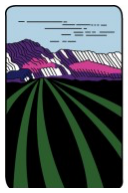

Oregon
Department
of Agriculture

Yamhill Basin Agricultural Water Quality Management Area Plan

Developed by the:

The Oregon Department of Agriculture
with support from the:

Yamhill Local Advisory Committee
and
the Yamhill Soil and Water Conservation District
and
the Polk Soil and Water Conservation District

December 4, 2019

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Acronyms and Terms Used in this Document

Ag Water Quality Program – Agricultural Water Quality Program
Area Plan – Agricultural Water Quality Management Area Plan
Area Rules – Agricultural Water Quality Management Area Rules
CAFO – Confined Animal Feeding Operation
CNPCP – Coastal Nonpoint Pollution Control Program
CWA – Clean Water Act
CZARA – Coastal Zone Act Reauthorization Amendments
DEQ – Oregon Department of Environmental Quality
GWMA – Groundwater Management Area
HUC – Hydrologic Unit Code
LAC – Local Advisory Committee
Management Area – Agricultural Water Quality Management Area
NPDES – National Pollution Discharge Elimination System
NRCS – Natural Resources Conservation Service
OAR – Oregon Administrative Rules
ODA – Oregon Department of Agriculture
ODFW – Oregon Department of Fish and Wildlife
ORS – Oregon Revised Statute
OWEB – Oregon Watershed Enhancement Board
OWRI – Oregon Watershed Restoration Inventory
PMP – Pesticides Management Plan
PSP – Pesticides Stewardship Partnership
PSWCD – Polk Soil and Water Conservation District
RUSLE – Revised Universal Soil Loss Equation
SIA – Strategic Implementation Area
SVA – Streamside Vegetation Assessment
SWCD – Soil and Water Conservation District
T – Soil Loss Tolerance Factor
TMDL – Total Maximum Daily Load
U.S. EPA – United States Environmental Protection Agency
USDA – United States Department of Agriculture
WQPMT – Water Quality Pesticides Management Team
YSWCD – Yamhill Soil and Water Conservation District

Foreword

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

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

Required Elements of Area Plans

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

Plan Content

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

Chapter 2: Local Background. Provides the local geographic, water quality, and agricultural context for the Management Area. Describes the water quality issues, Area Rules, and potential practices to addresswater 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 towards 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 603-095-0540). The general regulations guide the Ag Water Quality Program, and the Area Rules for the Management Area are the regulations with which landowners must comply. Landowners are encouraged through outreach and education to implement conservation and management activities.

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

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

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

1.2 History of the Ag Water Quality Program

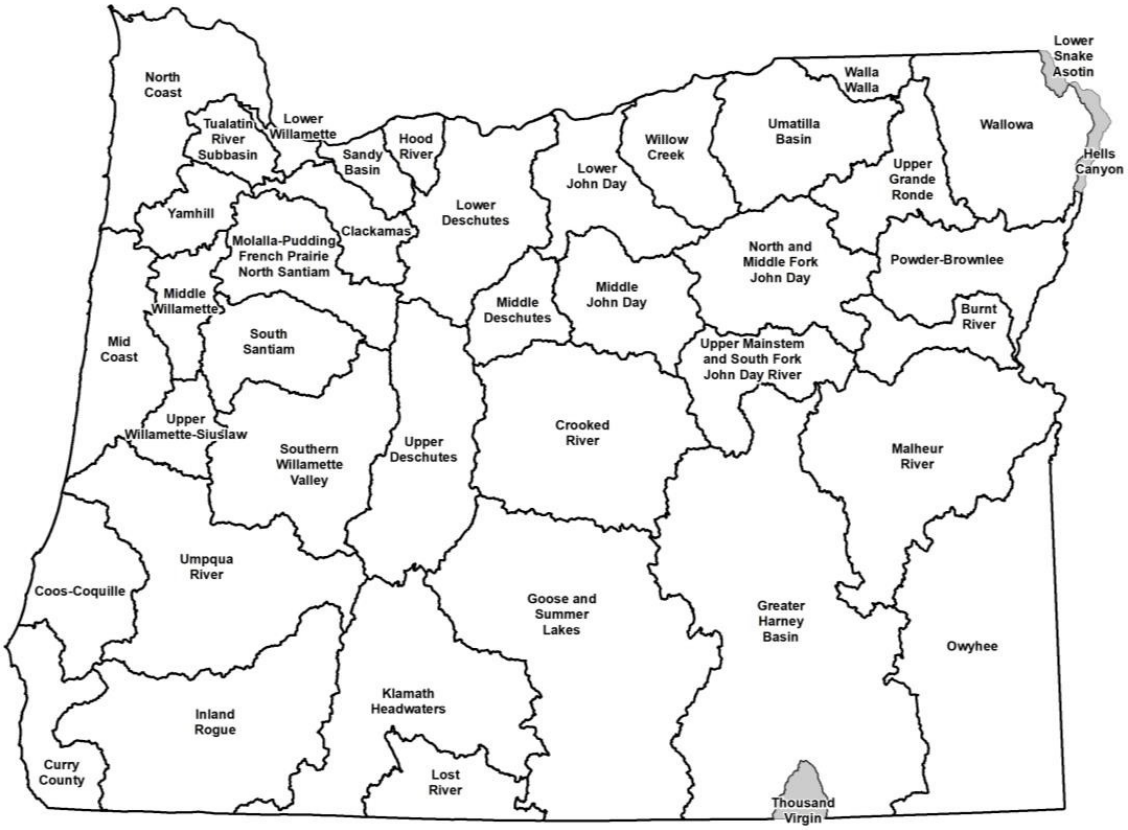
In 1993, the Oregon Legislature passed the Agricultural Water Quality Management Act directing ODA to develop plans to prevent and control water pollution from agricultural activities and soil erosion and to achieve water quality standards (ORS 568.900 through ORS 568.933). The Oregon Legislature passed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

Between 1997 and 2004, ODA worked with LACs and SWCDs to develop Area Plans and Area Rulesin 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

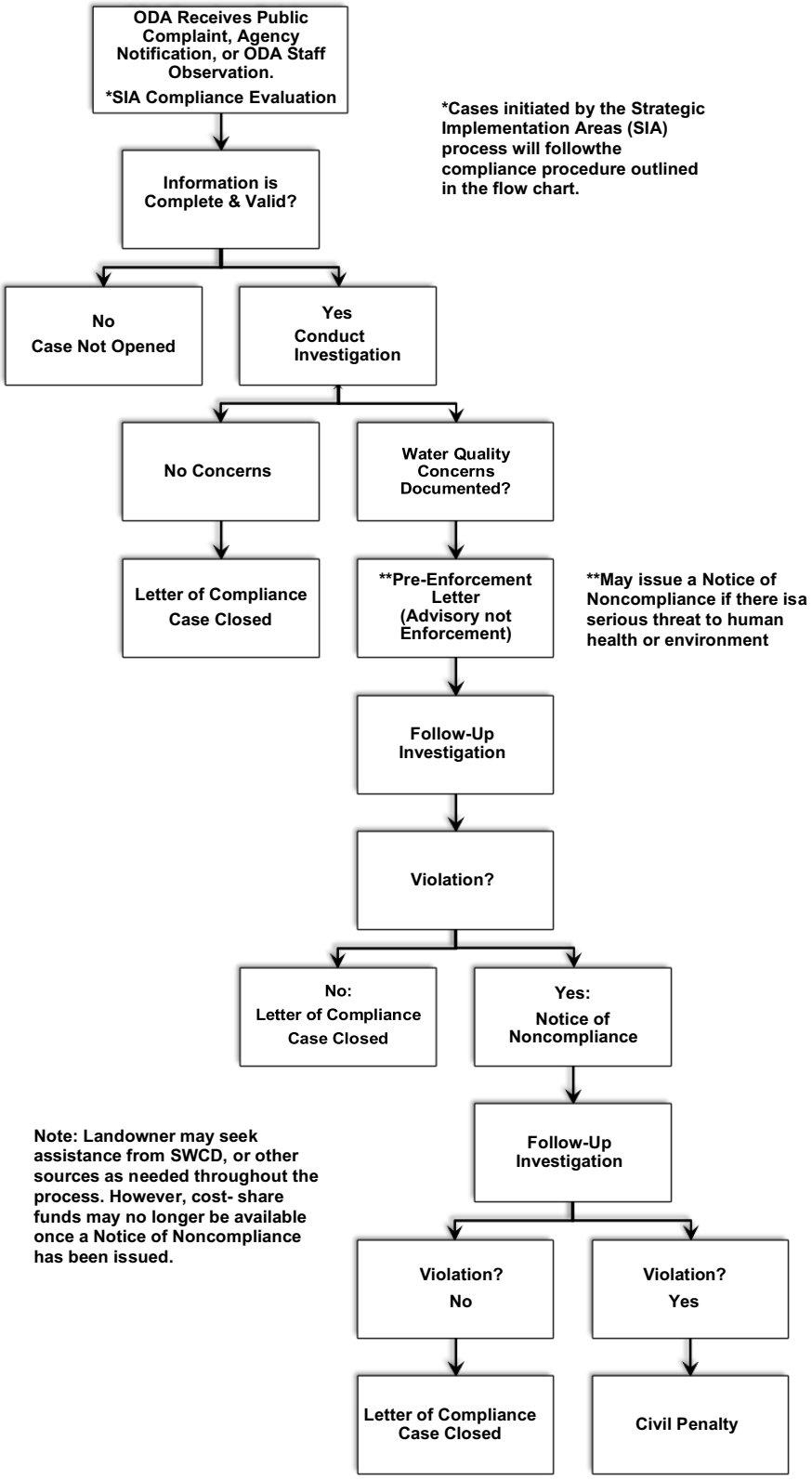
Plans and Area Rules. If other governmental policies, programs, or rules conflict with the Area Plan or Area Rules, ODA will consult with the appropriate agencies to resolve the conflict in a reasonable manner.

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

The Area Rules are a set of standards that landowners must meet on all agricultural or rural lands. "Landowner" includes any landowner, land occupier, or operator per OAR 603-95-0010(24). All landowners must comply with the Area Rules. ODA will use enforcement where appropriate and necessary to achieve compliance with Area Rules. Figure 2 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. Ifa landowner does not implement the required corrective actions, ODA may assess civil penalties for continued violation of the Area Rules.

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

Figure 1.3.1 Compliance Flow Chart



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 fully LMAs practical, consistent with the timely and effective implementation of AreaPlans (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.

1.3.2 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.

1.3.3 Agricultural Landowners

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

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

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

- Hot springs, glacial melt water, unusual weather events, and climate change,
- Septic systems and other sources of human waste,
- Public roadways, culverts, roadside ditches, and shoulders,
- Dams, dam removal, hydroelectric plants, and non-agricultural impoundments,
- Housing and other development in agricultural areas,
- Impacts on water quality and streamside vegetation from wildlife such as waterfowl, elk, and feral horses,

- Other circumstances not within the reasonable control of the landowner.

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

1.3.4 Public Participation

ODA, LACs, and LMAs conduct biennial reviews of the Area Plan and Area Rules. Partners, stakeholders, and the public are invited to participate in the process. Any revisions to the AreaRules 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 underthe CWA and does not currently require a permit.

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

1.4.2 Beneficial Uses and Parameters of Concern

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

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

1.4.3 Impaired Waterbodies and Total Maximum Daily Loads

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

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: Discharge any wastes into the waters of the state from any industrial or commercial establishment oractivity 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, inlandor 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.

Occasionally, mature site-capable vegetation such as tall trees may not be needed along narrow streams. For example, shrubs and grass may provide shade, protect streambanks, and filter pollutants. However, on larger streams, mature site-capable vegetation is needed to provide the water quality functions. In many cases, invasive, non-native plants, such as introduced varieties of blackberry and reed canarygrass, grow in streamside areas. This type of vegetation has established throughout much of Oregon due to historic and human influences and may provide some of the water quality functions of site-capable vegetation. ODA's statutory authority does not require the removal of invasive, non-native plants, however, ODA encourages landowners to remove these plants voluntarily. In addition, the Oregon State Weed Board identifies invasive plants that can impair watersheds. Public and private landowners are responsible for eliminating or intensively controlling noxious weeds, as described in state and local laws. For more information, visit www.oregon.gov/ODA/programs/weeds.

1.4.6 Soil Health and Agricultural Water Quality

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

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

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 (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 strongfocus 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 theOregon 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 i 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 cropmanagement. 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 (oda.direct/pmp). The PMP, completed in 2011, strives to protect drinking water supplies and the environment from pesticidecontamination, 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 PMPsets forth a process for preventing and responding to pesticide detections in Oregon's ground and surface water.

1.5.5 Drinking Water Source Protection

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

1.6 Partner Agencies and Organizations

1.6.1 Oregon Department of Environmental Quality

The US EPA delegated authority to DEQ to implement the federal CWA in Oregon. DEQ is the lead state agency with overall authority to implement the CWA in Oregon. DEQ works with other state agencies, including ODA and the Oregon Department of Forestry (ODF), to meet the requirements of the CWA. DEQ sets water quality standards and develops TMDLs for impaired waterbodies, which ultimately are approved or disapproved by the US EPA. In addition, DEQ develops and coordinates programs to address water quality including NPDES permits for point sources, the CWA Section 319 grant program, the Source Water Protection Program, 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 oda.direct/deq-oda_moa.

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

1.6.2 Other Partners

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

1.7 Measuring Progress

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

1.7.1 Measurable Objectives

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

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

The State of Oregon continues to improve its ability to use remote-sensing technology to measure current streamside vegetation conditions and compare these to the conditions needed to meet stream shade targets. As the state's use of this technology moves forward, ODA will use the information tohelp 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 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 deficient use of limited resources.

The current Focus Area for this Management Area is described in Chapter 3.Strategic Implementation Areas. Strategic Implementation Areas (SIAs) are small watersheds selected by ODA, in consultation with partners, based on a statewide review of water quality data and other available information. ODA conducts an evaluation of likely compliance with Area Rules and contacts landowners with the results and next steps. The Oregon Watershed Enhancement Board (OWEB) and other partners make funding and technical assistance available to support conservation and restoration projects. These efforts should result in greater ecological benefit than relying solely on compliance and enforcement. Landowners have the option of working with the SWCD or other partners to voluntarily address water quality concerns. ODA follows up as needed to enforce the Area Rules. Finally, ODA completes a post-evaluation to document progress in the SIA.

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

1.8 Progress and Adaptive Management

1.8.1 Biennial Reviews

The ODA, LAC, LMA, and partners evaluate progress of Area Plan implementation through the biennial review process. At each biennial review, they discuss:

1) progress toward meeting measurable objectives and implementing strategies,
2) local monitoring data from other agencies and organizations,including agricultural land conditions and water quality, and
3) ODA compliance activities.

As a result of these discussions, ODA and partners revise implementation strategies and measurable objectives in Chapter 3 as needed.

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

1.8.2 Water Quality Monitoring

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

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

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

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

Chapter 2: Local Background

2.1 Local Roles

2.1.1 Local Advisory Committee (LAC)

The Area Plan was developed with the assistance of the LAC. The LAC was formed 1998 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

Member Name	Geographic Representation	Affiliations
Sam Sweeney (Chair)	Dayton	General farming, row crops. Country Heritage Farms, Yamhill SWCD, Palmer Irrigation District
Alan Holstein	Dundee	Vineyard, Past board member of LIVE
Allan Elliott	Dayton	Nursery, Carlton Plants Oregon Association of Nurserymen
Bruce Ruddenklau	Amity	General farming; Ruddenklau Farms
Ernie Strahm	Carlton	Livestock, small woodlot city of McMinnville Water Reclamation Facility
Lucien Gunderman	McMinnville	Livestock, Crown Hill Farms
Matt Crawford	Amity	Grass and specialty seed; Seabreeze Farms, Polk SWCD
Rich Blaha	Yamhill	Livestock Aquila Geospatial LLC
Steve Jones	McMinnville	General farming, Select Seed Wheat League, Oregon Clover Growers
Tim Pfeiffer	Yamhill	General farming, Pfeiffer Farms
Tom Thomson	Dallas	General farming, grass seed Polk SWCD
Rod Volbeda (Alternate)	West Salem	Dairy Select Seed, Wheat League, Oregon Clover Growers

2.1.2 Local Management Agency

The day-to-day implementation of this Area Plan is accomplished through Memoranda of Agreement between the Yamhill and Polk SWCDs. This Agreement defines the SWCDs as the LMAs for implementation of the Area Plan. Beginning in 1998, the Yamhill SWCD agreed to provide staffing to facilitate the activities and responsibilities of the LAC. The Yamhill SWCD was directly involved in development of the Area Plan and Area Rules.

2.2 Area Plan and Area Rules: Development and History

The Area Plan and Area Rules were developed over 25 LAC meetings, beginning in June of 1998, and concluding in April of 2000. The Area Plan and Area Rules were approved by the Director of ODA in July of 2000. During the development process, all LAC meetings were open to the public and public input was specifically sought at a public hearing in December 1999.

Since approval, the LAC met in 2003 and 2007. Since then, the LAC has met every other year to review the Area Plan and Area Rules. Based on these assessments, the ODA, the SWCDs, the LAC, and the State Board of Agriculture consider making appropriate modifications to the Yamhill River Basin Area Plan and/or the associated Area Rules.

2.3 Geographic and Physical Setting

2.3.1 Yamhill Basin Overview

Location

The Yamhill Basin Management Area is 548,350 acres (857 square miles) in size and encompasses four counties: Yamhill, Polk, Tillamook, and Lincoln. Two counties comprise most of the Management Area (Yamhill County 400,251 acres and Polk County 141,646 acres). The Yamhill Basin is situated between the Coastal Mountains to the west and the Willamette River to the east. Elevation in the Yamhill Basin ranges from 60 to 3,600 feet. The current population of Yamhill County is approximately 99,193 and Polk County is 75,403 (US Census Bureau, 2010). By 2050, it is projected that Yamhill County's population will increase to approximately 167,300 and 135,877 in Polk County (Oregon Department of Administrative Services, 2013).

Land Use

The predominant land uses in the Yamhill Basin Management Area are agriculture and forestry (Table 2.3.1a). Urban development is concentrated to several small cities including Amity, Carlton, Dayton, Dundee, McMinnville, Lafayette, Newberg, Sheridan, Yamhill, and Willamina.

The forested areas are generally found in the western part of the watershed, in the foothills, and upper elevations of the Coastal Mountain Range. Additional forestland occurs in isolated tracts in the Amity-Eola Hills, Red Hills of Dundee, and the Chehalem and Parrett Mountains. Commercial forest is under public and private ownership. Private ownerships are industrial and non-industrial forests and smaller woodlots. The Confederated Tribes of Grand Ronde also own commercial forest in the western part of the watershed.

Table 2.3.1a Land Use in the Yamhill Management Area by State Zoning (Acres)
Data: 2014 - Oregon Department of Land Conservation and Development

Farm Use	241,580
Mixed Farm Forest	46,726
Commercial	2,011
Forest Federal	31,188
Forest Private	171,559
Indian Reservation	10,239
Industrial	3,696
Mineral and Aggregates	1,153
Parks and Open Space	2,461
Public Use	937
Rural Residential	23,371
Low-High Density Residential	8,333

Agriculture

The Yamhill Basin Management Area is one of the most diverse and agriculturally productive areas in Oregon (Table 2.3.1b). In the early settlement days of Yamhill and Polk counties, cattle grazing, and agriculture were introduced for subsistence. Settlement was rapid and overtime cattle were pushed up into the higher elevations and farmers began growing crops in the valley bottoms. A United States Census from 1880 recorded that hay, oats, and wheat comprised 99 percent of agricultural production in the Management Area. Clover was eventually introduced in the 1880s and was followed by a surge in livestock production. In the early 1900s, dairies began to establish and fruit and nut orchards increased. Commercial production of strawberries and blackberries started in the early 1920s and grass seed production was introduced in the 1930s once fields could be tiled and drained. (Hofert-Hay 2000). Since then, agricultural production in the basin has diversified to include irrigated specialty crops, small

family farms and ranches, Christmas trees, nursery stock production, as well as a greater variety of dryland crops. Most recently there has been an expansion of vineyards in Yamhill and Polk counties, making the Yamhill Basin the largest region in Oregon planted with wine grapes and a national leader in growing pinot noir varietals (Yamhill County 2009).

Table 2.3.1b Estimated Agricultural Production in Yamhill and Polk Counties (2017)

*Production	Yamhill County	Polk County
Total Land in Agricultural Production (acres)	169,357	148,905
Number of Farms	2,138	1,243
Average Size of Farms (acres)	79	120
Irrigated land (acres)	29,060	20,385
Total Cropland	113,373	107,580
Total Land in Pasture – All Types (acres)	26,089	18,131
# Farms in the USDA National Organic Program	39	26
# Farms enrolled in **USDA Conservation Programs	64	25
Acres in No-Till	14,796	10,881
Acres in Conservation Tillage (Excludes No-Till)	10,305	19,948
***Livestock (# farms with :)**		
Beef Cows	392	306
Milk Cows	29	18
Equine: Horses, Ponies, Mules & Donkeys	530	307
Any Poultry	451	267
Goats	221	125
Sheep and Lambs	174	154
Llamas & Alpacas	109	40
Hogs and Pigs	63	38
Total Bee Colonies in:	1,573	2,883
***Crops (acres)**		
Field Seeds/ Grass Seeds/ Hay/ Forage/ Silage	41,563	35,762
Vegetable Row Crops	3,543	948
Cover Crops Planted	7,894	4,023
***Orchards (acres)**		
Land in Orchards	22,002	14,714
Land in Christmas Tree Production	45,283	5,871
Filbert – Hazelnut Orchards	14,710	9,579
***Vineyards, Berries and Nurseries**		
***Planted Wine Grapes	637 Vineyards = 19,705 acres	
Nurseries (greenhouse acres)	793	2.5
Land in Berries	2,187	648

**Conservation Reserve, Wetlands Reserve, Farmable Wetlands, and CREP
***Data from 2017 Oregon Vineyard and Winery Report – North Willamette Valley (Includes Yamhill-Carlton, Chehalem Mountains, McMinnville, Ribbon Ridge, Dundee Hills, and Ecola-Amity Hills American Viticultural Areas.

*2017 US Census of Agriculture: www.agcensus.usda.gov (last accessed 11/6/1919)
NOTE: This data is for discussion purposes only. It is not likely that the census results include all operations that meet the definition of a farm or that all those that do meet the definition of a farm respond to the census inquiry. Information could be missing or inaccurate and is a report for all of Yamhill and Polk counties.

The majority of the farmland in the Management Area is in the southern and eastern portions of Yamhill County and the north-eastern portion of Polk County. Most of the major crops, such as cereal grains, orchards, andgrass seed are grown on the low foothills and the main valley terrace. Irrigated vegetable and specialtycrops such as nursery products, vegetables for processing and fresh market, corn for silage, hay, and alfalfa, are generally grown on the alluvial bottomlands (A large portion of the agricultural

land is artificially drained). Wine grapes grow well in soils that are not suitable for seed crops or orchards.Growing grapes fits well into the low-lying foothills above the valley bottom. Pasturelands are generally located where less productive soils are in the valley bottoms and foothills.

Farming practices in the Yamhill Basin have also undergone changes. Cover cropping in certain perennial crops is becoming an accepted method of reducing soil erosion. Farmers have also begun practicing crop residue management on highly erodible land. Confined Animal Feeding Operations (CAFOs), especially dairy farms, have worked to better contain wastes with manure storage systemsand utilizing waste for nutrients applying at agronomic rates to hay fields.

Soil Resources

In general, the source of the Management Area soils can be grouped into two groups; residual soils (those derived from the process of weathering and decomposition of the underlying consolidated rocks) and sedimentary or alluvial soils. Residual soils are derived from volcanic rock and are mostly found in the uplands but can be found throughout the Management Area. Sedimentary soils were either weathered in place or transported and left as alluvial deposits. The texture of these soil types is described as silty clay loam and silt loam with some units of gravelly silty clay loam or clay. These soil textures are found mainly on the valley floor and in upper terrace positions; gorming the soil mapping units found in the Management Area's agricultural lands. (USDA Soil Survey 1973).

Below is a summary of soil types found in the Management Area. For detailed information about soil in the Yamhill Basin Management Area, refer to USDA NRCS Web Soil Survey for Yamhill and Polk counties at websoilsurvey.sc.egov.usda.gov.

Soils of the Yamhill Basin Management Area Agricultural Lands

Listed below, in general, are five soil groups composed of soil mapping units found most often in the Yamhill Basin Management Area and are primarily agricultural soils. (Soil Descriptions: USDA Yamhill Area Soil Survey 1974 and Polk County Soil Survey 1982).

Amity-Dayton: Somewhat poorly drained and poorly drained, nearly level silt loams over silty clay loam and clay. This association is on the broad, nearly level terrace plain that forms the floor of the Willamette Valley. It is in the level areas that lead into shallow drainage ways and at the foot of low, rolling hills. Extensive areas are near Hopewell and on the Dayton prairie. Because these soils are wet during the winter, they are used mainly to grow small grain, hay, pasture, and grass and legume seed. There is a claypan at a shallow depth. Erosion is not a problem in this association. A high-water table during winterand spring seriously affects land use.

Chehalis-Cloquato-Newberg (found along the Willamette River and banks of major streams): Well-drained and somewhat excessively drained silty clay loams, silt loams, and fine sandy loams found on recent alluvial bottomlands and floodplains along the larger streams. It has nearly level to gently undulating topography and in places, is traversed by meandering overflow channels. These soils are intensely farmed and well suited for crops. These soils are subject to occasional or frequent flooding in winter. This soil association is well supplied with irrigation water from shallow wells and streams. Winter flooding is a hazard on these soils, although flood-control projects in the Willamette River have reduced this hazard. Low dikes divert the floodwater around this area and allow it to enter at a non-erosive rate.

Jory-Yamhill-Nekia: Well-drained, gently sloping to very steep, clay loams over clay and silt loams over silty clay; formed in basaltic colluvium. This association is on the Eola, Amity, and Dundee Hills, the southern slopes of Chehalem, Mountain, and the foot slopes of the Coast Range from Yamhill to Sheridan. The topography is smooth and gently sloping to very steep. These soils are intensively farmed. Erosion is a severe hazard in this area. The long, smooth slopes have sufficient grade so that the friable topsoil erodes during heavy rains. In many places, moderate depth to hard bedrock limits rootpenetration.

Wapato-Cove: Poorly drained silty clay loams and clays. This association is on recent alluvial bottom lands and floodplains. These soils occupy small areas along the larger streams and is the major soil types found along small streams. It has a gently sloping to basin like topography and is traversed in places by meandering overflow channels. Because these soils are wet for most of the year, they are best suited for hay and pasture. Some soils are improved with tile drainage and surface ditches can remove excess water when adequate outlets are available. Ponding of water in winter is the major hazard in this association. A high-water table persists until late in spring. Open drains and improved channels remove much of the excess water. Low dikes divert the water around the area so that it enters at a non-erosive rate.

Woodburn-Willamette: Moderately well drained and well drained, nearly level to moderately deep silt loams and silt loams over silty clay loam. This association is on the broad, nearly level terrace plain that forms the floor of the Willamette Valley. These soils are intensely farmed and well suited for crops. Erosion is not a serious hazard in most of the association. In some places, slight to severe erosion occurs on the gently to strongly sloping sides of drainage ways.

Water Resources

The Yamhill Basin Management Area is in the greater Willamette River Basin. The basin's climate is marine influenced resulting in extended winter rainy seasons and hot dry summers. The average annual rainfall ranges from 40 inches at the valley bottom to 150 inches at the higher elevations. The Management Area drains approximately 857 square miles and has an estimated 776 stream miles flowing throughout. The Yamhill River is the main river channel flowing through the Management Area and is nearly 65 miles long. The Yamhill River is referred to as two systems the North Yamhill River and the South Yamhill River. The Willamette River is the eastern boundary of theManagement Area. There are eight sub-watersheds in the Management Area: Agency Creek, Chehalem Creek, Deep Creek, Mill Creek, North Yamhill River, Salt Creek, South Yamhill River, and Willamina Creek.

Because there is no high elevation snowpack in the Management Area, winter rainfall supplies most of the basin's water supply, which can lead to low or absent base flows in the summer (Table 2.3.1c). About 85 percent of the total annual rainfall in the area usually falls during the period of September through April. High and low flows have different impacts on the landscape and resources. The greater amount of water diverted for irrigation during the summer also contributes to the fluctuations in flow.

Appropriated water in the Yamhill Basin is diverted for agricultural, municipal, industrial, and commercial use. The primary use for which water rights are issued in the Management Area is irrigation. The amount of water appropriated in the basin is 8,300 annual acre-feet (one-acre foot covers one acre of land with a foot of water), with 6,423-acre feet of this allocated for irrigation (Oregon Water Resources Department, 1998). There are 22,064 acres of irrigated land in Yamhill County and 101,014 acres in Polk County (Census of Agriculture, 2012). The water used for irrigation comes from several sources in the Yamhill Basin such as impoundments, groundwater, out-of-basin transfers, and streams. Additionally, the Palmer Creek Water District Improvement Company diverts water from the Willamette River and excess water is returned to the Yamhill. Presently, there are no further appropriations of surface water allowed for the Yamhill River, and most other basins are fully appropriated in the summer.

Table 2.3.1c South Yamhill River Surface Water Record Period of Record (POR) from 1994-2019 Drainage Area = 528 square miles USGS Gage 14194150 at South Yamhill River off SE Three Mile Lane www.waterdata.usgs.gov (last accessed November 2019)		
POR Winter Monthly Mean Discharge	December at 4,360 cfs.	January at 4,360 cfs.
POR Summer Monthly Mean Discharge	August at 42 cfs.	September at 69 cfs.
Maximum Discharge on Record	February 9, 1996 at 47,100 cfs.	
Minimum Discharge on Record	September 4, 2003 at 0.58 cfs.	
Highest Annual Average Flow	1996 at 2,796 cfs.	
Lowest Annual Average Flow	2001 at 551 cfs.	
2018 Average Annual Flow: 1,424 cfs.		

Oregon implements its drinking water protection program through a partnership between DEQ and OHA. The program provides individuals and communities with information on how to protect the quality of Oregon's drinking water. Department of Environmental Quality and OHA encourage preventive management strategies to ensure that all public drinking water resources are kept safe from current and future contamination. For drinking water sources in the Management Area, refer to Table 4.

Biological Resources

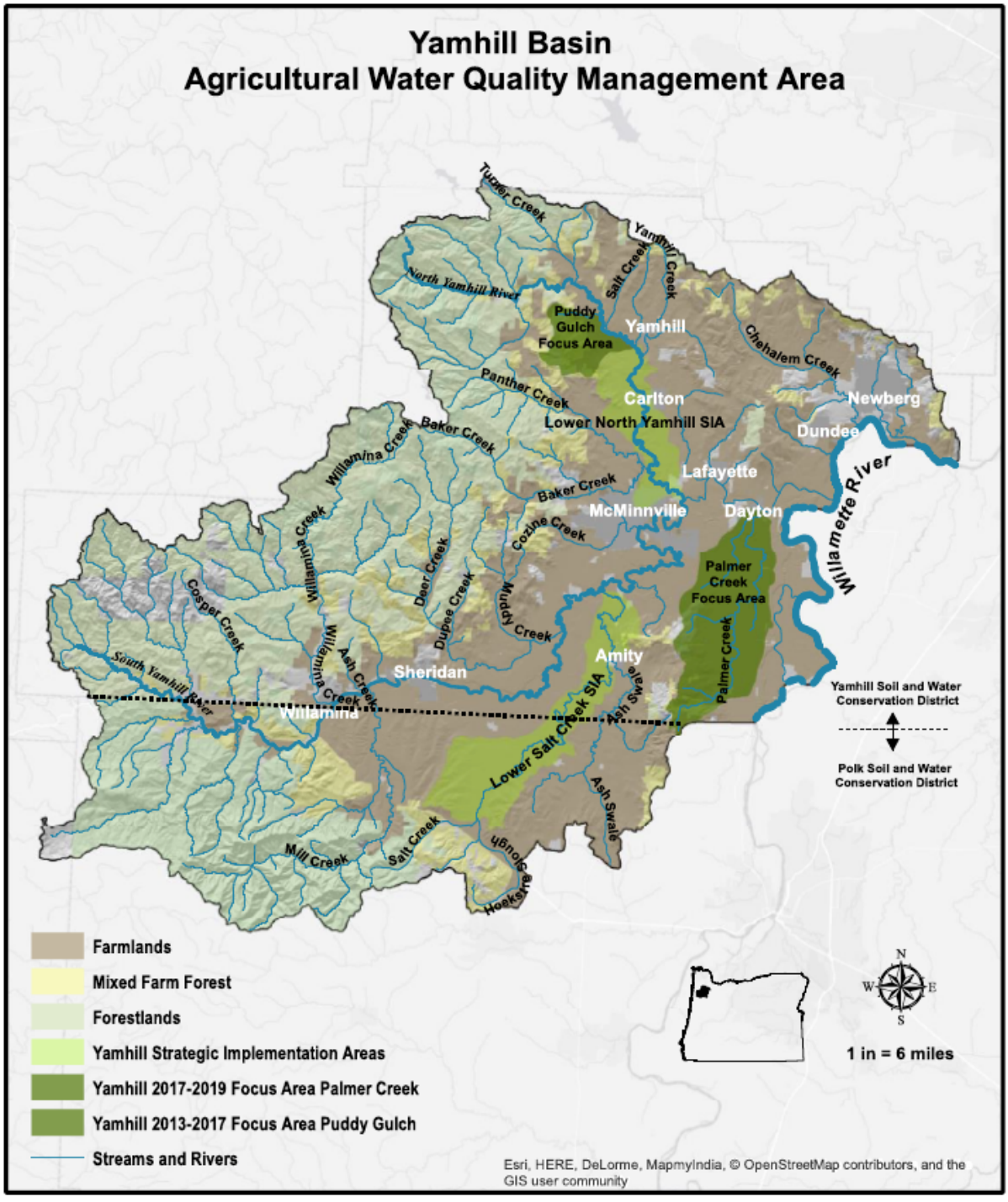
The diversity and acreage of natural wildlife habitats in the basin has been reduced as land has been converted from natural forest, woodlands, and grasslands to managed forests, orchards, pasture, cropland, nurseries, vineyards, homesteads, and urban areas. Studies estimate that around 40 percent of the original wetlands in the Willamette Valley have been lost (Gabriel, 1993). As a result, some of the ecological functions of wetlands and riparian areas have been impaired. These areas filter contaminants, trap sediment, and provide wildlife habitat. Wetland and riparian vegetation also minimize hydrologic fluctuations by retaining water during high flows. This water may then replenish groundwater or provide shallow subsurface flow to streams. Both flow mechanisms are important for water quality with groundwater providing most of the in-stream water during summertime periods of low precipitation.

The Yamhill Basin hosts several vertebrate species that depend on aquatic habitats. Native, non-game fish include red-side shiner (*Richardsonius balteatus*), northern pike minnow (*Ptychocheilus oregonensis*), largescale (*Catostumus columbianus*) and bridgelip (*Catostumus macrocheilus*) sucker, Pacific lamprey (*Lampetra tridentata*), brook lamprey (*Lampetra richardsoni*), and several species of sculpin (*Cottus spp.*). Also native are winter steelhead (*Oncorhynchus mykiss*) and perhaps the basin's most widely distributed fish, cutthroat trout (*Oncorhynchus clarki*). Although adult Willamette spring Chinook salmon do not spawn in the Yamhill Basin, juvenile spring Chinook salmon (*Oncorhynchus tshawytscha)* have been found to use streams in the lower portion of the basin during the winter months for seasonal rearing (Galovich, 1999). Other aquatic vertebrates in the basin include several amphibians such as the Pacific giant salamander (*Dicamptodon ensatus*), tailed frog (*Ascaphus trueii*), red-legged frog (*Rana aurora*), and Columbia seep salamander (*Rhyacotriton kezeri*). Several mammalian species also depend on the waters of the Yamhill Basin. Beavers (*Castor canadensis*), muskrats *(Ondatra zibethica*), and river otters *(Lutris canadensis*) are common throughout the region. American dippers, green herons, belted kingfishers, and several other bird species also live and feed in the basin's aquatic habitats.

Several of the Yamhill Basin's fish and aquatic vertebrate populations are currently in decline. The Upper Willamette steelhead is listed under the Endangered Species Act. Pacific lamprey (another anadromous, cold-water species) is currently listed as vulnerable on the Oregon Sensitive Species List

and is of special concern and cultural importance to tribal communities. The Columbia seep salamander and the Western pond turtle are currently listed as critical on the state Sensitive Species List, while the status of the tailed frog and red-legged frog is vulnerable.

Figure 2.3 Yamhill Basin Agricultural Management Area



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Path: \NRPA\WATERQUALITY\BRENDASANCHEZ\YAMHILL\YAMHILL AREA PLAN MAP 2017.MXD This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

Ongoing conservation efforts in the Yamhill Basin are benefiting wildlife habitat. Conservation practices such as wetland restoration, upland habitat planting, tree and shrub planting, and riparian restoration create new habitat. Many producers are working with the SWCDs in the Yamhill Basin to implement these types of measures that will benefit wildlife in the future.

2.4 Agricultural Water Quality

2.4.1 Water Quality Issues

Surface water quality in the Yamhill Management Area varies seasonally. During the summer low flow periods, sections of the middle and lower reaches of the Yamhill River have poor water quality for several parameters. Some seasonal variation in water quality in the Yamhill Basin probably occurred prior to European settlement due to the natural characteristics of the stream. Diversion of water and hydrologic changes (created by activities such as tiling or impoundments) has exaggerated seasonal variations. This reduction in flow and some loss of shading by riparian vegetation have probably contributed to some increases in water temperature. Also, point and nonpoint source wastewater discharges have adversely affected water quality.

There are several potential sources of water pollution in the Management Area. Point source pollution emanates from clearly identifiable discharge points such as wastewater plants and industrial operations. Non-point source pollution originates from the general landscape and is difficult to trace to a single point. Non-point sources of pollution in the Management Area include erosion from agricultural, rural, and forestlands and stream banks, roadsides, and development in urban areas; contaminated runoff from livestock and other agricultural operations; and contaminated runoff from established urban areas, septic systems, and natural sources. Pollutants from non-point sources are carried to the surface water or groundwater through the action of rainfall, irrigation runoff, seepage, and illicit discharges. The purpose of this Area Plan is to address strategies in preventing and controlling non-point pollution from agricultural activities from entering waters of the state.

2.4.1.1 Beneficial Uses

Water quality standards are established to protect beneficial uses of the state's waters. Beneficial uses are assigned by basin in the OARs for water quality (OAR 340-041-0002(17). Table 2.4.1.1 summarizes the State of Oregon's designated beneficial uses for the Yamhill Basin tributaries within the Willamette Basin (OAR 340-041-0340). Most of the impacts on beneficial uses are recognized during summer, low flow periods. Water impairments are often the result of activities that occur in thefall and winter months. For more information go to: https://www.oregon.gov/deq/wq/Pages/WQ-Standards-Uses.aspx

Table 2.4.1.1 Designated Beneficial Uses for the Yamhill Basin

Beneficial Use	All Mid-Willamette Streams and Tributaries
Aesthetic Quality	X
Boating	X
Commercial Navigation & Transportation	-
Fish and Aquatic Life	X
Fishing	X
Hydro Power	X
Industrial Water Supply	X
Irrigation	X
Livestock watering	X
Private Domestic Water Supply	X
Public Domestic Water Supply	X
Water Contact Recreation	X
Wildlife and Hunting	X

2.4.1.2 WQ Parameters and 303(d) List

A number of waterbodies within the Management Area are water quality limited (do not meet state water quality standards) (Table 2.4.1.2) for one or more parameters (Appendix B). The DEQ is required to submit a list of impaired waterbodies to the U.S. Environmental Protection Agency (EPA) every two years under section 303(d) of the federal CWA. This list is commonly referred to as the "303(d) list" and is made available online through DEQ's 2012 Integrated Report Assessment Database and 303(d) list at: www.deq.state.or.us/wq/assessment/rpt2012/search.asp.

At the time of the 2019 Biennial Review, the 2012 Integrated Report of Category 5 (303(d) listed waterbodies) specified that stream segments along twenty waterbodies within the Management Area were water quality limited and not meeting criteria for one or more of fourteen water quality parameters including biological criteria, copper, chlorophyll a, chlorpyrifos, dissolved oxygen, *E. coli*, fecal coliform, iron, lead, mercury, pH, phosphorus, temperature, and turbidity (Appendix B). For more information and a complete list of 303(d) listed streams, go online to DEQ's Integrated Report Assessment Database: www.oregon.gov/deq/wq/Pages/2018-Integrated-Report.aspx.

Table 2.4.1.2 303(d) Listed Streams of the Yamhill Basin by Water Quality Parameters

Bacteria: *E. coli* and Fecal Coliform	Stream Temperature
Baker Creek: 0-8.1 ***river miles***	Baker Creek: 0-14.2 ***river miles***
Cosper Creek: 0-9.1	Coast Creek: 0-8.6
Cozine Creek: 0-6.8	Cosper Creek: 0-9.1
Deer Creek: 0-20.4	Cozine Creek: 0-6.8
Mill Creek: 0-22.2	North Yamhill River: 0-32.4
North Yamhill River: 0-32.4	Deer Creek: 0-20.5
Panther Creek: 0-14.0	Gooseneck Creek: 0-8.8
Salt Creek: 0-32.8	Panther Creek: 0-14.0
South Yamhill River: 0-61.7	Salt Creek: 0-32.8
Turner Creek: 0-2.5	Hay Creek: 0-2.2
Willamina Creek: 0-20.8	Mill Creek: 0-22.2
Yamhill Creek: 0-6.9	Muddy Creek: 0-8.9
Additional Parameters	South Yamhill River: 0-42.6
Turbidity: Panther Creek: 12.2-14.0	Turner Creek: 0-2.5
Turbidity: Turner Creek: 4.0-7.3	West Fork Palmer Creek: 0-5.3
Chlorpyrifos: West Fork Palmer Creek: 0-5.2	West Fork Salt Creek: 0-6.4
Mercury: Yamhill River: 0.11.2	Wildwood Creek: 0-2.3
Legacy Pesticides: Middle Willamette River	Willamina Creek: 0-20.8
Copper, Iron, and Lead: North Yamhill River, South Yamhill River	Yamhill Creek: 0-6.9
Biological Criteria: Baker, Deer, Dupee, Gooseneck, Mill, North Yamhill, Panther, Willamina, Middle Willamette	
Dissolved Oxygen: Baker, Chehalem, Cozine, Gooseneck, Hay, Muddy, North Yamhill, Palmer, Panther, Salt Creek, West Fork Palmer, Yamhill Creek, Middle Willamette	

2.4.1.3 TMDLs and Agricultural Load Allocations

The DEQ, in accordance with the federal Clean Water Act, is required to establish TMDLs for pollutants on the list of impaired waterbodies (303(d) list). TMDLs generally apply to an entire basin or subbasin and not just to an individual water body that was on the 303(d) list.

Approved TMDLs in the Management Area were last completed in 1998 for phosphorus and pH (Yamhill River TMDL), 2004 for chlorophyll a, and 2006 for bacteria, mercury, and stream temperature (Willamette basin and Mid-Willamette – Chehalem Creek TMDL). TMDLs specify the daily amount (load) of pollution that a water body can receive and still meet water quality standards.Through the TMDL, nonpoint sources (including agriculture, forestry, and urban) are assigned "load allocations" while point sources are assigned "waste load allocations" in their permits.

Loading capacity provides a reference for calculating the amount of pollutant reduction needed to bring water into compliance with water quality standards. The load allocation represents the amount of pollutant that can be added to a waterbody and still achieve water quality standards. The 1998 TMDL process established an allocation for the load of phosphorus entering streams through agricultural activities. Efforts to reduce phosphorous have been ongoing under this Plan. Strategies documented in this Area Plan support phosphorous reduction and affiliated parameter improvements.

The agricultural sector is responsible for reducing agricultural water pollution to meet the load allocation assigned to agriculture. Once TMDLs are completed for a basin, the basin's water bodies are removed from the 303(d) list and are assigned to Category 4A (water quality limited, TMDL approved). In the future, when data show that water quality criteria have been met, water bodies will be assigned to

Category 2 (attaining). While this Area Plan applies to all agricultural water pollution, the objectives and strategies currently emphasize parameters on the 303(d) list with or without an approved TMDL.

Erosion control efforts under this Plan work towards mercury reductions in the Chehalem area where the TMDL for mercury has been established. This Area Plan is a tool for implementing the nonpoint source controls required by a TMDL for phosphorus, bacteria, mercury, and temperature. The same BMPs are used in Yamhill and therefore work for the mercury TMDL and for when other TMDLs inthe Yamhill are completed for the 303(d) listings applicable to the Yamhill Basin.

Table 2.4.1.3 2006 Nonpoint Source Agricultural TMDL Load Allocations/Reductions

Basin	TMDL	Allocations
Middle Willamette Chehalem Creek	Bacteria	95% reduction applies to the Middle Willamette overall
	Mercury	27% reduction applies to the Willamette Basin
	Temperature	Attainment and preservation of effective shade levels on smaller tributaries associatedwith system potential vegetation will eliminate most anthropogenic nonpoint source heat loads. 91% thermal pollution is from nonpoint sources. Surrogate measure is effective shade targets and a heat load equivalent of 0.05 ºC of the Human Use. Allowance.
Yamhill	Phosphorous	Waters of the state must be of sufficient quality to support aquatic species withoutdetrimental changes in the resident biological communities. The following standards support water quality under the phosphorus TMDL:pH 6.5-8.5 Many biological processes, such as everyday metabolism and reproduction, arehampered in acidic (pH too low) or alkaline. Chlorophyll a 0.015 mg/l Elevated levels of chlorophyll a indicate excessive inputs of nutrients.

2.4.1.4 Drinking Water

The primary goal of drinking water protection strategies should be to reduce or minimize the risks of pollution in the source water. It is highly improbable that one can *eliminate* risks in any area, but by applying one or more protection strategies, a community will be able to reduce the likelihood of pollutants affecting the water supply in the future. Potential strategies include both general management practices such as conservation or efficiency measures that will apply to the entire drinking water protection area and management practices that can be applied most appropriately by land-use category (commercial/industrial, agricultural/rural, forestry, residential/ municipal, and miscellaneous). (ODEQ)

Table 2.4.1.4 Yamhill Basin Management Area Drinking Water Systems

Watershed	Public Water System	Drinking Water Source
Lower South Yamhill River	Amity	South Yamhill River
Mill Creek/ South Yamhill River	Sheridan	Gooseneck Creek
North Yamhill River	Carlton	Panther Creek
Nestucca River	McMinnville	McGuire Reservoir
North Yamhill River	McMinnville	Haskins Reservoir
Upper South Yamhill River	Grande Ronde	Unnamed Creek
Lower South Yamhill River	Sheridan	South Yamhill River
Willamina Creek	Willamina	Willamina Creek
North Yamhill River	Yamhill	Turner Creek, Turner Creek Storage Reservoir
For more information: www.deq.state.or.us/wq/dwp/swrpts.asp		

2.5 Regulatory and Voluntary Measures

The focus of the Agricultural Water Quality Management Program is on voluntary and cooperative efforts by landowners, SWCDs, ODA, and others to protect water quality. However, the Agricultural Water Quality Management Act also provides for a regulatory backstop to ensure prevention and control of water pollution from agricultural sources in cases where landowners or operators refuse to correct problem conditions. Area Rules serve as this backstop while allowing landowners flexibility in how they protect water quality. Rules are goal-oriented and describe characteristics that should be achieved on agricultural lands, rather than practices that must be implemented.

In its advisory role to the ODA, the LAC developed rules to protect water quality and prevent and control water pollution from agriculture. The LAC recognizes that every farm and situation is different and recommends each situation be considered carefully when the Area Rules are enforced.

In addition to the Area Rules, available management practices that may help landowners achieve compliance and meet the goals and objectives of the Area Plan are included for reference (Appendix D). The available management practices are intended as suggestions for landowners as options on how to meet the goals and objectives the Area Plan and generally maintain and enhance natural resources on their property. Landowners are neither required to cease a specific practice nor implement a particular practice by the Area Plan or Area Rules. For more information, please consult the Soil and Water Conservation District or one of the agencies or organizations listed in Appendix A.

Cost-share and other forms of funding may be available for many of the management practices that can significantly offset the costs to the producer. For a list of funding programs, see Appendix E.

The concerns addressed in these prevention and control measures are:

- Bacteria (*E. coli* and fecal coliform)
- Temperature
- Nutrients (surrogate for Phosphorus, Chlorophyll, pH)
- Turbidity
- Dissolved oxygen
- Chlorophyll a
- pH
- Biological criteria
- Iron
- Manganese
- Mercury

This Area Plan serves as a guidance document and as stated in the foreword, does not establish provisions for enforcement. The Area Rules developed with the LAC, OAR 603-095-0540(1) through 603-095-0540(7) and are included in this document only as a reference for landowners. ***Each Area Rule has a border around it and appears in italics.*** The following, OAR 603-095-0540 gives some provisions that apply to the Area Rules that were developed with the LAC.

OAR 603—095-0540
All landowners or occupiers conducting activities on lands in agricultural use shall be in compliance with the following criteria. A landowner or occupier shall be responsible for only those violations of the following prevention and control measures caused by activities conducted on land managed by the landowner or occupier. Criteria do not apply to conditions resulting from unusual weather events or other exceptional circumstances which could not have been reasonably anticipated.

2.5.1 Prevention Measure #1 - Erosion and Sediment

The goal of this prevention and control measure (PCM) is to prevent erosion on agricultural and rural lands. Erosion occurs when soil particles detach and move due to the impacts of wind and water. Eroded soil particles can carry contaminants along with them. These particles, either with or without attached contaminants, can move to waterways, or create water quality problems. Soil erosion reduces the long-term productivity of farmland.

OAR 603-095-0540 (1)(c) of this PCM is intended to prevent existing drainages and channels from being damaged, destabilized or otherwise eroded with excessive volumes of flow and/or high energy discharges. Ditches, culverts, and other drainage structures are designed to handle a maximum flow volume and should not be relied upon to carry volumes of water beyond this maximum. Designed drainages also have a limit to the power (or energy) of flow they can handle without being damaged by scour or other erosion processes. Natural channels have formed in response to certain flow volumes and energies and cannot handle flows beyond these maximums without eroding and/or becoming unstable.

Potentially Impacted Parameters: Sedimentation, nutrients, toxics.

Indicators of Non-Compliance

Clear non-compliance

- Visible soil deposition that enters natural stream areas,
- Visible sloughing from drainage ways because of livestock grazing, tillage, or the destruction of riparian vegetation by the landowner or occupier,
- Underground drainage tile outlets either improperly installed or maintained allowing soil or bank erosion to actively occur.

Likely non-compliance, requires further investigation

- Sheet and rill erosion greater than “T”,
- Eroding road ditches, drainage ways, and field borders,
- A drainage way that is growing deeper or wider in response to increased flows,
- Field swales with high water flow and without crop residues, grass cover, or sediment control structures,
- Steep slopes with minimal cover,
- Sediment deposits left from flowing water that are visible away from the ditch or channel,
- Lack of vegetation in and around drainage ditch.

Definitions

- **Erosion, rill** - An erosion process in which numerous small channels only several inches deep are formed, which occurs mainly on recently disturbed soils. The small channels formed by rill erosion would be obliterated by normal smoothing or tillage operations. OAR 603-095-0010(14).
- **Erosion, sheet** - The removal of a fairly uniform layer of soil from the land surface by runoff water. OAR 603-095-0010(15).
- **Erosion rate, sheet, and rill** - The annualized amount of soil material lost from a field or

parcel of land due to sheet and rill erosion, expressed in tons of soil eroded per acre per year, and calculated according to the Universal Soil Loss Equation (USLE) or the Revised Universal Soil Loss Equation (RUSLE). OAR 603-095-0010(13).

- **Soil loss tolerance factor or "T"** - The maximum average annual amount of soil loss from erosion, as estimated by the USLE or the RUSLE, and expressed in tons per acre per year, that is allowable on a particular soil. This represents the tons of soil (related to the specific soil series), which can be lost through erosion annually without causing significant degradation of the soil or potential for crop production. OAR 603-095-0010(44).
- **Filter strip** - A strip or area of vegetation for removing sediment, organic matter, and other pollutants from runoff and wastewater (USDA – NRCS 1997).

Example Conservation Practices

- Utilize soil health principles and avoid leaving your soil bare. Plant a cover crop. USDA Soil Health Website: www.nrcs.usda.gov/wps/portal/nrcs/main/national/soils/health/,
- Under certain farming conditions and climates, consider switching from conventional tillage to conservation tillage or no till,
- Plant or till perpendicular to slope following elevation contour lines,
- Under certain farming and soil conditions sub-soiling or deep ripping a field can improve water infiltration,
- Properly designed and maintained conservation strategies such as strip cropping, catch basins, grass-lined waterways/ field and road ditches, vegetative filter strips, straw bales, and other erosion control methods can be very effective in retaining sediment.

2.5.2 Prevention Measure #2 – Irrigation

The goal of this PCM is to prevent the mobilization of potential contaminants. This PCM deals with irrigation water management. Irrigation water management is comprised of two distinct components that are equally important. The first component is the irrigation system itself: the physical means of moving water from the supply source into the crop's root zone. The type of irrigation system chosen must be appropriate for factors such as field slope, soil infiltration rates, water supply, type of crop, etc.

The second component of irrigation water management considers how the system is managed. This includes how long and how often the water is applied and how often wearable components (such as sprinkler nozzles, gaskets, hoses, etc.) are replaced or serviced. Costly or complex irrigation systems are not a guarantee of success, particularly if they are managed or maintained incorrectly.

Irrigation scheduling decisions need to be based on numerous factors, such as soil water holding capacity, soil tilth conditions, crop type, stage of growth, weather conditions, recent applications of fertilizers or other chemicals, projected harvesting dates, etc. Irrigation system capabilities (performance, uniformity, efficiency, and application rate) also need to be taken into consideration.

Irrigation monitoring to determine uniform application rates should be considered. There are numerous irrigation scheduling tools available, ranging from the very inexpensive (soil moisture by feel using a soil probe, evaporation pans), to the very expensive (neutron probes, infrared guns, satellite imagery). Naturally, some scheduling tools work better with some crops than with others.

OAR 603—095-0540
(2) Landowners or occupiers shall not apply irrigation water in a manner that results in irrigation water discharge entering the waters of the state.
(a) Indicator of non-compliance is irrigation water discharge entering waters of the state.

Potentially Impacted Parameters: Nutrients, toxics, sedimentation.

Indicators of Non-Compliance

Clear non-compliance

- Irrigation water discharge entering waters of the state.

Likely non-compliance, requires further investigation

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

Example Conservation Practices

Planting and irrigating crops on a contour, planting sloping field edges to grasses, installing sediment basins at field edges in swales, using irrigation soil moisture monitoring, and using drip irrigation.

2.5.3 Prevention and Control Measure #3 – Waste

The goal of this PCM is to ensure that potentially concentrated nutrients and pathogens associated with higher livestock density areas are not readily transported to waters of the state. Producers should be aware that in addition to this PCM, other laws regulate the management of animal waste. Many livestock operations are required to have a CAFO permit. Also, ORS 468B.025 prohibits activity that causes pollution of any waters of the state or places or causes to be placed any wastes in a location where such wastes are likely to escape or be carried into waters of the state by any means.

Potentially Impacted Parameters: Bacteria, nutrients, dissolved oxygen, aquatic weeds or algae, chlorophyll a, pH.

OAR 603—095-0540
(3) Placement, delivery, or sloughing of Wastes
(a) Effective upon rule adoption of these rules;
(A) Except as provided in ORS 468B.050, no person conducting agricultural land management or land disturbing practices shall:
(i) cause pollution of any waters of the states or place or caused to be placed any wastes in a location where such wastes are likely to be carried into waters of the state.
(ii) Discharge any wastes into any 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.
(B) No person shall violate the conditions of any waste discharge permit issued pursuant to ORS 468B.050 or ORS 568.
(b) Indicators of non-compliance are:
(A) runoff flowing through areas of high livestock usage and entering waters of the state; or
(B) livestock waste located in drainage ditches or areas of flooding.

Indicators of Non-Compliance

Clear non-compliance

- Runoff flowing through areas of high livestock usage and entering waters of the state,
- Livestock waste located in drainage ditches or areas of flooding.

Likely non-compliance, needs further investigation

- Animal confinement areas or waste accumulation located where there is a chance of pollutant transport to waters of the state.

Definitions

Livestock - the animals described or listed in ORS 596.010 and 596.020 and includes, but is not limited to, horses, mules, jennies, jack asses, cattle, sheep, dogs, hogs, goats, domesticated fowl, psittacine, ratites, domesticated fur-bearing animals, bison, cats, poultry, and any other vertebrate in captivity. Fish are not livestock. OAR 603-011-0250(4).

Example Conservation Practices

- Waste management – clean water diversions; waste collection, storage, and utilization; facilities operation and maintenance,
- Pasture management/prescribed grazing,
- Vegetative buffer strips,
- Apply manure to cropland at rates that do not exceed agronomic needs for nitrogen and phosphorus based on soil and/or tissue tests for the crop to be grown,
- Schedule timing and amounts based on expected rainfall to avoid runoff,
- Manage livestock access to streams, wetlands, and riparian areas using off-stream watering facilities, exclusion (temporary or permanent), and seasonal grazing.

2.5.4 Prevention and Control Measure #4 – Nutrients

The goal of this PCM is to limit over application of nutrients to field, vegetable, and berry crops; nurseries; vineyards; and orchards. Over application of nutrients may result in nutrient runoff and leaching into waters of the state. This may cause nuisance algal growth, high pH, bacterial growth, and a decrease in dissolved oxygen. This PCM encourages growers to adopt sound agronomic practices to guide their crop nutrient applications.

Crop nutrients are elements taken in by a plant that are essential to its growth, and which are used bythe plant in the production of its food and tissue. These elements include nitrogen, phosphorus, potassium, calcium, magnesium, Sulphur, zinc, iron, manganese, copper, boron, molybdenum, and chlorine. The two nutrients of prime concern for water quality in the Yamhill Basin are nitrogen and phosphorus. Sources of crop nutrients include irrigation water, chemical fertilizers, animal manure, compost, bio-solids, and leguminous and non-leguminous crop residues.

OAR 603—095-0540
(4) Effective upon rule adoption, landowners or occupiers shall prevent crop nutrient applications that result in adverse impacts to waters of the state.
(a) Indicators of non-compliance are:
(A) nutrients applied to open water; or
(B) visible trail of compost, ash, or bio-solids to waters of the state.

Potentially Impacted Parameters: Bacteria, dissolved oxygen, aquatic weeds and algae, nutrients, pH, chlorophyll a

Indicators of Non-ComplianceClear non-compliance

- Nutrients applied to open water,
- Visible trail of compost, ash, or bio-solids to waters of the state.

Likely non-compliance, requires further investigation

- Total nutrient applications that exceed currently accepted fertilizer guidelines, such as Certified Crop Advisor or OSU recommendations.

Definitions

Fertilizer - Any substance, or any combination or mixture of substances, designed for use principally as a source of plant food in inducing increased crop yields or plant growth, or producing any physical or chemical change in the soil and shall contain five percent or more of available nitrogen, phosphorus pentoxide (phosphoric acid), or potassium oxide (potash), singly, collectively, or in combination, except hays, straws, peat, leaf-mold, and unfortified animal manure. ORS 633.310(5)

Example Conservation Practices

Use of currently accepted fertilizer guidelines; setting realistic yield goals; regular calibration of fertilizer application equipment; appropriate application timing; periodic soil testing and plant tissue analysis; periodic nutrient analysis of manure and/or compost products that are applied; managing irrigation to prevent nutrient loss through leaching and/or surface runoff; carefully managing nutrient applications; and accounting for "non-fertilizer" sources of nutrients such as manure, compost, bio-solids, and leguminous and non-leguminous crop residues.

2.5.5 Prevention and Control Measure #5 – Pesticides

The goal of this PCM is to minimize off-site transport and maximize on-site retention of pesticide materials. Over application of pesticides can lead to runoff into waters of the state and leaching, which may result in an increase in toxics and a decrease in biological organisms in water bodies and groundwater.

Read the label. As required by ORS 634.372(2) and (4), follow label recommendations for both restricted and non-restricted use pesticides. Pesticides can have a wide range of application methods and rates depending on soil type, crop type, season, and geographic location of the crop. Rain/irrigation affects different materials different ways. For example, some pesticides require a rain/irrigation event to be activated, while others can be washed off and rendered useless during the same event. Following label guidelines (which can change over time) is not only required by federal and state of Oregon laws but will help to insure optimum results as well.

> ***ORS 634.372***
> *No Person Shall:*
> *(2) As a pesticide applicator or operator, intentionally or willfully apply or use a worthless pesticide or any pesticide inconsistent with its labeling, or as a pesticide consultant or dealer, recommend or distribute such pesticides.*
> *(4) Perform pesticide application activities in a faulty, careless, or negligent manner.*

Potentially Impacted Parameters: Toxics, biological criteria

Indicators of Non-Compliance

Clear non-compliance

- Pesticide product applied to open water unless labeled for such use,
- No air gap or other back-siphon prevention device in use on water source used to fill spray equipment. OAR 690-215-0017,
- Improper disposal of rinse/wash water or excess spray mix.

Likely non-compliance, requires further investigation

- Equipment not properly calibrated.

Definitions

Pesticide - Any substance or mixture of substances intended to be used for defoliating plants or for preventing, destroying, repelling, or mitigating all insects, plant fungi, weeds, rodents, predatory

animals or any other form of plant or animal life which is, or which ODA may declare to be a pest, which may infest or be detrimental to vegetation, humans, animals, or be present in any environment thereof. ORS 634.006(8)(h).

Example Conservation Practices

- Calibrate, maintain, and correctly operate application equipment. Spray rigs need to be calibrated each time application rates or materials change. Verify that a particular rpm range/gear/tire combination provides the intended ground speed. Nozzles need to be replaced often, particularly if abrasive pesticide formulations (such as wettable powders) are used. Sprayers need to be operated in the correct pressure range (dictated by the material and nozzle combination used), to prevent excess drift to non-target areas (i.e., waters of the state).
- Limit sediment movement off the property. Once applied, many pesticide materials attach to soil particles. If soil is moving off the property, pesticides will accompany it.
- Adopt integrated pest management (IPM) practices. IPM promotes a diverse, multi-faceted approach to pest control. This includes variety selection, field/orchard sanitation and cultural practices, field scouting, the establishment of an economic threshold for control actions, beneficial insect release, the use of biological pesticides, and the use of chemical pesticides. While IPM does not exclude the use of chemical pesticides, it does seek to reduce their use. A reduction in chemical pesticide use reduces the chance that these materials will make contact with waters of the state.
- Establish appropriate vegetative buffer strips. Buffer strips will help to retain soil (which may have absorbed pesticides) and prevent surface runoff (which may have dissolved pesticides) from making contact with waters of the state.
- Store and handle pesticide materials correctly. Storage and handling facilities should be secure and include a leak-proof pad with curbing for mixing and loading. An alternative to a permanent concrete pad is to always mix pesticides in the field frequently moving sites to prevent chemical build-up. Wash/rinse water should be directly applied to the appropriate crop. Empty liquid pesticide containers should be triple rinsed, then punctured and disposed of in an approved manner. Dry chemical bags should be emptied completely. Bundle and store paper bags until they can be disposed of in an approved manner.

2.5.6 Prevention and Control Measure #6 - Chemigated Irrigation Water

This PCM addresses the rate and concentration of chemically treated irrigation water applications to farm or ranch land. Chemicals such as pesticides and fertilizers, as dissolved product or in suspension, should be carefully applied so that they do not move off the property to other bodies of water. This could occur via surface and subsurface transport. Irrigation systems used to chemigate must have appropriate backflow prevention devices installed and properly maintained.

> ***ORS 634.372***
> *(5) Effective upon rule adoption, landowners or occupiers shall prevent the application of chemicals in combination with irrigation water that results in transport into waters of the state.*
> *(a) Indicator of non-compliance is chemigated water flowing into waters of the state.*

Potentially Impacted Parameters: Nutrients, toxics, aquatic weeds or algae, dissolved oxygen, pH

Indicators of Non-Compliance

Clear indicator of non-compliance

- Chemigated waters flowing into waters of the state,
- Functioning back-siphon prevention device not used while chemigating. OAR 690-215-0017.

Likely indicator of non-compliance, requires further investigation

- Chemigated waters flowing into or ponding around wells, well pits, cisterns, or other direct conduits to groundwater,
- In areas of known or suspected shallow groundwater, chemigated water ponding and standing for extended periods of time.

Definitions

Chemigation - The method of applying nutrients, pesticides, or both in irrigation water (National Association of Wheat Growers Foundation, 1994).

Example Conservation Practices

Irrigation water management, vegetative buffer strips, nutrient management, tailwater management, integrated pest management.

2.5.7 Prevention and Control Measure #7 – Roads, Staging Areas, and Farmsteads

This PCM is intended to address non-cropped areas that may be sources of sediment or contaminant input to streams. These include roads, staging areas, barn lots, stream crossings, and heavy use areas. Many management methods are available for constructing and maintaining roads to increase their stability and reduce erosion. A single poorly maintained road can comprise the vast majority of one farm's sediment output.

OAR 603-095-0540

(6) Roadways, staging areas, farmsteads, and heavy use areas shall be constructed and maintained to prevent sediment or runoff contaminants from reaching waters of the state. All roads on agricultural lands not subject to the Oregon Forest Practices Act (OFPA) are subject to this regulation. Public roads are excluded from this prevention and control measure.

(a) Indicators of non-compliance are:

(A) surface runoff from farmsteads, roads, and staging areas that pick-up contaminants and flow to waters of the state; or

(B) visible gully erosion in roads or staging areas.

Potentially Impacted Parameters: Sediment, turbidity, nutrients, toxics, dissolved oxygen

Indicators of Non-Compliance

Clear non-compliance

- Surface runoff from farmsteads, roads, and staging areas that pick-up contaminants and flow to waters of the state,
- Visible gully erosion in roads or staging areas.

Likely non-compliance

- Inadequate culverts and water bars to keep runoff in natural channel,
- Pesticide and oil containers stored in the open (exposed to precipitation).

Definitions

Oregon Forest Practices Act - As defined in ORS 527.610 - 527.992.

Example Conservation Practices

- Appropriate culvert construction and design, plant and maintain grass cover where appropriate, water bars, grading roads.

2.5.8 Prevention and Control Measure #8 - Streamside Areas

It is anticipated that this PCM will allow landowners to develop a flexible streamside area management strategy while providing:

- Shade to reduce solar radiation reaching the water,
- A buffer to filter sediment, organic material, nutrients, and pesticides in surface runoff,
- Native species and wildlife habitat, and
- Stable streambanks.

It is also anticipated that this PCM will minimize the impact of livestock on riparian vegetation and maintain stable streambanks while ensuring livestock access to water. A healthy streamside area provides adequate vegetation to trap sediment, prevents flood debris from depositing on fields, and protects pasture and cropland from bank erosion. Protecting vegetation along smaller streams helps reduce solar radiation reaching the water and provides wildlife habitat.

Landowners can determine the appropriate width of a streamside area through one of several methods. Some examples of how to determine the appropriate width include:

- An area extending 25 feet horizontally from the top of a streambank on each side of the stream, OR
- An area two times the height from the summer low flow level to the bank full level, plus ten feet (2h + 10') on each side of the stream, OR
- The width specified in the Conservation Practice Standards for Riparian Forest Buffer or Filter Strip, listed in the NRCS - Field Office Technical Guide (FOTG).

Although native vegetation affords benefits over exotic species, it is not necessarily recommended that exotic, non-invasive species be removed to replant an area with native plants. Native species may be more resistant to diseases and pests. Still, non-native species in the near stream area may also provide valuable shade, stabilize the streambank, and provide cover for wildlife.

OAR 603-095-0540
(7) Landowners or occupiers shall manage streamside areas to allow the establishment, growth, and/ or maintenance of vegetation appropriate to the site. Vegetation must be sufficient to provide shade and to protect the streamside area such that it maintains its integrity during high stream flow events such as those events that are reasonably expected to occur as a result of a 25 year, 24-hour storm event.
(a) If any agricultural activity degrades riparian vegetation, the landowner or occupier shall replant or restore the disturbed area to an adequate cover as soon as practical.
(b) Indicator of non-compliance is active streambank sloughing or erosion as a result of tillage, grazing, or destruction of vegetation by the landowner or occupier.

Potentially Impacted Parameters: Aquatic weeds or algae, bacteria, biological criteria, dissolved oxygen, flow modification, habitat modification, nutrients, sediment, temperature, total dissolved gas, toxics, and turbidity.

Indicators of Non-Compliance

Clear non-compliance

- Active streambank sloughing / erosion as a result of tillage, grazing, or destruction ofvegetation by the landowner or occupier.

Likely non-compliance, requires further investigation

- Stream not protected by appropriate vegetation.

Example Conservation Practices

To protect and/or restore ecological functions in riparian and wetland areas to improve watershed

health:

- Plant native trees and shrubs and control undesirable vegetation,
- Allow snags (dead trees) to remain standing unless safety factors indicate otherwise,
- Allow fallen trees to remain on the ground or in the stream unless removal is essential for traffic, navigation, or serious flooding reasons,
- Allow marginally productive lands in floodplains/poorly drained riparian areas to revert to riparian/wetland status.

To reduce erosion and sedimentation:

- Establish buffer zones and filterstrips,
- Establish grassed waterways,
- Protect streambanks.

Chapter 3: Strategic Plan to Achieve Area Plan Goals

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

Strategies for Area Plan Implementation
To maintain water quality, an effective strategy must increase awareness of the problems and the range of potential solutions, motivate appropriate voluntary action, and provide for technical and financial assistance to plan and implement effective water pollution prevention and control measures. The following strategies will be employed at the local level by the SWCDs and Management Area partners in cooperation with landowners:

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

Mission
The mission of the Yamhill Agricultural Water Quality Management Area Plan is to promote sound agricultural conservation within a framework of economic profitability and agricultural viability. The Area Plan is designed to achieve applicable chemical, physical, and biological water quality standards.The goal of this Area Plan is to prevent and control water pollution from agricultural activities and soil erosion and to achieve applicable water quality standards.

The Yamhill LAC used the following guiding principles in the development of this Area Plan:

- Control pollution as close to its source as possible,
- Base actions on scientifically based conservation planning,
- Promote a variety of conservation practices to address individual situations,
- Recognize the need for landowners, operators, or occupiers to maintain agricultural profitability,
- Protect beneficial uses of water in the Yamhill Basin.

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, ODA and the Yamhill SWCD are using Focus Area milestones to show progress in this Management Area.

3.1.2 Focus Areas
The Yamhill and Polk SWCDs apply 25 percent of their funding from ODA to implement the Area Plan in a focused approach in a sub-watershed. Through the Focus Area process, the LMA (SWCDs) delivers systematic, concentrated outreach and technical assistance in small geographic areas to

address priority water quality concerns. A Focus Area Action Plan (FAAP or Action Plan) has been developed by both the Yamhill and Polk SWCDs. The FAAPs have been approved by ODA and each one outlines the details for assessing their Focus Areas and providing landowner assistance. An essential component of this approach is measuring land conditions before and after implementation and to document the progress made with available resources. Currently, the Yamhill SWCD's Focus Area is in the Palmer Creek sub-watershed and the Polk SWCD is in the Salt Creek sub-watershed.

Key components and activities of the focused approach are:

a. Identifying priority water quality parameters of concern,
b. Prioritizing a sub-watershed within the Management Area,
c. Determining an assessment methodology to conduct a pre- and post- assessment of land conditions,
d. Developing milestones and timelines for implementation,
e. Engaging the Focus Area's agricultural community in preventing and controlling water pollution from agricultural activities,
f. Offering technical assistance and site evaluations,
g. Providing information and assistance for cost-share and funding programs,
h. Conducting post assessment of land conditions at two-year intervals,
i. Tracking outputs and reporting accomplishments to the ODA and the Yamhill LAC.

3.1.2.1 2017-2021 Palmer Creek Focus Area (Yamhill SWCD-Open)

The Palmer Creek Focus Area (Figure 2) is predominantly in agricultural production and is divided into two parts, the main stem and the west branch of Palmer Creek. The main stem is impaired for dissolved oxygen and the west branch is impaired for temperature, dissolved oxygen, and chlorpyrifos. The area consists of a fairly large irrigation district, so the flow of this system, especially in the summer, is largely controlled and pumped from the Willamette River. Palmer Creek was selected as a Focus Area in 2017.

Assessment Methodology: The Streamside Vegetation Assessment (SVA) is a tool utilized by ODA and partners to analyze streamside vegetation from aerial photographs using a Geographic Information System (GIS) software program. Stream side 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).

2019-2021 Palmer Creek Focus Area Milestone and Timeline

2019 Condition:	As of June 30, 2019, there were 122.26 total acres in the Bare, Bare Ag, Grass, and Grass Ag SVA mapping categories; 31% of the assessed area.
Milestone:	By June 30, 2021: Decrease Bare, Bare Ag, Grass, and Grass Ag acreage along agricultural streams in the Palmer Creek sub-watershed by 7.74 acres (2%) and reduce to 114.52 Grass Ag and Bare Ag acres; 29% of the assessed acreage.

3.1.2.2 2019-2021 Lower Salt Creek Focus Area (Polk SWCD-Open)

The Lower Salt Creek Focus Area (approximately 19,000 total acres) begins just north of Highway 22 near Cross Creek Golf Course in Polk County and extends to just north of Whiteson, a small community in Yamhill County (Figure 2). Salt Creek originates in Polk County and flows into the Yamhill River just north of Whiteson. Agricultural areas of the watershed consist mostly of grass seed, nurseries, and hazelnuts. Water quality concerns in the watershed are limited to nutrients but is

limited to the data available. The Lower Salt Creek was selected as a Focus Area in 2017 and was one of ODA's Strategic Implementation Areas implemented in 2016. Following the SIA process, landowners throughout the Lower Salt Creek expressed increased interest in addressing watershed issues beyond agricultural water quality compliance, including flooding. In order to work with the community in developing solutions while also addressing agricultural water quality concerns, the SWCD has chosen Lower Salt Creek as the Focus Area. There is momentum, interest, and complex issues that require a long-term, holistic, and grass-roots solutions, and the Polk SWCD is motivated to continue work in this area to address these concerns.

Assessment Methodology: See section 3.1.2.1 for assessment methodology description.

2019-2021 Lower Salt Creek Focus Area Current Milestone and Timeline

2019 Condition:	The SWCD is reassessing the data therefore the data was not available at thetime of the biennial review. Data will be available at the next biennial review.
Milestone:	At the time of the 2019 biennial review, milestones had not been developed. They will be presented at the next biennial review.

3.1.3 Strategic Implementation Areas

3.1.3.1 2015 Lower North Yamhill River SIA (Closed)

In 2015, the Lower North Yamhill River watershed was selected as a SIA. The Lower North Yamhill River SIA is in Yamhill County and contains approximately 10,000 total agricultural acres. Agriculture in the watershed consist primarily of grass seed, nurseries, and hazelnuts. Water quality concerns in the watershed include bacteria, nutrients, and temperature. SIA work is completed. Refer to the 2017 Yamhill Area Plan for information related to this SIA. The next SIA is scheduled for the Yamhill MA in 2020.

3.1.3.2 2015 Lower Salt Creek SIA (Open)

In 2015, the Lower Salt Creek watershed was selected as a SIA. The Lower Salt Creek watershed flows through a portion of both Polk and Yamhill counties, the SIA area contains approximately 19,000 total agricultural acres. Agricultural areas in the watershed consist primarily of grass seed, nurseries, and hazelnuts. Water quality concerns in the watershed include nutrients but there is limited data available. SIA work is almost completed. ODA is working with one landowner. Refer to the 2017 Yamhill Area Plan for information related to this SIA. The next SIA is scheduled for the Yamhill MA in 2020.

3.1.4 Pesticide Stewardship Partnership

The PSP Program uses water quality monitoring data to inform and focus voluntary, collaborative actions to reduce pesticides in Oregon waters. There are currently PSP projects in seven watersheds in Oregon, including the Yamhill Sub-Basin. The Greater Yamhill PSP project was initiated in 2007, with DEQ, Greater Yamhill Watershed Council, Yamhill SWCD, OSU Extension and ODA as the principal partner to monitor agricultural pesticide contributions to nearby waterways. Monitoring results are summarized in 4.1.4.

3.2 Proposed Activities

The activities provided in the following sections were determined by the ODA, the LAC, and the LMAas a means to achieving the objectives of the Area Plan. The activities outlined are to be carried out typically by the ODA and the LMA (SWCD). In the Yamhill Basin Management Area, the

Yamhill SWCD is the primary LMA and local expert, however, the Polk SWCD also serves a portion of the Yamhill Basin and works in collaboration with the ODA and the Yamhill SWCD in achieving the goals and objectives of the Yamhill Basin Area Plan.

Every two years, with recommendations from the LAC (provided during biennial reviews) and in consultation with ODA, the LMA will select from the activities outlined below that best suit the capability, priorities, and resources of the LMA. It is also important that the ODA, the LMA, and Management Area partners consider working together to implement the activities in the Area Plan as opportunities, funding, and resources allow.

3.2.1 Community and Landowner Engagement

A key component to achieving the goals of the Area Plan is working to engage the agricultural community in accomplishing the objectives outlined in Section 3.1.1. It is recommended that the ODA, the LMA, and Management Area partners develop, promote, and conduct events and activities that directly connect with the agricultural community. Activities should include a range of opportunities for agricultural landowners and operators to strengthen their knowledge and capacity to prevent and control water pollution from agricultural activities as well as provide information about specific agricultural water quality issues that are of concern in the Yamhill Basin. Moreover, events and activities conducted to engage the agricultural community can be used as a venue for notifying the agricultural community about news and opportunities related to water quality management as well as informing them of their responsibilities in preventing and controlling water pollution from agricultural activities.

Table 3.2.1 Proposed Activities for 2019-2022

Activity	Yamhill 4-year Target	Polk 4-year Target	Description
Community and Landowner Engagement			
# active events that target landowners/operators (workshops, demonstrations, tours)	4	4	
Technical Assistance (TA)			
# landowners/managers provided with TA (via phone/walk-in/email/site visit)	250	200	
# site visits	70	100	
# conservation plans written*	Will develop targets by the next biennial review in 2021. The SWCDs need additional time and discussion to consider		
On-the-ground Project Funding			
# funding applications submitted • No Till Program • Willamette Confluence • Carbon Farm Planning	Will develop targets by the next biennial review in 2021. The SWCDs need additional time and discussion to consider		
* 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)			

The list of recommended activities outlined below are provided for the ODA, the LMA (SWCD), and Management Area partners to consider when putting together a strategy for community and landowner engagement or are planning an event or activity aimed at achieving the objectives of the Area Plan. Engaging the agricultural community should be considered at all levels from large-scale commercial operators to family farms, nurseries, orchards, vineyards, and ranches. Events and activities should be

structured to address the diverse agricultural systems and related water quality concerns found in the Yamhill Management Area (Chapter 2). The following tasks and strategies are recommended at the local level and should be conducted in a manner that encourages cooperative efforts and promotes voluntary participation:

The Yamhill Basin agricultural community has the best potential to engage agricultural landowners andoperators in working toward achieving the goals and objectives of the Area Plan. The agricultural community is encouraged to participate in community engagement events and activities by supporting and participating in the activities outlined as well as share news and information related to agricultural water quality issues and solutions with others as opportunities become available through local grower groups and associations, agribusiness, the SWCDs, and Management Area partners.

A. Develop, promote, and conduct events or activities that function to increase awareness of agricultural water quality concerns related to the Yamhill Basin.
    - The Yamhill Basin Area Plan has identified bacteria, stream temperature, phosphorus, pH, mercury, chlorpyrifos, and chlorophyll a as priority water quality parameters of concern. Events and activities related to water quality should have a focus on these water quality concerns whenever possible.
B. Develop, promote, and conduct events or activities that function to strengthen the knowledge and capacity of agricultural landowners and operators:
    - To prevent and control water pollution from agricultural activities,
    - To prevent and control soil erosion from agricultural activities,
    - To self-evaluate their agricultural operation and their impacts to water quality from agricultural activities.
C. The Yamhill Basin Area Rules specify fundamental requirements for erosion and sediment, irrigation tail-water, waste management, nutrients, pesticides, chemigated irrigation water, agricultural roads and staging areas, and streamside areas. Emphasis, when conducting events and activities related to agricultural water quality management, should include information regarding these management objectives whenever possible.
D. Develop an outreach strategy to inform the agricultural community of issues and events related to agricultural water quality prevention and control. This includes but is not limited to the distribution of informational material, interactions on social media, hosting a web page, creating a quarterly newsletter, and submitting public service announcements to local sources of news and communications.
E. Develop, promote, and conduct events or activities that function to:
    - Inform agricultural landowners and operators of the availability of technical assistance and farm planning public services available in the Management Area,
    - Inform agricultural landowners and operators of the availability of cost-share and conservation programs available in the Management Area,
    - Inform agricultural landowners and operators of their responsibilities toward preventing and controlling water pollution and soil erosion from agricultural activities,
    - Inform the agricultural community of the goals and objectives of the Area Plan.
F. Produce and or distribute informational material such as brochures, videos, and fact sheets related to the prevention and control of water pollution from agricultural activities.
G. Increase awareness of the agricultural community's efforts at water quality management and demonstrate successful and innovative efforts toward preventing and controlling water pollution from agricultural activities.

3.2.2 Technical Assistance

Providing agricultural landowners and operators with one-on-one technical assistance and

consultation should be a core activity developed by the LMA. Dedicated staff-time, training, technical resources, and equipment should be made available at the LMA level to build an agricultural water qualityprogram that works to achieve the goals and objectives of the Area Plan.

The ODA can provide technical assistance, however the LMA (SWCD) is a non-regulatory partner and a local source of expert knowledge and are more capable to serve the Management Area's agricultural community in this capacity. The ODA, the LMA, and Management Area partners should work together whenever possible to provide a strong foundation of technical support and site-specific evaluations that work to strengthen the ability and capacity of agricultural landowners and operators to solve water quality management challenges.

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 and should fit within a framework of economic profitability and agricultural viability. Therefore, the scope of technical assistance, specifically provided by the LMA, should include a range of information applicable to the local agricultural systems found in the Management Area (Chapter 2) and should be:

- Focused on agricultural water quality management,
- Flexible to provide options for the landowner or operator to choose from or adapt to,
- Tailored and scaled to the agricultural operation or activity,
- Technically sound,
- Planned for operational efficiency,
- Emphasizes long-term solutions,
- Economically feasible to implement successfully, and
- Strengthens the ability for agricultural landowners and operators to self-evaluate their agricultural operation and their impacts to water quality from agricultural activities.

Technical assistance should also be carried out in a manner that encourages the agricultural landowner or operator to work cooperatively and participate in the voluntary efforts necessary to accomplish the Area Plan's goals and objectives. Listed below are some recommendations for technical assistance activities:

a. Provide one-on-one technical assistance and consultation to agricultural landowners and operators regarding the prevention and control of water pollution and soil erosion from agricultural activities.
b. Provide an on-site evaluation for agricultural landowners and operators to identify potential water quality concerns and recommend solutions that prevent and control water pollution and soil erosion from agricultural activities.
c. Provide assistance to agricultural landowners and operators who would like to develop and implement a conservation farm or ranch plan including but not limited to nutrient management plans, pasture management plans, soil health management, and irrigation water management.
d. Provide technical assistance for the development, implementation, and maintenance of on-the-ground projects that prevent and control water pollution and soil erosion from agricultural activities.
e. Assist agricultural landowners and operators by providing information on funding opportunities as well as assistance in applying and enrolling in cost-share programs.

Agricultural landowners and operators are encouraged to participate in technical assistance activities by supporting and participating in the activities outlined above as well as providing guidance and direction on local agricultural water quality concerns and solutions to ODA, the LMA, agribusiness

associations, and Management Area partners. Serving as an LAC member or on an SWCD or watershed council board and participating in local grower groups and agribusiness associations are ways to contribute. TheYamhill Basin agricultural community is the best resource for local and specialized technical information related to agricultural management practices. Agricultural landowners and operators are encouraged to share their practical working knowledge of farming practices that work toward the prevention and control of water pollution with others who would benefit. Sections 2.5.1-2.5.8 and Appendix D provide basic guidelines for preventing and controlling water pollution from agricultural activities.

3.2.3 Biennial Review of the Yamhill Basin Area Plan

Every two years, the ODA will conduct a review of the progress made toward achieving the Area Plan mission, goals, and objectives. The ODA will administer the Area Plan, coordinate the LAC, and work with the LMA to conduct the biennial review meetings. Activities to be carried out for the biennial review:

a. Adapt and modify the Area Plan to accommodate recently identified challenges, new data, new information, and shifting priorities.
b. Convene the LAC members and recruit new members as needed.
c. Compile and report the most recent results of ODA's compliance actions in the Yamhill Basin.
d. Review progress and achievements toward the Area Plan goals and objectives by ODA, the LMA, and Management Area partners by tracking outputs and reporting accomplishments.
e. Analyze available water quality monitoring data and report the status and trends indicated.
f. Evaluate and measure progress toward achieving the Area Plan's goals and objectives by setting milestones, describing outcomes, and developing measurable objectives.
g. Deliberate and troubleshoot impediments to achieving the goals and objectives of the Area Plan.

3.2.4 Partnerships

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

3.3 Water Quality and Landscape Condition Monitoring

Monitoring is an essential activity to tracking the status and trend of water quality in the Yamhill Basin as well as understanding the influences landscape conditions have on water quality. Data collected from monitoring efforts can be useful in developing measurable objectives that measure changes in environmental conditions. Data can also be utilized in software applications that model landscape conditions. Additionally, data analysis and results can be informative in determining if goals and objectives of the Area Plan are being achieved. See section 4.4 for current water quality monitoring efforts and summaries. Water quality monitoring must be performed using quality assurance procedures and specialized equipment that takes funding, time, and resources to accomplish. Monitoring water quality and landscape conditions, for the purposes of the Area Plan, is recommended as an activity to be carried out and collaborated on by the ODA, the LMA, and Management Area partners.

Listed below are recommendations for monitoring activities that may be completed as opportunities, funding, and resources allow.

a. Develop a water quality-monitoring plan that works to achieve long-term baseline data collection and allows for ease in sharing data with partners and collaborating with other monitoring efforts.
b. Develop quality control plans to guarantee that data collected can be used for the intended purposes and analysis with confidence.
c. Perform water quality monitoring for a set of selected water quality parameters to establish a baseline of water quality data, which can be used for status and trends analysis as well as opportunities to model for change in environmental indicators.
d. Characterize bacteria concentrations, sediment, and stream temperature during periods of base flow and storm events.
e. Evaluate Light Detection and Ranging (LiDAR) information to understand vegetative conditions along streams in agricultural areas.
f. Identify data gaps that are needed to fully understand influences and changes in water quality.
g. Consider applying for grants or partnering with others to fund and implement monitoring efforts.
h. Consider a monitoring project that seeks to innovate or sample new approaches to measuring water quality conditions or generates new technology or software to monitor environmental changes related to water quality.

Chapter 4: Implementation, Monitoring, and Adaptive Management

4.1 Measurable Objectives and Strategic Initiatives

4.1.1 Management Area

ODA is working with SWCDs and LACs throughout Oregon towards establishing long-term measurable objectives to achieve desired conditions. Currently, ODA and the Yamhill SWCD are using Focus Area milestones to show progress in this Management Area.

4.1.2 Focus Areas

4.1.2.1 2017-2021 Palmer Creek Focus Area (Open)

Table 4.1.2.1 Palmer Creek Focus Area

Milestone	
2017 Condition: As of July 1, 2017, there were 122.26 total acres in the Bare, Bare Ag, Grass, and Grass Ag SVA mapping categories; 31% of the assessed area. **2017-2019 Milestone:** By June 30, 2019: Decrease Bare, Bare Ag, Grass, and Grass Ag acreage along agricultural streams in the Palmer Creek sub-watershed by 7.74 acres (2%) and reduce to 114.52 Grass Ag and Bare Ag acres; 29% of the assessed acreage.	
Current Conditions: Progress Toward Milestones	
2019 Current Condition: As of June 30, 2019, there were 122.26 total acres in the Bare, Bare Ag, Grass, and Grass Ag SVA mapping categories; 31% of the assessed area. No progress was made toward the milestone.	
Activities and Accomplishments: 2017 to 2019	
Community and Landowner Engagement	
# active events that target landowners/ operators (workshops, demonstrations, tours)	**2**
# landowners/operators participating in active events	**26**
Technical Assistance (TA)	
# landowners/operators provided with TA (via phone/walk-in/email/site visit)	**23**
# site visits	**14**
# conservation plans written*	**0**
Ag Water Quality Practices Implemented in the Focus Area	
Mulching	**5.9 acres**
Cover Crops	**20 acres**
Adaptive Management Discussion	
No progress was achieved on the milestone. Increasing riparian buffer distances are a hard practice to sell especially if the property is being managed for perennial crops like nurseries or hazelnuts. The Yamhill SWCD with support from an ODA PSP grant, were able to work with clients in the Focus Area on erosion prevention strategies, mulching, and cover cropping in hazelnuts. Long-term measurable objectives were not written for earlier FAs, however, ODA will work with the SWCD to determine a long-term measurable objective. *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)	

4.1.2.2 2017-2021 Lower Salt Creek Focus Area (Open)

Table 4.1.2.2 Lower Salt Creek Focus Area

Milestone
2019 Condition: As of July 1, 2019, there were 214.71 total acres in the Bare, Bare Ag, Grass, and Grass Ag SVA mapping categories; 42.2% of the assessed area. **2017-2019 Milestone:** By June 30, 2019: Decrease Bare, Bare Ag, Grass, and Grass Ag acreage along agricultural streams in the Lower Salt Creek sub-watershed by 27 acres (5.3%) and reduce to 187.7 acres of Bare, Bare Ag, Grass, and Grass Ag; 36.9% of the assessed acreage.
Current Conditions: Progress Toward Milestones
The Focus Area milestone for 2017-2019 was not achieved. Conditions measured at the beginning of the biennium has remained the same through the completion of the biennium.
Activities and Accomplishments
No projects were written and/or completed in Lower Salt Creek that would have led to a reduction in one of the four SVA categories.
Adaptive Management Discussion
Due to the low landowner response and interest from the Lower Salt Creek Ag community the Polk SWCD considered carefully whether or not to continue on with the Lower Salt Creek FA or to move into another area for the 2019 to 2021 biennium. The SWCD feels they have fostered a momentum in the current FA that is worth building on and interest has formed behind the idea of collecting strategic data from the basin and how that data can be used to influence land use decisions. The SWCD recognizes that if they move out of the FA they would lose the foundation they have worked for and would have to start over in another watershed. With that stated, the SWCD has decided to continue working in the Lower Salt Creek FA. In doing so, the SWCD would like to redo the SVA and determine new milestones to achieve a long-term measurable objective. This is so they can construct an adapted landowner engagement and technical assistance strategy that will work to engage the Salt Creek Ag community and reach the new milestones and measurable objective. The SWCD will complete this work during the 2019 to 2021 biennium and results will be available at the next biennial review in 2021.

4.1.3 Strategic Implementation Area(s)

4.1.3.1 2015 Lower North Yamhill River SIA (Closed)

In 2015, the Lower North Yamhill River watershed was selected as a SIA. The Lower North Yamhill River SIA is in Yamhill County and contains approximately 10,000 total agricultural acres. Agriculture in the watershed consist primarily of grass seed, nurseries, and hazelnuts. Water quality concerns in the watershed include: bacteria, nutrients, and temperature. SIA work is completed. Refer to the 2017 Yamhill Area Plan for information related to this SIA. The next SIA is scheduled for the Yamhill MA in 2020.

4.1.3.2 2015 Lower Salt Creek SIA (Open)

In 2015, the Lower Salt Creek watershed was selected as a SIA. The Lower Salt Creek watershed flows through a portion of both Polk and Yamhill counties, the SIA area contains approximately 19,000 total agricultural acres. Agricultural areas in the watershed consist primarily of grass seed, nurseries, and hazelnuts. Water quality concerns in the watershed include nutrients but there is limited data available. SIA work is almost completed with one case still open. The landowner is working with ODA. Refer to the 2017 Yamhill Area Plan for information related to this SIA. The next SIA is scheduled for the Yamhill MA in 2020.

4.1.4 Pesticide Stewardship Partnership

Pesticide Stewardship Partnership

Pesticide monitoring in the Greater Yamhill basin began initially in 2005 (limited duration) and became routine in 2007. Water quality monitoring begins in March and continuing through June, and

again in September and continuing through November. During the time frame of July 1, 2015 through June 30, 2017, water quality samples were collected from six locations; five within the watershed and one additional site at the Palmer Creek Irrigation district intake.

Water quality monitoring conducted during the time frame July 1, 2015 through June 30, 2017 indicated the presence of a significant number of pesticides at high concentrations and frequency, a majority of which is attributed to agricultural land use. Ten pesticides were detected at levels of high concern, while seven were detected at levels of moderate concern. The frequency and magnitude of the detections of the insecticide, bifenthrin, within the sub-watershed monitored at one station is of additional concern.

Based on a request by stakeholders to evaluate potential pesticide loadings from the Willamette River into the Palmer Creek Irrigation District system, the Palmer Creek Water District Willamette withdrawal was monitored for pesticides and flow obtained to coincide with that monitoring. Using the discharge data, it was possible to evaluate the pesticide loading coming into the irrigation system. The findings of the sampling indicated that pesticide residues were entering the irrigation system from the Willamette withdrawal, however, the loading entering the system from the Willamette River was very low.

Much of the PSP activities within the Greater Yamhill PSP has been focused on agricultural pesticide contributions to nearby waterways. In the previous biennium, the GYWC was awarded a grant from the Oregon Water Quality Pesticide Management Team (WQPMT) of $8,250 to collect water quality samples and develop and implement outreach to these sectors for pesticide reduction activities. These actions included conducting five field demonstrations of recycling sprayer technology and holding several meetings and workshops with stakeholder groups regarding pesticide results. Additionally, OSUwas awarded $37,460 to begin modeling of pesticide use and hydrology in the Palmer Creek sub-watershed. As of December 2017, significant progress had been made regarding crop and hydrology characterization potentially leading to the ability to predict pesticide impacts to water using a variety of scenarios.

Progress in reducing pesticide residues in streams has been limited. Especially challenging has been achieving reductions in areas where land use is diversified agricultural. While there has been some progress made in reducing the frequency of detections, the significant increase in benchmark exceedances and the number of pesticides detected indicate limited success in the effectiveness, thus far, of management measures implemented. The shift in focus toward sub-watersheds is expected to result in a more targeted approach to delivering education and outreach materials as well as technical assistance. A five-year trend analysis indicates some success in reducing pesticide concentrations for chlorpyrifos, dimethoate, glyphosate, metsulfuron methyl, and oxyfluorfen. However, upward trends were noted for bifenthrin, dimethenamid, diazinon, ethoprop, imidacloprid, propiconazole and sulfometuron. Monitoring continues in the Greater Yamhill PSP.

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.

Table 4.2a Activities of 2017 to 2019 Combined reporting from Yamhill and Polk SWCDs.

Activity	2-year results
Community and Landowner Engagement	
# active events that target landowners/ operators (workshops, demonstrations, tours)	14
# landowners/managers participating in active events	2,217
Technical Assistance (TA)	
# landowners/operators provided with TA(via phone/walk-in/email/site visit	327
# site visits	182
# conservation plans written*	24
On-the-ground Project Funding	
# funding applications submitted	10
# funding applications awarded	10

* 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 agwater 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 waterquality)

Table 4.2b and 4.2c summarize information from the OWRI on restoration project funding and accomplishments 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.

Table 4.2b Implementation Funding for Projects on Agricultural Lands Reported 1997 to 2018
(OWRI Data include most, but not all projects, implemented in the Management Area.

Landowner	OWEB	DEQ	NRCS	SWCDs	Greater Yamhill WC	FSA	All other sources*	TOTAL
$183,989	$835,419	$2,000,000	$677,557	$77,069	$8,385	$28,716	$1,691,668	$5,502,803

*includes city, county, tribal, other state and federal programs, and non-profit organizations.

Table 4.2c Miles and Acres Treated on Agricultural Lands Reported 1997 to 2018
OWRI data include most, but not all projects, implemented in the Management Area.

Activity Type	Miles	Acres	Count *	Activity Description From 1997 to 2018, 85 projects have been submitted to OWRI. Activity descriptions below reflect projects completed from 2015-2018.
Riparian	7.9	104.5	-	Riparian shrub plantings. Riparian invasive weed treatments
Fish Passage	28.5	-	5	New fish screens installed on diversions
Instream Flow	0.42	-	-	Irrigation system improvements
Wetland	-	349	-	
Road	-	-	101	
Upland/ Livestock	-	5,126.5	-	Integrated Pest Management, Composting facility, shrub and herbaceoustreatments and plantings, livestock manure management, grassed waterway, heavy use area protection, cover crops.
Other		112.7		Mulching
TOTAL	36.9	5,580	106	

* # of structures, logs, boulders, hardened crossings, culverts, etc.

4.3 Water Quality and Land Condition Monitoring

4.3.1 Water Quality

Water quality in the Yamhill Basin Management Area currently is monitored on a limited basis by DEQ, USGS, and the Greater Yamhill Watershed Council since 1998 (not consistently) in general for six water quality parameters. Data collection ranges from ambient (grab samples) to continuous. It is recommended that monitoring in the basin be increased to acquire applicable and quality data to form a better analysis of water quality in the basin.

DEQ has been working to reformat their Status & Trends Report and an updated report was not available at the time of the 2019 Yamhill biennial review. DEQ will be issuing these reformatted reports starting in April 2020, just beyond the time frame for the 2019 Yamhill biennial review and is why new data and updates to the water quality monitoring Table 4.3.1 are not available at this time.

4.4 Biennial Reviews and Adaptive Management

ODA, the LAC, the LMA, and other partners met on December 4, 2019, 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
The Yamhill LAC did not distinguish any new impediments. They were disappointed that the water quality Status & Trends Report was not ready in time for the Biennial Review. Discussion centered on tile drainage and concern that groundwater recharge is impacted by drainage of fields to surface water. Soil erosion is still a major concern but remarked that progress recently made through the district's mulching program, which had alarge response from farmers is a step closer to reducing soil erosion in Yamhill MA. The LAC were concernedthat Focus Areas are not meeting the milestones but willing and still optimistic to see what happens over the next two years as both SWCDs continue in their ongoing Focus Area work in the Lower Salt Creek and Palmer Creek.
Recommended Modifications and Adaptive Management
The Yamhill SWCD expressed they were satisfied with revisions in the Area Plan. They supported the addition of targets and welcome the idea of developing measurable objectives. The LAC was content with the progress of both Yamhill and Polk SWCDs and encouraged them to continue to work at the pace and progress they are achieving over the next biennium. The LAC communicated that they would like to see more water quality monitoring in the Yamhill MA. There were a few minor edits to language recommended in the Area Plan. ODA has incorporated them into the 2019 Area Plan. No further modifications to the Area Plan were requested.

Table 4.4b Number of Compliance Actions from January 1, 2017 to December 2019

Actions	Letter of Compliance	Pre-Enforcement Notification	Notice of Noncompliance	Civil Penalty
Compliance ActionsOutside SIA(s)	14	13	0	0
Compliance ActionsWithin SIA(s)	17	11	1	0

References

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Appendix A: Educational/Technical – Natural Resource/Farm Management

Soil and Water Conservation Districts (Local Management Agency for Area Plan)
Assist landowners in identifying and implementing land management activities and coordinate with other technical experts in natural resources.

Yamhill SWCD
2200 SW 2nd Street
McMinnville, OR 97128
Phone: (503) 472-1474
www.yamhillswcd.org

Polk SWCD
580 Main Street, Suite A
Dallas, OR 97338
Phone: (503) 623- 9680 ext. 108

Oregon Department of Agriculture (ODA)
Administers the Area Plan and Agricultural Water Quality program, responds to water quality complaints, issues CAFO permits and helps producers comply with CAFO water management programs, provides support to Soil and Water Conservation Districts.
635 Capitol St. NE Salem, OR 97301-2532
Natural Resources Division: 503-986-4700
www.oregon.gov/ODA

ODA Yamhill Basin Water Quality Specialist: 503-986-5141
ODA Livestock Water Quality Specialist: 503-986-4780 *Online Link to Area Plan*:
https://www.oregon.gov/oda/programs/NaturalResources/AgWQ/Pages/AgWQPlans.aspx

Yamhill Basin Management Area Local Advisory Committee (LAC)
Voluntary committee composed of twelve agricultural producers, landowners, and other stakeholders inthe Management Area. The LAC assists ODA with developing and reviewing the Agricultural Water Quality Management Area Plan and Area Rules.
Oregon Department of Agriculture: 503-986-5141

ODA Pesticides and Fertilizer Program
Phone: (503) 986-4635
www.oregon.gov/ODA/PEST

ODA Plant Program (pests, weeds, etc.)
Nursery & Christmas Trees Program, Phone: (503) 986-4644
Plant Pest & Disease Programs, Phone: (503) 986-4636
Noxious Weed Control Program, Phone: (503) 986-4621
Invasive Species Hotline, Phone: 1-866-INVADER
www.oregon.gov/ODA/PLANT

USDA – Natural Resources Conservation Service (NRCS)
Provides information on soil types, soils mapping, and interpretation of the Field Office Technical Guide. Administers and provides assistance in developing plans for Conservation Reserve Program (CRP), Environmental Quality Incentive Program (EQIP), Agricultural Conservation Easement

Program (ACEP), and other cost share programs. Makes technical determinations on wetlands and highly erodible land. http://www.or.nrcs.usda.gov/

NRCS Yamhill Office
2200 SW 2nd Street
McMinnville, OR 97128
Phone: (503) 472-1474 ext. 3

NRCS Polk Office
580 Main Street, Suite A
Dallas, OR 97338-1911
Phone: (503) 623-9USDA

OSU Extension Yamhill County Office
2050 NE Lafayette Street
McMinnville, OR 97128
Phone: (503) 434-7517
http://www.extension.oregonstate.edu/yamhill
OSU Extension Polk County Office
289 E Ellendale, Suite 301
Dallas, OR 97338
Phone: (503) 623-8395
https://extension.oregonstate.edu/polk

Greater Yamhill Basin Council
Brings diverse interests together to work towards solutions on local natural resource issues. Collects environmental data about the watershed and conducts education and volunteer programs.
237 NE Ford Street, Suite 9. http://www.gywc.org
PO Box 1517
McMinnville, OR 97128
Phone: (503) 474-1047
Fax: (503) 472-2459

Department of State Lands (DSL)
Administers state removal/fill law and provides technical assistance.
775 Summer St. N.E., Suite 100
Salem, OR 97301-1279
Phone: (503) 986-5200
Fax: (503) 378-4844
www.oregon.gov/DSL

Department of Environmental Quality (DEQ)
Responsible for protecting and enhancing Oregon's water and air quality, cleaning up spills and releasesof hazardous materials, and managing the proper disposal of solid and hazardous wastes. Maintains a list of water quality limited streams, sets TMDL allocations.
4026 Fairview Industrial Dr. SE
Salem, OR 97302
TTY: (800) 735-2900
http://www.oregon.gov/DEQ
DEQ Yamhill Basin Coordinator
(503) 378-5073

Oregon Water Resources Department (WRD)
Provides technical and educational assistance and water rights permits and information.
725 Summer St. NE, Suite A
Salem, OR 97301
Phone: (503) 986-0900
www.oregon.gov/OWRD

Yamhill County Office
2200 SW 2nd Street
McMinnville, OR 97128
Phone: (503) 472-1474 ext. 2

Polk County Office
580 Main Street, Suite D
Dallas, OR 97338
Phone: (503) 623-2396

Appendix B: Common Agricultural 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: deq-wq-assessment.

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 tobe 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 depend on a waterbody's designation as fish spawning habitat. Streams designated as salmon rearing and migration are assumed to have resident trout spawning from January 1–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 depend on a stream's designation as providing for cold, cool, or warm water aquatic life, each defined in OAR 340 Division 41.

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.

Nitrates: While nitrates occur naturally, the use of synthetic and natural fertilizers can increase nitratesin drinking water (ground and surface water). Applied nitrates that are not taken up by plants are readilycarried 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, and 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 at: deq/WQ-Standards-Toxics.

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 cancontribute to all these conditions.

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 waterbody 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.

Sediment and Turbidity: Sediment includes fine silt and organic particles suspended in water, settledparticles, 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 andfish 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 streamtemperatures. Elevated stream temperatures also contribute to excessive algal growth, which leads to low dissolved oxygen levels and high pH levels.

Appendix C: The Conservation Planning Process

Voluntary conservation plans describe the management systems and schedule of conservation practices that the landowner or operator 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 be able to assist in developing voluntary conservation plans. The Area Plan isa great reference for developing your own conservation plan. An individual conservation plan should include specific measures necessary to address the "Prevention and Control Measures" outlined in Chapter 2. Contact your local SWCD for more information.

Management practices and land management changes are most effective when selected and installed asintegral parts of a comprehensive resource management plan based on natural resource inventories andassessment of management practices. The result is a system using the management practices and land management changes that are designed to be complementary, and when used in combination is more technically sound than each practice separately.

A Nine-Step process for developing a voluntary conservation plan.

1. **Identify Problems:** Identify resource problems, opportunities, and concerns.
2. **Determine Objectives:** Identify, agree on, and document objectives.
3. **Inventory Resources:** Inventory the natural resources and their condition, and the economic and social considerations. This includes on-site and related off-site conditions.
4. **Analyze Resource Data:** Analyze the resource information gathered in planning step 3 to clearly define the natural resource conditions, along with economic and social issues. This includes problems and opportunities.
5. **Formulate Alternatives:** Formulate alternatives that will achieve the client's objectives, solve natural resource problems, and take advantage of opportunities to improve or protect resource conditions.
6. **Evaluate Alternatives:** Evaluate the alternatives to determine their effects in addressing the client's objectives and the natural resource problems and opportunities. Evaluate the projected effects on social, economic, and ecological concerns. Special attention must begiven to those ecological values protected by law or Executive Order.
7. **Make Decisions:** The client selects the alternative(s) and works with the planner to schedule conservation system and practice implementation. The planner prepares thenecessary documentation.
8. **Implement the Plan:** Implement the selected alternative(s). The planner provides encouragement to the client for continued implementation.
9. **Evaluate Plan:** Evaluate the effectiveness of the plan as it is implemented and adjust as needed.

Appendix D: Conservation Practices

The following is a table with examples of agricultural conservation practices.

Example Conservation Practices by Type of Operation		
Field and Vegetable Crop Production		
Reduce erosion and sediment delivery from agricultural and rural land	• Residue management • Grassed waterways • Cover cropping • Crop rotations • Conservation tillage • Vegetative buffer strips	• Straw mulch Jute erosion matting • Irrigation scheduling using soil moisture instrumentation • Sub-surface drainage - surface inlets and diversions
Limit movement of nutrients and pesticides from agricultural lands to streams	• Vegetative buffer strips • Irrigation water management • Equipment calibration and maintenance	• Tailwater management • Integrated pest management • Proper storage of pesticides, fertilizer, and fuel
Manage and conserve irrigation water	Irrigation scheduling based on site specific factors that influence crop growth, such as: • Evapotranspiration demands (crop type, stage of growth, percent ground shade, weather conditions) • Soil conditions (percolation rate, water holding capacity) • Irrigation system performance (uniformity, efficiency, and application rate) • Recent applications of crop nutrients or farm chemicals Irrigation schedulingusing: 1) Soil moisture probes, 2) Evaporation pans, 3) Neutron probes and other soil water monitoring devices	
Livestock		
Ensure proper animal waste storage and utilization or disposal	• Vegetative buffer strips • Cover manure piles with a tarp • Manure storage and composting structures • Waste management—clean water diversions; waste collection, storage, and utilization; facilities operation and maintenance	• Apply manure to cropland at rates that do not exceed agronomic needs for nitrogen and phosphorusbased on soil and/or tissue tests forthe crop to be grown • Pasture management/prescribed grazing
Manage livestock access to streams, wetlands, and riparian areas	• Off-stream watering • Seasonal grazing • Exclusion - temporary or permanent	
Nurseries		
Reduce erosion and sediment delivery from nurseries	• Use ground cloth and/or gravel in container nurseries as a surface covering • Gravel or sod road surfaces and staging areas • Designed drainage systems to handle runoff from greenhouse/building roofs	• Grass ditches, waterways, and buffer strips adjacent to streams and ponds Land leveling • Limit irrigation runoff from fields • Manage cultivation timing and methods
Manage and conserve irrigation water	• Recycling of irrigation tail water in container nurseries • Moisture monitoring to determine field moisture to balance irrigation applications with crop needs • Monitor and record water use • Regular maintenance of irrigation delivery systems for maximum efficiency	

Limit movement of nutrients and pesticides from nurseries to streams	• Utilize Integrated Pest Management (IPM) practices • Apply fertilizer based on competent advice and nutrient levels determined by soil and tissue analysis • Time fertilizer applications to promote optimum plant utilization and limit leaching • Protect water sources from contamination through use of backflow prevention devices where fertigation is practiced • Restrict irrigation water from leaving the property though irrigation management and water recycling • Make banded fertilizer applicationwhen feasible • Calibrate application machinery prior to use • Monitor and record application rates	• Use timed release fertilizers Maintain organic content of soil mixes and fields to hold nutrients for plant utilization • Scout crops to determine presence of insects and disease • Trap to quantify pest populations • Establish economic thresholds for various crops • Use traps, pheromone disrupters, and beneficial insects as alternatives to chemicals. • Rotate chemicals used in applications • Make application as per label instructions • Have trained applicators apply, or supervise the application of, pesticides • Calibrate equipment and use equipment suited for specific typesof applications (i.e., ground, foliar,drench, etc.).
Other Nursery Management Issues		
• Recycle nursery wastes and by products to restrict their impact on the environment: o Empty chemical containers o Plant tissue and residues (through composting) o Paper products o Plastic products—poly, pots, and flats o Metal, glass, wood tires, and oils • Cover cropping to reduce erosion, build organic matter, provide habitat for beneficial insects and wildlife, and control weeds • Fish screening at pump intakes to protect small fish and other aquatic life • Control of noxious weeds to prevent degradation of protective native vegetation near riparian areas • Set aside less productive land for conservation and wildlife habitat enhancement		
Streamside Areas		
Protect and/or restore ecological functions in riparian and wetland areas to improve watershed health	• Control of undesirable vegetation • Planting native trees and shrubs • Allowing snags (dead trees) to remain standing unless safety factors indicate otherwise • Allowing fallen trees to remain on the ground or in the stream unless removal is essential for traffic, navigation, or serious flooding reasons	
Reduce erosion and sedimentation and provide filtering and buffering characteristics	• Manage buffer zones • Grassed waterways • Stream bank protection • Allow marginally productive or poorly drained lands in floodplains to revert to riparian or wetland status.	
Vineyards, Berries, Orchards		
Reduce erosion and sediment delivery	• Annual and perennial cover crops • Conservation tillage • Strip cropping • High density tree cropping • Straw mulch	• Catch basins • Grassed waterways • Vegetative filter strips • Straw bales

Limit over application of pesticides and nutrients	• Mechanical weed control • Apply herbicide under the vine row or spot treat weeds • Adopt methods to monitor disease and pest pressure • Apply insecticides only at label recommended rates • Rotate pest control methods to reduce development of resistance • Encourage an open canopy – reduces disease pressure, improves spray penetration and fruit quality • Encourage use of new, low impactproducts • Apply nutrients when there is a maximum uptake by the crop • Use organic nutrient sources • Apply fertilizer based on competent advice and nutrient levels determined by soil and tissue tests • Recycle all organic matter
Manage and conserve irrigation water	• Limit irrigation to young vineyards, shallow soils, or drought conditions. • Use water sensing devices or physiological indicators to help schedule water applications.
Vegetation Management	• Encourage botanical diversity within and around the borders of the vineyard to provide favorable habitat for beneficial insects • Alternate mowing (the oldest inter-row is mowed when the youngest inter-row begins flowering) • Botanical diversity in cover
Other Management Areas – Roads, Staging Areas, and Farmsteads There are other land uses associated with agriculture that do not fall under a specific type of operation, such as access roads and staging areas. Several conservation practices may be applicable to these areas.	
Minimize soil erosion from access roads	• Encourage landowners to cooperate with county or state roads departments to implement roadside management practices • Plant and maintain grass cover where appropriate • Appropriate culvert construction and design • Water bars/ grading roads

Appendix E: Public Funding Sources for Landowner Assistance

The following is a list of some conservation funding programs available to landowners and organizations in Oregon. For more information, please refer to the contact agencies for each program. Additional programs may become available after the publication of this document. For more current information, please contact one of the organizations listed below.

Program	General Description	Contact
Agricultural Conservation Easement Program (ACEP)	NRCS provides financial assistance to eligible partners for purchasing agricultural land easements that protect the agricultural use and conservation values of eligible land.	NRCS, SWCDs
Conservation Reserve Enhancement Program (CREP)	Provides annual rent to landowners who enroll agricultural landsalong fish-bearing streams. Also cost-shares conservation practices such as riparian tree planting, livestock watering facilities, and riparian fencing.	NRCS, SWCDs, Oregon Department of Forestry
Conservation Reserve Program (CRP)	USDA CRP is a voluntary program available to agricultural producers to help them use environmentally sensitive land for conservation benefits. Producers enrolled in CRP plant long-term, resource conserving covers to improve the quality of water, control soil erosion, and develop wildlife habitat. In return FSA provides participants with rental payments and cost-shareassistance.	NRCS, SWCDs
Emergency Watershed Protection Program (EWP)	Available through the USDA-Natural Resources ConservationService. Provides federal funds for emergency protection measures to safeguard lives and property from floods and the products of erosion created by natural disasters that cause asudden impairment to a watershed.	NRCS, SWCDs
Environmental Protection Agency Section 319 Grants	Fund projects that improve watershed functions and protect thequality of surface and groundwater, including restoration and education projects.	DEQ, SWCDs, Watershed Councils
Environmental Quality Incentives Program (EQIP)	Cost-shares water quality and wildlife habitat improvement activities, including conservation tillage, nutrient and manure management, fish habitat improvements, and riparian plantings.	NRCS, SWCDs
Federal Reforestation Tax Credit	Provides federal tax credit as incentive to plant trees.	Internal Revenue Service
Oregon Watershed Enhancement Board (OWEB).	Provides grants for a variety of restoration, assessment, monitoring, and education projects, as well as watershed council staff support. 25% local match requirement on all grants.	SWCDs, Watershed Councils, OWEB
Oregon Watershed Enhancement Board Small Grant Program.	Provides grants up to $15,000 for priority watershed enhancementprojects identified by local focus group.	SWCDs, Watershed Councils, OWEB
Partners for Wildlife Program	Provides financial and technical assistance to private and non- federal landowners to restore and improve wetlands, riparian areas, and upland habitats in partnership with the U.S. Fish and Wildlife Service and other cooperating groups.	U.S. Fish and Wildlife, NRCS, SWCDs

Public Law 566 Watershed Program	Program available to state agencies and other eligible organizations for planning and implementing watershed improvement and management projects. Projects should reduceerosion, siltation, and flooding; provide for agricultural water management; or improve fish and wildlife resources.	NRCS, SWCDs
State Forestation Tax Credit	Provides for reforestation of under-productive forestland not covered under the Oregon Forest Practices Act. Situations include brush and pasture conversions, fire damage areas, and insect anddisease areas.	Oregon Department of Forestry
State Tax Credit for Fish Habitat Improvements	Provides tax credit for part of the costs of voluntary fish habitatimprovements and required fish screening devices.	Oregon Department of Fish and Wildlife
Wildlife Habitat Tax Deferral Program	Maintains farm or forestry deferral for landowners who develop awildlife management plan with the approval of the Oregon Department of Fish and Wildlife.	Oregon Department of Fish and Wildlife,NRCS, SWCDs

Oregon Department of Agriculture

Pesticide Management Plan

The ODA Pesticides and Fertilizer Program holds the primary responsibility for pesticide registration and use regulation within the state of Oregon under the Federal Insecticide Fungicide Rodenticide Act.As the EPA designated the state as the lead agency for pesticides, ODA is responsible for overseeing the development and implementation of a Pesticide Management Plan (PMP) for the state of Oregon asstipulated in the annual EPA/ODA Consolidated Pesticide Cooperative Agreement. The PMP sets fortha process for preventing and responding to pesticide detections in Oregon's ground and surface water resources by managing the pesticides that are currently approved for use by EPA in both the agricultural and non-agricultural settings. Pesticides that are no longer marketed, also called "legacy" pesticides, are regulated through a separate process under the Clean Water Act. The PMP 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.

Yamhill Soil and Water Conservation District

No-Till Drill Rental Program

The Yamhill SWCD purchased a 2016 Land Pride 606 No-Till Compact Drill and is now available to rent. The program was started to assist farmers in reducing tillage and soil disturbance to increase water infiltration, improve nutrient cycling, retain more organic matter, and reduce soil erosion. No-till under certain soil and cropping systems can benefit from this practice. Contact YamhillSWCD for more information.

Polk Soil and Water Conservation District

Salt Creek Watershed Collaborative

In 2017, the Polk SWCD assembled the Salt Creek Watershed Collaborative (SCWC). The purpose of the SCWC is to create an inclusive community forum to identify current and potential watershed challenges and a unified plan to balance watershed needs related to flooding impacts and overall watershed health. Actions detailed in the plan will: (a) increase landowner knowledge of issues to makeinformed decisions on long-term, adaptable solutions that will foster resilient, productive, and sustainable agriculture; and (b) secure financial, technical, and human resources necessary to reduce flood impacts while ensuring good water quality and a healthy river system.

Greater Yamhill Basin Watershed Council
The Greater Yamhill Watershed Council (YBC) has been a key partner in monitoring efforts from 1998to 2009. In 1998, YBC monitored stream temperature at several sites throughout the region to collect baseline data on stream temperatures. Beginning in 2003, the YBC monitored additional parameters (temperature, dissolved oxygen, pH, conductivity, turbidity, *E. coli*, and aquatic insects) at 25 sites in the watershed. In 2004, monitoring continued at a subset of the 2003 sites. In 2005 and 2006, the YBC completed baseline monitoring 17 sites on the North Yamhill River and tributaries. In 2008 and 2009, the YBC completed monitoring on the Lower South Yamhill. For additional information or results of the monitoring, contact the YBC.

Farm Service Agency
The Conservation Reserve Enhancement Program (CREP)
CREP provides annual rent to landowners who enroll agricultural lands along fish-bearing streams. The program also provides cost-share for the implementation of conservation practices such as ripariantree planting, livestock watering facilities, and riparian fencing. In the Yamhill Management Area from2015-2017 CREP completed 105 CREP eligibility site visits, 17 CREP contracts that encompass 135 acres and 7.9 stream miles. 60 practices were implemented.