OREGON DEPARTMENT OF AGRICULTURE

Lower Deschutes Agricultural Water Quality Management Area Plan

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Developed by the

Oregon Department of Agriculture

and the

Lower Deschutes Local Advisory Committee

with support from the

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Acronyms and Terms

Ag Water Quality Program – Agricultural Water Quality Program
Area Plan – Agricultural Water Quality Management Area Plan
Area Rules – Agricultural Water Quality Management Area Rules
CAFO – Confined Animal Feeding Operation
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
LAC – Local Advisory Committee
LMA – Local Management Agency
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
OHA – Oregon Health Authority
ORS – Oregon Revised Statute
OWEB – Oregon Watershed Enhancement Board
OWRI – Oregon Watershed Restoration Inventory
PMP – Pesticides Management Plan
PSP – Pesticide Stewardship Partnership
SIA – Strategic Implementation Area
SWCD – Soil and Water Conservation District
TMDL – Total Maximum Daily Load
USDA – United States Department of Agriculture
US EPA – United States Environmental Protection Agency
WPCF – Water Pollution Control Facility
WQPMT – Water Quality Pesticides Management Team

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Foreword

This Agricultural Water Quality Management Area Plan (Area Plan) provides guidance for addressing water quality related to agricultural activities in the Agricultural Water Quality Management Area (Management Area). The Area Plan identifies strategies to prevent and control water pollution from agricultural lands through a combination of outreach programs, suggested land treatments, management activities, compliance, and monitoring.

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

Required Elements of Area Plans

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

Plan Content

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

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

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

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

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Chapter 1: Agricultural Water Quality Program

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

As part of Oregon's Agricultural Water Quality Program (Ag Water Quality Program), the Area Plan guides landowners and partners such as Soil and Water Conservation Districts (SWCDs) in addressing water quality issues related to agricultural activities. The Area Plan identifies strategies to prevent and control "water pollution from agricultural activities and soil erosion" (ORS 568.909(2)) on agricultural and rural lands within the boundaries of this Management Area (OAR 603-090-0000(3)) and to achieve and maintain water quality standards (ORS 561.191(2)). The Area Plan has been developed and revised by ODA and the Local Advisory Committee (LAC), with support and input from the SWCD and the Oregon Department of Environmental Quality (DEQ). The Area Plan is implemented using a combination of outreach, conservation and management activities, compliance with Area Rules, monitoring, evaluation, and adaptive management.

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

Each Area Plan is accompanied by Area Rules that describe local agricultural water quality regulatory requirements. ODA will exercise its regulatory authority for the prevention and control of water pollution from agricultural activities under the Ag Water Quality Program's general regulations (OAR 603-090-0000 to 603-090-0120) and under the Area Rules for this Management Area (OAR 603-095-0640). The general regulations guide the Ag Water Quality Program, and the Area Rules for the Management Area are the regulations with which landowners must comply. Landowners are encouraged through outreach and education to implement conservation and management activities.

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

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

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

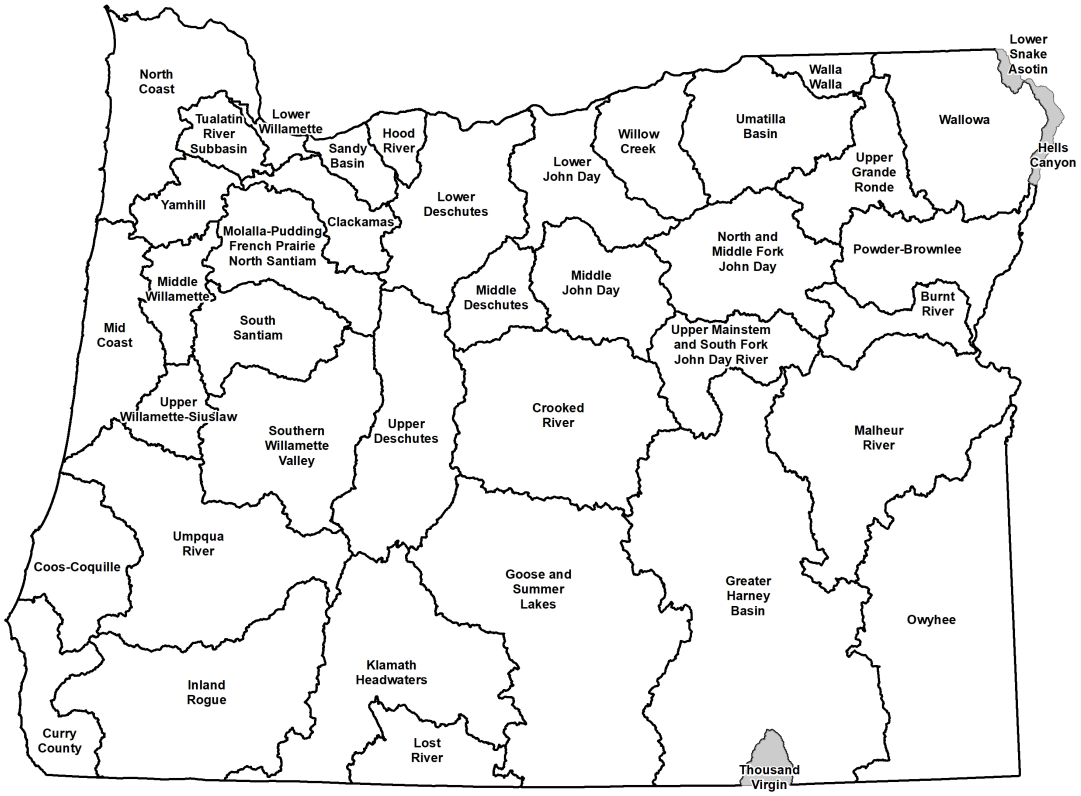
1.2 History of the Ag Water Quality Program

In 1993, the Oregon Legislature passed the Agricultural Water Quality Management Act directing ODA to develop plans to prevent and control water pollution from agricultural activities and soil erosion and achieve water quality standards and to adopt rules as necessary (ORS 568.900 through ORS 568.933). The Oregon Legislature passed additional legislation in 1995 to clarify that ODA is the lead agency for regulating agriculture with respect to water quality (ORS 561.191). The Area Plan and Area Rules were developed and subsequently revised pursuant to these statutes.

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

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

Figure 1.2 Map of 38 Agricultural Water Quality Management Areas*



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

1.3 Roles and Responsibilities

1.3.1 Oregon Department of Agriculture

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

- State water quality standards,

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

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

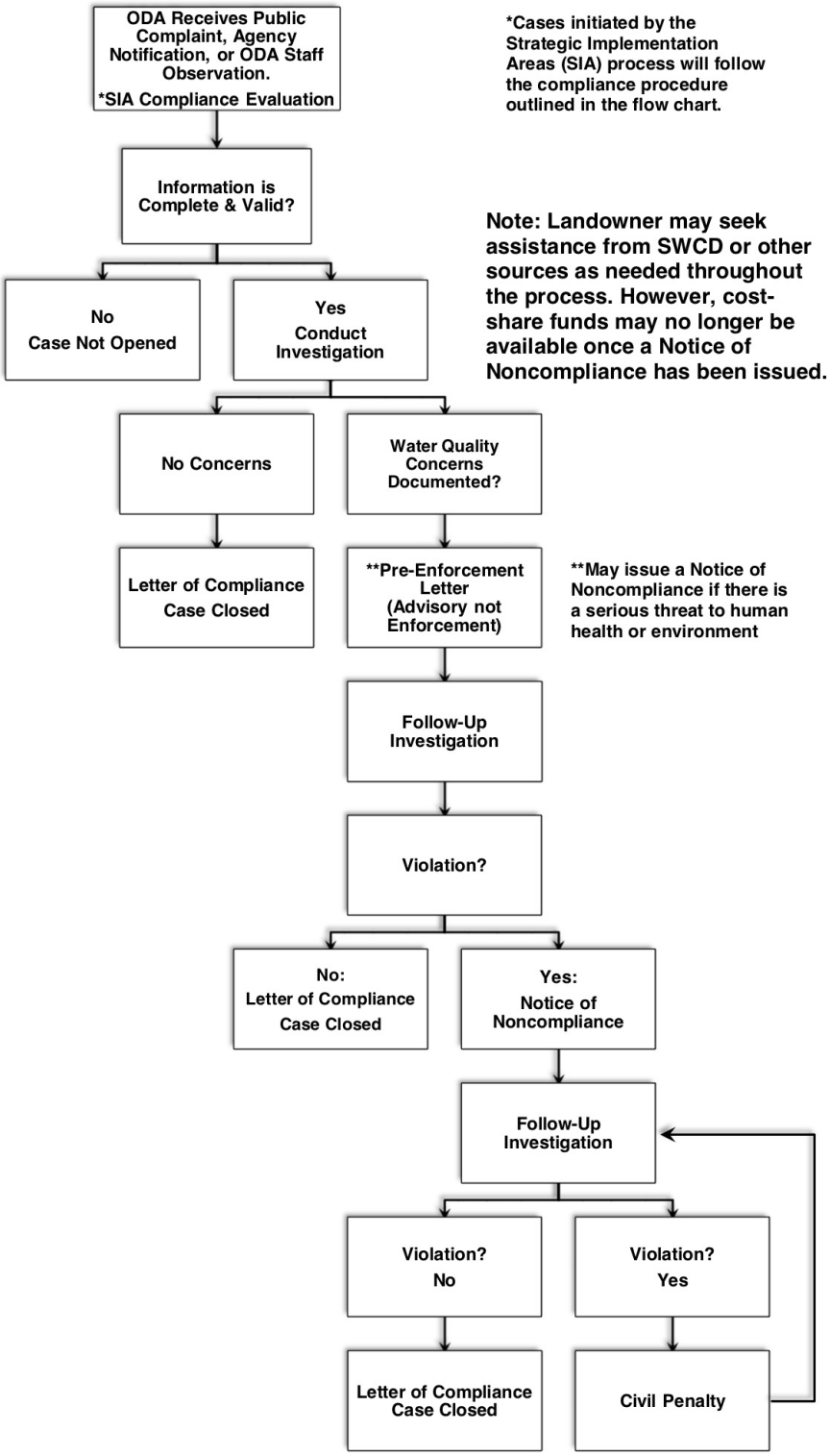
1.3.1.1 ODA Compliance Process

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

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

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

Figure 1.3.1 Compliance Flow Chart



1.3.2 Local Management Agency

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

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

1.3.3 Local Advisory Committee

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

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

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

1.3.4 Agricultural Landowners

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

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

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

- Hot springs, glacial melt water, unusual weather events, and climate change,
- Wildfires and other natural disasters,

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

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

1.3.5 Public Participation

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

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

1.4 Agricultural Water Quality

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

1.4.1 Point and Nonpoint Sources of Water Pollution

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

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

1.4.2 Beneficial Uses and Parameters of Concern

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

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

1.4.3 Impaired Waterbodies and Total Maximum Daily Loads

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

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 to achieve.

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

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

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

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

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

ORS 468B.025 (prohibited activities) states that:
"(1) Except as provided in ORS 468B.050 or 468B.053, no person shall:
(a) Cause pollution of any waters of the state or place or cause to be placed any wastes in a location where such wastes are likely to escape or be carried into the waters of the state by any means.
(b) Discharge any wastes into the waters of the state if the discharge reduces the quality of such waters below the water quality standards established by rule for such waters by the Environmental Quality Commission.

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

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

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

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

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

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

1.4.5 Streamside Vegetation and Agricultural Water Quality

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

Site-Capable Vegetation

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

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

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

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

1.4.6 Soil Health and Agricultural Water Quality

An increasingly important concept in Oregon and across the United States is soil health. The Ag Water Quality Program promotes soil health to reduce erosion and keep sediment out of surface waters, thereby helping to maintain and improve water quality. Healthy soils have relatively high organic matter and well-formed soil structure. These characteristics may resist erosion and increase water infiltration, leading to less surface runoff and greater groundwater recharge; the resultant groundwater flows in some cases can help moderate stream water temperatures. [Note that the beneficial effects on water quality vary based on factors such as soil type and ecoregion.] According to the NRCS and others, there are four Soil Health Principles that

together build highly productive and resilient soils: minimize disturbance and maximize cover, continuous living roots, and diversity above and below the surface.

Building soil health increases resiliency to extreme weather, protects water quality, and helps keep farms and ranches viable. Incorporating soil health practices can help landowners adapt and reduce risks. For more information, visit www.nrcs.usda.gov/wps/portal/nrcs/detail/or/soils/health.

1.5 Other Water Quality Programs

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

1.5.1 Confined Animal Feeding Operation Program

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

1.5.2 Groundwater Management Areas

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

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

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

1.5.3 The Oregon Plan for Salmon and Watersheds

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

1.5.4 Pesticide Management and Stewardship

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

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

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

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

1.5.5 Drinking Water Source Protection

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

1.6 Partner Agencies and Organizations

1.6.1 Oregon Department of Environmental Quality

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

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

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

1.6.2 Other Partners

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

1.7 Measuring Progress

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

1.7.1 Measurable Objectives

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

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

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

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

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

1.7.2 Land Conditions and Water Quality

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

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

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

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

1.7.3 Focused Implementation in Small Geographic Areas

Focus Areas

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

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

The current Focus Area for this Management Area is described in Chapter 3. SWCDs will also continue to provide outreach and technical assistance to the entire Management Area.

Strategic Implementation Areas

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

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

1.8 Progress and Adaptive Management

1.8.1 Biennial Reviews

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

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

1.8.2 Agricultural Water Quality Monitoring

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

As part of monitoring water quality status and trends, DEQ regularly collects water samples every other month throughout the year at 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, chlorophyll a, specific conductance, dissolved oxygen (concentration and percent saturation), bacteria (*E. coli)*, ammonia, nitrate and nitrite, pH, total phosphorus, total solids, temperature, and turbidity.

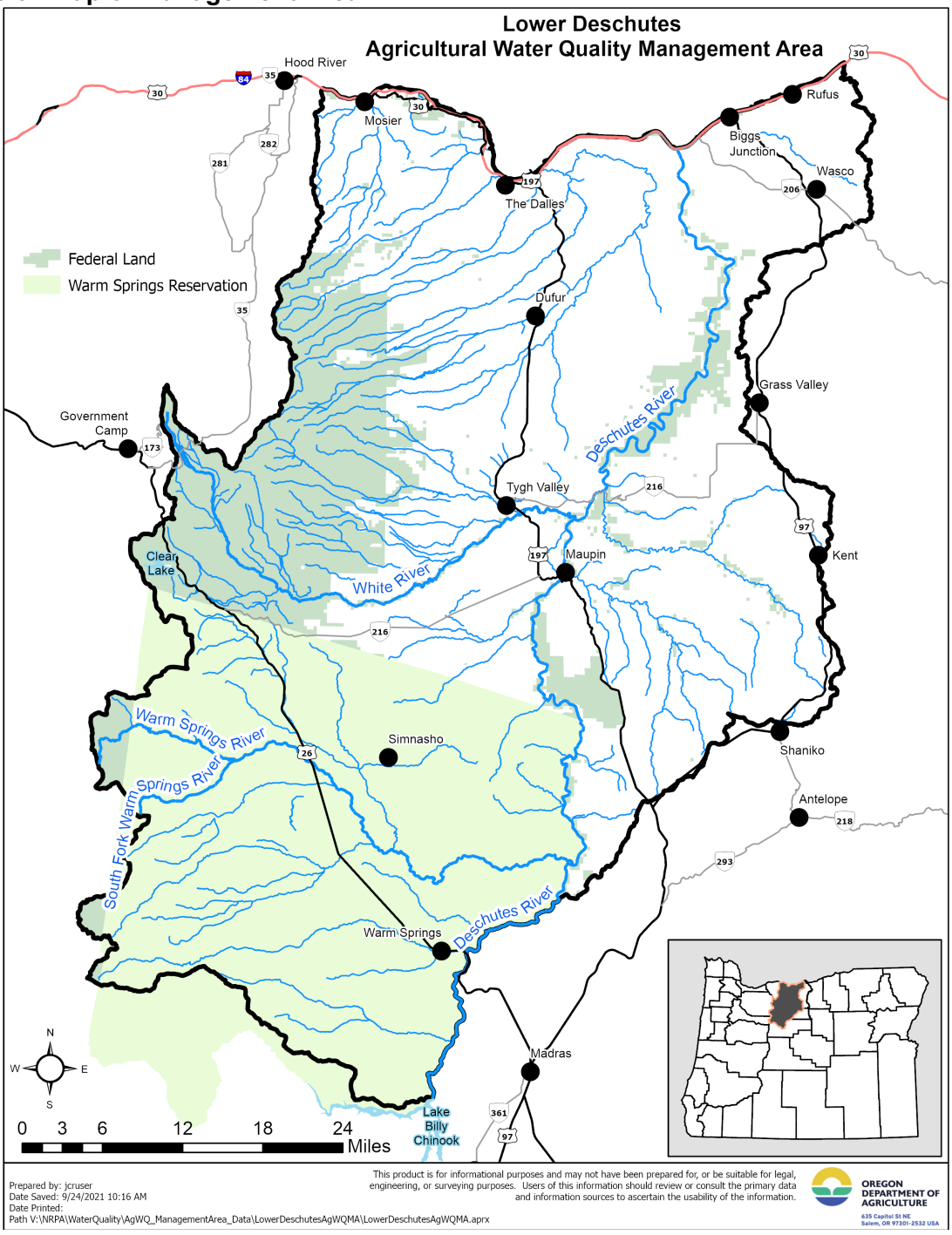
DEQ provides status and trends reports for selected parameters in relation to water quality standards. ODA will continue to work with DEQ to summarize the data results and how they apply to agricultural activities.

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

Chapter 2: Local Background

The Management Area includes the drainage area of the Deschutes River downstream from its confluence with Trout Creek to its confluence with the Columbia River near the city of The Dalles. It also includes all Oregon lands draining to the Columbia River between the Hood River drainage and the John Day Basin (Figure 3).

Figure 3. Map of Management Area



2.1 Local Roles

Wasco County SWCD is designated as the Local Management Agency for revisions of the Area Plan and for implementation of the Area Plan and projects in Wasco County. Sherman County SWCD is responsible for implementing the Area Plan and related projects within Sherman County. Implementation priorities are established on a periodic basis through annual work plans developed jointly by the SWCDs and ODA with input from partner agencies.

As resources allow, Sherman and Wasco County SWCDs and NRCS staff are available to assist landowners in evaluating effective practices for reducing runoff and soil erosion on their farms and incorporating these practices into Conservation Plans. Personnel in these offices can also design and assist with implementation of practices and assist in identifying sources of cost-sharing funds for the construction and/or use of some of these practices.

Technical and cost-sharing assistance for installation of certain conservation practices may be available through current USDA conservation programs such as Environmental Quality Incentive Program (EQIP), Continuous Conservation Reserve Program (CCRP); EPA's nonpoint source implementation grants (319); or state programs such as Oregon Watershed Enhancement Board (OWEB) and the Conservation Reserve Enhancement Program (CREP). Other agencies, such as Oregon Department of Fish and Wildlife (ODFW), may provide technical assistance or financial assistance to private landowners.

2.1.1 Local Advisory Committee

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

Table 2.1.1 Current LAC members

Name	Geographic Representation	Agricultural Product or Interest Representation
Ken Bailey, Chair	The Dalles	Sweet cherries, pears
Bill Hammel	The Dalles	Wheat, cattle
Bob Krein	Maupin	Cattle
Brandon Beachamp	Dufur	City of Dufur
Ethan Moore	Moro	
Jason Seals	The Dalles	ODFW Fish Biologist
Jerod Warnock	Maupin	Cattle
Michael Carter	Maupin	Wheat, cattle
Norm Lyda	Dufur	Wheat, hay
Rory Wilson	Grass Valley	North Central Livestock Ass'n
Tom McCoy	Wasco	Wheat and cattle; Weed Board
Vacant		

2.1.2 Local Management Agency

SWCDs implement Area Plans through OWEB capacity grants, with details negotiated between ODA and each SWCD. The resulting Scopes of Work define the SWCDs as the LMAs for implementation of the Ag Water Quality Program in specific Management Areas. The LMAs for this Management Area are Wasco County and Sherman County SWCDs. These SWCDs were also involved in development of the Area Plan and Area Rules.
The LMA implements the Area Plan by conducting the activities detailed in Chapter 3, which are intended to achieve the goals and objectives of the Area Plan.

2.2 Area Plan and Area Rules: Development and History

The director of ODA approved the initial Area Plan and Area Rules in 2000.

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

2.3 Geographical and Physical Setting

The Management Area is east of the Cascade Mountain Range in North Central Oregon. This area includes portions of the Mount Hood National Forest, Bureau of Land Management parcels, and State of Oregon Lands. Counties within this area include Hood River (eastern-most portion), Wasco, and Sherman (western portion). The Management Area contains 1,311,493 acres (2,049 square miles).

The Deschutes and Columbia rivers are the largest rivers within the area. Major tributaries of the Deschutes River in the Management Area include White River, Buck Hollow Creek, and Bakeoven Creek. The Trout Creek watershed is the southern boundary of, but is not included in, this Management Area. All waters of the Management Area flow into the Columbia River, which is the northern boundary of the area. Streams between Rufus and Mosier and their drainages are also part of the area. This includes Spanish Hollow, Fifteenmile Creek, Threemile Creek, Mill Creek, Chenoweth Creek, and Mosier Creek.

Average annual precipitation ranges from about 110 inches on Mount Hood to about 10 inches in the east. This results from the rain shadow effect produced by the Cascade Mountain Range. While most precipitation is in the form of rain, substantial snow falls almost every winter in the higher elevations. Elevations range from 98 feet at The Dalles, to 11,240 feet at the top of Mount Hood (headwaters of White River). The low annual rainfall on most of the landscape is characteristic of the Intermountain Region, which receives 70-80 percent of its precipitation between November and March. This reflects the strong influence of marine air masses moving in from the Pacific Ocean. Most of the area was once native grassland. The Dalles, located on the Columbia River on the northern end of the Management Area, is often the warmest location in the state. Two types of events that produce substantial and frequently damaging runoff events in this area are heavy precipitation or rapid snowmelt on frozen soils and violent cloudbursts in the summer.

The Management Area lies within the Columbia Plateau and the Eastern Cascade Mountain physiographic province. The Columbia Plateau is a lava-floored plain that has been uplifted since molten basalt flooded the area. The Eastern Cascade province is a high upland terrace of coarse loose soil and volcanic rock fragments. This terrace is eroded and is characterized by wide nearly level ridge tops and deep V-shaped canyons up to 1,000 feet deep. The Columbia River Basalt of the Miocene series is the most prominent formation. It is part of a widespread series of basalt flows that extend from Astoria, in the western part of Oregon, east into Idaho and north into Washington. The Columbia River Basalt has preserved major ridges in the basin and is between 1,000 to 2,000 feet thick.

Soils in the basin were formed in residuum from the weathering of bedrock and in loose bodies of sediment on sloping uplands and plateaus; material transported by water and deposited as unconsolidated deposits of clay, silt, and gravel; pumice and ash from volcanic activity

(Newberry Crater and Mount Mazama); and deposits of silt that has been transported by wind from other areas.

Land Use
Agriculture is the predominant land use in the Management Area. The small portion of Hood River County in the Management Area is primarily national forest land.

Wasco County was established in 1854 and has a total area of 2,396 square miles, including the Warm Springs Indian Reservation. Farming became the principal industry in Wasco County in the 1860s.

Water Use
The largest watercourses in this Management Area are the Deschutes and Columbia rivers. The Deschutes River drains approximately 10,500 square miles, with an average discharge of 4,222,000 acre-feet/year (5,828 ft^3/second). The third largest water course in the area is the White River, which originates from Mount Hood. The White River drains approximately 417 square miles, with an average discharge of 308,600 acre-feet/year (426 ft^3/second).

Five reservoirs store water in the Lower Deschutes Basin and are used for irrigation and municipal water supply. Three of the five reservoirs reside in the Mount Hood National Forest. Badger Lake has a maximum volume of 660 acre-feet available for irrigation and feeds Badger Creek. Clear Lake has a maximum volume of 13,060 acre-feet and feeds Clear Creek. Rock Creek Reservoir has a maximum volume of 1,280 acre-feet. It is fed by Rock, Gate, and Threemile creeks. Crow Creek Reservoir is surrounded by National Forest land but resides within land owned by the city of The Dalles. The maximum volume is 955 acre-feet, and it is fed by the South Fork of Mill Creek and Dog River. Crow Creek Reservoir is the primary water source for the city of The Dalles. Pine Hollow Reservoir has a maximum volume of 4,750 acre-feet that allots 3,550 acre-feet for irrigation use. Many orchards near The Dalles are irrigated with Columbia River water.

2.4 Agricultural Water Quality

2.4.1 Water Quality Issues

2.4.1.1 Beneficial Uses
Beneficial uses in the Management Area include domestic water supply, irrigation, industrial, municipal, livestock watering, fish and aquatic life, boating, fishing, water contact recreation, wildlife and hunting, and aesthetics. Uses related to aquatic life are the most sensitive. Appendix 1 discusses fisheries.

2.4.1.2 WQ Parameters and 303(d) list
According to the 2018/20 Integrated Report, temperature, sediment, and pH are the primary water quality parameters of concern (oregon.gov/deq/wq/Pages/epaApprovedIR.aspx). There are also listings for Dissolved Oxygen, Bioligical Criteria, and *E. coli*.

1. **Water temperatures** above 55°F (12.78°C) inhibit salmonid spawning, egg incubation, and fry emergence from the egg and from stream gravels. Salmonid rearing is impaired by temperatures greater than 64°F (17.78°C). The water quality standard requires that waters supporting all life stages of bull trout must be cooler than 50°F (10°C). This temperature is required for spawning, but other bull trout life stages exist at higher temperatures.

The temperature standard (OAR 340-041-0028) provides numeric and narrative temperature criteria. Maps and tables provided in OAR 340-041-151 specify where and when the criteria apply.

2. Fine **sediment** can harm fish communities by silting in redds (affecting egg incubation), damaging gills, reducing food availability, and causing other problems. Standards are found at OAR 340-041-0036 and 340-041-007(13).

3. **Bacteria** are used to determine the safety for “water contact recreation." *Escherichia coli* is one bacterial contaminant that is monitored as an indicator of fecal contamination. The DEQ has established acute and chronic water quality standards for *E. coli* in recreational waters. Potential sources of fecal contamination and *E. coli* include sewer or septic leaks, urban stormwater runoff, pet or wildlife waste, and livestock manure.

4. **“Biological Criteria”** listings indicate waters that don’t adequately support aquatic insects and similar invertebrates (benthic macroinvertebrates). These organisms are important as the basis of the food chain and are very sensitive to changes in water quality. To assess a stream’s biological health, the community of benthic macroinvertebrates is sampled and compared to the community expected if the stream were in good shape (“reference community”). If the difference is too great, the stream section is designated as ‘water quality limited.’ This designation does not identify the limiting factor (e.g., sediment, excessive nutrients, temperature).

5. **Pesticides** used on farms, forestlands, rights-of-way, and urban areas can contaminate surface waters through runoff or aerial drift. Analysis of water samples from some Wasco County creeks indicates that pesticides potentially threaten water quality and aquatic life in the Management Area. Some broad-spectrum pesticides, such as organophosphate insecticides, are toxic to aquatic life even at low concentrations. Toxic pesticides are of particular concern in streams that support steelhead, which are listed as threatened under the Endangered Species Act.

Stream flow modifications in the form of reduced flow can contribute to warmer water, increased pH, reduced dissolved oxygen, a general reduction in available habitat, and, in extreme cases, interfere with fish migration. Slow-moving streams are more susceptible to warming and they are less turbulent, all of which can contribute to reduced oxygen levels. Several streams in the basin have flow modifications as irrigation districts divert water for irrigation and/or power generation. In some reaches in late summer-early fall, diversions reduce instream flows to an estimated 25 percent of normal (US Forest Service Hood River Basin Aquatic Habitat Restoration Strategy, 2006).

Modification of physical habitat can have direct adverse effects on all aquatic life. Channelization reduces the amount of habitat (stream length is usually reduced as meanders are eliminated), as well as the instream habitat complexity such as the normal mixture of pools, riffles, and runs. Loss of streamside vegetation often destabilizes banks, which results in increased erosion, increased stream sedimentation, loss of instream habitat complexity and cover, and the loss of future large woody debris that naturally falls into streams. Loss of streambank vegetation may also cause increased stream temperatures.

2.4.1.3 TMDLs and Agricultural Load Allocations

The goal of the Middle Columbia-Hood (Miles Creeks) Subbasin Temperature TMDL is to

reduce the amount of solar radiation that reaches the waterway to natural levels. The amount of "load" of solar radiation is measured by DEQ in watts per square meter. These loads have been translated into 'percent effective shade' targets.

The TMDL contains Percent Effective Shade Targets for the Middle-Columbia Hood portion of the Management Area. These targets were developed by evaluating the solar radiation load associated with native streamside communities that have not been impacted by human activities. **Landowners may use these targets as a guide to determine if they have sufficient streamside vegetation.** Percent effective shade is the amount of shade that reaches the stream. For example, 70 percent effective shade means that canopy cover has kept 70 percent of the sunshine on an August day from reaching the stream.

Appendix 2 shows the shade target graphs for the three eco-regions that include agricultural lands.

Historic vegetation is not required along streams, although the shade and function provided by historic vegetation should be targeted. Native trees such as fir and pine, which historically lined many Management Area streams, may not be desirable in some areas. Smaller native trees and shrubs, such as willow and dogwood, may provide sufficient shade along smaller streams to attain the shade targets. As a general guideline, landowners are encouraged to maintain the widest possible band or buffer of native vegetation along the stream. Streamside vegetation buffers also absorb fertilizer and manure runoff, reduce flood erosion, filter sediment, provide habitat for birds and other wildlife, and may help protect streams from pesticide drift.

All interested parties must understand that these targets may not be appropriate for all areas. For instance, streams at road crossings and road rights-of-way may not be shaded for visibility/safety reasons.

2.4.1.4 Drinking Water

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

Fifty-seven public water systems obtain domestic drinking water from groundwater and surface water in the Management Area, serving 27,660 persons regularly. Drinking water contaminates of concern within this Management Area potentially sourced from agriculture are: *E. coli* and nitrate.

Of the soils assessed in the Management Area, most have high nitrate leaching potential, according to the National Cooperative Soil Survey, based on slope, precipitation, and land use. Nitrate from fertilizers and septic systems can readily penetrate to the aquifers used for drinking water when leaching potential is high, and bacteria removal through soil filtration can be less effective in sandy soils.

Twenty public water systems in the Management Area have had alerts for bacteria; it is unclear based on their locations whether any of these are related to agriculture. Eight systems have recent *E. coli* violations, none of which may be related to agriculture.

Nitrate alerts are generated when nitrate exceeds 5 mg/L (the standard is 10 mg/L). Four public systems had alerts for nitrate: Auction Sales Company, Tooley Water District, Pinewood Mobile

Manor, and Rufus Public Works. Tooley Water District and Pinewood Mobile Manor have recent nitrate violations, none of which may be related to agriculture.

There are also numerous private groundwater wells for domestic use in the area. The Domestic Well Testing Act database (real estate transaction testing data) for 1989-2019 indicates two significant detections of nitrate (>7mg/L) in private wells out of 80 total results included in the database for this area. Of those private wells, four results are ≥5 mg/L, and 0 are ≥10mg/L.

It is difficult to determine how much of an impact agriculture is having on groundwater sourced for drinking water in this Management Area. Landowners should always properly manage manure and fertilizer to minimize leaching of nitrates and *E. coli* to groundwater.

At this time, the Sherman SWCD Board has decided not to further evaluate drinking water sources in the Management Area. The Sherman and Wasco SWCDs will highlight implementation of best management practices to reduce the potential for agricultural sources to impact source water through their newletters.

2.4.2 Sources of Impairment

Agricultural sources of pollution in the Management Area include runoff and erosion from fields, removal of streamside vegetation, leaching of pollutants to groundwater, eroding stream banks, and runoff from roads. Pollutants can be carried to the surface water or groundwater through the actions of rainfall, snowmelt, irrigation, and leaching. Heat input due to direct solar radiation, seasonal flow reduction, changes in channel shape, and floodplain alteration can contribute to water quality impairment. Channelization and bank instability may alter gradient, width/depth ratio, and sinuosity, thereby causing undesirable changes in sediment transport regime, erosional and depositional characteristics, and stream temperature.

2.5 Regulatory and Voluntary Measures

Water pollution will be minimized through a combination of landowner education and implementation of appropriate management measures. Management measures include both recommended management practices and the regulations.

The intent of this Area Plan is not to tell anyone how to farm, ranch, or otherwise utilize his or her natural resources. However, the NRCS along with SWCD personnel in local offices can provide technical assistance to help farmers, ranchers, and other agricultural land users implement recommendations in this Area Plan (see Prohibited Conditions section). Each farmer, rancher, or other agricultural land user is expected to observe their property to ensure that either prohibited conditions do not exist or that they are beginning to improve. If problems are encountered in meeting the goals of this Area Plan, land managers are encouraged to seek assistance, as they must bring the land they own or operate into compliance with Area Rules. This Area Plan recognizes that planning for water quality is only part of a successful plan for overall management of agricultural and rural land and that other, broader objectives must also be considered in total farm or resource management planning. Sustaining agricultural production capacity for future generations is one of those broader objectives. Conserving water and soil resources helps achieve that.

The Wasco and Sherman County SWCDs maintain a list of resource concerns, which are prioritized in their long-range planning documents. In addition, baseline assessments described in Chapter 3 will help identify specific priority areas for education, technical, and financial assistance.

Current top priorities for Wasco SWCD include continuing to implement riparian buffers, making direct seed/no-till sustainable, conserving water, and working with small acreage landowners that have horses on streams. Sherman SWCD is focusing on reaching all residents of the county and their absentee landlord with conservation-related information, promoting CREP and CCRP to meet goals for improved water temperature, increasing the amount of "hands on" agriculture-related learning experiences available to youth, and providing quality assistance to NRCS and FSA to get more landowners involved in USDA programs.

In September 2011, DEQ published the Deschutes Basin Water Quality Status and Action Plan. It discussed water quality concerns and emphasized the following actions related to agriculture in the Management Area.

1. **Surface Water Actions**
    - Reduce temperatures, improve flow volume and patterns, and improve habitat through:
        - Better land management and conservation
        - Increasing native, streamside vegetation
        - Improved water conservation
        - Increased instream flows
        - Channel restoration
        - Juniper reduction
        - Combating invasive weeds
    - Reduce erosion and nutrient and pesticide levels in water through better land and crop management.
2. **Groundwater Actions**
    - Minimize nitrate contamination,
    - Assess effects of groundwater pumping and irrigation efficiency projects on stream flows,
    - Assess cause, extent and magnitude of risks associated with bacteria in groundwater.

2.5.1 Management Objectives

Farmers, ranchers, and other agricultural land users in the Management Area are expected to achieve the following conditions on the land they manage:

1. Soil erosion on uplands within acceptable rates (less than the NRCS estimate of "T", which is either two or five tons per acre per year, depending on the soil type. See 2.5.2.1).
2. Streambank erosion within acceptable levels.
3. Elimination of placement, delivery, or sloughing of wastes into streams.
4. Adequate riparian vegetation for bank stability and stream shading consistent with site capable vegetation. *Riparian vegetation* means plant communities consisting of plants dependent upon or tolerant of the presence of water near the ground surface for at least part of the year.

2.5.2 Requirements (Prohibited Conditions)

To prevent and control pollution from agricultural land in the Management Area, the conditions identified below must be met. These conditions relate directly to the management objectives of this Area Plan.

A landowner's responsibility is to implement measures that prevent or end the occurrence of Prohibited Conditions. Prohibited Conditions are least likely to occur where an effective program for their identification and control is in place. Implementation of a voluntary, individual conservation plan that addresses the conditions offers a way of meeting this responsibility. Individual conservation plans can be modified to meet changing conditions.

Structural conservation practices generally are designed to withstand different levels of storm events. For instance, terraces and waterways typically should handle a 10-year, 24-hour event, while drop structures, streambank protection, and larger dams should handle at least a 25-year, 24-hour event. Most agronomic practices can handle a two to five-year event. Riparian systems in healthy condition are expected to withstand a 25-year event with minimal damage.

A landowner is responsible for only those conditions caused by agricultural activities conducted on land controlled by the landowner. A landowner is not responsible for prohibited conditions resulting from actions by another landowner. Conditions resulting from unusual weather events, greater than 25-year event, or other exceptional circumstances are not the responsibility of the landowner.

2.5.2.1 Soil Erosion on Uplands Within Acceptable Rates

Erosion is a natural process. Some parts of the crop production process increase vulnerability to erosion. In conservation planning an effort is made to design the plan so that erosion is at or below T, the theoretical erosion rate that equals the rate at which soil is formed. T varies by soil type and is also known as the tolerable loss rate in tons per acres that the soil can sustain without loss of productive capacity.

Characteristic to Achieve

Soil erosion must be minimized through appropriate vegetation management or structural practices to protect soils and increase water infiltration rates. While all soils lost through erosion may not necessarily enter waters of the state, due to distance from the stream or to practices such as sediment basins, the reduction in such erosion reduces the likelihood that soils will enter Management Area streams.

In addition to complying with this requirement, landowners should be aware that the waste rule requires them to prevent pollution from sediment delivery to streams. While an NRCS-approved farm plan may show compliance with the erosion rule, farming in accordance with the plan may still result in pollution in violation of rule #3 (OAR 603-095-0640(4)). If ODA determines during a compliance investigation that a landowner's farm plan is not adequate to comply with the waste rule, ODA works with NRCS and the landowner to modify the plan to comply with the waste rule.

Prohibited Condition (OAR 603-095-0640(2))

Effective on rule adoption, landowners must control soil erosion on uplands using practical and available methods.
(a) On croplands, a landowner may demonstrate compliance with 603-095-0640(2) by:
(A) operating consistent with a Soil and Water Conservation District (SWCD)-approved conservation plan that meets Resource Management System (RMS) quality criteria for soil and water resources; or
(B) operating in accordance with an SWCD-approved plan for Highly Erodible Lands (HEL) developed for the purpose of complying with the current US Department of Agriculture (USDA) farm program legislation; and farming non-HEL

cropland in a manner that meets the requirements of an approved USDA HEL compliance plan for similar cropland soils in the county; or
(C) farming such that the predicted sheet and rill erosion rate does not exceed 5 tons/acre/year, as estimated by the Revised Universal Soil Loss Equation (RUSLE); or
(D) constructing and maintaining terraces, sediment basins, or other structures sufficient to keep eroding soil out of streams.
(b) On rangelands, a landowner may demonstrate compliance with 603-095-0640(2) by:
(A) operating consistent with a Soil and Water Conservation District (SWCD)-approved conservation plan that meets Resource Management System (RMS) quality criteria for soil and water resources; or
(B) maintaining sufficient live vegetation cover and plant litter to capture precipitation, slow the movement of water, increase infiltration, and reduce excessive movement of soil off the site; or
(C) minimizing visible signs of erosion, such as pedestal or rill formation and areas of sediment accumulation.
(c) Landowners must control active gully erosion to protect against sediment delivery to streams. 'Active Gully Erosion' means gullies or channels that at the largest dimension have a cross-sectional area of at least one square foot and that occur at the same location for two or more consecutive years of cropping or grazing.

Compliance can be documented through a variety of methods. Landowners may choose to follow a voluntary conservation plan. The Revised Universal Soil Loss Equation (RUSLE) provides a standard method of calculating predicted sheet and rill erosion rates. Photo points may be used to show compliance with active channel erosion requirements or upland vegetation requirements. The Prohibited Conditions describe several ways in which adequate erosion control can be demonstrated.

2.5.2.2 Streambank Erosion Within Acceptable Levels

Streams naturally experience some bank erosion. The Wasco County SWCD estimates, based on field observations, that banks of perennial and intermittent streams currently are approximately 80 percent stable. Stable stream banks reduce sediment in the stream caused by mass wasting and bank erosion and help narrow channels, thereby reducing the amount of surface water exposed to solar radiation.

Ephemeral streams (dry draws) rarely have defined banks and are primarily influenced by upland management practices. Appropriate cropping and rangeland practices minimize the sediment contributed by such streams.

Characteristic to Achieve

Active stream bank erosion must be within acceptable levels. Stream channel modification caused by short-term erosion is minimal. Stabilization of stream banks reduces stream sediment loads. Vegetation used to stabilize banks helps reduce the rate of heating of water.

Prohibited Condition (OAR 603-95-0640(3))

By January 1, 2005, active stream bank erosion is not allowed beyond that expected for stream flow regimes and channel types. Stream channel modification that extends well beyond the level anticipated from natural disturbance given system characteristics is not allowed.

Methods for evaluating stream bank stability include but are not limited to: Environmental Protection Agency's (EPA) monitoring protocol for bank stability (1993), protocols described in Platts (1987) and Rosgen (1996), and NRCS-developed protocols (Oregon Tech Note No. 12 "Procedures for using Oregon Stream Habitat Data Sheet" and National Water and Climate Center Tech Note 99-1 "Stream Visual Assessment Protocol"). Selection of the appropriate protocol is site-specific.

2.5.2.3 Elimination of Placement, Delivery, or Sloughing of Wastes

High nutrient concentrations, pathogens associated with livestock manure, high sediment concentrations in run-off, pesticides, and other potential pollutants should not be transported to streams and groundwater.

Wastes include livestock manure from situations like seasonal feeding and birthing areas, gathering pastures and corrals, rangelands and pasture, and any other situations not already covered by Oregon's Confined Animal Feeding Operation laws. Indicators of water quality issues include 1) runoff flowing through areas of high livestock usage and entering waters of the state, 2) livestock waste accumulated in drainage ditches or areas of flooding, and 3) fecal coliform counts that exceed State water quality standards. Livestock grazing is allowed to the extent it does not cause conditions that violate State water quality standards and complies with the Prohibited Conditions in the Area Rules. Livestock facilities located near streams should use an adequate runoff control system. Compliance with the riparian objectives below helps keep wastes from running into waters of the state.

Characteristic to Achieve

Wastes are placed so they are not likely to pollute waters of the state. This is already State law under ORS 468b; the following Prohibited Condition is consistent with the current law.

Prohibited Condition (OAR 603-095-0640(4))

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

If visual inspection discloses a potential problem, then an appropriate monitoring protocol may be selected to determine if there is an adverse effect on water quality. The nature of the waste involved determines which monitoring protocol is appropriate.

2.5.2.4 Adequate Riparian Vegetation

Landowners must eliminate activities restricting the growth of streamside riparian vegetation.

The purpose of this objective is to provide for stream bank stability and stream shading, as allowed by site capability. Adequate vegetation for stream bank stability and stream shading also results in: interception and immobilization of nutrients and sediment, more complex stream structure, and, where applicable, presence of large woody debris. The potential width of the vegetated riparian area varies depending on site capability.

The purpose is not to restore riparian areas to their pre-settlement conditions or to address wetland areas away from streams.

Adequate riparian vegetation should:
- Include a variety of plant species and ages,
- Include plants that have root masses capable of withstanding high stream flows, and
- Provide adequate cover to protect the stream bank and dissipate energy during high flows,
- Include sufficient ground cover to filter out excess sediment or nutrients in overland flows,
- Provide shade.

Adequate vegetation includes:
- Visible ongoing renewal of riparian vegetation through natural processes,
- Vigorous growth; presence of native species, and
- The maintenance of each year's new growth of woody vegetation (trees and shrubs). Noxious weeds are undesirable as they generally provide less shade, filtering capacity, and stabilizing root mass than the plants they replace.

As riparian vegetation matures, stream channels are expected to narrow and deepen. These stream channels will have less water surface area exposed to solar radiation (thereby reducing heating rates during summer) and will be more connected to their floodplain. Better floodplain connectivity has the added benefit of increasing storm water storage and reducing storm water velocities. These streams will also meander more, which will reduce flow velocities and reduce the damage from flooding. Additionally, as late season stream levels drop, groundwater stored in the flood plain will add some cooler water to the stream.

Characteristic to Achieve

Riparian vegetation provides sufficient: 1) root mass for stream bank stability and 2) above-ground herbaceous material for stream shading to reduce the solar heating rate of surface water.

Prohibited Condition (OAR 603-095-0640(5))

By January 1, 2005, agricultural management or soil-disturbing activities that preclude establishment and development of adequate riparian vegetation for stream bank stability and shading, consistent with site capability, are not allowed.

Monitoring for Condition

ODA uses a modification of the Greenline method (Bureau of Land Management, 1993) to determine compliance with this condition. The method evaluates ground cover, canopy cover, and plant diversity in relation to stream shading and stabilizing streambanks.

Site capability is determined on a site-specific basis, generally by comparison with nearby sites in good condition with similar characteristics and by reviewing scientific information.

Photographic records with a time sequence of photographs taken from the same point are the simplest method for qualitative assessments and for monitoring of trends.

2.5.3 Recommended Management Practices

Soil Erosion and Sediment Control

- Conservation tillage (crop residue management): reduced tillage, minimum tillage, no-till, direct seeding, modified conventional tillage, reservoir tillage, sub-soiling, or deep chiseling,
- Enrollment in Conservation Reserve Program (CRP) and CCRP,
- Cover crops (perennial, annual),
- Contour farming practices: strip cropping, divided slopes, terraces (level and gradient), contour tillage,
- Water and sediment control basins,
- Crop rotations,
- Early or double seeding,
- Vegetative buffer strip (filter strips, grassed waterways, field borders, contour buffer strips),
- Irrigation scheduling,
- Prescribed burning,
- Weed control,
- Grazing management plans,
- Range plantings,
- Livestock distribution.

Streamside Areas

- Critical area planting,
- Enrollment in CREP and CCRP,
- Vegetative buffer strips (filter strips, riparian buffers, riparian forest buffers),
- Livestock management (see below),
- Conservation tillage practices,
- Weed control,
- Nutrient and chemical application scheduling,
- Road, culvert, bridge, and crossings maintenance,
- Wildlife management.

Livestock

- Grazing management or scheduling: intensity, duration, frequency, season pasture rotations, rest/deferral,
- Vegetation management (grazing management, grass seeding, weed control, controlled burning),
- Fencing (temporary, cross, exclusion),
- Watering facilities (spring development, off-stream water, water gaps),
- Salt and mineral distribution,
- Waste management systems: clean water diversions; waste collection, storage, and utilization; facilities operation and maintenance.

Irrigation

- Irrigation scheduling: crop needs, soil type, climate, topography, and infiltration rates,
- Irrigation system efficiency (flood, sprinkler, drip),
- Diversion maintenance (push-up dam management, fish screens),
- Return flow management,
- Back-flow prevention devices,

- Reservoir tillage,
- Cover crops.

Nutrient and Farm Chemical Application

- Nutrient budgeting (soil testing, tissue testing, plant needs, water testing),
- Application methods,
- Application timing,
- Tail water management,
- Hydraulic connectivity,
- Label requirements,
- Irrigation scheduling.

Integrated Pest Management

- Pest and disease modeling,
- Weather monitoring,
- Selection of low toxicity pesticides,
- Mating disruption,
- Ground cover management,
- Spray drift barriers,
- Low volume sprayers.

Channel and Drain Management

- Vegetation management (burning, chemical, clipping),
- Stream bank stabilization (structural, bio-engineered),
- Critical area planting,
- Channel management,
- Obstruction removal,
- Wetland development,
- Out-fall protection.

Chapter 3: Implementation Strategies

Goal

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

The LAC established these objectives to achieve the Area Plan goal (Section 2.5.1):

1. Soil erosion on uplands less than the NRCS estimate of "T."
2. Streambank erosion is only what is naturally expected for flow regimes and channel types.
3. Elimination of placement, delivery, or sloughing of wastes into streams.
4. Adequate riparian vegetation for bank stability and stream shading consistent with site capable vegetation.

The following conditions on agricultural lands contribute to good water quality in this Management Area:

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

LAC Mission

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.

The SWCDs uses essentially the same method to assess riparian conditions at both the Management Area scale and in the Focus Areas.

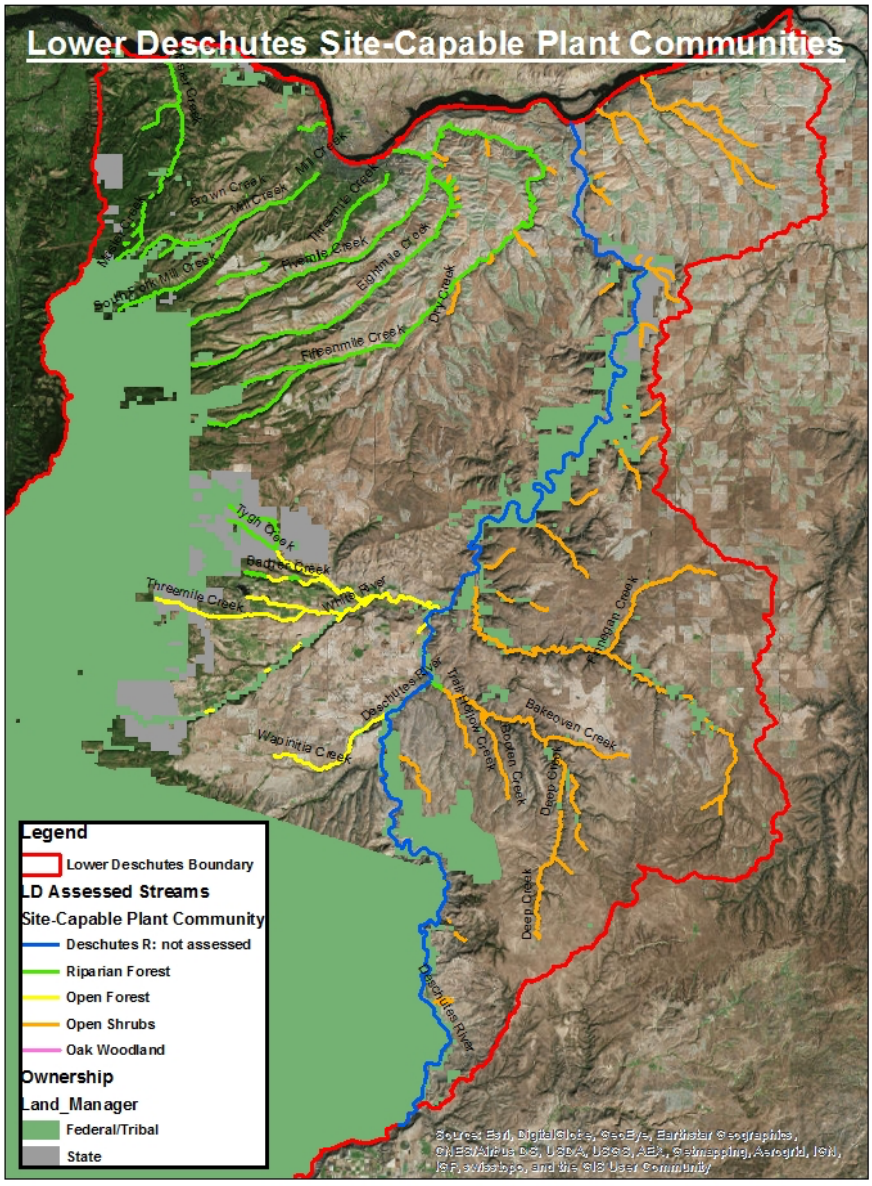
Streamside vegetation is categorized based on the degree to which it is likely to prevent and control water pollution, compared to site capability (Table 3.1). The method relies on 'remote evaluations' from aerials, drive-bys, and best professional judgement. Canopy cover and ground cover are used as surrogates for the key water quality functions (shade, bank stability, and filtration of pollutants in overland flows) because cover is easier to evaluate remotely. (Hammond, Ellen. ODA. 2016 Streamside Vegetation Assessment for the Lower Deschutes Agricultural Water Quality Management Area. 2017).

SWCD, ODA, and ODFW staff identified perennial stream reaches on non-federal and non-Tribal Trust lands. Perennial reaches flowing through urban areas and industrial forestlands were also excluded.

Site-capable community types were identified, located, and described based on personal knowledge and drive-bys.

Table 3.1: Vegetative Site Community Types in the Management Area

Community Name	Plant Description	% canopy cover over stream	% ground cover	Where	% of assessed streams
Riparian Forest	Alder/cottonwood; some oaks, ponderosa pines, and Douglas-fir; plus dogwood, willows, roses, etc.	90	90	Higher rainfall	43
Open Forest	Scattered live oaks, ponderosa pines, and cottonwoods; plus shrubs	60	80	Cobbly soils	12
Open Shrubs	Mostly willows and other shrubs with some alder/cottonwood	≤ 80	≤ 80	Lower rainfall	44
Oak Woodland	Mostly oaks with an understory of grasses and some shrubs	50	80	Dry slope tribs	< 1



SWCD staff determine classifications based on how much canopy and ground cover is present compared to *what could be provided by site capable vegetation*.

Table 3.1.1.2b: Determining classes based on surrogates (compared to that provided by site capability).			
WQ functions provided by riparian veg, to the extent allowed by site capability	**How to determine classes?**	***% of that provided by site capability***	
		Canopy Cover Over Stream	**Ground Cover**
Class I = Fully provided	Both of the following met	>75%	>75%
Class II = Partially provided, not impaired by agricultural activities	At least one of the following met	>50%	>50%
Class III = Likely not provided due to agricultural activities	At least one of the following met	<50%	<50%
Class IIIx = Likely not provided due to weeds	At least one of the following met	<50%	<50%
Class V = Can't determine			

3.1.1 Management Area

3.1.1.1 Measurable Objective #1: Control soil erosion on uplands to acceptable rates.

Assessment Method

Uplands were evaluated for erosion potential. NRCS used RUSLE2 to estimate erosion rates, based on average slopes, rainfall, soil types, and cropping practices. Soil loss was estimated at 10-year intervals between 1975 and 2015. These estimations are modeled based upon best known information and technology at the time of study. The information is an approximation, based on assumptions and averages and should be used accordingly. The asessment method will be completed every four years.

Current Condition: During 2015, the average erosion rate on tilled cropland was 1.34 tons of soil per acre per year. In addition, the total erosion for the year was approximately 300,000 tons. The sustainable loss rate is two or five tons per acre per year, depending on soil type.

Measurable Objective

By December 1, 2025, reduce the average erosion rate on tilled cropland to 1.0 tons of soil per acre per year without increasing the total erosion for the year above 300,000 tons. This analysis will be repeated before the 2025 Biennial Review to determine whether this goal has been met.

3.1.1.2 Measurable Objective #2: Provide adequate riparian vegetation for stream bank stability and stream shading consistent with site capability; streambank erosion is within acceptable levels.

Assessment Method

SWCD staff calculated the percentages of stream miles in each category for their respective counties and provided these to ODA. Because of large properties and landownership patterns in this Management Area, landowners generally own both sides of a stream and the vegetation on opposite banks tends to be in a similar class. The percentages in each class in each county were fairly similar. The asessment method will be completed every four years.

Current conditions: 82% of perennial stream miles identified in the assessment in ag lands are in Class I.

Milestone
By December 1, 2025, 90% of perennial streams in agricultural areas will be in Class I (vegetation that likely provides the full suite of water quality functions the site is capable of (i.e., shade, bank stability, filtration of overland flow)).

Measurable Objective (updated in 2021 as a result of adaptive management)
After December 1, 2025, > 90% of perennial streams in agricultural areas will be in Class I (vegetation that likely provides the full suite of water quality functions the site is capable of (i.e., shade, bank stability, filtration of overland flow)). The LAC, SWCDs, and conservation partners would prefer a measurable objective of at least 95%. However, the percentage of streams in Class I will fluctuate due to landowner turnover, natural disasters, and other circumstances that can hinder progress towards meeting that measurable objective.

3.1.1.3 Measurable Objective #3: Prevent water pollution from wastes.

Targets identified in Section 3.1.1.1 address bacteria from livestock manure. Sediment from erosion is already addressed in Objectives 1 and 2. Pesticides in the Management Area will be addressed through the PSP.

Assessment Method:
Every four years, during fall prior to the full biennial review, livestock operations along streams will be evaluated for likelihood of pollution from bacteria. The method consists of looking for likely sources (manure piles and heavy use areas) during riparian vegetation surveys of perennial streams and following up with landowner to do site visit followed up by technical assistance if needed.

Current Conditions: Seven livestock operations identified in the assessment are likely to pollute perennial streams.

Milestone:
By December 1, 2025, reduce livestock operations identified in the assessment to less than five.

Measurable Objective (updated in 2021 as a result of adaptive management)
After December 1, 2025, less than five livestock operations likely to pollute perennial streams will be identified in assessments. The LAC, SWCDs, and conservation partners would prefer a measurable objective of zero operations. However, the number of operations will fluctuate due to landowner turnover, natural disasters, and other circumstances that can hinder progress towards meeting that measurable objective.

3.1.2 Focus Areas

Assessment Method for all Focus Areas:

1. Aerial photos are used to map the waterways and do a broad classification from I-IV.
2. The mapped classifications are ground-truthed by stopping at all roads and public access points along mapped waterways to visually assess the ground and canopy cover along the waterway.
3. This method is the same as that for the Management Area (Section 3.1), except that Classes III and IIIx are combined, and there are no ‘unevaluated’ lands.

The following classes were used to classify and record conditions:

Table 6. Streamside condition classifications in the Eightmile Creek Focus Area.			
Class I	**Class II**	**Class III**	**Class IV (non-ag)**
Vegetation on agricultural lands likely sufficient to moderate solar heating, stabilize streambanks, and filter out pollutants consistent with site capability.	Agricultural activities allowing plant growth, but vegetation likely insufficient to moderate solar heating, stabilize streambanks, or filter out pollutants consistent with site capability.	Agricultural activities likely not allowing vegetation to moderate solar heating, stabilize streambanks, or filter out pollutants consistent with site capability.	Non-agricultural land, e.g. roads, rural residential, forest land.

3.1.2.1 Chenoweth Creek Focus Area

The Chenoweth Focus Area is part of ODA's Focus Area strategic initiative. The Chenoweth Creek – Columbia River drainage has approximately 70 intermittent and perennial stream miles. Numerous small livestock operations would benefit from conservation practices to improve water quality. The southeast portion of the Murdock-Columbia River Watershed lies between the Mill Creek and Threemile Watersheds, which are previous ODA SIAs.

Milestone:

By June 30, 2021:

1) Increase Class I conditions to at least 186.36 ac
2) Decrease Class III conditions to no more than 4.7 ac

3.1.2.2 Fifteenmile Creek Focus Area

The Fifteenmile Focus Area is part of ODA's Focus Area strategic initiative. The Fifteenmile Watershed includes approximately 111,345 acres drained by Fifteenmile Creek. The SWCD has been working with many of the landowners in the Fifteenmile watershed. The Fifteenmile watershed has strong landowner participation. The SWCD chose this area to align with the current efforts that are taking place on Fifteenmile to address high stream temperatures, and to improve on farm practices to benefit water quality and quantity.

Milestones:

By June 30, 2021:

1. Increase Class I conditions to at least 319.8 ac
2. Maintain Class III conditions at 0 ac

3.1.3 Strategic Implementation Area(s)

Eightmile Creek SIA (Initiated 2017)

The Upper Eightmile Creek, Middle Eightmile Creek, and Lower Eightmile Creek Watersheds have been identified by ODA as a priority through the SIA process. The Eightmile Watershed includes approximately 48,653 acres drained by Eightmile Creek in Wasco County. Eightmile Creek is the principal tributary of Fifteenmile Creek, which flows into the Columbia River east of The Dalles. Eightmile creek provides critical habitat for Mid-Columbia Steelhead, a species listed as threatened by the federal Endangered Species Act in 1998. The watershed is also habitat for Pacific Lamprey and Coastal Cutthroat Trout. Eightmile Creek is included in Oregon's 303d List for not meeting state water quality standards for temperature and sediment. A TMDL is in place for temperature, a limiting factor for aquatic species present in Eightmile.

Eastern Lower Deschutes SIA (Initiated 2020)

The Eastern Lower Deschutes project includes both Sherman and Wasco Counties and is approximately 329,727 acres. The major waterways within this SIA boundary include Spanish Hollow Creek and China Hollow Creek which feed into the Columbia River, Finnegan Creek and Kerr Creek, which flow into Buck Hollow Creek, which feeds into the Lower Deschutes River.

Lack of riparian vegetation, manure inputs and active erosion are of water quality concerns. The Eastern Lower Deschutes SIA project is needed to assist ODA and landowners who have property within the SIA boundary to achieve compliance in water quality management area with potential watershed enhancement opportunities.

SIA Compliance Evaluation Method:
ODA evaluated all agricultural tax lots within the SIA to identify opportunities to improve water quality and ensure compliance with Area Rules. The evaluation considered the condition of streamside vegetation, areas of bare ground, and potential livestock impacts (including manure management). The process involved both a remote evaluation and field verification from publicly accessible areas. For further information see:
https://www.oregon.gov/oda/shared/Documents/Publications/NaturalResources/SIAProgressReport.pdf

Opportunity levels:

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

Eightmile Creek SIA Measurable Objective:
By February 1, 2022, all 12 tax lots identified as a Potential Violation or an Opportunity for Improvement will be downgraded to Low or Limited.

Eastern Lower Deschutes SIA Measurable Objective:
By May 3, 2025, all 14 tax lots identified as a Potential Violation or an Opportunity for Improvement will be downgraded to Low or Limited opportunities.

3.1.4 WASCO Pesticide Stewardship Partnership

Since 2019, water quality is monitored for pesticide residues beginning in March and continuing through mid- April and again from late May through end of July. Two sampling events occurred in September. During this timeframe water quality samples were collected from four locations. Land use encompassed by these locations was primarily tree fruit (cherries) and urban landscapes around the city of The Dalles.

Currently, four locations are being sampled for pesticide residues as part of the PSP project they are:

- Fifteenmile Creek Above Seufert Falls (AKA Cushing Falls),
- Mill Creek at 2nd Street, The Dalles,
- Mill Creek at Wright Road,
- Threemile Creek at Hwy 197.

Measurable Objectives and Associated Milestones:
The Wasco SWCD recently was approved for funding and are planning to develop an SAP for the PSP program in the coming year. Measurable Objectives and associated milestones will be reported at next Biennial Review.

3.2 Proposed Activities

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

Table 3.2 Planned Activities for 2022-2025 by Sherman SWCD, Wasco SWCD, Sherman Watershed Council, and Wasco County Watershed Councils.

Activity	4-year Target	Description
Landowner Engagement		
# events that actively engage landowners (workshops, demonstrations, tours)	31	Neighborhood Meetings, Crop Tours
# landowners participating in active events	1,000	
Technical Assistance (TA)		
# landowners provided with TA (via phone/walk-in/email/site visit)	450	
# site visits	300	
# conservation plans written*	160	Including CRP renewals
On-the-ground Project Funding		
# funding applications submitted	100	
* Definition: any written management plan to address agricultural water quality. Can include NRCS-level plans. Can include: nutrients, soil health, grazing, riparian planting, forest thinning to improve upland pastures to reduce livestock pressure on riparian areas, etc. Cannot include projects with no or weak connection to agricultural water quality (weed eradication not for riparian restoration, fuels reduction, alternative energy, rain gardens/rain harvesting, non-agricultural culvert replacement, and instream habitat enhancement that does not also improve water quality)		

3.3 Agricultural Water Quality and Land Condition Monitoring

3.3.1 Water Quality

DEQ has one ambient site in the Management Area.

Mill Creek *E. coli* study
Wasco County SWCD and The Dalles Watershed Council have monitored Mill Creek for *E. coli* since 2009 to determine when and where levels exceed state standards for recreational waters. The ongoing goals are to use results to identify sources and make further recommendations to reduce and possibly eliminate *E. coli* contamination. Forty sites have been sampled during this study, their number and location changing over time based on data trends. When high levels of *E.coli* were observed, new sampling sites were positioned to bracket the affected reach.

FAST Program
The FAST program uses a predictive model that combines climate and streamflow information to forecast water temperatures. When the model predicts stream temperatures lethal to ESA-listed threatened steelhead - 72º or higher - at two or more sites for two or more days, the flow restoration coordinator initiates an automatic phone alert to irrigators, notifying them of a need to reduce diversions and keep more water instream.

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

Chapter 4: Progress and Adaptive Management

4.1 Measurable Objectives and Strategic Initiatives

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

4.1.1 Management Area

To achieve the Area Plan purpose and goal, the following water quality related objectives are established:

Table 4.1.1 Management Area Results

Measurable Objectives (updated in 2021 as a result of adaptive management)
• Soil Erosion: By December 1, 2025, reduce the average erosion rate on tilled cropland to 1.0 tons of soil per acre per year without increasing the total erosion for the year above 300,000 tons. This analysis will be repeated before the next Biennial Review to determine whether this goal has been met. • Riparian Vegetation: After December 1, 2025, > 90% of perennial streams in agricultural areas will be in Class I (vegetation that likely provides the full suite of water quality functions the site is capable of (i.e., shade, bank stability, filtration of overland flow)). The LAC, SWCDs, and conservation partners would prefer a measurable objective of at least 95%. However, the percentage of streams in Class I will fluctuate due to landowner turnover, natural disasters, and other circumstances that can hinder progress towards meeting that measurable objective. • Pollution from wastes: After December 1, 2025, less than five livestock operations likely to pollute perennial streams will be identified in assessments. The LAC, SWCDs, and conservation partners would prefer a measurable objective of zero operations. However, the number of operations will fluctuate due to landowner turnover, natural disasters, and other circumstances that can hinder progress towards meeting that measurable objective.
Milestones
• Soil Erosion: By June 30, 2020, reduce the average erosion rate on tilled cropland to 1.0 tons of soil per acre per year without increasing the total erosion for the year above 300,000 tons. This analysis will be repeated after 2020 to determine whether this goal has been met. • Riparian Vegetation: By June 30, 2020, 95% of perennial streams identified in the assessment in agricultural areas will have streamside vegetation that likely provides the full suite of water quality functions the site is capable of (i.e., shade, bank stability, filtration of overland flow). • Pollution from wastes: By June 30, 2021, zero livestock operations identified in the assessment are likely to pollute perennial streams.
Current Conditions
Progress Toward Measurable Objectives and Milestones • Soil Erosion: ODA met with NRCS staff to discuss new RUSLE method. NRCS staff was reassigned and were not able to re-run the analysis in time for the 2021 Biennial Review. This analysis will be repeated before the next Biennial Review to determine whether this goal has been met. • Riparian Vegetation: There has been a 10% increase in Class IIIx due to the 2018 wildfires in the Management Area. • Pollution from wastes: There has been an increase in four livestock operations since 2016.

Table 3.1.1.2c: Miles and percentages of assessed stream miles in different classes. (281 miles in Wasco County, 76 in Sherman County)		
	2016	**2021**
Class I	324 miles (91%)	294 miles (82%)
Class II	26 miles (7%)	17 miles (5%)
Class III	3 miles (<1%)	4 miles (1%)
Class IIIx	4 miles (1%)	40 miles (11%)
Class V	<1 miles (<1%)	< 2 miles (<1%)
Total	357 miles (100%)	357 miles (100%)

Assessment Results

- Soil Erosion: N/A
- Riparian Vegetation:
- Pollution from wastes: Seven livestock operations identified in the assessment are likely to pollute perennial streams.

Activities and Accomplishments

- The Eastern Lower Deschutes SIA will address any riparian vegetation and waste concerns that were identified through the SIA process.

Adaptive Management Discussion

Soil Erosion: N/A

Riparian Vegetation: As a results of the adaptive management discussion with the LAC, it was decided to update the measurable objective to continously maintain at least 90% of perennial streams in agricultural areas in Class I. Natural catastrophes such as wildfires and floods may impact the riparian vegetation class and can the skew the progress towards meeting the measurable objective.

Pollution from wastes: As a result of the adaptive management discussion with the LAC, it was decided to keep livestock operations to a minimum, defined as four operations at any given time. This will allow for flexibility of changing land managers and timing of when the assessment is completed.

4.1.2 Focus Areas

Table 4.1.2.1 Chenoweth Creek Focus Area

Measurable Objective

N/A

Milestones

By June 30, 2021:
1) Increase Class I conditions to at least 186.36 ac
2) Decrease Class III conditions to no more than 4.7 ac

Current Conditions

Progress Toward Milestones

2019: Overgrazed pasture has been over taken by weeds moving 0.7 ac from Class II to Class III. Class III property of 2.6 ac was brought to Class II via compliance investigation and work with SWCD.
2020: Heavy livestock presence was noted on approximately 2.5 acres, which changed the assessment from class II to III.

Assessment Results

	2017	**2019**	**2020**
Class I	167.8 ac	167.8 ac	167.8 ac
Class II	134.6 ac	136.5 ac	134.0 ac
Class III	8.2 ac	6.3 ac	8.8 ac
Class IV	32.4 ac	32.4 ac	32.4 ac

Community and Landowner Engagement	
# active events that target landowners/ operators	**10**
# landowners/operators participating in active events	**39**
Technical Assistance (TA)	
# landowners/operators provided with TA	**23**

# site visits	**27**
# conservation plans written	**1**
Ag Water Quality Practices Implemented in the Focus Area	
Fencing as a result of ODA compliance investigation	**1**
Adaptive Management Discussion	
• Focus Area was closed in September 2020 due to significant lack of interest despite three years of outreach in the watershed. • SWCD hoped that increased outreach and personal contacts with landowners would benefit the Focus Area. Unfortunately, this was not the case in this watershed, and Focus Area was closed in order to provide TA to landowners who are actively seeking assistance in conservation efforts.	

Table 4.1.2.2 Fifteenmile Creek Focus Area

Measurable Objective		
n/a		
Milestones		
By June 30, 2021: 1) Increase Class I conditions to at least 319.8 ac 2) Maintain Class III conditions at 0 ac		
Current Conditions		
Progress Toward Measurable Objectives and Milestones 2021: 10.9 Class II acres increased to Class I acres due to post-fire natural regeneration.		
Assessment Results		
	2019	**2021**
Class I	313.7 ac	324.6 ac
Class II	17.0 ac	6.1 ac
Class III	0.0 ac	0.0 ac
Class IV	0.0 ac	0.0 ac
Activities and Accomplishments		
Community and Landowner Engagement		
# active events that target landowners/ operators	**2**	
# landowners/operators participating in active events	**15**	
Technical Assistance (TA)		
# landowners/operators provided with TA	**65**	
# site visits	**49**	
# conservation plans written	**19**	
Ag Water Quality Practices Implemented in the Focus Area		
Heavy Use Area Protection	3,168 ft	
Pivot/Irrigation System	19.7 ac	
Riparian Forest Buffer	10.3 ac	
Conservation Cover	.63 ac	
Tree and Shrub Site Prep	1.5 ac	
Tree and Shrub Establishment	1.5 ac	
Access Control	10.3 ac	
Upland Wildlife Habitat Management	10.3 ac	
Adaptive Management Discussion		
Focus Area was opened in September 2020. Most improvements in riparian vegetation were due to post-fire natural regeneration. The short (1-year) timeframe was not long enough to make a greater impact on riparian vegetation conditions through changes in management practices. It takes time to conduct meaningful outreach, gain landowner interest, develop conservation plans, and implement practices.		

4.1.3 Strategic Implementation Area(s)

Table 4.1.3 Strategic Implementation Area(s)

2017 Eightmile SIA

Evaluation Results		
As of February 1, 2018, 12 tax lots were identified as either a Potential Violation or an Opportunity for Improvement. LIMITED = 191, LOW = 7. OPP = 12, PV = 0		
Measurable Objective		
By December 2022, all 12 tax lots identified as a Potential Violation or an Opportunity for Improvement will be downgraded to Low or Limited.		
Post Evaluation		
To be completed December 2022.		
Adaptive Management Discussion *Was measurable objective achieved?*		
As of December 2021, five tax lots identified as a Potential Violation or an Opportunity for Improvement were downgraded to Low or Limited. LIMITED = 191, LOW = 12, OPP= 7, PV = 0. • ODA opened compliance investigation with one landowner in the SIA. ODA still has an active investigation with landowner. • SWCD is currently working with the remaining six landowners identified in the SIA as Opportunity for Improvements. • SIA is on track to meet the measurable objective. • Conservation plans were developed for several landowners and two expressed interest in applying for cost share. Both are waiting until fall 2021 to decide if they want to go forward with their cost share applications.		
Activity	**Accomplishment**	**Description**
ODA		
# acres evaluated	35,498	
# stream miles evaluated	141	
# landowners at Open House	15	
# landowners receiving outreach materials	104	
SWCD and Conservation Partners		
# landowners provided with TA	11	
# site visits	19	1 ODA site visit
# conservation plans written	6	
SIA and Project Funding		
# funding applications submitted	1	$125,000 OWEB Grant for TA and monitoring
# funding applications awarded	1	

2020 Eastern Lower Deschutes SIA

Evaluation Results		
As of May 3, 2021, 14 tax lots were identified as either a Potential Violation or an Opportunity for Improvement. LIMITED = 713, LOW =63, OPP = 11, PV = 3		
Measurable Objective		
By May 3, 2025, all 14 tax lots identified as a Potential Violation or an Opportunity for Improvement will be downgraded to Low or Limited opportunity levels.		
Adaptive Management Discussion *Was measurable objective achieved?*		
The SIA is open and SIA work is starting. COVID-19 restrictions have set back the SIA process and Open House. An adaptive management discussion will be available at the next biennial review.		
Activity	**Accomplishment**	**Description**
ODA		
# acres evaluated	283,476	

# stream miles evaluated	1,133	
# landowners at Open House	-	Open House to be held in spring
# landowners receiving outreach materials	-	ODA and SWCD are working to develop outreach strategy
# of ODA site visits	-	Process has not started
# of ODA compliance cases	-	Process has not started
SWCD and Conservation Partners		
# landowners provided with TA	-	Process has not started
# site visits	-	Process has not started
# conservation plans written	-	
SIA and Project Funding		
# funding applications submitted	1	$125,000 OWEB Grant for TA and monitoring
# funding applications awarded	1	

4.2 Activities and Accomplishments

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

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

Table 4.2a Activities conducted in 2018-2021 by Sherman SWCD, Wasco SWCD, Sherman Watershed Council, and Wasco County Watershed Councils

Activity	4-year results	Description
Landowner Engagement		
# events that actively engage landowners (workshops, demonstrations, tours)	19	Neighborhood Meetings, Crop Tours
# landowners participating in active events	992	
Technical Assistance (TA)		
# landowners provided with TA (via phone/walk-in/email/site visit	722	
# site visits	454	
# conservation plans written*	227	
On-the-ground Project Funding		
# funding applications submitted	94	
# funding applications awarded	94	

* Definition: any written management plan to address agricultural water quality. Can include NRCS-level plans or simpler plans. Can include: nutrients, soil health, water quality, irrigation, grazing, riparian planting, forest thinning to improve upland pastures to reduce livestock pressure on riparian areas, etc. Cannot include projects with no or weak connection to ag water quality (weed eradication that is not for riparian restoration, fuels reduction, alternative energy, non-ag rain gardens/rain harvesting, non-ag culvert replacement, and instream habitat enhancement that does not also improve water quality)

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

Table 4.2b Implementation funding (cash and in-kind) for projects on agricultural lands reported 1997-2019 (OWRI data include most, but not all projects, implemented in the Management Area).

Landowners	OWEB	DEQ	NRCS*	ODFW	SWCDs	BPA	All other sources**	TOTAL
$2,432,773	$2,762,921	$94,996	$458,854	$642,191	$269,697	$187,890	$918,569	$7,767,891

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

Table 4.2c Miles and acres treated on agricultural lands reported 1997-2019 (OWRI data include most, but not all projects, implemented in the Management Area).

Activity Type*	Miles	Acres	Count**	Activity Description
Riparian	39	708		Fifteenmile Bank Stabilization & Riparian Fencing (4.5 miles) Dead Dog Canyon RMS (166 acres)
Fish Passage	107		26	Ernst Ranch Habitat Restoration #212-4032 (9.6 miles) Dry Creek Steelhead and Trout Habitat Restoration (11)
Instream habitat	5			Dry Creek Instream Restoration (2)
Instream flow	630		31 cfs	Fifteenmile and Deschutes Water Programs through a Coordinated Funder Framework (505.9 miles and 10.46 cfs)
Wetland		0		-
Road	1		5	Ernst Ranch Habitat Restoration #212-4032 (1 mile and 4 structures)
Upland		55,736		Sheldon Ridge Fire Restoration (6,000ac), Fifteen Mile BMPs (4,273),
TOTAL	781	56,444	31	

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

4.3 Agricultural Water Quality and Land Condition Monitoring

4.3.1 Water Quality

DEQ analyzed data for *E. coli*, pH, dissolved oxygen, temperature, total phosphorus, and total suspended solids for over 60 stations in the Management Area. (DEQ. 2020 Oregon Water Quality Status and Trends Report. www.oregon.gov/deq/wq/programs/Pages/wqstatustrends.aspx).

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

Only one location had sufficient data to evaluate the effect of agricultural activities in the Management Area in the last four years (Table 4.3.1). The conclusions are the same as they were for the last biennial review.

The main agricultural water quality concerns are highlighted in grey and discussed below.

Table 4.3.1 Attainment of water quality standards for 2016-2019.

Site ID	Site Description	*E. coli* (mpn/100mL)	pH	Dissolved Oxygen (mg/L)	Total Phosphorus (mg/L)	Total Suspended Solids (mg/L)
		Attainment status			median; maximum[1]	median; maximum[1]
28333	**15Mile Creek at Petersburg**	No, but only 3 acute exceedances in the last 6 years.	Yes	Yes	0.045; 0.27	3; 29

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

Based on DEQ's analysis, phosphorus is the parameter of greatest concern at this location. Based on the patterns of high values of phosphorus and total suspended solids in the graphs, it appears that most of the phosphorus is entering Fifteenmile Creek attached to soil particles. In spite of the largescale conversion to direct seed, sediment is still entering Fifteenmile Creek but the mechanism is not clear. One potential recent source of phosphorus is ash from the catastrophic wildfires in 2018.

DEQ evaluated dissolved oxygen from grab samples not from continuous loggers. Therefore, dissolved oxygen may be more of a concern at this site than can be concluded from this analysis.

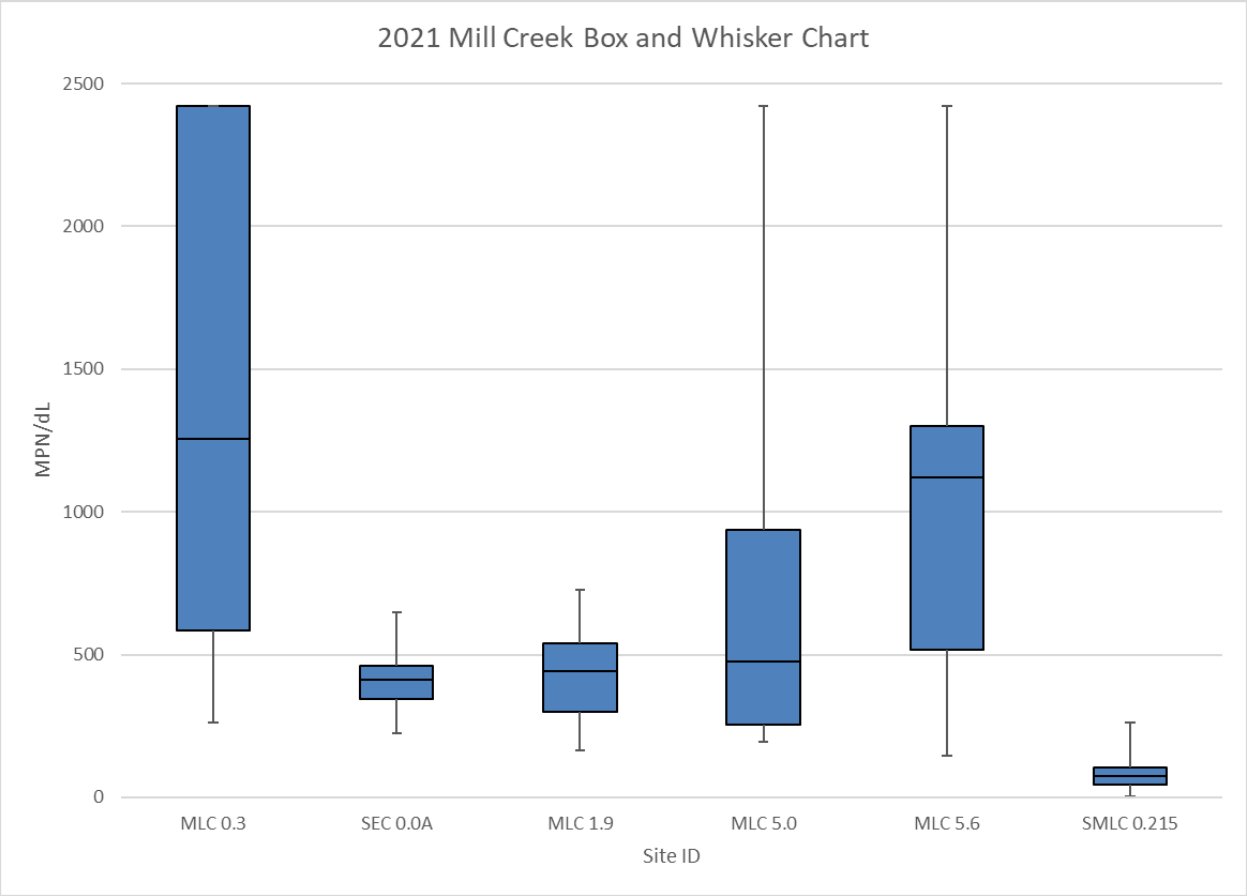
E. coli is a significant issue in the plan area as indicated from monitoring by the SWCD, the Dalles Watershed Council, Columbia RiverKeepers, Mosier Watershed Council. Agriculture is not the only source but likely a contributing source.

Temperature is also a significant issue in the plan area as evidenced by the FAST program which tries to prevent fish kills by keeping more cool streamflow instream.

Mill Creek *E. coli* study

Mill Creek flows through The Dalles to the Columbia River. Six sites were sampled from 2018-2021 from June until the beginning of October. Five were on the mainstem (River Miles 0.3, 1.9, 5.0, 5.6, and South Fork 0.015) and one was at the mouth of the tributary that parallels Skyline Road. MLC 5.0, 5.6, and SMLC 0.215 are in agricultural areas.

Almost all of the values collected from Mill Creek RM 0.3 exceeded the water quality standard, with several samples exceeding the limits of the sampling methodology. Additionally, average *E. coli* concentrations within the watershed have been trending up over this same three-year period. The Dalles Watershed Council is currently working with DEQ to compile data from Mill Creek across multiple agencies, with the goal of analyzing this data for trends and patterns to assess where the *E. coli* contamination might be coming from.



4.4 Biennial Reviews and Adaptive Management

ODA, the LAC, the LMA, and other partners met on December 8, 2021 to review implementation of the Area Plan and provided recommendations for the future (Tables 4.4a and 4.4b).

Table 4.4a Summary of biennial review discussion

Progress
Management Area Wide Assessments: Soil Erosion: ODA met with NRCS staff to discuss new RUSLE method. NRCS staff was reassigned and were not able to re-run the analysis in time for the 2021 Biennial Review. This analysis will be repeated before the next Biennial Review to determine whether this goal has been met. Riparian Vegetation: There has been a 10% increase in Class IIIx due to the 2018 wildfires in the Management Area. *See adaptive management discussion below. Pollution from wastes: There has been an increase in four livestock operations since 2016. *See adaptive management discussion below. **Chenoweth Creek Focus Area:** 2019: Overgrazed pasture has been overtaken by weeds moving 0.7 ac from Class II to Class III. Class III property of 2.6 ac was brought to Class II via compliance investigation and work with SWCD. 2020: Heavy livestock presence was noted on approximately 2.5 acres, which changed the assessment from class II to III. **Fifteenmile Focus Area:** 2021: 10.9 Class II acres increased to Class I acres due to post-fire natural regeneration.

Eightmile SIA:

As of December 2021, five tax lots identified as a Potential Violation or an Opportunity for Improvement were downgraded to Low or Limited. LIMITED = 191, LOW = 12, OPP= 7, PV = 0.

- ODA opened compliance investigation with one landowner in the SIA. ODA still has an active investigation with landowner.
- SWCD is currently working with the remaining six landowners identified in the SIA as Opportunity for Improvements.
- SIA is on track to meet the measurable objective.

Conservation plans were developed for several landowners and two expressed interest in applying for cost share. Both are waiting until fall 2021 to decide if they want to go forward with their cost share applications.

Eastern Lower Deschutes SIA:

SIA is open and SIA work is just starting. COVID-19 restrictions have set back the SIA process and Open House. An adaptive management discussion will be available at the next biennial review.

Impediments

- Climate change and natural catastrophes impact progress towards meeting measurable objectives.

Recommended Modifications

- Distribute management area-wide assessment results to landowners.
- Distribute BMPs to address *E. coli* and nitrate levels in drinking water wells via newsletter.
- Additional outreach for PSP.

Adaptive Management

Management Area Wide Assessments:

Soil Erosion: N/A

Riparian Vegetation: As a result of the adaptive management discussion with the LAC, it was decided to update the measurable objective to continuously maintain at least 90% of perennial streams in agricultural areas in Class I. Natural catastrophes such as wildfires and floods may impact the riparian vegetation class and can the skew the progress towards meeting the measurable objective.

Pollution from wastes: As a result of the adaptive management discussion with the LAC, it was decided to keep livestock operations to a minimum, defined as four operations at any given time. This will allow for flexibility of changing land managers and timing of when the assessment is completed.

Chenoweth Creek Focus Area:

- Focus Area was closed in September 2020 due to significant lack of interest despite three years of outreach in the watershed.
- SWCD hoped that increased outreach and personal contacts with landowners would benefit the Focus Area. Unfortunately, this was not the case in this watershed, and Focus Area was closed in order to provide TA to landowners who are actively seeking assistance in conservation efforts.

Fifteenmile Focus Area:

- Focus Area was opened in September 2020. Most improvements in riparian vegetation were due to post-fire natural regeneration. The short (one-year) timeframe was not long enough to make a greater impact on riparian vegetation conditions through changes in management practices. It takes time to conduct meaningful outreach, gain landowner interest, develop conservation plans, and implement practices.

Eightmile SIA: None

Eastern Lower Deschutes SIA: None

Table 4.4b Number of ODA compliance actions December 2018-November 2021

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

REFERENCES

DEQ. Water Quality Status and Action Plan: Deschutes Basin. September 2011. 11-WQ-043.

Field Office Technical Guide. USDA - Natural Resources Conservation Service.

BLM. Riparian Area Management: Greenline Riparian-Wetland Monitoring. TR 1737-8. 1993.

EPA. Monitoring Protocols to Evaluate Water Quality Effects of Grazing Management on Western Rangeland Streams. EPA 910/R-93-017. 1993.

Platts, William S., et al. Methods for Evaluating Riparian Habitats with Applications to Management. USDA - Forest Service. General Technical Report INT-221. 1987.

Rosgen, Dave. Applied River Morphology. Wildland Hydrology. 1996.

Appendix 1: Fisheries

Sensitive Fish Species

The Management Area is located within the climatic transition zone between Eastern and Western Oregon. A wide variety of fish species have evolved in the diverse stream habitats of this area.

The small Columbia River tributary streams, including Rock, Mosier, Chenoweth, Mill, Threemile, and Fifteenmile creeks, support coastal cutthroat trout, rainbow trout, winter steelhead, Coho salmon, Pacific lamprey, and a variety of non-game fish. In addition, Mill Creek periodically provides spawning and rearing habitat for fall Chinook salmon, and the Fifteenmile Creek system provides spawning and rearing habitat for spring Chinook salmon.

The lower Deschutes River supports summer steelhead, summer/fall Chinook, resident redband trout, bull trout, mountain white fish, and a variety of non-game fish. The river also serves as a migration corridor, as well as rearing habitat, for spring Chinook salmon. The river and tributaries, including White River, Macks, Jones, Ferry, Oak, and Stag canyons, and Wapinitia, Nena, Bakeoven, Buck Hollow, and Eagle creeks, provide spawning and rearing habitat for summer steelhead, redband trout, and a variety of non-game fish.

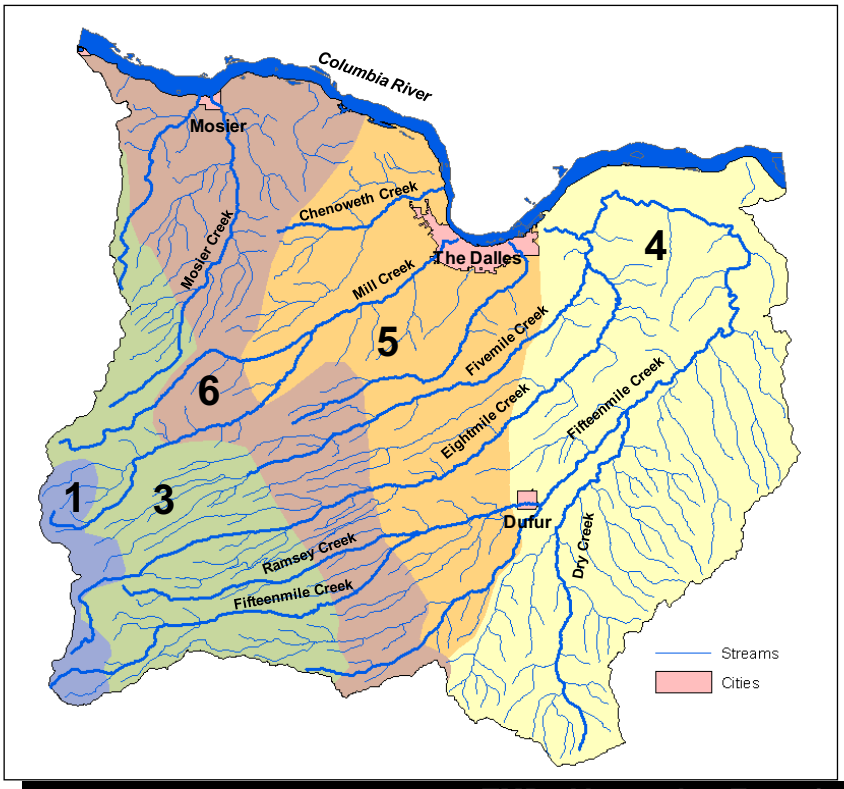
White River and tributaries upstream from White River Falls support resident redband and brook trout, mountain whitefish, and several non-game fish species.

Status of Fish Populations

Steelhead throughout the Management Area are listed as "Threatened Species" under the Endangered Species Act (ESA). Bull trout also are currently listed as "Threatened." Fall Chinook salmon in the Deschutes River have been proposed for listing as “Threatened,” however, the listing was deemed unwarranted. In recent years, fall Chinook populations in the Deschutes River have rebounded to near historic highs. Cutthroat trout throughout the Management Area also have been considered for listing as "Threatened," however, this listing was also considered unwarranted.

Redband trout and mountain white fish populations throughout the Management Area are considered to be healthy. The redband trout upstream from White River Falls are genetically unique and are most closely related to redband populations found in the desert streams in Southeast Oregon. Brook trout, found in upper White River tributaries (Clear, Frog, and Badger creeks), are an introduced species with limited distribution.

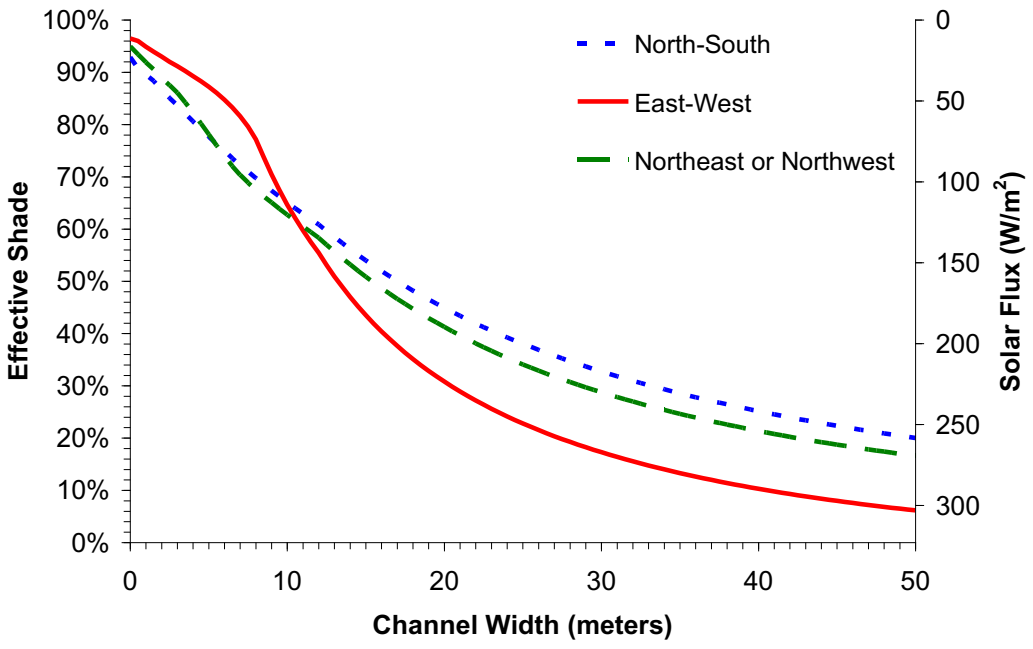
Appendix 2: TMDL Shade Curves

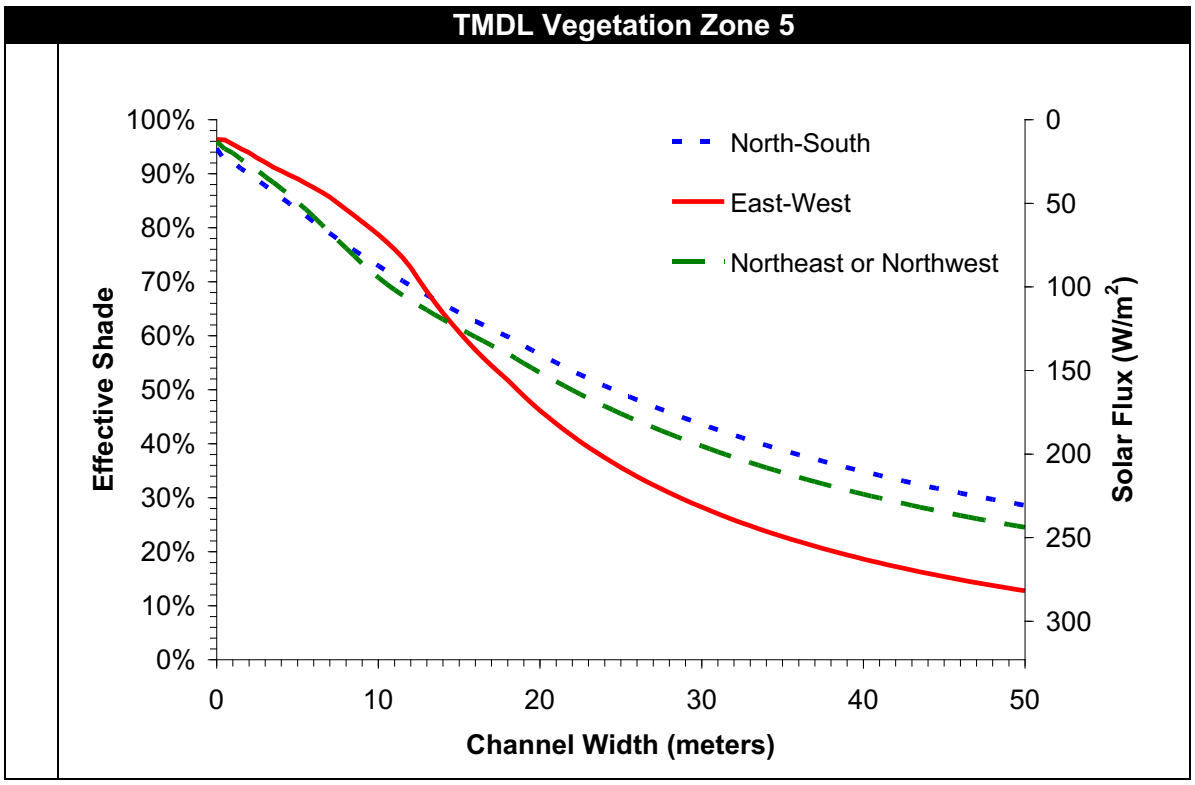


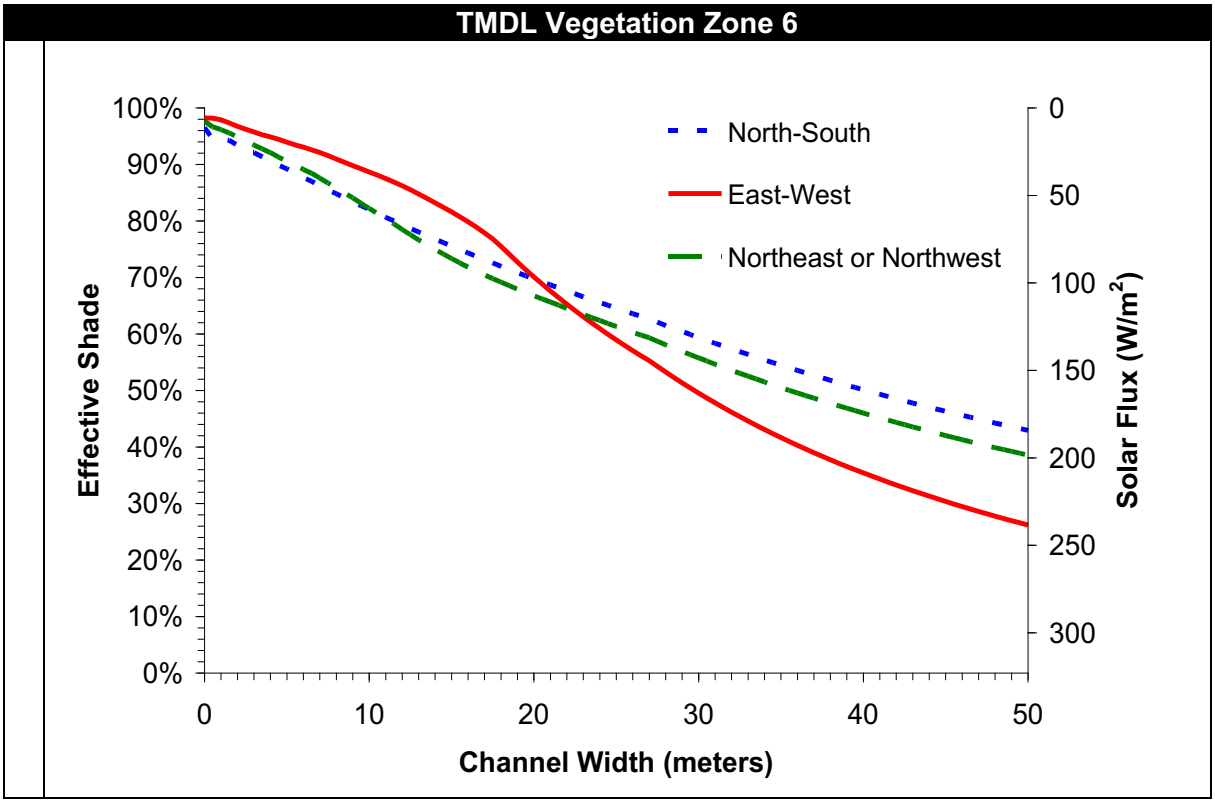
Map of ecoregions and the shade curves that correspond to zones 4, 5, and 6. The three curves in each graph correspond to the direction the creek is flowing.

O km = mouth

TMDL Vegetation Zone 4




TMDL Vegetation Zone 5
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Effective Shade
0
50
100
150
200
250
300
Solar Flux (W/m2)
North-South
East-West
Northeast or Northwest
0
10
20
30
40
50
Channel Width (meters)


TMDL Vegetation Zone 6
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Effective Shade
0
50
100
150
200
250
300
Solar Flux (W/m2)
North-South
East-West
Northeast or Northwest
0
10
20
30
40
50
Channel Width (meters)