastructure	0
Bare	5.1
Bare Ag	0.2
Grass	6.53
Grass Ag	16.56
Not Ag	32.34
Shrub	2.04
Shrub Ag	0
Tree	22.56
Tree Ag	0
Water	15.33
Total Acres	**100.66**
Total Ag Acres Assessed (= Total Minus "Not Ag")	**68.32**

Activities and Accomplishments	
Community and Landowner Engagement	
# active events that target landowners/ operators	**0**
# landowners/operators participating in active events	**0**
Technical Assistance (TA)	
# landowners/operators provided with TA	**1**
# site visits	**0**
# conservation plans written	**0**
Ag Water Quality Practices Implemented in the Focus Area	
	0

4.1.3 Pesticide Stewardship Partnership

There are no measurable objectives for this PSP. See a summary of results in 4.3.1.

4.2 Activities and Accomplishments

ODA, the LAC, the LMA, and other partners identified the following priority activities to track progress toward meeting the goal and objectives of the Area Plan. ODA will review the four-year results and then provide a report at the end of the 2021-2023 Biennium.

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

Table 4.2a Activities conducted in 2018-2020 by Umpqua SWCD and Conservation Reserve Enhancement Program (CREP)

Activity	2-yr results	Description
Community and Landowner Engagement		
# active events that target landowners/ managers (workshops, demonstrations, tours)	7	CREP: 7
# landowners/managers participating in active events	110	CREP :110
Technical Assistance (TA)		
# landowners/managers provided with TA (via phone/walk-in/email/site visit	210	USWCD: 39, CREP: 171
# site visits	205	USWCD: 10, CREP: 195
# conservation plans written*	13	CREP: 13
Partnerships		
# of partner events or meetings that SWCD staff or board attended	54	USWCD: 54
# of events the SWCD hosted for partners	6	USWCD: 6
# of attendees at events hosted by the SWCD for partners	59	USWCD: 59
On-the-ground Project Funding		
# funding applications submitted	2	USWCD agricultural water quality funding, CREP TA Grant Funding from December 2019- December 2021
# funding applications awarded	2	
* Definition: any written management plan to address agricultural water quality. Can include NRCS-level plans or simpler plans. Can include: nutrients, soil health, water quality, irrigation, grazing, riparian planting, forest thinning to improve upland pastures to reduce livestock pressure on riparian areas, etc. Cannot include projects with no or weak connection to ag water quality (weed eradication that is not for riparian restoration, fuels reduction, alternative energy, non-ag rain gardens/rain harvesting, non-ag culvert replacement, and instream habitat enhancement that does not also improve water quality).		

CREP: Stream miles protected with CREP from September 2019-September 2020: 22.64 miles

Total acres in CREP Plans from September 2019-September 2020: 337.2 acres

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 1997-2018 (OWRI data include most, but not all projects, implemented in the Management Area).

Landowners	OWEB	DEQ	NRCS	BLM	USFWS	ODFW	All other sources*	TOTAL
1,002,736	3,156,295	285,238	165,240**	788,009	471,518	700,381	1,182,489	**7,751,906**

*includes city, county, tribal, other state and federal programs, and non-profit organizations. There were too many entities to list.
** NRCS amounts are lower than actual due to federal privacy protections and the absence of an OWRI reporting mechanism.

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

Activity Type	Miles	Acres	Count*	Activity Description
Riparian	84	731	-	Riparian planting & fencing
Fish Passage	560	-	43	Fish passage culverts & bridges, fish screens
Instream	32	-	-	Large wood placements, rock placements
Wetland	-	62	-	Wetland restoration & protection
Road	0	-	11	Sediment abatement through culverts, rock, drainage improvement
Upland	-	981	-	Cross fencing, pasture management, offstream watering
TOTAL	677	1773	54	

* # of hardened crossings, culverts, etc.

4.3 Water Quality and Land Condition Monitoring

4.3.1 Water Quality

4.3.1.1 DEQ Status & Trends Report

DEQ analyzed data from 2001 through 2019 for dissolved oxygen, *E. coli*, pH, total phosphorus, temperature, and total suspended solids in the Management Area (DEQ. 2020 Oregon Water Quality Status and Trends Report (https://www.oregon.gov/deq/wq/programs/Pages/wqstatustrends.aspx).

Ten locations are part of DEQ's ambient monitoring program with long-term monitoring, eight of which are listed below. Most of the rest of the sites were continuous temperature monitoring in the headwaters or PUR volunteer monitoring sites. Table 4.3.1 summarizes water quality at sites that may be influenced by agriculture and have sufficient data to evaluate trends *and* recent attainment status of water quality standards.

Table 4.3.1 Trends (2000-2019) and attainment of water quality standards (2016 to 2019)

Site Description	Site ID	Parameter				
		E. coli	pH	Dissolved Oxygen	Total Phosphorus (mg/L)	Total Suspended Solids (mg/L)
		Attainment Status (yes/no) and Trend			Median, Maximum[1] (# samples)	Median, Maximum[2] (# samples)
Umpqua Subbasin						
Umpqua River at Elkton Bridge	10437 *	No ↑	Yes	Yes ↑	0.02, 0.08 (23)	2, 36 (23)
Elk Creek at Elkton	10441 *	Yes	Yes	Yes ↑	0.03, 0.10 (23)	2, 17 (23) ↑
Calapooya Creek at Umpqua	10996 *	No	Yes ↓	Yes ↑	0.03, 0.07 (25)	4, 41 (24)
North Umpqua Subbasin						
N. Umpqua at Garden Valley Rd	10451 *	Yes ↑	Yes	Yes	0.03, 0.04 (24)	2, 6 (24)

South Umpqua Subbasin						
S. Umpqua at Melrose Rd	10442 *	Yes	No	Yes	0.04, 0.08 (24) ↑	2, 33 (24)
S. Umpqua at Hwy 42 (Winston)	10443 *	Yes ↑	Yes	Yes ↑	0.03, 0.07 (23)	2, 33 (24)
Cow Creek at Mouth (Riddle)	10997 *	No ↓	Yes ↓	Yes ↓	No 0.02, 0.02 (23)	1, 16 (24)
Lookingglass Creek at Hwy 42 (Winston)	12248	No ↑	Yes	Yes		
Myrtle Creek South Fork at Neal Lane Bridge below golf course	33247	No ↑	Yes ↓	Yes ↑		
S. Umpqua at Days Creek Cutoff Road (Canyonville)	11484 *	No ↓	Yes ↓	Yes ↓	0.02, 0.03 (23)	1, 4 (24)

[1] DEQ has a total phosphorus target concentration for Cow Creek (0.011 mg/L); 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 degrading trend
↑ Statistically significant improving trend
* DEQ Ambient Monitoring Site

According to this analysis:

- *E. coli* in the Williams Creek-Calapooya Creek watershed. Water quality attains *E. coli* criterion in the primarily forested upper watershed, but fails to meet criterion below Oldham Creek as Calapooya Creek flows downstream through predominately rural residential or agricultural lands. Wastewater effluent is not a likely source of bacteria because the wastewater treatment plants are not permitted to discharge to surface waters from June 1 through October 31.
- *E. coli,* pH, and dissolved oxygen in the South Umpqua below Days Creek and tributaries. Water quality fails to attain *E. coli* criterion in the South Umpqua River below Days Creek and in many of the tributaries that drain agricultural valleys including Cow Creek, Myrtle Creek, Looking Glass Creek, Roberts Creek, Deer Creek, and Champagne Creek. Large algae mats that frequently form in the South Umpqua River's warm shallow water contribute to high pH and low dissolved oxygen conditions. Anthropogenic nutrient loading from both nonpoint sources, such as agriculture, septic systems, and point sources (wastewater treatment plants) encourage algal growth and likely contribute to harmful algal blooms.
- Total phosphorus in Cow Creek watershed. Cow Creek does not attain the TMDL target concentration for total phosphorus. Both wastewater treatment plants are currently meeting phosphorus limits. Anthropogenic nonpoint source phosphorus loading in lower Cow Creek includes agricultural lands and residential development. Additional investigation is needed to determine how agriculture is contributing to water quality conditions in Cow Creek, including the risk of harmful algal blooms.
- Stream temperature. Water temperature monitoring sites are distributed throughout the watershed. With the exception of five long term monitoring sites, few sites are consistently monitored every year. Data from 81 of the 93 assessed sites did not attain applicable temperature criterion, and 49 sites in exhibited degrading trends. DEQ requires continuous stream temperature data to evaluate if a station is attaining temperature criteria. Many of the sites with sufficient data to determine status and trends did not have continuous temperature data. Therefore, temperature was not included in Table 4.3.1.
- North Umpqua Subbasin: Monitoring sites in the North Umpqua Subbasin are located in predominantly forested locations or have insufficient data to determine whether agricultural activities are influencing water quality.

4.3.1.2 Partnership for Umpqua Rivers – Water Quality Monitoring Results

The Umpqua LAC would like to thank Sandy Lyons and Joe Carnes at PUR for their work to collect and analyze water quality monitoring data throughout the Umpqua Basin. During 2020 PUR produced two

final reports summarizing its water quality data collection from the previous two years: OWEB Umpqua Basin Collaborative Monitoring Final Report Aug. 2020 and Rice Creek Monitoring Progress Report – 2020. They are available at https://www.umpquarivers.org/final-monitoring-reports. The following summary was provided by Partnership for Umpqua Rivers.

The OWEB Umpqua Basin Collaborative Monitoring Final Report Aug. 2020 reports on three years of monitoring the Upper Umpqua Fifth Field Watershed and Calapooya Fifth Field Watershed. A summary of concerns is listed below. This information in no way pinpoints any single landowner and, though DEQ criteria is referenced, it does not imply that a listing is required from what is presented here. This data is grab sample data performed monthly.

Upper Umpqua Fifth Field Watershed

McGee Creek

1. McGee Creek at Bullock Road exhibits the most occurrences of high turbidity with 47% of its samplings being greater than 10 NTU.
2. 13% of samples of McGee Creek sampling events were higher than the DEQ single sample criteria for *E. coli* (406 MPN/100ml), one in summer and three in winter.

Calapooya Creek at Garden Valley Road

1. Highest turbidity levels occurred in Calapooya Creek at Garden Valley Road near its mouth.
2. Calapooya Creek at the mouth consistently had the worst 7DAM of over 83°F each of the three years.
3. Calapooya Creek at Garden Valley Road exceeded limits for both spawning and non-spawning dissolved oxygen criteria.
4. Calapooya Creek at the mouth had 9% of its samples exceeding DEQ single sample criteria for *E. coli* (406 MPN/100ml) in the winter but none in the summer.

Umpqua at Mehl Creek Road

1. Exceedances above the 8.5 pH DEQ upper exceedance criteria were detected.

Umpqua at State Hwy 138W

1. Exceedances above the 8.5 pH DEQ upper exceedance criteria were detected.

Elk Creek at State Hwy 138 W Bridge

1. Exceedances above the 8.5 pH DEQ upper exceedance criteria were detected.

Mill Creek

1, Mill Creek had the most exceedances with 36% of its sampling events being higher than the DEQ single sample criteria for *E. coli* (406 MPN/100ml). It had 55% exceedances in summer and 27.3% in winter.
2. Mill Creek had the four highest recorded *E. coli* levels with two of them being over the limit of the assay (≥2419.6).
3. Mill Creek had 54.5% of its temperature exceedances occurring during the summer period, while 27.3% showed exceedances during winter.
4. Mill Creek had exceedences for both spawning and non-spawning dissolved oxygen criteria.

Hedding Creek

1. Hedding Creek had 10% of its sampling events higher than the DEQ single sample criteria for *E. coli* (406 MPN/100ml), two occurred in summer and one in winter.
2. Hedding Creek went dry four months during the three years monitored.
3. Hedding Creek failed to meet dissolved oxygen criteria for Spawning Season.

Umpqua River 2-3 miles upstream of Elkton

1. The Umpqua River had the second-highest temperature 7DAM breaking 80°F each of the three years.
2. This site had 78 days over 70°F in 2016 and 2017 and, in 2018 had 95 days over 70°F.

Hubbard Creek at Hubbard Creek Road

1. Went dry once during the three years monitored.

2. Hubbard Creek had one exceedence of the DEQ single sample criteria for *E. coli* (406 MPN/100ml) in summer and one in winter.

Little Wolf at Tyee Access Road

1. Went dry once during the three years monitored.

Calapooya Fifth Field Watershed

Cabin Creek

1. Cabin Creek at Old Town Road exhibits the most occurrences of high turbidity with 78% of its samplings being greater than 10 NTU.
2. 57% of its summer samplings and 88% of winter samplings occurred over 10 NTU.
3. The maximum of the upper quartile for Cabin Creek exceeded the limit for DEQ's listing criteria of 406 MPN/100ml with 44% of samples exceeding the *E. coli* criteria.

Williams Creek

1. The highest turbidity levels occurred in Williams Creek (578 NTU).
2. Williams is of high concern in summer and extreme concern in winter for turbidity.
3. The lowest outlier was Williams Creek with 6.35 mg/l dissolved oxygen.
4. Williams Creek had 5 occurrences exceeding 500 us/cm conductivity.
5. Williams Creek exceeded the limit for DEQ's listing criteria of 406 MPN/100ml with 40% of samples exceeding the *E. coli* criteria.
6. Williams Creek had at least one sample exceeding the limit of the *E. coli* assaying technique.
7. Williams Creek at its mouth was dry 8 months during the three years.

Oldham Creek at Elkhead Road

1. Oldham Creek had the second-highest turbidity levels (338 NTU).
2. Oldham Creek is of extreme concern for both summer and winter exceedances greater than 10 NTU.
3. Oldham Creek exceeded the limit DEQ's listing criteria of 406 MPN/100ml with 36% of sample exceeding the *E. coli* criteria.
4. Oldham Creek had at least one sample exceeding the limit of the *E. coli* assaying technique.
5. Oldham Creek was dry 6 months during the three years.

Calapooya at Garden Valley Road

1. Calapooya at Garden Valley Road had the third-highest turbidity levels (321 NTU).
2. pH levels fell below minimum pH criteria twice at Calapooya Creek at Garden Valley Road.
3. Calapooya at Garden Valley Road had the lower whisker of the box plot fall below the 8 mg/l minimum for dissolved oxygen (6.62 mg/l).
4. Calapooya at Garden Valley Road had at least one sample exceeding the limit of the *E. coli* assaying technique.

Cook Creek

1. Cook Creek is of extreme concern for both summer and winter exceedances greater than 10 NTU.
2. Cook Creek exceeded the limit for DEQ's listing criteria of 406 MPN/100ml with 21% of samples exceeding the *E. coli* criteria.
3. Cook Creek had at least one sample exceeding the limit of the *E. coli* assaying technique.
4. Cook Creek at its mouth was dry 8 months during the three years.

Calapooya at Driver Valley Road Bridge

1. Calapooya at Driver Valley Road Bridge is of high concern in summer and extreme concern in winter for turbidity.
2. Upper exceedances in pH occurred four times at Calapooya Creek at Driver Valley Road Bridge.

Bachelor Creek

1. Bachelor Creek exceeded the limit DEQ's listing criteria of 406 MPN/100ml with 18% of samples exceeding the *E. coli* criteria.

Dodge Canyon Creek at its mouth

1. Dodge Canyon Creek at its mouth was dry 7 months during the three years.

2. Dodge Canyon Creek had at least one sample exceeding the limit of the *E. coli* assaying technique.

Rice Creek Effectiveness Monitoring
This report is a preliminary progress report on changes observed in pre and post the Rice Creek ranch riparian restoration project. A final report will be issued in another three years. The following is observations recorded thus far:

- Cross Sections - Numerous cross sections have gravel accumulation and erosion to create pools, a change in substrate composition has been noted;
- Macroinvertebrates – A positive trend of taxa diversity in middle reach has been observed;
- Habitat Surveys- Are indicating increasing channel complexity and diversity;
- Pools - Increased number and size of pools has been recorded;
- Sinuosity – An overall increasing sinuosity and added side channels is occurring;
- *E. coli* - Since livestock exclusion *E. coli* levels have been reduced;
- pH - Range of detected levels has narrowed and stabilized;
- Turbidity - Lower turbidity levels have been seen since restoration, and cattle exclusion.

Smith River Results
As mentioned in section 3.1.1, a single three-day deployment of PUR's sonde was performed on Lower Smith River at the site of a future tide-gate replacement to determine the salinity of the river at that point up the river, not far above the South Smith River Bridge. In addition to salinity, temperature, depth, dissolved oxygen, turbidity and pH were recorded every 10 minutes. The date of August 30, 2019 was chosen to begin this study as it had a low river flow and high (+7.5ft) tide. Under these conditions it was expected to record one of the highest upstream inundation of saline water to this site. During the winter, the increased flow of Smith overrides the tidal effect and PUR has recorded low conductivity levels under those conditions with the monthly grab sample monitoring at the South Smith River Bridge.

This data is challenging to analyze due to the constantly changing conditions of fresh water from the ranch mixing with the varying input from Smith River flowing downstream and the tidal influence bringing saline upriver, not to mention the variations due to diurnal/nocturnal changes. Therefore, these are generalized observation. Preliminary results indicated a tidally correlated (determined by increasing depth of the multi-parameter metering device from 1.5 ft to 9 ft) increase of salinity from 9 ppt to 15.2 ppt (ocean levels are around 35 ppt). Indicating that at this time of year salinity from the ocean is being carried upriver to this site reaching nearly half the concentration of the ocean water. Dissolved oxygen levels varied from 9 mg/l to 14.5 mg/l; the higher levels occurring when the tide was out and streamflow from the ranch through the failed tidegate reached our probes. Temperature levels generally fell with the waning tide and increased with the incoming tidal. pH levels fluctuated from around 7 to 8.5 with higher levels generally following tidal outflow.

4.3.1.3 Pesticide Stewardship Partnership

The following is a summary of results for the South Umpqua PSP. The language here was taken from the final report for the South Umpqua PSP (provided by Kirk Cook, ODA PSP lead). During the two sampling periods (September 2014 through June 2019), there were 263 pesticide detections out of 3092 sample analysis conducted for an overall detection rate of 8%. Concentrations of the 263 detections were all below 50% of the aquatic life benchmarks (254 were below 10% of the aquatic life benchmark and 9 were between 10-50% of the aquatic life benchmark). The majority of the pesticides detected during the South Umpqua Pilot Study are classified as herbicides (a substance that is toxic to plants and used to control unwanted vegetation) or herbicide breakdown products. Three pesticides other than herbicides were also detected. The results of the South Umpqua Pilot Study indicated that there were no aquatic life ratios above 0.35. The frequency of detection was the highest for the herbicide atrazine. In some sub-

watersheds, the detection rate approached or exceeded 60% (Lookingglass Creek @ Hwy 42, Winston, OR and Lookingglass Creek @ bridge Happy Valley Rd). The high frequency of detection for the herbicide atrazine raises it to a moderate level concern due to its continuous presence and continuous exposure to aquatic species coupled with the atrazine breakdown product desethlyatrazine and the herbicide simazine. Atrazine and simazine are both of triazines and can be evaluated together along with their breakdown products to assess total aquatic life exposure.

To address the concern related to triazines, the Water Quality Pesticide Management Team (WQPMT) suggests several actions be considered in the South Umpqua Subbasin. These suggestions are:

- Consider additional evaluation or assessment into the types of registered uses of atrazine in the Subbasin and specific watersheds;
- Based on the results of the evaluation, education and outreach strategies should be developed for user groups in the South Umpqua pilot area and coordinated with local partners. The education would focus on ways of reducing off-target movement of atrazine and other herbicides. This program would also provide information on newly adopted statute(s) regarding buffers for aerial application of forest herbicides.
- In concert with state agencies and the WQPMT, PUR, Douglas SWCD, OSU Extension, and the Cow Creek Band of Umpqua Tribe of Indians and private landowners evaluate the utility of alternative monitoring techniques that could provide additional information on the link between pesticide use and occurrence in waterbodies. This group would also provide guidance regarding the necessity for any future monitoring within the South Umpqua Subbasin.

4.4 Biennial Reviews and Adaptive Management

ODA, the LAC, the LMA, and other partners met on <<date(s)>> 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

Summary of Progress and Impediments
Progress: The Partnership for Umpqua Rivers (PUR) provided summaries of their extensive basin wide water quality monitoring, Rice Creek project monitoring, and Smith River Tidegate project monitoring. DEQ provided an updated water quality Status and Trends Report for the Umpqua Basin A lot of progress made regarding tidegates. Strengthened partnerships, funding and permitting pathways, and landowner relationships will likely lead to improved ag water quality and salmonid habitat in the tidally influenced agricultural areas in the Umpqua SWCD area. This progress may lead to attainment of Focus Area measurable objectives and milestones. The Elk Creek Watershed Council has been effectively utilizing OWEB Small Grants for livestock offstream watering systems and other projects. CREP: Stream miles protected with CREP from September 2019-September 2020: 22.64 miles Total acres in CREP Plans from September 2019-September 2020: 337.2 acres OWRI summary data for 1997-2018 added to the Plan. **Impediments:** The Douglas SWCD is not currently functional. Large wildfires in the upper watershed is likely to negatively affect water quality in the winter 2021. Online meeting formats are decreasing active participation and conversations in LAC meetings.
Recommended Modifications and Adaptive Management
ODA will notify the LAC chair or a LAC member when a compliance case is opened in the Umpqua Basin. The LAC would like to be notified of any changes to the compliance procedures. The LAC would like to be notified of any changes to compliance assessment methods. The South Umpqua PSP provided recommendations for outreach regarding Atrazine use in the watershed.

Table 4.4b Number of ODA compliance actions in 2018-2020.

Location	Letter of Compliance	Pre-Enforcement Notification	Notice of Noncompliance	Civil Penalty
Outside SIA(s)	1	3	0	0
Within SIA(s)	0	0	0	0

References

Council for Agricultural Science and Technology. 2012. Assessing the Health of Streams in Agricultural Landscapes: The Impacts of Land Management Change on Water Quality. Special Publication No. 31. Ames, Iowa.

National Council for Air and Stream Improvement, 2000…

State of Oregon, 2000

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Appendix A: Common Ag Water Quality Parameters of Concern

The following parameters are used by DEQ in establishing the 303(d) List and assessing and documenting waterbodies with TMDLs. Note: This is an abbreviated summary and does not contain all parameters or detailed descriptions of the parameters and associated standards. Specific information about these parameters and standards can be found at: https://www.oregon.gov/deq/wq/Pages/WQ-Assessment.aspx or by calling (503) 229-6099.

Parameters

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

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

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

Harmful Algal Blooms: Some species of algae, such as cyanobacteria or blue-green algae, can produce toxins or poisons that can cause serious illness or death in pets, livestock, wildlife, and humans. As a result, they are classified as Harmful Algae Blooms. Several beneficial uses are affected by Harmful Algae Blooms: aesthetics, livestock watering, fishing, water contact recreation, and drinking water supply. The Public Health Department of the Oregon Health Authority is the agency responsible for posting warnings and educating the public about Harmful Algae Blooms. Under this program, a variety of partners share information, coordinate efforts and communicate with the public. Once a water body is identified as having a harmful algal bloom, DEQ is responsible for investigating the causes, identifying sources of pollution and writing a pollution reduction plan.

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

Nitrate: While nitrate occurs naturally, the use of synthetic and natural fertilizers can increase nitrate in drinking water (ground and surface water). Applied nitrate that is not taken up by plants is readily carried

by runoff to streams or infiltrate to ground water. High nitrate levels in drinking water cause a range of human health problems, particularly with infants, the elderly, pregnant and nursing women.

Pesticides: Agricultural pesticides of concern include substances in current use and substances no longer in use but persist in the environment. Additional agricultural pesticides without established standards have also been detected. On agricultural lands, sediment from soil erosion can carry these pesticides to water. Current use agricultural pesticide applications, mixing-loading, and disposal activities may also contribute to pesticide detections in surface water. For more information, see: https://www.oregon.gov/deq/wq/Pages/WQ-Standards-Toxics.aspx.

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

Sediment and Turbidity: Sediment includes fine silt and organic particles suspended in water, settled particles, and larger gravel and boulders that move at high flows. Turbidity is a measure of the lack of clarity of water. Sediment movement and deposition is a natural process, but high levels of sediment can degrade fish habitat by filling pools, creating a wider and shallower channel, and covering spawning gravels. Suspended sediment or turbidity in the water can physically damage fish and other aquatic life, modify behavior, and increase temperature by absorbing incoming solar radiation. Sediment comes from erosion of streambanks and streambeds, agricultural land, forestland, roads, and developed areas. Sediment particles can transport other pollutants, including bacteria, nutrients, pesticides, and toxic substances.

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

Appendix B: Coastal Zone Management Act Measures

In 1990, the Federal Coastal Zone Reauthorization Amendments were enacted. This law mandated that all states and territories with approved coastal zone management programs develop and implement coastal nonpoint pollution control programs. Listed below are the Coastal Zone Management measures that were developed for use in Oregon for coastal basins such as the Umpqua.

The following section contains the approved management measures for coastal nonpoint pollution in Oregon as developed for the Coastal Zone Reauthorization Amendments.

Sedimentation

- Apply the erosion component of a Resource Management System as defined in the Field Office Technical Guide of the NRCS to minimize the delivery of sediment to surface waters.
- Design and install a combination of management and physical practices to settle the settleable solids and associated pollutants in runoff delivered from the contributing area for storms of up to and including a 10-year, 24-hour frequency.

Nutrients

- Develop, implement, and periodically update a nutrient management plan to: (1) apply nutrients at rates necessary to achieve realistic crop yields, (2) improve the timing of nutrient application, and (3) use agronomic crop production technology to increase nutrient use efficiency. When the source of the nutrients is other than commercial fertilizer, determine the nutrient value and the rate of availability of the nutrients. Determine and credit the nitrogen contribution of any legume crop. Soil and plant tissue testing should be used routinely.

Pesticides

- Evaluate the pest problems, previous pest management practices, and cropping history.
- Evaluate the soil and physical characteristics of the site, including mixing, loading and storage areas for potential leaching or runoff of pesticides. If leaching or runoff is found, steps should be taken to prevent further contamination.
- Use integrated pest management strategies that:
    - Apply pesticides only when an economic benefit to the producer will be achieved (i.e. application based on economic thresholds).
    - Apply pesticides efficiently and at times when runoff losses are unlikely.
    - When pesticide applications are necessary and a choice of registered materials exists, consider the persistence, toxicity, runoff potential, and leaching potential of products being used.
    - Periodically calibrate pesticide spraying equipment.
    - Use anti-backflow devices on hoses used for filling tank mixtures.

Riparian Areas

- Exclude livestock from riparian areas that are susceptible to overgrazing and when there is no other practical way to protect the riparian area when grazing uplands.
- Provide stream crossings and hardened access areas for watering.
- Provide alternative drinking water locations.
- Locate salt and shade away from sensitive riparian locations.
- Include riparian areas in separate pastures with separate management objectives and strategies.

- Fence, or where appropriate, herd livestock out of areas for as long as necessary to allow vegetation and streambanks to recover.
- Control the timing of grazing to: (1) keep livestock off streambanks where they are most vulnerable to damage, and (2) coincide with the physiological needs of target plant species.

Irrigation

- Operate the irrigation system so that the timing and amount of water match crop water needs. This will require, at a minimum: (a) the accurate measure of soil water depletion and the volume of irrigation applied, and (b) uniform application of water.
- When chemigation is used, include backflow preventers for wells, minimize the harmful amounts of chemigated waters from the field, and control deep percolation.
- In cases where chemigation is performed with furrow irrigation systems, a tailwater management system may be needed.
- In some locations, irrigation return flows are subject to other water rights or are required to maintain stream flow(s). In these special cases, on-site use could be precluded and would not be considered part of the management measures for such locations.
- In some locations, leaching is necessary to control salt in the soil profile. Leaching for salt control should be limited to the leaching requirement for the root zone.
- Where leakage from delivery systems or return flows support wetlands or wildlife refuges, it may be preferable to modify the system to achieve a high level of efficiency and then divert the "saved water" to the wetland or wildlife refuge. This will improve the quality of water delivered to wetlands or wildlife refuges by preventing the introduction of pollutants from irrigated lands to such diverted water.
- In some locations, sprinkler irrigation is used for frost or freeze protection, or for crop cooling. In these special cases, applications should be limited to the amount necessary for crop protection, and applied water should remain on site.

Appendix C: Technical and Financial Resources for Landowners

Bureau of Land Management
777 N.W. Garden Valley Blvd.
Roseburg, OR 97471
541-440-4930

Douglas County Water Resources Advisory Board
1036 S.E. Douglas
Roseburg, OR 97470
541-440-4231

Douglas Soil and Water Conservation District
2741 West Harvard Ave.
Roseburg, OR 97471
541-957-5061

Douglas Timber Operators
3000 N.W. Stewart Parkway
Roseburg, OR 97471
541-672-0757

Farm Services Agency (CREP Programs)
2593 NW Kline St
Roseburg, OR 97471
541-673-6071

Oregon Watershed Enhancement Board
221 Stewart Ave, Suite 201
Medford, OR 97501
(541) 776-6010 ext.231

National Marine Fisheries Service
2900 N.W. Stewart Parkway
Roseburg, OR 97471
541-957-3383

Natural Resources Conservation Service
2593 NW Kline St
Roseburg, OR 97471
(541) 378-3531

Oregon Department of Environmental Quality
165 East 7th Avenue, Suite 100
Eugene, OR 97401
(541) 687-7345

Oregon Department of Environmental Quality
(Coastal Zone Management)
1102 Lincoln, Suite 210
Eugene, OR 97401
541-686-7838

Oregon Department of Fish and Wildlife
4192 N. Umpqua Highway
Roseburg, OR 97470
541-440-3353

Oregon Department of Forestry
1758 N.E. Airport Road
Roseburg, OR 97470
541-440-3412

Oregon State University Extension Service
Douglas County Office
1134 S.E. Douglas Avenue
Roseburg, OR 97470
541-672-4461

Partnership for the Umpqua Rivers
3012 W. Harvard Ave.
Roseburg, Oregon 97471
541-673-5756

U.S. Department of Fish and Wildlife
2900 N.W. Stewart Parkway
Roseburg, OR 97470
541-957-3470

U.S. Forest Service
2900 N.W. Stewart Parkway
Roseburg, OR 97471
541-957-3204

Umpqua Soil and Water Conservation District
P.O. Box 415
Reedsport, OR 97467
541-662-1341