Walla Walla Agricultural Water Quality Management Area Plan

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Developed by the

Oregon Department of Agriculture

and the

Walla Walla 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
ODF – Oregon Department of Forestry
ORS – Oregon Revised Statute
OWEB – Oregon Watershed Enhancement Board
OWRI – Oregon Watershed Restoration Inventory
PMP – Pesticides Management Plan
PSP – Pesticides 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 Area Plan (Area Plan) provides guidance for addressing water quality related to agricultural activities in the Agricultural Water Quality Management Area (Management Area). The Area Plan identifies strategies to prevent and control water pollution from agricultural lands.

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

Required Elements of Area Plans

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

Plan Content

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

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

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

Chapter 4: Progress and Adaptive Management. Describes progress towards 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 603-095-1700). The general regulations guide the Ag Water Quality Program, and the Area Rules for the Management Area are the regulations with which landowners must comply. Landowners are encouraged through outreach and education to implement conservation and management activities.

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

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

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

1.2 History of the Ag Water Quality Program

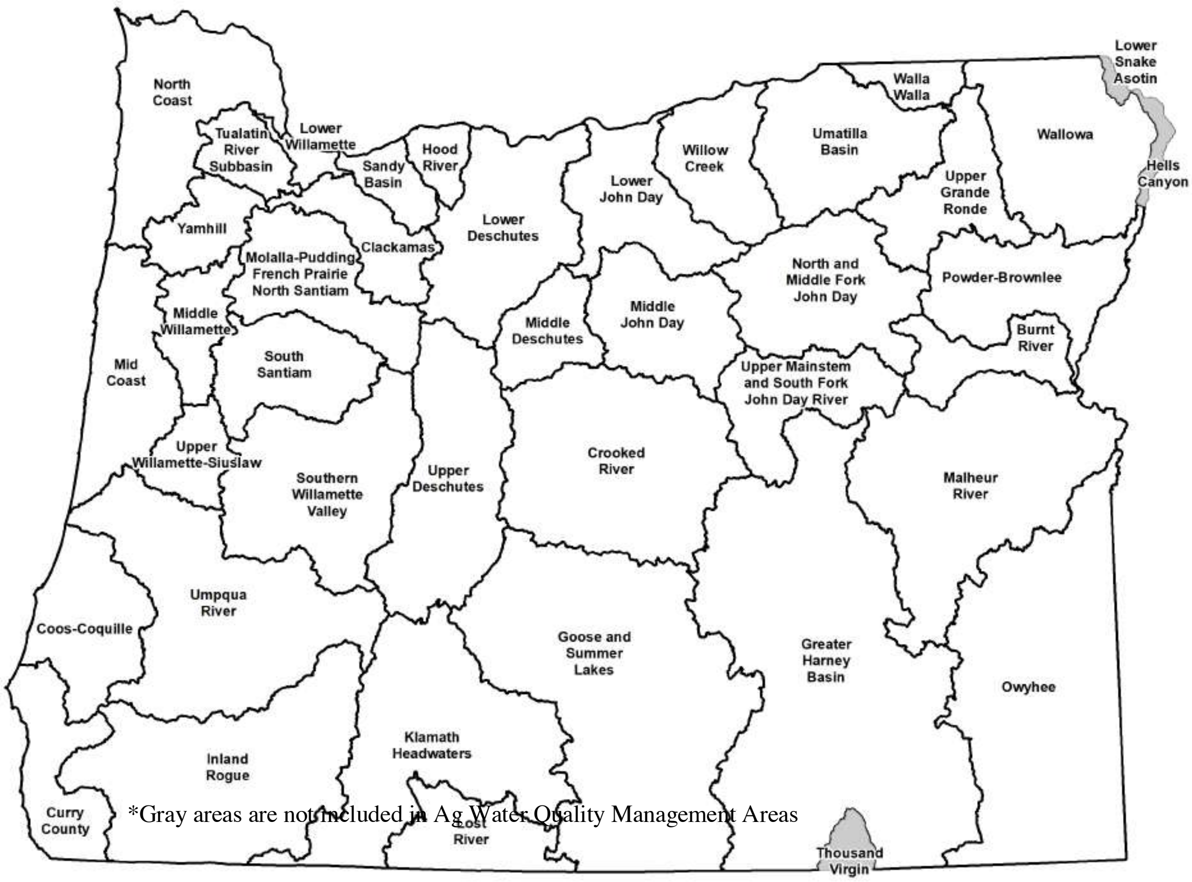
In 1993, the Oregon Legislature passed the Agricultural Water Quality Management Act directing ODA to develop plans to prevent and control water pollution from agricultural activities and soil erosion and to achieve water quality standards (ORS 568.900 through ORS 568.933). The Oregon Legislature passed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

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

- Providing education, outreach, and technical assistance to landowners,
- Implementing projects to improve agricultural water quality,

- Investigating complaints of potential violations of Area Rules,
- Conducting biennial reviews of Area Plans and Area Rules,
- Monitoring, evaluation, and adaptive management,
- Developing partnerships with state and federal agencies, tribes, watershed councils, and others.

*Figure 1.2 Map of 38 Agricultural Water Quality Management Areas**



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

1.3 Roles and Responsibilities

1.3.1 Oregon Department of Agriculture

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

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

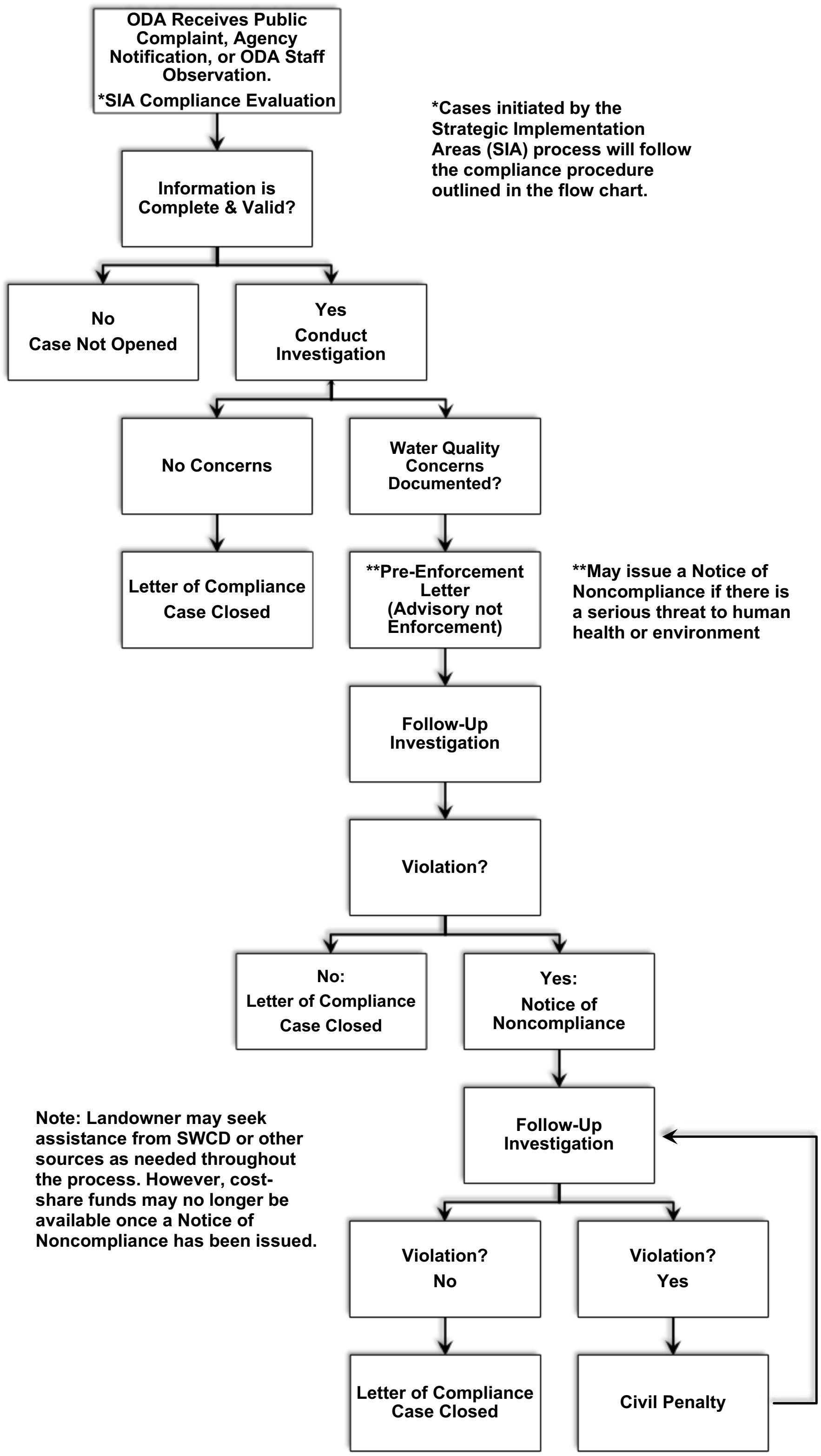
ODA bases Area Plans and Area Rules on scientific information (ORS 568.909). ODA works in partnership with SWCDs, LACs, DEQ, and other partners to implement, evaluate, and update the Area Plans and Area Rules. If and when other governmental policies, programs, or rules conflict with the Area Plan or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

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

The Area Rules are a set of standards that landowners must meet on all agricultural or rural lands. "Landowner" includes any landowner, land occupier, or operator per OAR 603-95-0010(24). All landowners must comply with the Area Rules. ODA will use enforcement where appropriate and necessary to achieve compliance with Area Rules. Figure 2 outlines ODA's compliance process. ODA will pursue enforcement action only when reasonable attempts at voluntary solutions have failed (OAR 603-090-0000(5)(e)). If a violation is documented, ODA may issue a pre-enforcement notification or an enforcement order such as a Notice of Noncompliance. If a Notice of Noncompliance is issued, ODA will direct the landowner to remedy any conditions through required corrective actions under the provisions of the enforcement procedures outlined in OAR 603-090-060 through OAR 603-090-120. 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,
- 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

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 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".

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

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

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

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

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

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

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

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

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

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

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

1.4.5 Streamside Vegetation and Agricultural Water Quality

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

Site-Capable Vegetation

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

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

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

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

1.4.6 Soil Health and Agricultural Water Quality

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

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

1.5 Other Water Quality Programs

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

1.5.1 Confined Animal Feeding Operation Program

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

1.5.2 Groundwater Management Areas

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

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

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

1.5.3 The Oregon Plan for Salmon and Watersheds

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

1.5.4 Pesticide Management and Stewardship

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

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

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

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

1.5.5 Drinking Water Source Protection

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

1.6 Partner Agencies and Organizations

1.6.1 Oregon Department of Environmental Quality

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

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

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

1.6.2 Other Partners

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

1.7 Measuring Progress

Agricultural landowners have been implementing 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.

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 Water Quality Monitoring

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

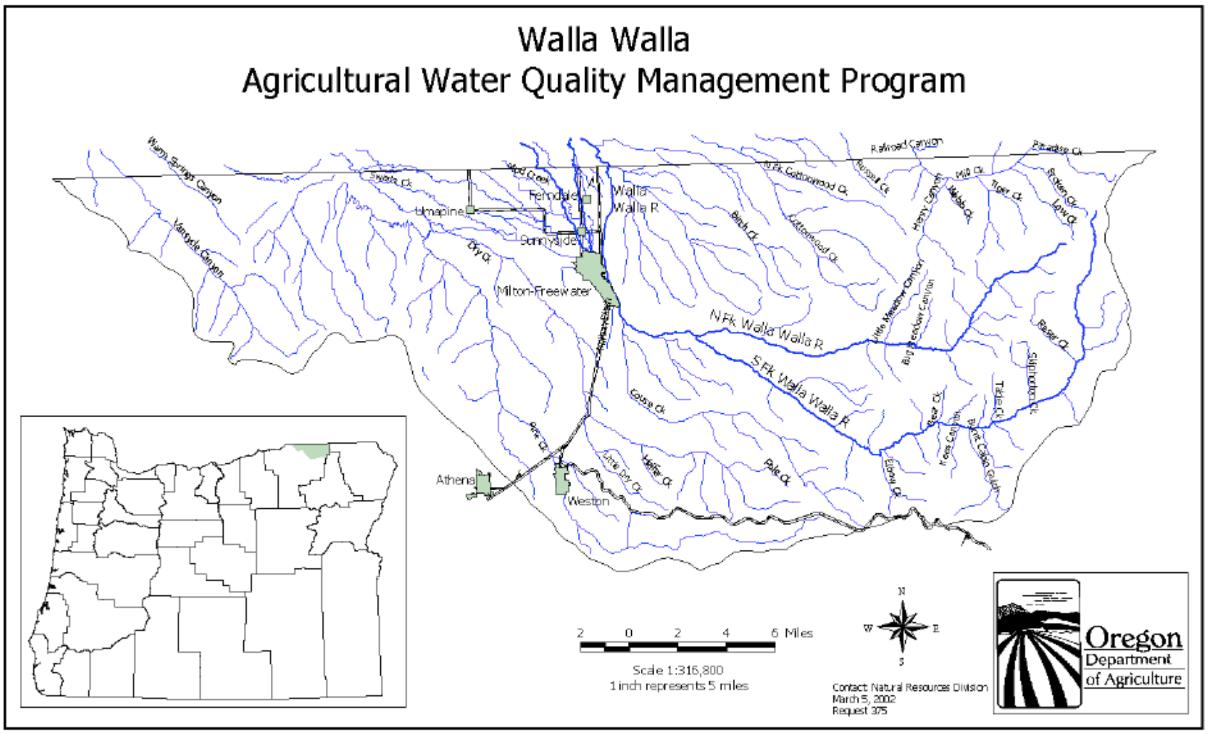
As part of monitoring water quality status and trends, DEQ regularly collects water samples every other month throughout the year at over 130 sites on more than 50 rivers and streams across the state. Sites are located across the major land uses (forestry, agriculture, rural residential, and urban/suburban).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

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

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

Chapter 2: Local Background

The Walla Walla River Basin, located in southeast Washington and northeast Oregon, encompasses 1,758 square miles (1,125,120 acres). The portion of the basin in Oregon is 27 percent or 480 square miles. The Oregon Walla Walla River subbasin is bounded by the Oregon-Washington state line (on the north), by the Blue Mountains (on the east and the south), and by Umatilla River Basin and the Columbia River (on the west). The Walla Walla River originates in the Blue Mountains and flows northwesterly, crossing into Washington state at River Mile (RM) 40, and entering the Columbia River at Wallula, WA (RM 313). The Oregon portion of the subbasin has eight watersheds: mainstem Walla Walla River (including branches of the Little Walla Walla River), South Fork Walla Walla River, North Fork Walla Walla River, Pine Creek, Dry Creek, Birch Creek, Vansycle Canyon and Couse Creek. Two other watersheds, Cottonwood Creek and Mill Creek, lying partially in Oregon, are included in the plan area. This Area Plan applies only to the Oregon portion of the basin.



2.1 Local Roles

2.1.1 Local Advisory Committee

The Area Plan was developed with the assistance of the LAC. 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
Bob Lewis (Co-Chair)	Stateline, East Little Walla Walla River	Irrigated Crops, environmental consultant
Vern Rodighiero (Co-Chair)	Milton-Freewater	Orchard Crops
Dennis Rea	Spofford, North Fork Walla Walla River	Dryland & Irrigated Crops
Jerry Zahl	College Place, WA	Agriculture Consultant Field Man
Brian Wolcott	Milton-Freewater	Watershed Council Executive Director
Herb March	Couse Creek	Dryland Crops
Lance Bullock	Walla Walla River	Orchard Crops
Ralph Perkins	Milton-Freewater	Irrigated Crops
Ray Williams	Umapine	Irrigated Crops, Dairy

2.1.2 Local Management Agency

Implementation of the Area Plan is accomplished through an Intergovernmental Grant Agreement(s) between ODA and the Umatilla SWCD. This Intergovernmental Grant Agreement defines the SWCD(s) as the LMA(s) for implementation of the Ag Water Quality Program in this Management Area. The SWCD(s) was/were also involved in development of the Area Plan and Area Rules.

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

2.2 Area Plan and Area Rules: Development and History

The director of ODA initially approved the Area Plan and Area Rules in 2002.

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

The Area Plan was revised in 2007 to add TMDL information, updated in 2012 to add information about monitoring and Focus Areas, reformatted in 2014, and in 2018 to include Strategic Implementation Areas.

2.3 Geographical and Physical Setting

The Walla Walla River Basin, located in southeast Washington and northeast Oregon, encompasses 1,758 square miles (1,125,120 acres). The portion of the basin in Oregon is 27 percent or 480 square miles. The Oregon Walla Walla River Subbasin is bounded by the Oregon-Washington state line (on the north), by the Blue Mountains (on the east and the south), and by Umatilla River Basin and the Columbia River (on the west). The Walla Walla River originates in the Blue Mountains and flows northwesterly, crossing into Washington State at river mile (RM) 40, and entering the Columbia River at Wallula, Washington (RM 313). The Oregon portion of the Subbasin has eight watersheds: mainstem Walla Walla River (including branches of the Little Walla Walla River), South Fork Walla Walla River, North Fork Walla Walla River, Pine Creek, Dry Creek, Birch Creek, Vansycle Canyon and Couse Creek. Two other watersheds, Cottonwood Creek and Mill Creek, lie partially in Oregon and are included in the Management Area. This Area Plan applies only to the Oregon portion of the basin.

2.3.1 Climate

The climate in the basin is continental where winters are cold, but generally not severe, and summer days are hot, but nights are fairly cool. Average daytime high temperatures generally decrease with increasing elevation. Lower elevation area temperatures average 50° to 55°Fahrenheit (F) with extreme temperatures of 115° and -21°F recorded in recent years. Precipitation ranges from less than ten-inches in a narrow band along the Columbia River to more than 40-inches at high elevations in the Blue Mountains. Most precipitation occurs between October and May with snow in the upper elevations.

2.3.2 Geology

Elevations in the Walla Walla River basin are about 270 feet at the Columbia River, about 3,000 feet along the base of the Blue Mountains, and up to 6,000 feet at mountain crests. The elevation of Milton-Freewater is about 950 feet. Multiple lava flows exceeding 2,500 feet in thickness, known as the "Columbia River Basalt," underlie nearly the entire Subbasin. The river basin is divided into two physiographic regions, the Deschutes-Umatilla Plateau and the Blue Mountains.

The Deschutes-Umatilla Plateau is a broad upland plain formed by flow upon flow of basalt, which dip gently northward from the Blue Mountains to the Columbia River. The Blue Mountain region includes the extreme northern extension of the Blue Mountains of Oregon. It was formed by uplifting, folding, faulting, and erosion of a variety of volcanic, sedimentary and metamorphic rock, and is characterized by flat-topped ridges, steep-walled canyons, and forested mountain slopes.

The Walla Walla syncline (a broad u-shaped fold) forms the center of the Walla Walla Subbasin and forms a deposition basin between the upland areas. These numerous sedimentary deposits include both areas of clay and gravels deposited on top of the basalt. Younger sedimentary deposits overlie the clay and gravel units. (Umatilla Basin Report, 1988)

2.3.3 Hydrology

The Walla Walla River and its tributaries drain about 480 square miles in Oregon. Water availability in the Walla Walla River Basin depends on high-elevation snowpack in the Blue Mountains. Runoff occurs anytime during the precipitation period of October through May, with peaks occurring in April. Flows diminish rapidly after May, reaching their lowest levels in August and September. In late fall and winter, stream flows increase in response to storms migrating in from the Pacific Ocean.

2.3.4 Soils

An extensive deposit of silty clay known as the Palouse Formation covers much of the uplands. Recent alluvium, consisting of clay, silt, sand, and gravel deposited by present-day rivers and streams is common in river valleys and flood plains. (Umatilla Basin Report, 1988)

A deep deposit of loess (windblown silt and fine sand) covers much of the Subbasin that is used for agricultural purposes. Loess is highly erodible, yielding sediment, particularly in the middle and lower reaches of the main stem Walla Walla River. (Watershed Assessment, Upper Walla Walla River Subbasin, 1997).

2.3.5 Vegetation

Currently, vegetation in the headwaters of the drainage is primarily evergreen forest, dominated in the higher elevations by Douglas fir and grand fir with an understory of shrubs, grasses, and forbs. In the lower elevation, there is a more open forest dominated by ponderosa pine.

Mid-elevation lands are characterized by stands of timber changing into brush and grass as the elevation declines. Past land management has eliminated much of the native sagebrush and bunchgrass; these have widely been replaced by noxious weeds and other undesirable grasses, shrubs, and broadleaf weeds. Large mid-lower elevation areas have been converted into dryland farming. This is a transition zone, where farmland is intermingled with range. Often, the north slopes will be farmed while the west and south slopes, with shallower soils, are used as range.

A riparian community dominated by cottonwood, alder, willow, and various shrubs occurs throughout the river basin. Cultivation, logging, domestic livestock grazing, residential and commercial development, and flood control activities have affected riparian vegetation throughout much of the mid-lower elevation reaches of the Subbasin.

2.3.6 Land Ownership and Land Use

According to the Umatilla Basin Report, 1988, the total acreage in the Oregon portion of the Walla Walla basin is 311,982 acres. Land in private ownership is 256,111 acres (81.7%), mostly in cropland or rangeland. The public owns 55,871 acres (17.8%); the US Forest Service manages 53,588 acres, the Bureau of Land Management manages 1,942 acres, and the state manages 41 acres. The US Forest Service has 136 acres of land in the Wenaha-Tucannon Wilderness Area that lie within the Walla Walla River Basin.

Agriculture and related trades and industries are the economic base for the area. Production of a number of important food crops has led to the development of a large food-processing complex in the valley. Since farm-gate value is reported for Umatilla County as a whole (503 million dollars), it is difficult to determine an exact economic value for agriculture in the Walla Walla River basin alone. Statistics of 2011 from the Oregon State University (OSU) Extension Information Office, indicate the value of tree fruit crops and alfalfa seed, which are grown almost exclusively in the Walla Walla Basin, at $49 million.

There are about 133,000 acres of cropland in the Walla Walla River basin. Grains, predominantly wheat, account for about 50 percent of crops grown and are located primarily on the higher dryland areas. Green peas account for about 13 percent and are grown on the drylands where the rainfall is adequate, usually in rotation with wheat. Commercial vegetable and fruit production, concentrated north of Milton-Freewater account for about nine percent of the acreage; pasture, alfalfa, and other hay account for about 15 percent; and the remainder is idle or fallow. Approximately 20,000 acres are irrigated with water that is withdrawn from wells and from surface sources.

Livestock production is important in the valley. Most of the estimated 4,800 cow-calf pairs are raised on irrigated pastures with summer grazing on the slopes of the Blue Mountains. There are some small feedlots and dairies in the Subbasin.

Forested land in the Subbasin is about 88,200 acres. National forests comprise about 54 percent, private holdings about 43 percent and state and local government less than three percent. Most forestland has been logged at least once.

The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) have treaty rights and interests in their traditional homeland, which includes the entire Walla Walla Basin and those relating to natural resources and water quality, such as fishing and subsistence activities.

2.3.7 Water Yield and Flow

The hydrology of the Walla Walla Basin is complex due to its geology and extensive development. The Walla Walla River's flow in Oregon comes largely from two tributaries: The North and South Forks Walla Walla River. Both forks emerge from deep basaltic canyons and join to form the Walla Walla River mainstem about five miles southeast of Milton-Freewater.

Active gauges are maintained on the North and South Forks of the Walla Walla River. The South Fork is the larger of the two streams. Average annual yield of the South Fork is more than three times that of the North Fork. Together, they yield about198,000 acre-feet per year.

The Walla Walla River has created an extensive alluvial fan from the gravels supplied by its forks and its channel. Once it flows out of the bedrock canyons of its headwaters, the Walla Walla dissipates a portion of its flow into the deposited gravels. Historically, the mainstem dispersed into multiple channels spreading across the valley floor. The multiple channels, including the Little Walla Walla River, are now used as natural irrigation ditches to carry water to the farms and orchards. (Umatilla Basin Report, 1988)

By June or early July on an average year and prior to 2001, the Walla Walla River was dry near the state line because of irrigation withdrawals, seasonally low flows, channel bed water losses, and evaporative losses. Irrigation and groundwater return flows yield live flow in the Washington section of the Walla Walla River. During the irrigation season, decreases noted in some wells that pump from the shallow gravel aquifer are attributed to groundwater recharge from irrigation ditches The Walla Walla Watershed Council has continued to monitor these changes in the Walla Walla River and the local well network and will update these numbers in the 2022 biennial plan.

2.3.8 Water Use

The first irrigation was believed to have occurred in 1846, and the earliest water rights of record date to the early 1860s. Some of these rights were established by court decree in the Walla Walla adjudication in 1933. In 1986, the Water Resources Commission withdrew the Walla Walla River and tributaries from further appropriation from the Little Walla Walla diversion to the state line. Ground water development for irrigation dates back to the early 1900s.

A general provision of law, ORS 537.811, prohibits out-of-state diversions of water without consent of the Oregon Legislature. A 1936 U. S. Supreme Court decision allows Oregon users with senior water rights to divert the entire flow of the Walla Walla River before it enters Washington. Other judicial stipulations require water distribution on interstate tributaries as if the state line did not exist.

Approximately 70 percent of the surface irrigation water in the Oregon portion of the basin is delivered through two irrigation districts: the Walla Walla River Irrigation District (WWRID) and the Hudson Bay District Improvement Company (HBDIC). The combined water rights for the two districts is approximately 280 cubic feet per second (cfs) with the combined diversion rate peaking at about 150 cfs during June and drops to approximately 60 cfs in September.

The WWRID was formed in 1995 by the consolidation of five existing irrigation companies. Almost 500 water rights, with priority dates in the late 1800s, make up the WWRID that allow for year-around diversion. It delivers water to 3,600 acres with water rights from the Walla Walla River. It maintains four diversion sites and ten canals and ditches totaling 30.4 miles. The irrigation season is from mid-March to mid-October with irrigation water applied mostly by sprinklers. In general, water rights in the WWRID provide for a diversion of 16.8 gallons per minute per acre though modern application methods and current crops may require less water.

The HBDIC was formed in 1952 and took over existing irrigation facilities. It delivers water to approximately 6,900 acres with Walla Walla River surface rights. The water is diverted at the Little Walla Walla diversion and redistributed at the “frog,” a centralized distribution facility. The HBDIC maintains five canals and ditches with a combined length of 35.6 miles.

The Little Walla Walla River is a former braided stream section of the Walla Walla River and is used as a primary component of the District's water delivery system. The Walla Walla River flow is regulated by head gates and fish screens even though a court order considers it to be a natural stream.

Above Milton-Freewater, water is diverted by other basin users via individual or small group diversions that do not have organized irrigation districts. These diversions account for about 30 cfs. Current projects are being implemented by local citizens, irrigation districts, the WWBWC, the Water Resources Department (WRD), Bonneville Power Administration, and the CTUIR to improve the efficiency of these diversions including: improved head gates and flow measuring devices, fish screens, removal or modification of gravel push-up dams, conversion to pump systems, and conversion from flood to sprinkler systems.

2.3.9 Groundwater

Fractured basalt provides a major groundwater source throughout the Management Area. A major alluvial or gravel aquifer underlies approximately 120,000 acres of the Milton-Freewater/Walla Walla area. Recharge to the gravels occurs from precipitation, infiltration from river beds, canals, ditches, and irrigation loss.

Groundwater declines could be related to the increasing number of wells and increasing water usage for domestic and agricultural activities requiring more water withdrawal than is sustainable for the basin's aquifer. Additionally, a significant water management change in 2001 could be having an effect on the basin's aquifer. In that year, a Settlement Agreement with three irrigation districts required them to keep 18 cubic feet per second in the Walla Walla River during summer months and be incrementally raised to 25 cfs during fall and spring. For the previous ~100 years, the Walla Walla River ran dry during the summer because all water was diverted for irrigation uses. This water flowed through the vast array of irrigation ditches in the basin, providing groundwater recharge as seepage occurred within the ditch systems. Since 2001, less water has been flowing through the Walla Walla/Gardena/Hudson Bay systems during the summer months leading to a reduced amount of groundwater recharge through the ditch system. However, since the decline in the aquifer seems to have started prior to the 2001 Settlement Agreement, the reduced recharged from surface flows in the irrigation system does not fully explain the downward trend. Increased efficiency for irrigation (ditch piping projects and modern irrigation methods) has further reduced the amount of groundwater recharge from irrigation ditches and canals. Historic irrigation practices included flood irrigation, which allowed for groundwater recharge, while newer drip and sprinkler systems only deliver as much water as is needed. Also, many irrigators have begun using supplemental wells more than in the past and new irrigation wells have been drilled.

Groundwater levels in the Walla Walla and College Place region and in the upper Milton-Freewater area appear to be relatively stable. Some wells have shown moderate water level increases in previous years, especially wells near the lower East Little Walla Walla and Big Spring system (GW_102, 113, Figures 32-33). These systems have seen higher surface flows in recent years. The East Little Walla Walla River and Big Spring systems and the nearby wells are likely benefitting from a combination of water management changes and large quantities of seepage from the mainstem Walla Walla River between Nursery Bridge and Tum-A-Lum bridge.

Because the gravel aquifer is shallow and the soils are highly permeable, groundwater is susceptible to degradation from fertilizers, pesticides, septic systems, and urban runoff (Umatilla basin Report, 1988). A groundwater quality study, conducted in April 1999 by DEQ in the area north and west of Milton-Freewater, found no levels of contaminants at or above drinking water standards. However, occasional elevated levels of bacteria and nitrates do indicate a need for further study.

2.3.10 Fish Resources

The Walla Walla River basin is home to several anadromous and resident fish species, of which steelhead and bull trout are listed as threatened under the federal Endangered Species Act. Channelization, low streamflow and high-water temperature are factors limiting the production of fish in this Basin. Measures are being taken by local irrigators, tribes, and agencies to develop a Bi-State Habitat Conservation Plan to protect these wild fish. The WWBWC, irrigation districts and producers are actively promoting irrigation efficiency projects to reduce the amount of water diverted from the Walla Walla River. Yearly agreements were negotiated until 2007 between the irrigation districts and the US Fish and Wildlife Service to protect irrigation district patrons from liability and to leave adequate water instream to protect and improve fish habitat.

Most major migration barriers have been removed or altered, but passage at push-up dams is still a potential problem. Completion of the new Nursery Bridge Dam fish ladder, in 2001, removed the last permanent structural barrier in the Walla Walla River. All ditches and diversions in the mainstem are screened and diversion structures are being improved to make them more efficient and fish friendly. WWBWC and CTUIR documents point out that several fish barriers still exist on the Little Walla Walla River system.

Resident and anadromous fish habitat and water temperatures are good in the headwaters of the North and South Forks. Fish habitat quality decreases and water temperature increases as the river flows down through the valley. Water quality remains fairly high, but because of levees to protect property, fish habitat quality (stream complexity and large organic debris) decreases. Mainstem habitat is limited between Milton-Freewater and the state-line because of low flows, U.S. Army Corps of Engineers flood control levees, and diversions.

Steelhead are present, with adult and juvenile migration coinciding with the higher stream flows of November through June. A ten-year average of 621 adult steelhead returns annually to the upper Walla Walla River (Oregon Department of Fish and Wildlife communication, 2/2012). This suggests that the steelhead population is near the carrying capacity of 658 fish under current conditions. Most spawning occurs in March through May while smolt outmigration takes place during winter and spring.

Bull trout are found in the Upper Walla Walla River and Mill Creek. Adult bull trout move downstream from headwater tributaries after spawning in the fall, over-winter mostly in the mainstem, and return to the headwaters as waters warm in the spring. Based on spawning surveys, bull trout numbers are increasing with a population of 4,000 estimated in the entire Walla Walla River system.

Small numbers of Western Brook lampreys are present. Lampreys are anadromous and migrate as juveniles, returning to the headwaters to spawn. Resident fish include redband trout, mountain whitefish and margined and Paiute sculpin in the upper watershed and northern pikeminnows, chiselmouth, redside shiners, large-scale suckers, and speckled dace in the lower basin. Spring Chinook were indigenous historically to the basin but were extirpated by the 1920's. The CTUIR successfully reintroduced spring Chinook salmon to the basin in September 2000 and August 2001. Adult Chinook began returning to the Walla Walla River in 2004. Since re-introduction, the average Chinook return is 263 adults with 1,193 in 2010.

2.4 Agricultural Water Quality

2.4.1 Water Quality Issues

2.4.1.1 Beneficial Uses

Water quality in the Walla Walla Management Area is managed to protect recognized beneficial uses. Beneficial uses of water in the Walla Walla basin are: public and private water supply, industrial water supply, irrigation, livestock watering, anadromous fish passage, salmonid fish rearing and spawning, resident fish and aquatic life, wildlife and hunting, fishing, boating, water contact recreation, and aesthetic quality (OAR 340-041-682, table 12). Beneficial uses that are adversely affected, according to current data, include: salmonid fish rearing and spawning, anadromous fish passage, resident fish and aquatic life, irrigation, and fishing.

2.4.1.2 WQ Parameters and 303(d) list

TMDLs were approved for temperature in 2005. In addition, most assessments of the conditions of the Walla Walla Subbasin indicate that sediment is a water quality concern affecting beneficial uses. Management that addresses the conditions described in the Prevention and Control Measures section of this Area Plan will aid in preventing future water quality listings. The most recent Water Quality Limited List –303(d) is included as Appendix A. The following discussion of water quality parameters of concern in the watershed addresses the CWA requirements for standards to be established for protection of the most sensitive beneficial uses.

Temperature

Temperature is primarily a summer concern for rearing of anadromous fish species, resident trout and for bull trout. Water temperatures above 70°F can be immediately lethal to salmonids due to a breakdown in their respiration and circulation systems. Temperatures between the mid-60s to 70°F are stressful to salmonids, and fish survival is reduced as the salmonids are more susceptible to a variety of other agents. The sub-lethal effects associated with higher than optimum temperatures are disease, reduced metabolic energy for feeding, and reduced growth or reproductive behavior due to avoidance of areas with high temperatures. High water temperatures can also create barriers to migration and prevent normal movement of both juvenile and adult fish.

At temperatures above 65-70°F, these fish are inefficient at hunting, hiding, and processing food. In addition, warmer water can also harm salmonids by increasing the incidence of disease, impairing their ability to spawn, reducing growth rates, and decreasing survival of eggs.

The Oregon temperature standard is defined in OAR 340-041-0028. The applicable biologically-based temperature thresholds (numeric criteria) in the basin are:

- Salmon and trout rearing and migration (18.0°C (64.4°F)) applicable at all times when not superseded by a cooler criterion below.
- Core cold water habitat criterion (16°C (60.8°F)), applicable year-round in waters draining to the mainstem while still in Oregon; except where cooler criteria apply simultaneously.
- Salmon and steelhead spawning criterion (13°C (55.4°F)), applicable above the state border to the upstream part of the city of Milton-Freewater from January 1 through June 15.
- Bull trout spawning and juvenile rearing criterion (12°C (53.6°F)), applicable above the state border during times of spawning and rearing.

In the Walla Walla basin, a substantial cause of stream heating results from the removal of trees and other shade-producing vegetation adjacent to the stream. This allows direct sunlight to heat the water. In addition, vegetation disturbance and stream straightening are common causes of bank erosion in the basin, resulting in wider channels with more solar heating.

Sediment

Sediment includes fine silt and organic particles suspended in the water column, settled particles, and larger gravel and boulders that move at high flows. Sediment movement and deposition is a natural occurrence but, high levels of sediment can degrade fish habitat by filling pools, creating a wider and shallower channel and covering spawning gravels. Suspended sediment or turbidity can physically damage fish and other aquatic life, modify behavior and increase temperature by absorbing incoming sunlight. Sediment comes from erosion on range and croplands, erosion from streambanks and streambeds, and runoff from roads and developed areas. Nutrients, pesticides, and toxic substances can also be attached to sediment particles.

Land managers are carrying out ongoing efforts to reduce soil erosion and sediment delivery to streams. However, current U.S. Department of Agriculture (USDA) farm programs do not require soil erosion reduction on the majority of Walla Walla area soils because they are not classified as "highly erodible" and are capable of maintaining productivity while losing up to five tons per acre per year. To maintain adequate water quality for beneficial uses, this Area Plan addresses soil erosion and sediment by extending USDA farm program soil erosion control requirements to all soil types.

Sediment deposition or siltation is a problem in the spring branch streams. Historically, these streams had productive fisheries. Now there is limited value for fisheries and aquatic life due to lack of spawning gravels, habitat, and aquatic weeds. Irrigation return flow, bank erosion, and livestock access for watering are some of the causes of this harmful siltation.

2.4.1.3 TMDLs and Agricultural Load Allocations

The strategies identified in this Area Plan for reducing pollution from agricultural and rural lands are consistent with goals for nonpoint source pollution reduction established in the Walla Walla Basin TMDL. This Area Plan serves as the implementation plan for agriculture's load allocation and may be revised to address the load allocations as they are implemented. It is expected that adoption of management practices aligned with the Voluntary and Regulatory Measures will, over time, result in achievement of TMDL goals and meeting water quality standards. In 2005, the EPA approved the Oregon portion of the Walla Walla Basin TMDL. The Walla Walla TMDL issued temperature targets and an improvement plan to address stream heating in the basin. DEQ developed the TMDL for temperature in partnership with the WWBWC and in collaboration with the various affected organizations and watershed managers. This effort advanced their understanding of the river.

The lower portions of the Walla Walla River and its tributaries are not cool enough in the summer to fully protect salmon and trout (salmonids) when they rear and spawn. The Walla Walla Basin salmonids that are most sensitive to this heating are: Chinook salmon, steelhead trout, and bull trout present in much of the Basin. During the summer and early fall, low stream flows and high solar input cause the water temperature to rise to levels that can be deadly to cold water species.

The TMDL addresses the problem in several ways:

- Provides an estimate of near-natural temperatures along the length of the Walla Walla River. This allows managers to see where the greatest room for improvement is.
- Establishes numeric goals for on-the-ground conditions that would lead to more natural temperatures. The TMDL identifies vegetation heights and stable channel widths that would provide for lessened, more natural heating. Potential increased stream flow is also estimated,

along with the resultant temperature profile. However, it is important to recognize that DEQ does not regulate flow, nor is the TMDL intended to diminish existing water rights.

- The TMDL is accompanied by a management plan designed to establish a cooling trend.

A TMDL Water Quality Management Plan (WQMP) provides a framework with placeholders for various authorities: Oregon Departments of Agriculture and Forestry, the US Forest Service, and US Bureau of Land Management. These designated management agencies (DMAs) will provide TMDL water quality management planning and implementation for the area each administers.

2.4.1.4 Drinking Water

Several communities obtain domestic drinking water from surface and groundwater in the Management Area. Nearly all of the Management Area contributes to the drinking water source area for the City of Hermiston's Columbia River intake and to the City of Walla Walla's Mill Creek intake. These two community water systems serve over 50,000 people. Agricultural land uses (crops, pasture, and livestock) are present throughout the source area for Hermiston. The portion of the Management Area within Walla Walla's drinking water source area is primarily USFS lands and closed to public use under an agreement between the city's water division and the USFS.

In addition, 17 public water systems use groundwater wells to serve approximately 9,100 people. Community water systems using groundwater include the cities of Milton-Freewater and Weston plus Vincent Water Company and Villadom, Green Acres, and Locust Mobile Home Park water systems. There are also the Alpine Outpost (Tollgate Resort), Kelly's, The Oasis, M-F Drive-In Theatre, Wayside Market, Clay In Motion, First Stop Mart, and Harris Park (Umatilla County Park) non-community systems. There are two schools, Ferndale Elementary and Milton-Stateline School, and a workplace, Smith Frozen Foods.

All public water systems in the management area, excluding the cities of Walla Walla and Hermiston, have <u>recent</u> alerts for total coliform and/or *E. coli*. Nitrate alerts (generated when nitrate exceeds 5 mg/l) exist for Vincent Water Company (6-6.9 mg/L), and First Stop Mart (5.9 mg/L); these are on the west side of the Management Area. These contaminants are often related to animal and cropland agriculture. All of the public water systems have agricultural land uses (irrigated crops, pasture, and/or livestock) within their source areas, although intensity of use varies. Oregon Health Authority rated most of the public water systems in the Management Area for contaminant susceptibility (Harris Park, Clay In Motion, Wayside Market, and First Stop Mart are unrated). All evaluated ones rate as high to moderate susceptibility for land use impacts to drinking water sources based on Source Water Assessments, aquifer characteristics, and well locations and construction.

DEQ only addresses drinking water issues identified for PUBLIC water systems. A query of Oregon Water Resources' water rights database for private domestic wells identified 20 private domestic water rights in the Management Area. There are also numerous private groundwater wells for domestic use. Real Estate Testing data for 1989-2015 indicates four significant detections of nitrate (>7mg/L) in private wells out of 45 wells are included in the database for this area.

2.4.1.5 GWMA

There is no Ground Water Management Area in the Management Area.

2.4.2 Sources of Impairment

The high stream temperatures and low summer flows are the main water quality problems in the Walla Walla River. Stream temperatures can increase from various types of land management activities and natural disturbances that cause the removal of riparian vegetation or changes in channel morphology, from hydrological factors such as groundwater recharge and discharge, and from other factors such as high sediment loads. Protection of riparian and streamside areas for moderation of stream temperatures are addressed in Area Rules.

Low summer stream flows often result from channel loss and water withdrawls for beneficial uses, primarily irrigation, along with normal seasonal reductions in stream flow. The WRD regulates water withdrawls.

2.5 Regulatory and Voluntary Measures

A landowner or operator's responsibility under this Area Plan is to implement measures that prevent and control the sources of water pollution associated with agricultural activities and rural lands. The sections that follow describe more detailed information related to potential agricultural water quality concerns, provides definitions of commonly used terms, provides dates when landowner compliance should be achieved, and provides some exemptions to the rules. Criteria will be applied with consideration of agronomic, horticultural, and economic impacts.

603-095-1740 Prevention and Control Measures
(1) Limitations:
(a) All landowners or operators conducting activities on agricultural lands are provided the following
exemptions from the requirements of OAR 603-095-1740 (Prevention and Control Measures).
(A) A landowner or operator shall be responsible for only those conditions caused by activities conducted on land managed by the landowner or operator.
(B) A landowner or operator is not responsible for conditions resulting from unusual weather events or
other uncontrollable circumstances.
(C) The Department will allow temporary exceptions when a specific integrated pest management plan
is in place to deal with certain weed or pest problem.
(b) These rules may be modified as a result of the biennial review of the progress of implementation of the Walla Walla AgWQM area plan.

2.5.1 Waste Management

A landowner or operator's responsibility under this Area Plan is to prevent the introduction of waste materials into nearby bodies of water. These requirements are consistent with existing water quality regulations and are enforceable by designated management agencies.

603-095-1740 (2) Waste Management Effective on rule adoption, no person subject to these rules shall violate any provision of ORS 468B.025 or 468B.050.

2.5.2 Streamside and Riparian Area Management

Areas near water bodies are especially important to water quality and sensitive to management activities because of the natural ecological functions performed there such as water infiltration, waste filtration, erosion control, water storage, and moderation of temperature. Good riparian management provides habitat for fish and may yield more water in the channel in the summer. Summer water temperatures at sub-optimal levels for aquatic species survival are a concern in some reaches of the Walla Walla Subbasin. Moderation of high summer water temperatures is an objective of this Area Plan. Water temperature can best be influenced by activities that encourage the development and protection of vegetation along streams to provide shade, narrowing and deepening of the channel, and water infiltration and storage within the streambanks. Increasing summer stream flows would also leads to reduced water temperatures. However, issues dealing directly with increasing stream flow are beyond the scope of this Area Plan.

The streamside area is defined as the area near the stream where management practices can most directly influence the conditions of the water. This area usually ranges from 10 feet to 100 feet from the water, depending on the slope, soil type, stream size, and morphology.

The riparian area, as defined in OAR 690-400-0010(14) is a zone of transition from an aquatic to a terrestrial system, dependent upon surface or subsurface water, that reveals through the zone's existing or potential soil-vegetation complex the influence of such surface or subsurface water. A riparian area may be located adjacent to a lake, reservoir, estuary, pothole, spring, bog, wet meadow, muskeg, slough, or ephemeral, intermittent or perennial stream.

Water is the distinguishing characteristic of these areas but soil, vegetation, and landform also exert strong influence on these systems. In a healthy riparian ecosystem, these four components interact to produce a wide variety of conditions.
Healthy riparian areas provide several important ecological functions. These include:

- Floodwater retention and ground water recharge,
- Stabilization of streambanks through plant root mass,
- Development of diverse channel characteristics providing pool depth, cover, and variations in water velocity necessary for fish production,
- Support of biodiversity,
- Moderation of solar heat input by shade,
- Recruitment of large woody debris for aquatic habitat.

Indicators to determine improvement of this condition include:

- Recruitment of desirable riparian plant species,
- Maintenance of established beneficial vegetation,
- Maintenance or recruitment of woody vegetation--both trees and shrubs,
- Streambank integrity capable of withstanding 25-year flood events.

Factors available to evaluate improvement of the streamside area condition could include:

- Expansion of riparian area as evidenced by development of riparian vegetation and plant vigor,
- Reduction in actively eroding streambank length beyond that expected of a dynamic stream system,
- Plant community composition changes reflecting increases in grass-sedge-rush, shrubs, litter and decreases in bare ground,
- Plant community composition reflecting decreases in noxious plant species,
- Stream channel characteristics showing a narrowing and deepening of the channel,
- Shade patterns consistent with site capability,
- Stubble height of herbaceous (grass) species and leader (new) growth of shrubs and trees.

Characteristics of a healthy riparian area condition evaluation:

- Actively eroding streambank of no more than 20-25 percent of total streambank length,
- Shade levels of 50-70 percent at midday on fourth order or less streams,
- Stubble height measurements, dependent on species, of four to six-inches of herbaceous species left prior to spring runoff,
- Growth and recruitment of shrubs and trees -no more than 50 percent utilization of annual
- growth of shrubs and trees.

The LAC has determined that the irrigation canals and ditches in the area served by the WWRID and the HBDIC should be exempt from the riparian vegetation requirement. These waterways are maintained for the delivery of irrigation water to cropland within the boundaries of the Districts. There is minimal flow of water from these irrigation canals and ditches back into perennial streams and the ditches are screened to prevent the introduction of fish. Therefore, since there are no known impacts to fish spawning and rearing streams within the canal system, moderation of water temperature is not required. Water that does infiltrate into the gravel aquifer and recharges groundwater or re-emerge as streamflow usually is cooler than the receiving stream water. Maintenance of riparian vegetation along ditches and canals within the intense fruit growing areas would create a hazard by providing host vegetation for fruit pests and would result in increased use of pesticides.

All other irrigation diversions in the Walla Walla River Basin must prevent overland return flows that may carry pollutants into the receiving streams.

603-095-1740
(3) Streamside and Riparian Area Management
(a) Except as provided in OAR 603-095-1740(3)(b), effective January 1, 2006, streamside area management must have allowed the establishment, growth and maintenance of riparian vegetation to promote habitat and protect water quality by filtering sediment, stabilizing streambanks, naturally storing water, and providing shade consistent with the vegetative capability of the site.
(b) OAR 603-095-1740(3)(a) does not apply to irrigation water conveyance systems, including, but not limited to, irrigation canals, ditches, laterals, and waterways, such as the Upper Little Walla Walla system, that in the normal course of operation have no return flow into perennial streams where cold-water fish species are present.

2.5.3 Uplands Management and Soil Erosion

A landowner or operator must implement measures that prevent and control water pollution from upland runoff and soil erosion. This includes agricultural and rural lands that may not be in close proximity to water bodies.

Soil erosion on uplands must be within acceptable limits. While soils lost through erosion may not necessarily enter waters of the state due to distance from the stream or to practices such as terraces and filter strips, the reduction in such erosion will reduce the likelihood that soils will enter area streams.

Upland areas are the rangelands, forests, and croplands upslope from the riparian areas. These areas extend to the ridge tops of watersheds. Vegetation and soils are distinguishing characteristics of upland areas. With a protective cover of crops, grass (herbs), shrubs or trees, consistent with site capability, these areas will capture, store, and safely release precipitation, thereby reducing the potential of excessive soil erosion or delivery of soil or pollutants to the receiving stream or other waters. Vegetation is dependent on physical characteristics including soil, geology, landform, water and other climate factors. Healthy uplands maintain productivity over time and are resilient to stresses caused by variations in physical and climatic conditions.

Healthy upland areas provide several important ecological functions. These include:

- Capture, storage, and safe release of precipitation,
- Provide for plant health and diversity that support habitat (cover and forage) for wildlife and livestock,
- Filtration of sediment,
- Filtration of polluted runoff,

- Provide for plant growth, particularly root mass that utilizes nutrients and stabilizes soil against erosion,

Indicators of these conditions include:
- Recruitment of beneficial plant species,
- Ground cover to limit runoff of nutrients and sediment,
- Cropland cover that is sufficient to limit movement of nutrients and sediment,
- Roads and related structures designed, constructed and maintained to limit sediment delivery to streams,
- Noxious weed and insect pest populations contained -see state weed laws and county weed regulations to determine weed species that must be controlled.

Factors to evaluate upland area condition may include:
- Vegetation utilization through stubble height measurements,
- Plant species composition to measure plant health and diversity,
- Ground cover (live plants, standing plant litter and ground litter) as a measure of potential erosion,
- Evidence of overland flow (pattern and quantity),
- Site productivity (domestic livestock and wildlife carrying capacity),
- Soil erosion potential through prediction models available through the NRCS.

Cropland management systems must be designed to control sheet and rill erosion and gully erosion on all cropland, not just land designated as Highly Erodible Land (HEL). The Revised Universal Soil Loss Equation (RUSLE) can estimate average annual sheet and rill erosion rates over a cropping rotation, with supporting data from the NRCS Field Office Technical Guide and similar data from other credible sources.

Rangeland and pasture management must allow vegetation sufficient to protect water quality by providing water infiltration, filtering of sediment and animal wastes, and controlling soil erosion within the capability of the site.

Private roads on rural lands or roads used for agricultural activities should be constructed and maintained to limit runoff of sediment into waters of the state. Roads used for activities subject to the Oregon Forest Practice Act are regulated by Forest Practice Act rules. Homesteads, farmsteads, and other non-crop areas should be managed to control runoff of sediment and animal wastes into waters of the state.

For more information on effective management practices for prevention and control of runoff from upland areas, see Appendix B.

603-095-1740
(4) Soil Erosion and Sediment Control
(a) Effective on January 1, 2006, landowners must control upland soil erosion using practical and available methods.
(b) Landowners must control active channel erosion to protect against sediment delivery to streams.
(c) On croplands, a landowner may demonstrate compliance with this rule by:
(A) operating consistent with a SWCD-approved conservation plan that meets Resource Management Systems (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);
(D) constructing and maintaining terraces, sediment basins, or other structures sufficient to keep eroding soil out of streams.
(d) On rangelands, a landowner may demonstrate compliance with this rule by:
(A) operating consistent with a Soil and Water Conservation District (SWCD)-approved conservation
plan that meets Resource Management Systems (RMS) quality criteria for soil and water resources, or
(B) maintaining sufficient live vegetation cover and plant litter to capture precipitation or 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.

2.5.4 Irrigation Management

A landowner or operator must implement measures that prevent and control water pollution from irrigation activities. Diversion of water for irrigation and the return of water to the stream are activities that have potential for contributing to water quality problems by affecting channel stability and carrying pollutants to the stream through overland return flows.

Diversion of water from a waterbody to be applied on land for the purpose of growing crops is a recognized beneficial use of water. Irrigation water use is regulated by the Oregon WRD in the form of water rights, which specify the rate and amount of water that can be applied to a particular parcel of land. Refer to WRD laws and rules (OAR Division 690 and ORS Chapters 536 through 543) for more details.

Irrigation in this basin is done primarily by sprinkler application though there is some flood, furrow, and drip irrigation. Water usually is diverted from a surface source (stream or pond) but may also be from groundwater sources. Irrigation management in this basin recognizes there may be some positive benefits that occur from irrigation application; including flow augmentation as water returns back to the stream, cooling and filtering of water through underground percolation, and the recharge of shallow wells and springs due to the connectivity of surface water to ground water sources. Irrigation water may be used more than once as it returns to the stream or irrigation conveyance ditch and is available for instream uses or by other irrigators. Ultimately, stream flows will be enhanced by upland and riparian management practices promoting natural upstream storage and properly functioning floodplains that catch, store, and safely release precipitation for beneficial uses during summer months.

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

- Efficient application of water to the land within legal water rights,
- Minimal overland return flows,
- Return flow routing that provides for settling, filtering and infiltration,
- Minimal effect on stability of streambanks and minimal soil erosion,
- Appropriate scheduling of water application to the site considering soil conditions, crop needs, climate and topography,
- Diversion structures that are installed and managed in a way that controls erosion and sediment delivery and protect the stability of streambanks. If funding becomes available, temporary diversions, which must be reinstalled every year, should be replaced with suitable permanent diversions (i.e. pumping stations, infiltration galleries, ponds, dams),
- Diversions that are adequately screened and provide fish passage. (Refer to ORS 498.268).

OAR 603-095-1740(2) is applicable to any pollution caused by irrigation practices that allow wastes to enter waters of the state through overland return flows.

Refer to Appendix B for more information on effective management for protection of irrigation return flows.

2.5.5 Livestock Management

A landowner or operator must implement measures as needed to prevent and control water pollution from livestock enterprises. Careful management of areas used for grazing, feeding, and handling are critical to the success of livestock operations and have potential to affect water quality by the runoff of sediment and animal wastes containing bacteria, nutrients, and pathogens.

Grazing of livestock can be done in a manner that limits soil erosion and minimizes the delivery of sediment and animal wastes to nearby streams. A grazing management system will promote and maintain adequate vegetative cover, for protection of water quality, by consideration of intensity, frequency, duration, and season of grazing.

Managed grazing near streams will prevent negative impacts to streambank stability, allow for recovery of plants, and leave adequate vegetative cover to ensure protection of riparian functions including shade and habitat. Off-stream watering systems, upland water developments, feed, salt and mineral placement are effective ways to reduce impacts of livestock to streamside areas.

Livestock confinement areas need adequate measures to prevent and control runoff of sediment and animal waste. Certain confinement areas, as defined in ORS 468B.200-230, are required to have permits issued by ODA.

Factors used to evaluate effectiveness of management may include:

- Safe diversion or containment of runoff,
- Protection of clean water sources,
- Off-stream watering systems,
- Lot maintenance -smoothing, mounding, seeding,
- Structural measures - i.e. filter strips, catch basins, berms,
- Waste collection, storage and application methods.

OAR 603-095-1740(2) and (3) apply to runoff of animal waste and streamside or riparian vegetation conditions.

Chapter 3: Implementation Strategies

Goal

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

To achieve the Area Plan goals, the following water quality related objectives are established:

1. Prevent runoff of agricultural wastes,
2. Control soil erosion on uplands to acceptable rates,
3. Provide adequate riparian vegetation for stream bank stability and stream shading consistent with site capability.

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

Seek to achieve water quality standards appropriate to the Walla Walla Management Area through development and implementation of the Area Plan.

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. Progress is reported in Chapter 4.

3.1.1 Management Area

Measurable objectives allow the Ag Water Quality Program to better evaluate progress toward meeting water quality standards and TMDL load allocations.

To achieve the Area Plan mission and goal, the LAC established the following long-term water quality related objectives:

1. Prevent runoff of agricultural wastes,
2. Control soil erosion on uplands to acceptable rates,
3. Provide adequate riparian vegetation for stream bank stability and stream shading consistent with site capability.

3.1.1.1 Measurable Objective #1: Prevent runoff of agricultural wastes

Assessment Method: By 2021, livestock operations along streams will be evaluated for likelihood of pollution from bacteria and sediment. The method consists of: looking for likely sources (manure piles and heavy use areas) during riparian vegetation survey and follow-up with (site visit followed up by technical assistance if needed).

Measurable Objective and Associated Milestones: These results will help the LAC develop long-term targets at the 2022 Biennial Review. Likely targets include:

- By June 30, 2030, the number of livestock operations that are likely to pollute surface water is reduced by 10%;
- By June 30, 2040, fewer than 5% of livestock operations are likely to pollute surface water.

3.1.1.2 Measurable Objective #2: Control soil erosion on uplands to acceptable rates

Assessment Method: By 2021, uplands will be evaluated for erosion potential. The method consists of RUSLE2 evaluations based on average slopes for conventional and direct seed management practices and typical crop rotations. Soil loss will be estimated for 2020 and previous years.

Measurable Objective and Associated Milestones: These results will help the LAC develop long-term targets at the 2022 Biennial Review. Likely targets include:

- By June 30, 2030, estimated soil erosion rates on cropland will be reduced by 10% from 2020 levels;
- By June 30, 2040, estimated soil erosion rates on all cropland will be less than five tons/acre.

3.1.1.3 Measurable Objective #3: Provide adequate riparian vegetation for stream bank stability and stream shading consistent with site capability

Assessment Method: By 2021, perennial stream reaches will be evaluated for vegetative water quality function (shading, bank stability, and filtration of potential pollutants in overland flows). The method consists of a combination of aerial photo evaluation and local knowledge to determine how similar the ground cover and canopy cover/shade are to what could be provided by site capable vegetation.

Measurable Objective and Associated Milestones: These results will help the LAC develop long-term targets at the 2022 Biennial Review. Likely targets include:

- By June 30, 2030, 70% of perennial streams 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);
- By June 30, 2040, 90% of perennial streams 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).

3.1.2 Focus Area

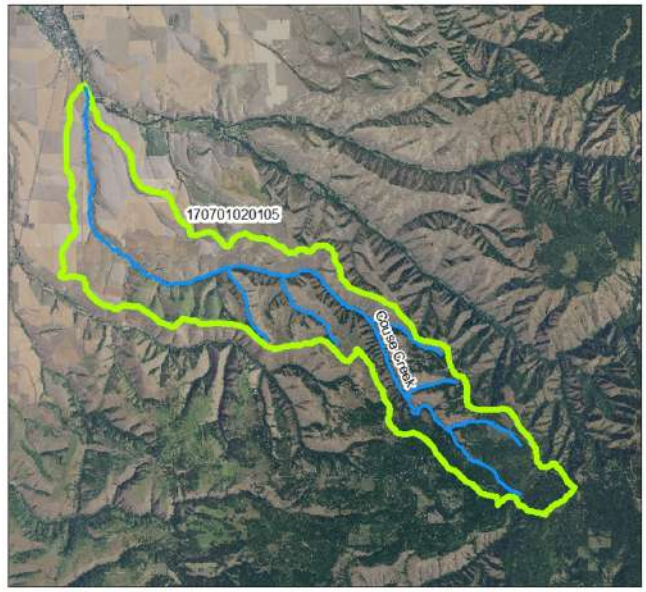
3.1.2.1 Couse Creek Focus Area 2019-2023

The Couse Creek Focus Area is part of ODA's Focus Area strategic initiative. Couse Creek was selected using input from the LAC, Walla Walla Watershed Council, and SWCD Board of Directors. Factors that played a role included a monitoring grant for Couse Creek that the Watershed Council received, the need for outreach in the Couse Creek area, and Couse Creek is geographically positioned right next to a previous Strategic Implementation Area (SIA) project.

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

SVA Results – In Acres

SVA Map Category	2019: Pre-Assessment
Ag Infrastructure	.57
Bare	7.68
Bare Ag	.07
Grass	2.87
Grass Ag	.82
Not Ag	66.30
Shrub	9.68
Shrub Ag	.25
Tree	132.62
Tree Ag	0
Water	0
Total Acres	**220.87**
Total Ag Acres Assessed (= Total Minus "Not Ag")	**154.57**



3.1.3 Strategic Implementation Area

In 2016, the Cache Hollow watershed was selected as a SIA. Part of the Cache Hollow watershed in Umatilla County contains approximately 7,900 total agricultural acres. Agricultural areas in the watershed consist primarily of pasture and dry farming. Water quality concerns in the watershed include: sediment and temperature.

Assessment Method: ODA completed a compliance evaluation of agricultural activities and potential concerns related to surface and ground water. The evaluation considered the condition of streamside vegetation, bare ground, and potential livestock impacts (including manure piles). The process involved both a remote evaluation and field verification from publicly accessible areas.

After evaluation, each parcel was quantified with one of the following levels of concern:

- No Concern = No water quality concerns related to agricultural activities were observed.
- Low Concern = Minimal potential for agricultural activities to impact surface or ground water or vegetation along streams may be inadequate but unable to determine if agricultural activities are limiting vegetation.
- Moderate Concern = Possible potential for agricultural activities to impact surface or ground water or agricultural activities may be preventing adequate vegetation along streams.
- Significant Concern = Likely potential for agricultural activities to impair surface or ground water or agricultural activities may be preventing adequate vegetation along streams (field verified).
- Serious Concern = Field verified likely violation such as discharge of agricultural waste into waters of the state or active removal of riparian vegetation.

Measurable Objectives and Associated Milestones: 100% of agricultural tax lots are in compliance with the streamside vegetation and waste rules in year 2020.

3.1.4 Pesticide Stewardship Partnerships

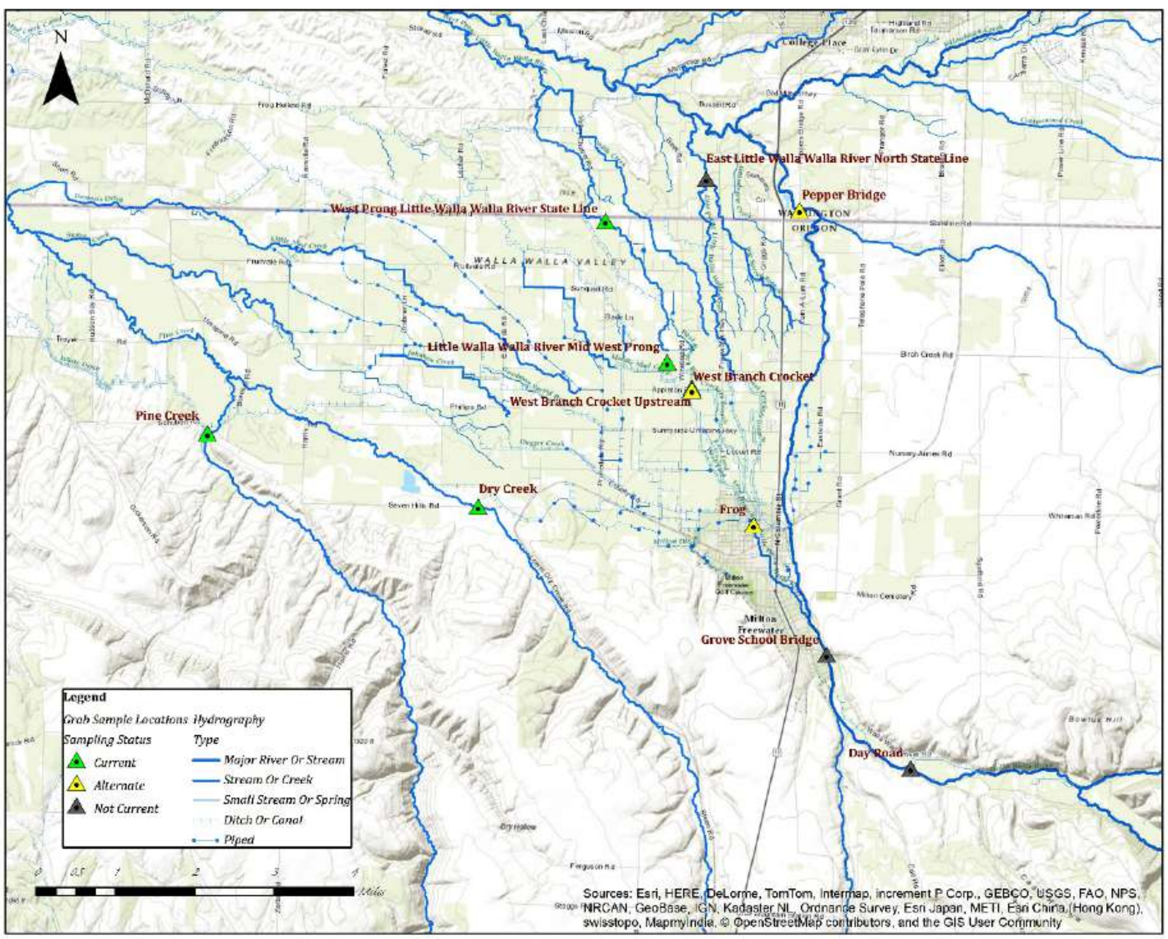
The Walla Walla Pesticide Stewardship Partnership (PSP) began in 2005. The sizable amount of apple acreage in the Walla Walla Watershed near Milton-Freewater, and the use of organophophates, was a primary factor in initiating a PSP. By 2006, multiple monitoring locations were established along tributaries to the Little Walla Walla River. In addition, monitoring stations were designated on the main stem of the Walla Walla River and the Little Walla Walla River in Milton-Freewater. Since 2015, in cooperation with pea and wheat growers interested in having their farms certified as Salmon Safe, monitoring was expanded further upstream to include Pine and Dry creeks to encompass pea and wheat growing areas. Pesticide detections throughout the watershed have generally been decreasing over the past several years, with only one organophophate insecticide (chlorpyrifos) being detected in the early spring every year at the distributary locations.

<u>Assessment Method</u>: As part of the PSP program, water quality is monitored for pesticide residues beginning in March and continuing through June and again in September and continuing through November. At the end of every field season, this data will be analyzed to determine any detections at the sampling sites.

<u>Measurable Objectives and Associated Milestones</u>: To continue to reduce the frequency and number of pesticide residues detected in stream.

<u>Measurable Objective</u>: To be determined.
Potential Milestone: By 2022, 50% fewer detections overall in the 2022 sampling season

Figure 1 PSP Sampling Sites (Current and Historic)



3.2 Proposed Activities

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

Table 3.2 Planned Activities for 2019-2022.

Activity	4-year Target	Description
Community and Landowner Engagement		
# active events that target landowners/managers (workshops, demonstrations, tours)	10	Couse Creek Diversion removal, Groundwater recharge program
# landowners/managers participating in active events	10	
Focus Area Couse Creek	191	Letter sent
Technical Assistance (TA)		
# landowners/managers provided with TA (via phone/walk-in/email/site visit)	40	Couse Creek Diversion removal, Groundwater recharge program
# site visits	25	Couse Creek Diversion removal, Groundwater recharge program, Pine Creek Irrigation study
# conservation plans written*	4	
# Focus Area Couse Creek	14	
On-the-ground Project Funding		
# Funding applications submitted	20	Irrigation efficiency, fish passage, habitiat, managed aquifer recharge projects
# Funding applications awarded	10	
# Focus Area Couse Creek	7	

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

3.3 Water Quality and Land Condition Monitoring

3.3.1 Water Quality

Since 2002, the WWBWC has been building a network of surface flow monitoring stations throughout the Walla Walla River Valley and currently includes 50 sites on the Walla Walla River, its tributaries, springs, small order streams, and irrigation ditches. Seventeen near-real-time gauge stations transmit data in near-real-time and are published on their website (www.wwbwc.org) while most monitoring sites are instrumented with data loggers downloaded quarterly.

The primary objectives of the WWBWC Surface Water Monitoring network are to:

- Monitor the effectiveness of aquifer recharge projects,
- Provide data for surface water/groundwater modeling projects,
- Inform water and fisheries management decisions.

The well monitoring network in the Walla Walla Basin's shallow alluvial aquifer has been expanding every year, giving the WWBWC and basin partners a better understanding of changing groundwater conditions throughout the valley. One hundred thirty-three wells are currently monitored in the Walla Walla Basin shallow alluvial aquifer, 72 of those in Oregon. The WWBBC monitors water levels, temperature, and specific conductivity. Nine of the wells are historic wells with data going back as far as 1933. These wells are used to see long-term trends in the Walla Walla Basin's shallow alluvial aquifer.

Furthermore, the well monitoring network data are being used to inform decisions about current and future aquifer recharge projects. The data were used for modeling projects which informed the 2013 *Walla Walla Basin Aquifer Recharge Strategic Plan* and are currently informing the on-going Walla Walla Basin Integrated Flow Enhancement Study.

The aquifer recharge study uses five sites. Source water was diverted from the Walla Walla River at the Little Walla Walla Diversion in Milton-Freewater, OR.

<u>PSP</u>
Six locations were sampled for pesticides.

<u>DEQ</u>
One station is part of DEQ's ambient program (Pine Creek at Hudson Substation Road).

In 2013, the Oregon Legislature funded a long-term monitoring program to assess quality of the state's groundwater. The program includes 20 studies over 10 years. The Walla Walla Basin is the third basin to be studied as part of this program. Partners include WWBWC, OSU Extension, Oregon Health Authority, and local elected officials. Water samples were collected from 60 to 100 wells where well owners volunteered to have their water sampled. A portion of the wells selected for this study were wells that were sampled in the 1999 groundwater study. Sampling took place in 2016 and 2017 and included nitrate, bacteria, pesticides, arsenic, perchlorate, and other chemicals. Wells were sampled two times during the year; once in the spring (February/March) and once in the fall (Sept/Oct). The data will be used to fill gaps in understanding of groundwater quality, to identify risks to drinking water (if any), and to inform other programs. All data will be publicly available.

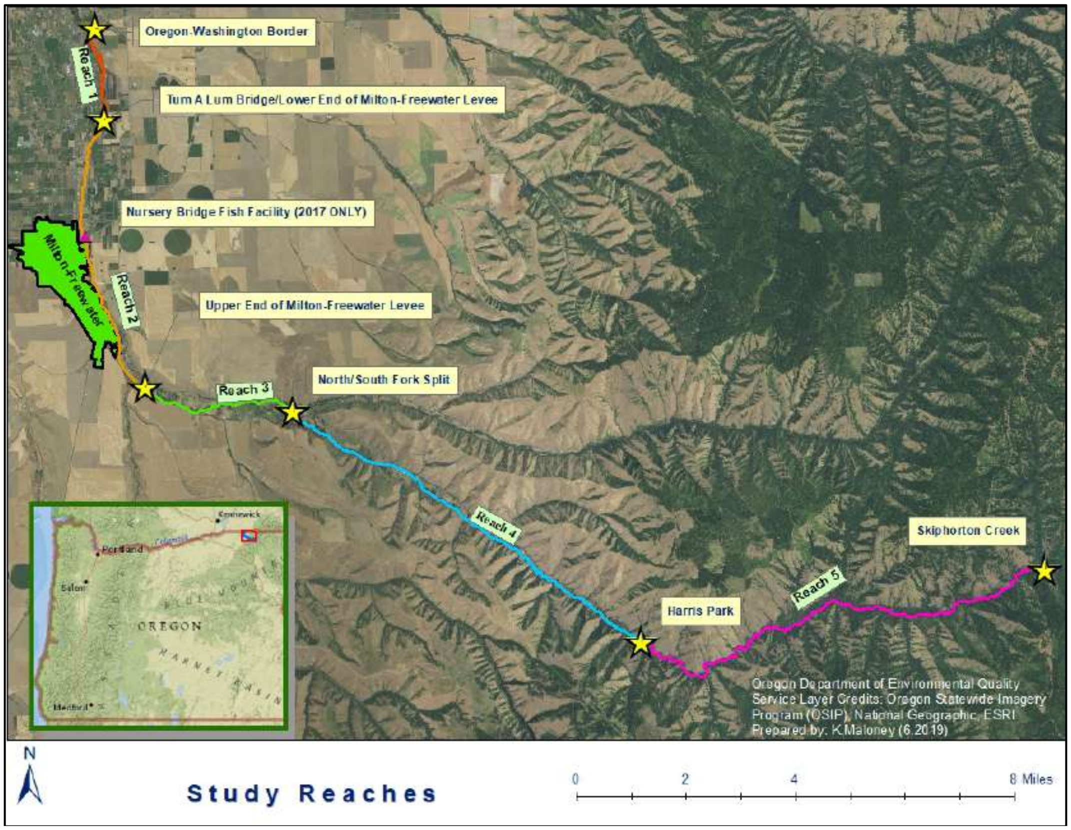
3.3.2 Land Conditions

3.3.2.1 DEQ Assessment of Stream Shading and Channel Width

The following section describes the process DEQ used to assess changes in streamside vegetation and channel width over time, along the Walla Walla River. Results of the assessment are summarized in Section 4.3.2.1 of this Area Plan. The results are encouraging and show where conditions have improved, as well as where ODA and partners should focus efforts for additional improvement in the future.

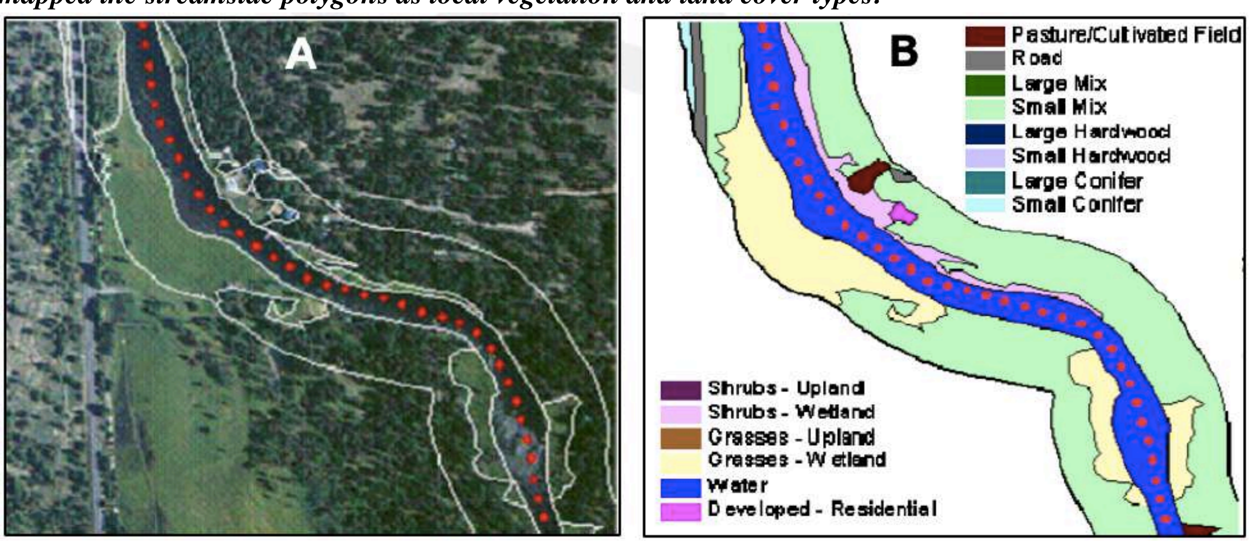
In early 2020, DEQ produced a report, "Walla Walla Subbasin Temperature TMDL Effective Shade and Channel Width Assessment" (final report will be posted at www.oregon.gov/deq/wq/tmdls/Pages/TMDLs-Umatilla-Basin.aspx#walla). In this report, DEQ assessed two types of nonpoint source solar heating along 29 miles of the Walla Walla River in Oregon (river mile 42 to 71; see Figure 3.3.2.1a), to measure progress toward the targets established in the TMDL. "Effective shade" (shade) measures the percent of the river that is shaded by streamside vegetation plus topography. Shade helps reduce the rate of stream warming from solar radiation. "Channel width" is addressed in the temperature TMDL because narrower and deeper channels help to reduce stream temperatures.

Figure 3.3.2.1a: Walla Walla study area; study reaches are explained in section 4.3.2.1



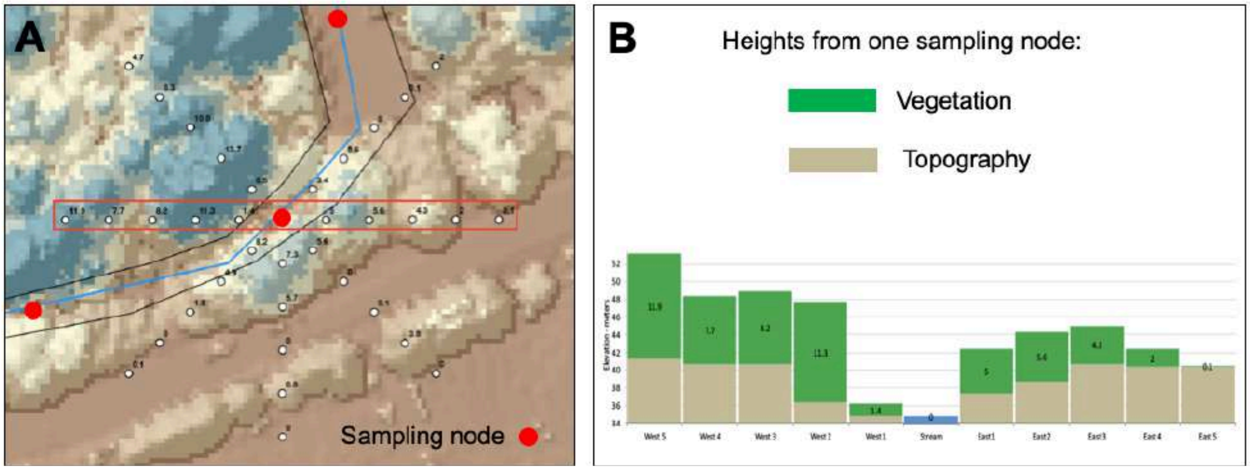
DEQ used remote sensing data (aerial imagery and Lidar ground elevations), computer mapping, and computer modeling to calculate shade and channel width for the Walla Walla River in 1995 and 2017 and to compare these to the targets in the TMDL. DEQ mapped vegetation and land cover types along the river (Figure 3.3.2.1b). Each vegetation or land cover type has an average height and density. DEQ set up sampling nodes for modeling (red dots in Figure 3.3.2.1b) every 164 feet (50 meters) along the river.

Figure 3.3.2.1b: A - DEQ mapped polygons of streamside features from aerial imagery; B - DEQ then mapped the streamside polygons as local vegetation and land cover types.



DEQ used the Heat Source model to calculate the effective shade (amount of sun blocked) throughout a mid-summer day, from the mapped vegetation height and density for each sampling node (Figure 3.3.2.1c). DEQ used aerial imagery to estimate the channel width at each sampling node, based on the distance to the left and right channel edges.

Figure 3.3.2.1c: A - For each sampling node (red dot), DEQ calculated vegetation and topographic heights in seven directions (at white dots), out to a distance of 157 feet (48 m); B - Cross section, west and east of the sampling node, shows vegetation, and topographic heights.



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 two years. See Chapter 3.1 for background and assessment methods.

4.1.1 Management Area

Measurable objectives will be determined after baseline data are collected.

4.1.2 Focus Areas and Other Focused Efforts in Small Watersheds

By June 30, 2020, measurable objectives will be developed by the SWCD after remote sensing results are ground-truthed.

4.1.3 Strategic Implementation Area

Table 4.1.3 Cache Hollow Strategic Implementation Area

Measurable Objective
100% of agricultural tax lots are in compliance with the streamside vegetation and waste rules in year 2018
Milestones
• None needed
Current Conditions
Progress Toward Measurable Objectives and Milestones: Met Measurable Objective Assessment Results / Compliance Results 100% in compliance as of December 2018 Pre-assessment (233 tax lots): 227 No concern, 6 Low concern. Post assessment: same
Activities and Accomplishments
• No compliance issues were initially identified by ODA. The SWCD and Walla Walla Watershed Council did contact the low concern land owners.
Adaptive Management Discussion
N/A

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 2015-2018 by Umatilla SWCD and Walla Walla Watershed Council

Activity	4-year results	Description
Community and Landowner Engagement		
# active events that target landowners/ managers (workshops, demonstrations, tours)	9	Managed Aquifer Recharge workshop, Watershed Restoration Project Tour, Pesticide Stewardship Partnership annual meeting, civic group presentations
# landowners/managers participating in active events	275	
Technical Assistance (TA)		
# landowners/managers provided with TA (via phone/walk-in/email/site visit	35	Irrigation efficiency, fish passage, habitat, managed aquifer recharge projects
# site visits	23	
# conservation plans written*	9	Projects designed and installed
On-the-ground Project Funding		
# funding applications submitted	17	Irrigation efficciency, fish passage, habitiat, managed aquifer recharge projects
# funding applications awarded	10	

*Definition: any written management plan to address agricultural water quality. Can include NRCS-level plans or simpler plans. Can include: nutrients, soil health, water quality, irrigation, grazing, riparian planting, forest thinning to improve upland pastures to reduce livestock pressure on riparian areas, etc. Cannot include projects with no or weak connection to 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.

Table 4.2b Implementation funding for projects (cash and inkind) on agricultural lands reported 1997-2018 (OWRI data include most, but not all projects, implemented in the Management Area).

Land-owners	OWEB	DEQ	NRCS	CTUIR	Bonneville Power Admin	Hudson Bay Irrigation District	All other sources*	TOTAL
666,146	2,575,326	186,917	419,917	998,768	2,982,888	533,809	1,132,513	$9,496,284

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

Activity Type	Miles	Acres	Count*	Activity Description
Riparian	2.7	29.5		Fencing, plantings, side channels, bank stabilization
Fish Passage	343		11	Fish screens, removed push up dams
Instream	2.4			
Wetland		0		
Road	4.26		16	Culverts
Upland		10,379.28		Irrigation Water Management, Conversion to Direct Seed
TOTAL	352.36	10408.78	27	

*number of structures, culverts, etc.

4.3 Water Quality and Land Condition Monitoring

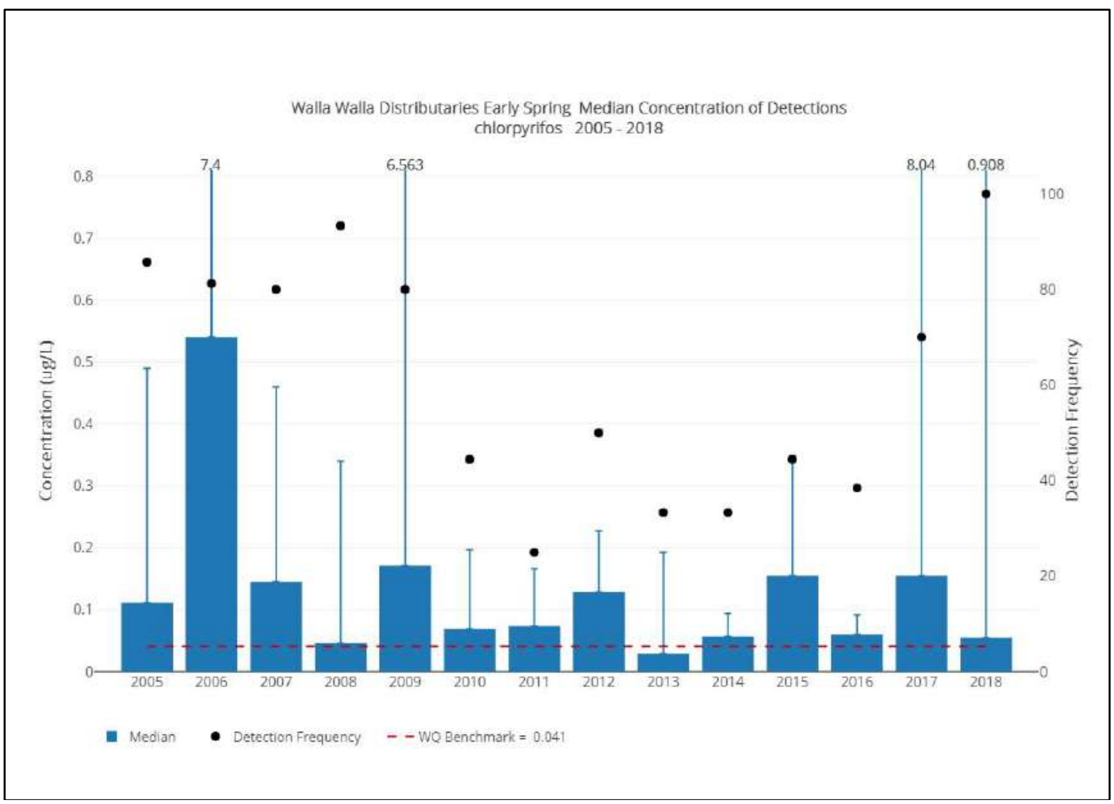
4.3.1 Water Quality

PSP

The Walla Walla Pesticide Stewardship Partnership (PSP) began in 2005. By 2006, multiple monitoring locations were established along tributaries to the Little Walla Walla River. In addition, monitoring stations were designated on the main stem of the Walla Walla River and the Little Walla Walla River in Milton-Freewater. Since 2015, in cooperation with pea and wheat growers, monitoring was expanded further upstream to include the Pine and Dry Creek basins to encompass pea and wheat growing areas. Data collected since 2015 in these areas have indicated little to no detections approaching a pesticide level of concern. Pesticide detections throughout the watershed have generally been decreasing over the past several years, with the exception of the organophophate insecticide (chlorpyrifos) associated with apple production. Generally, the chlorpyrifos detections occur in the spring.

Monitoring conducted during the period 2017-2019 indicates a fluctuation in both the frequency and concentration of chlorpyrifos concentrations in three of the current monitoring locations (Little Walla Walla River Mid-West Prong, Little Walla Walla River, west branch/Crocket, West Prong Little Walla Walla River S. Stateline) where chlorpyrifos has historically been detected. 2019 data collected during the spring sampling event show a significant reduction in chlorpyrifos concentration over 2018 data. This may be due to a shift away from chlorpyrifos to other less toxic insecticides. The Walla Walla Basin Watershed Council in currently developing an PSP Strategic Plan to address current and future pesticide occurrences in the basin. Development of this plan is being funded by Pesticide Stewardship Partnership dollars.

Figure 4.3.1 Median Concentration of Detections (Chlorpyrifos) 2005 - 2018



DEQ Status & Trends Report

DEQ analyzed data for *E. coli*, pH, dissolved oxygen, total suspended solids, total phosphorus, and temperature in the Management Area. (DEQ. Umatilla-Walla Walla-Willow Basin Water Quality Status and Trends Analysis. 2019.)

Pine Creek drains 70,000 acres of primarily croplands and enters the Walla Walla River west of the town of Walla Walla. The site at Hudson Bay Substation Road is part of DEQ's ambient monitoring network, where grab samples have been collected every two months since 2012.

Table 4.3.1 Attainment of water quality standards for 2015-2018.

Parameter	Pine Creek at Hudson Bay Substation	Walla Walla River (up to 19 sites)
Dissolved oxygen	Attain	No data
E. coli	Most samples (21/24) attain, and the average concentration is around half the standard for grab samples.	No data
pH	Attain	No data
Total phosphorus[1]	Concern. Values for the three stations on Pine Creek mostly exceeded the ODA target.	No data
Temperature	No data	Concern. For 19 sites: two attain (both on South Fork), four insufficient data, rest exceed.
TSS[2]	Values generally < 25 mg/L.	No data

[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 TSS in this Management Area

4.3.2 Land Conditions DEQ Shade Data

4.3.2.1 DEQ Assessment of Stream Shading and Channel Width

The following section describes the results of DEQ's assessment of streamside vegetation and channel width along the Walla Walla River. The assessment shows that conditions in some areas have improved over time, and also highlights where ODA and partners should focus efforts in the future.

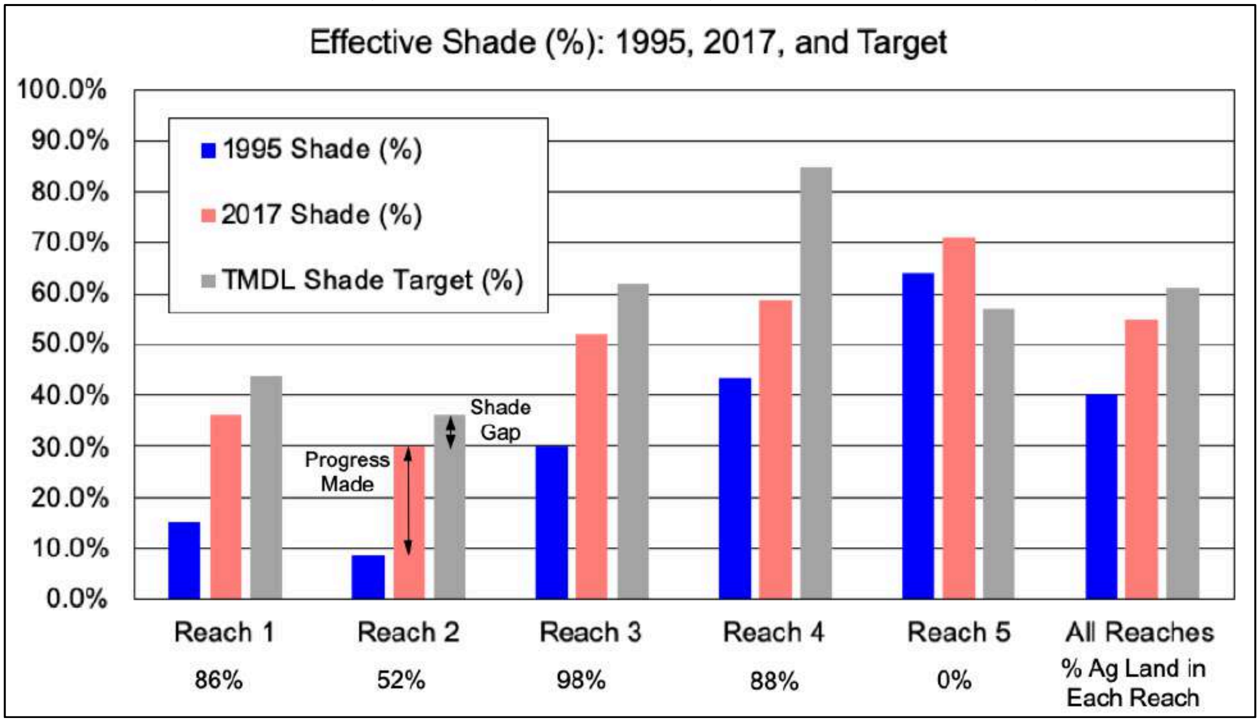
In the 2020 report, "Walla Walla Subbasin Temperature TMDL Effective Shade and Channel Width Assessment" (final report will be posted at www.oregon.gov/deq/wq/tmdls/Pages/TMDLs-Umatilla-Basin.aspx#walla), DEQ analyzed conditions within 157 feet (48 m) feet of the Walla Walla River, along five reaches (Table 4.3.2.1). For Reaches 1, 2, 3, and 4, agriculture is the primary land use within the area assessed. Reach 5 has no agricultural land use.

Table 4.3.2.1: Summary of five reaches used in the DEQ shade and channel width assessment

Reach #	Start (Downstream) and End (Upstream) Landmarks	Reach Length in 2017	Agricultural Land in Area Assessed
1	OR-WA state line to lower end of levee	2.5 mi	86 %
2	Lower end of levee to upper end of levee	5.5 mi	52 %
3	Upper end of levee to split of N and S Fork	3.2 mi	98 %
4	Split of N and S Fork to Harris Park	8.5 mi	88 %
5	Harris Park to Skiphorton Creek	9.7 mi	0 %

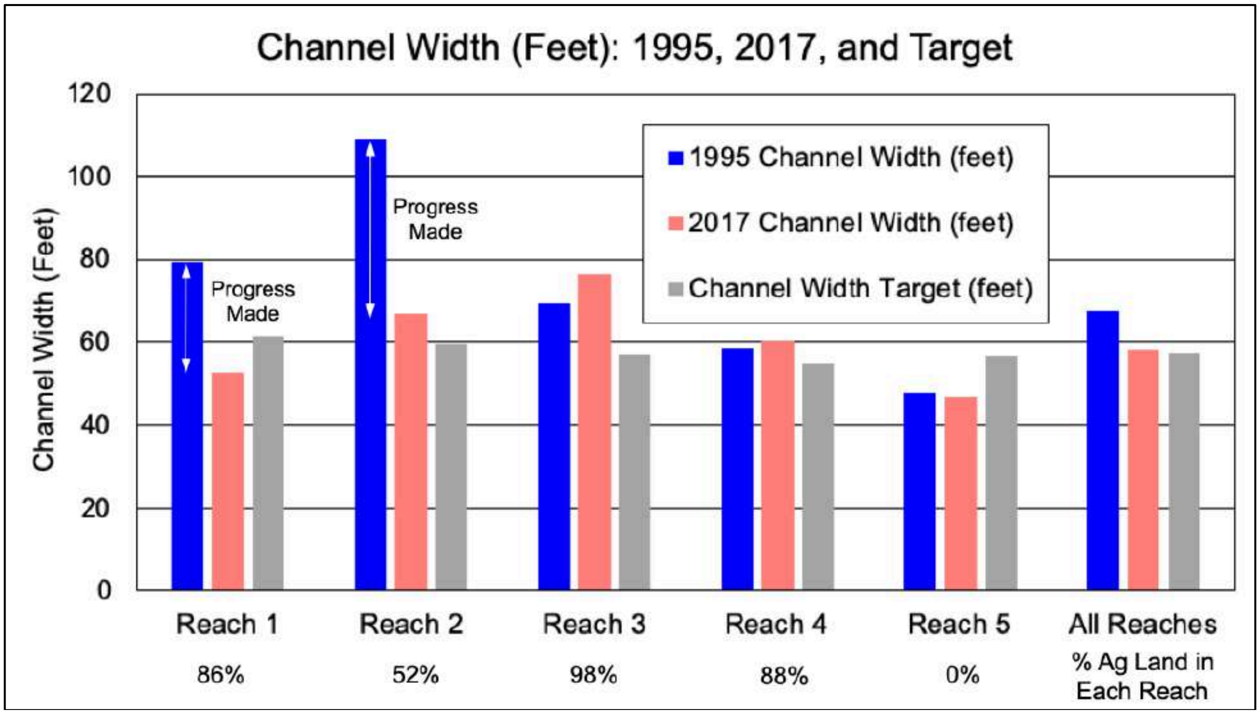
Shade: The model results (Figure 4.3.2.1a) show a notable improvement (increase) in shade for Reaches 1, 2, and 3 between 1995 (blue) and 2017 (orange). The difference between 2017 conditions (orange) and the TMDL shade target (gray) is the additional shade needed ("shade gap") for each reach. Reach 4 has the largest shade gap, and some additional shade is also needed in Reaches 1, 2, and 3.

Figure 4.3.2.1a: Shade results for each reach and average for all reaches; results are for all land uses



Channel width: Along Reach 2, the Milton-Freewater Levee provides flood protection but it also constrains and alters the Walla Walla River, resulting in channel straightening, down cutting, bed scouring, and amplified erosional processes. Several projects have been completed and more are underway, to improve river conditions along the levee (e.g. levee setbacks, enhanced flow, streamside vegetation restoration, and floodplain restoration). The model results (Figure 4.3.2.1b) show that these projects have resulted in a major improvement (decrease) in channel width in Reach 2 between 1995 (blue) and 2017 (orange). The narrowing of Reach 2 may have influenced the downstream Reach 1, which also shows some narrowing. Some additional channel narrowing is needed in Reaches 2, 3, and 4, to achieve the channel width targets in the TMDL (gray).

Figure 4.3.2.1b: Channel width results (in feet) for each reach and average for all reaches; results are for all land uses.



These substantial and measurable improvements are most apparent in the lowest ~10 miles of the Walla Walla River in Oregon (Reaches 1, 2, and 3). In addition, other changes have been observed that help the river system naturally regulate stream temperatures:

- The river's sinuosity and channel complexity have increased; channel length increased from 28.6 miles to 29.5 miles, an increase of 0.9 miles or 3.3%,
- Below Nursery Bridge, instream flows have increased due to improved irrigation management and an agreed-upon minimum instream flow of 25 cfs.

ODA and partners plan to use the information from the DEQ assessment to identify where to focus work in the future. The assessment also helps ODA and partners to understand how changes to land conditions improve water quality and how much remains to be done. This will help ODA and partners to set objectives for future improvements. ODA, DEQ, the LMA, and the LAC recognize that TMDL implementation is a community effort that may take decades. The 2020 DEQ report recommends reassessing conditions in 2025, or 30 years after the initial assessment of conditions in 1995.

4.4 Biennial Reviews and Adaptive Management

ODA, the LAC, the LMA, and other partners met on January 23, 2020 to review implementation of the Area Plan and provided recommendations for the future (Tables 4.4a and 4.4b).

Table 4.4a Summary of biennial review discussion.

Summary of Progress and Impediments
The LAC will continue to work with the Army Corp of Engineers on vegetation requirements along the main stem Walla Walla River that could help meet shade and TMDL standards. This includes Federal Guidelines along the levees in the Walla Walla. The LAC would like to better identify the different reaches based on vegative capabilities this would help better describe how to move toward TMDL attainment. Progress has been made toward stream shading with the data presented on the Shade and Channel Width Assessment provided by the DEQ. The Walla Walla Watershed Council continues to make PSP improvements by trying to better understand the chlorpyrifos detections that are being sampled in the spring in the orchards around Milton Freewater.
Recommended Modifications and Adaptive Management
Update the assessments being done by Walla Walla watershed council and Umatilla SWCD. This includes updated farming tillage patterns and soil erosions calculations in the Walla Walla Basin. This also includes any potential manure erosion. Update the vegetation standards that are required to meet shade standards while meeting the requirements set forth by the Army Corp of Engineers along the Levees.

Table 4.4b Number of compliance actions in 2015-2018.

Actions	Letter of Compliance	Pre-Enforcement Notification	Notice of Noncompliance	Civil Penalty
Compliance Actions Outside SIA(s)	2	0	0	0
Compliance Actions Within SIA(s)	0	0	0	0

Appendix A: 2012 303(d) Water Quality Limited List

Waterbodies	River Miles	Parameter	Criteria	Season
		Category 4A – TMDL Approved		
Mill Creek	22.0	Temperature	Bull Trout 10.0 C	Summer
North Fork Walla Walla	0 to 18.7	Temperature Temperature	Bull Trout 10.0 C Bull Trout 12.0 C (non-Spawning)	Summer
South Fork Walla Walla	0 to 27.1	Temperature Temperature	Bull Trout 10.0 C Bull Trout 12.0 C (non-Spawning)	Summer
Walla Walla River	40.6 to 50.6	Temperature	Rearing 17.8 C	Summer
		Category 5 –TMDL Needed		
Pine Creek	0 to 37.8	Iron	Table 20 – Toxic Substances	Year Round
South Fork Walla Walla River	0 to 27.2	Dissolved Oxygen	Spawning	Sept 1 – June 15
Walla Walla River	40.6 to 46.1 46.1 to 50.6	Dissolved Oxygen	Spawning	Jan 1 – June 15 Sept 1 – June 15
West Branch / West Crokett Branch	0 to 2.6	Chlorpyrifos Guthion	Table 20 – Toxic substances	Year Round
West Branch / West Crokett Branch	4.6 to 11.5	Dissolved Oxygen	Spawning	Jan 1 – May 15
West Little Walla Walla River	4.6 to 11.5	Chlorpyrifos Guthion Parathion Dissolved Oxygen	Table 20 – Toxic Substances Spawning	Year Round Jan 1 – May 15

Appendix B: Effective Water Quality Management Practices

These practices and many others may be considered in development of a management system that is appropriate for prevention and control of pollution caused by agricultural activities on an individual parcel of land. Management practices and land management changes are most effective when selected and installed as integral parts of a comprehensive resource management plan based on natural resource inventories and assessment of management practices. The result is a system using management practices and land management changes which are designed to be complementary, and when used in combination, are more technically sound than each practice separately.

For soil erosion and sediment control -

- Conservation Tillage (Crop Residue Management) - reduced tillage, minimum tillage, direct seeding, modified conventional tillage, reservoir tillage, sub-soiling, or deep chiseling:
  - Cover Crops - perennial, annual
  - Contour Farming Practices - strip cropping, divided slopes, terraces (level and gradient), contour tillage
  - Crop Rotations
  - Early or Double Seeding in Critical Areas
  - Vegetative Buffer Strips
  - Filter strips, grassed waterways, field borders, contour buffer strips
  - Irrigation Scheduling - soil moisture monitoring, application rate monitoring
  - Prescribed Burning
  - Weed Control
  - Grazing Management Plans
  - Range Plantings
  - Livestock Distribution
  - Road Design and Maintenance
- Sediment Retention Basins and Runoff Control Structures for prevention and control of impacts to stream side areas:
  - Critical area planting
  - Vegetative Buffer Strips - CCRP, CREP, riparian buffers, riparian forest buffers
  - Livestock Management - fencing - exclusion, temporary, seasonal grazing
  - Water Developments - off stream watering, water gaps, spring development
  - Conservation Tillage Practices
  - Weed Control
  - Nutrient and Chemical Application Scheduling
  - Road, Culvert, Bridge, and Crossing Maintenance
  - Wildlife Management for prevention and control of impacts from livestock
- Grazing Management or Scheduling - intensity, duration, frequency, season, pasture rotations, rest/deferral:
  - Vegetation Management - grass seeding, weed control, controlled burning
  - Fencing - temporary, cross, exclosure
  - Watering Facilities - spring development, water gaps, off-stream water, (may require water rights, refer to ORS 537.141)
  - Salt and Mineral Distribution
- Waste Management Systems - clean water diversions; waste collection, storage, and utilization; facilities operation and maintenance for prevention and control of impacts from irrigation:
  - Irrigation Scheduling - crop needs, soil type, climate, topography, infiltration rates
  - Irrigation System Efficiency and Uniformity -flood, sprinkler, drip, pivot

- Diversion Maintenance - push-up dam management, screens
- Return Flow Management
- Backflow Devices
- Reservoir Tillage
- Cover Crops or nutrient and farm chemical application
- Nutrient Budgeting - soil testing, tissue testing, plant needs for water testing
- Application Methods
- Application Timing
- Tail Water Management
- Hydraulic Connectivity
- Label Requirements
- Irrigation Scheduling
- Integrated Pest Management Practices for channel and drain management
- Vegetation Management - burning, chemical, clipping
- Streambank Stabilization - structural, bio-engineered
- Critical area planting
- Channel Management
- Obstruction Removal
- Wetland Development
- Outfall Protection
- Off-stream or Headwater Storage