Upper Grande Ronde Agricultural Water Quality Management Area Plan

March 7, 2019

Developed by the

Oregon Department of Agriculture

Upper Grande Ronde Local Advisory Committee

With support from the

Union Soil and Water Conservation District

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Table of Contents

Acronyms and Terms Used in this Document

Ag Water Quality Program – Agricultural Water Quality Management 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
DMA – Designated Management Agency
GRMWP – Grande Ronde Model Watershed Program
GWMA – Groundwater Management Area
HABs – Harmful Algal Blooms
LA- TMDL Load Allocation
LAC – Local Advisory Committee
LMA – Local Management Agency
Management Area – Agricultural Water Quality Management Area
MOA – Memorandum of Agreement
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
OHA – Oregon Health Authority
ORS – Oregon Revised Statute
OSU – Oregon State University
OWEB – Oregon Watershed Enhancement Board
PMP – Pesticides Management Plan
PSP – Pesticides Stewardship Partnership
RCA – Required Corrective Action
SIA – Strategic Implementation Area
SWCD – Soil and Water Conservation District
TMDL – Total Maximum Daily Load
UGR – Upper Grande Ronde
USDA – United States Department of Agriculture
US EPA – United States Environmental Protection Agency
WPCF – Water Pollution Control Facility
WQPMT – Water Quality Pesticides Management Team

Foreword

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

The Area Plan is neither regulatory nor enforceable (Oregon Revised Statute (ORS) 568.912(1)). It references associated Agricultural Water Quality Management Area Rules (Area Rules), which are Oregon Administrative Rules (OARs) 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 state and federal law (OAR 603-090-0030(1)). At a minimum, an Area Plan must:

- Describe the geographical area and physical setting of the Management Area.
- List water quality issues of concern.
- List impaired beneficial uses.
- State that the goal of the Area Plan is to prevent and control water pollution from agricultural activities and soil erosion and to achieve applicable water quality standards.
- Include water quality objectives.
- Describe pollution prevention and control measures deemed necessary by ODA to achieve the goal.
- Include an implementation schedule for measures needed to meet applicable dates established by law.
- Include guidelines for public participation.
- Describe a strategy for ensuring that the necessary measures are implemented.

Plan Content

Chapter 1: Agricultural Water Quality Management Program Purpose and Background. The purpose is to have 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 available practices to address water quality issues.

Chapter 3: Local Goals, Objectives, and Implementation Strategies. Presents goal(s), measurable objectives, and timelines, along with strategies to achieve these goal(s) and objectives.

Chapter 4: Local Implementation, Monitoring, and Adaptive Management. ODA and the Local Advisory Committee (LAC) will work with knowledgeable sources to summarize land condition and water quality status and trends to assess progress toward the goals and objectives in Chapter 3.

Chapter 1: Agricultural Water Quality Management Program Purpose and Background

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

As part of Oregon's Agricultural Water Quality Management 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 due 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 LAC, with support and input from the SWCD and the Oregon Department of Environmental Quality (DEQ). The public was invited to participate in the original development and approval of the Area Plans and is invited to participate in the biennial review process. The Area Plan is implemented using a combination of outreach, conservation and management activities, compliance with Area Rules developed to implement the Area Plan, 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 603-095-0400 to 603-095-0460). The Ag Water Quality Program's general rules guide the Ag Water Quality Program, and the Area Rules for the Management Area are the regulations that landowners are required to follow. Landowners will be encouraged through outreach and education to implement conservation 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 properties grazing a few 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 lands in Oregon is regulated by DEQ and on Tribal Trust lands by the respective tribe, with oversight by the United States Environmental Protection Agency (US EPA).

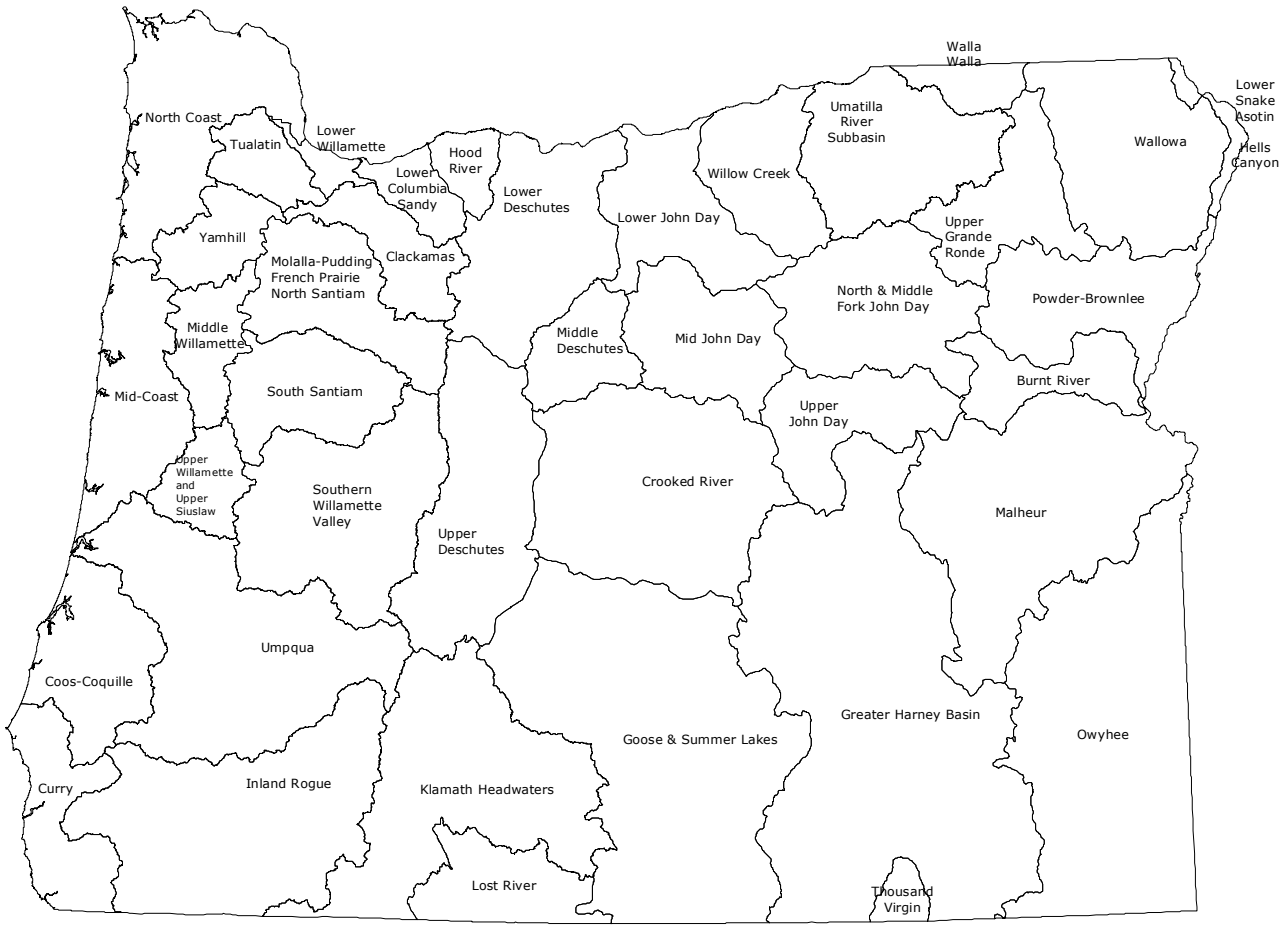
1.2 History of the Ag Water Quality Program

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; to achieve water quality standards; and to adopt rules as necessary (ORS 568.900 through ORS 568.933). Senate Bill 502 was passed in 1995 to clarify that ODA is the lead agency for regulating agriculture with respect to water quality (ORS 561.191). The Area Plan and Area Rules were developed and subsequently revised pursuant to these statutes.

Between 1997 and 2004, ODA worked with LACs and SWCDs to develop Area Plans and Area Rules in 38 watershed-based Management Areas across Oregon (Figure 1). 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: Map of 38 Agricultural Water Quality Management Areas



1.3 Roles and Responsibilities

1.3.1 Oregon Department of Agriculture

The Oregon Department of Agriculture 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 carry out a water quality management plan for the

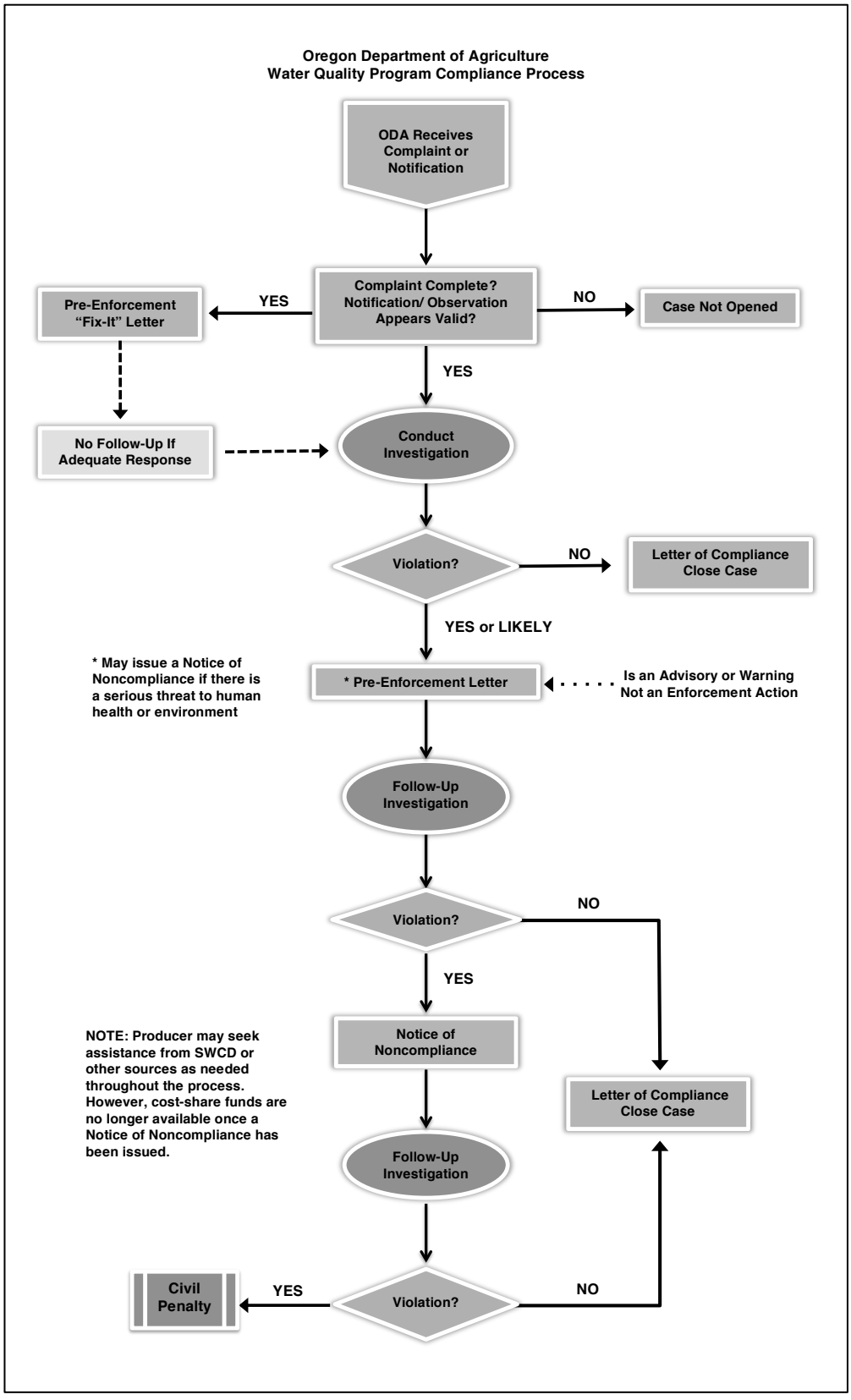
prevention and control of water pollution from agricultural activities and soil erosion. State and federal laws drive the establishment of a Ag Water Quality Management Plan, which include:

- State water quality standards,
- Load allocations for agricultural nonpoint source pollution assigned under Total Maximum Daily Loads (TMDLs) issued pursuant to the 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 and an Action Plan has been developed).

The Oregon Department of Agriculture has the legal authority to develop and implement Area Plans and Area Rules for the prevention and control of water pollution from agricultural activities and soil erosion, where such plans are required by state or federal law (ORS 568.909 and ORS 568.912). 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. 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. The ODA will use enforcement where appropriate and necessary to gain 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 the condition through required corrective actions (RCAs) 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 RCAs, ODA may assess civil penalties for continued violation of the 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.

Figure 2: Compliance Flow Chart



1.3.2 Local Management Agency

A Local Management Agency (LMA) is an organization that ODA designated to assist with the implementation of an Area Plan (OAR 603-090-0010). The Oregon Legislature's intent is for SWCDs to 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 agreement between ODA and each SWCD. 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 as many as 12 members to assist with the development and subsequent biennial reviews of the local Area Plan and Area Rules. The LAC serves in an advisory role to the director of ODA and to the Board of Agriculture. LACs are composed primarily of agricultural landowners in the Management Area and must reflect a balance of affected persons.

The LAC may meet as frequently as necessary to carry out their responsibilities, which include but are not limited to:

- Participate in the development and ongoing revisions of the Area Plan,
- Participate in the development and revisions of the 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. Each landowner in the Management Area is required to comply with the Area Rules, In addition, landowners need to select and implement a suite of measures to protect water quality. The actions of each landowner will collectively contribute toward achievement of the water quality standards.

Technical and financial assistance is available to landowners who want to work with SWCDs (or other local partners) to achieve land conditions that contribute to good water quality. Landowners also may 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 do not result from agricultural activities, such as:

- Conditions resulting from unusual weather events,
- Hot springs, glacial melt water, extreme or unforeseen 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,
- Other circumstances not within the reasonable control of the landowner.

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

1.3.5 Public Participation

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

The Oregon Department of Agriculture, LACs, and SWCDs conduct biennial reviews of the Area Plans and Area Rules. Partners, stakeholders, and the general public are invited to participate in the process. Any future revisions to the Area Rules will include a formal public comment period and a formal public hearing.

1.4 Agricultural Water Quality

The CWA directs states to designate beneficial uses related to water quality for every waterbody, 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. Significant 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 many are regulated under ODA's CAFO Program. Pesticide applications in, over, or within three feet of water also are regulated as point sources. Irrigation water flows from agricultural fields may be at a defined outlet but they do not currently require a permit.

Nonpoint 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 in OARs for each basin. They may include: public and private domestic water supply, industrial water supply, irrigation, livestock watering, fish and aquatic life, wildlife and hunting, fishing, boating, water contact recreation, aesthetic quality, hydropower, and commercial navigation and transportation. 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 water bodies throughout Oregon do not meet state water quality standards. Many of these water bodies have established water quality management plans that document needed pollutant reductions. The most common water quality concerns related to agricultural activities are temperature, bacteria, biological criteria, sediment and turbidity, phosphorous, algae, pH, dissolved oxygen, harmful algal blooms (HABs), nitrates, pesticides, and mercury. These parameters vary by Management Area and are summarized in Chapter 2.

1.4.3 Impaired Water Bodies and Total Maximum Daily Loads (TMDLs)

Every two years, DEQ is required by the CWA to assess water quality in Oregon. Clean Water Act Section 303(d) requires DEQ to identify a list of waters that do not meet water quality standards. The resulting list is commonly referred to as the 303(d) list. In accordance with the CWA, DEQ must establish TMDLs for pollutants specific to the pollutants that led to the placement of a waterbody on the 303(d) list.

A TMDL includes an assessment of water quality data and current conditions and describes a plan to achieve conditions so that water bodies will meet water quality standards. TMDLs specify the daily amount of pollution a water body can receive and still meet water quality standards. In the TMDL, point sources are allocated pollution limits as "waste load allocations" that are then incorporated in NPDES waste discharge permits, while a "load allocation" is attributed to nonpoint sources (agriculture, forestry, and urban). The agricultural sector is responsible for helping achieve the pollution limit by achieving the load allocation assigned to agriculture specifically, or to nonpoint sources in general, depending on how the TMDL was written.

Total Maximum Daily Loads generally apply to an entire basin or Subbasin, not just to an individual water body on the 303(d) list. When a water body is first placed on the 303(d) list as impaired, it is generally in Category 5 (Water Quality Limited – TMDL needed). Once TMDLs are completed for a basin, the water bodies with TMDLs are removed from the Category 5 list and assigned to the Category 4A list (Water Quality Limited – TMDL Approved). In the future, when data show that water quality criteria have been met for these water bodies, the will be assigned to the Category 2 list (Attaining Water Quality Criteria).

As part of the TMDL process, DEQ identifies the Designated Management Agency (DMA) or parties responsible for submitting TMDL implementation plans. TMDLs designate the local Area Plan as the implementation plan for the agricultural component of this Management Area. Biennial reviews and revisions to the Area Plan and Area Rules must address agricultural or nonpoint source load allocations from relevant TMDLs.

The list of impaired water bodies (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 ORS 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 of the Area Rules.

ORS 468B.025 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:

"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. Additionally, OAR 603-095-0010(53) includes but is not limited to commercial fertilizers, soil amendments, composts, animal wastes, vegetative materials, or any other wastes.

"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.

"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.

1.4.5 Streamside Vegetation and Agricultural Water Quality

Across Oregon, the Ag Water Quality Program emphasizes streamside vegetation protection and enhancement to prevent and control water pollution from agriculture activities and to prevent and control soil erosion. Streamside vegetation can provide three primary water quality functions: shade for cool stream temperatures, 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.

Additional reasons for the Ag Water Quality Program's emphasis on streamside vegetation include:

- Streamside vegetation improves water quality related to multiple pollutants, including: temperature (heat), sediment, bacteria, nutrients, toxics, and pesticides.
- Streamside vegetation provides fish and wildlife habitat.
- Landowners can improve streamside vegetation in ways that are compatible with their operation. Streamside conditions may be improved without the removal of the agricultural activity, such as with managed grazing.
- Streamside vegetation condition is measurable and can be used to track progress in achieving desired site conditions.

Site-Capable Vegetation

The Ag Water Quality Program uses the concept of "site-capable vegetation" to describe the vegetation that agricultural streams can provide to protect water quality. Site-capable vegetation is the 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 flowing through agricultural lands. The Area Rules for each Management Area require that agricultural activities 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 for 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 recognizes removal as a good conservation activity and encourages landowners to remove these plants. Voluntary programs through SWCDs and watershed councils provide technical assistance and financial incentives for weed control and restoration projects. In addition, the Oregon State Weed Board identifies invasive plants that can negatively impact watersheds. Public and private landowners are responsible for eliminating or intensively controlling noxious weeds as may be provided by state and local law enacted for that purpose. For further information, visit www.oregon.gov/ODA/programs/weeds.

1.5 Other Water Quality Programs

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

1.5.1 Confined Animal Feeding Operation Program

The Oregon Department of Agriculture is the lead state agency for the CAFO Program. The CAFO Program was developed to ensure that operators do not contaminate ground or surface water with animal manure or process wastewater. Since the early 1980s, CAFOs in Oregon have been registered to a general Water Pollution Control Facility (WPCF) permit designed to protect water quality. A properly maintained CAFO must implement a site-specific suite of structural and management practices to protect ground or surface water. To assure continued protection of ground and surface water, the 2001 Oregon State Legislature directed ODA to convert the CAFO Program from a WPCF permit program to a federal National Pollutant Discharge Elimination System (NPDES) program. Oregon Department of Agriculture and DEQ jointly issue the NPDES CAFO Permit, which complies with all CWA requirements for CAFOs. In 2015, ODA and DEQ jointly issued a WPCF general CAFO Permit as an alternative for CAFOs that are not subject to the federal NPDES CAFO permit requirements. Currently, ODA can register CAFOs to either the WPCF or NPDES CAFO permit.

Either of the Oregon CAFO 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. You can view the CAFO program site at
http://www.oregon.gov/ODA/programs/NaturalResources/Pages/CAFO.aspx

1.5.2 Groundwater Management Areas

Groundwater Management Areas are designated by DEQ where groundwater has elevated contaminant concentrations resulting, at least in part, from nonpoint sources. After the GWMA is declared, a local groundwater management committee comprised of affected and interested parties is formed. The committee works with and advises the state agencies that are required to develop an action plan that will reduce groundwater contamination in the area.

Oregon 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.

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

The ODA 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, the interagency Water Quality Pesticide Management Team (WQPMT) was formed to expand efforts to improve water quality in Oregon related to pesticide use. The WQPMT includes representation

from ODA, ODF, DEQ, and Oregon Health Authority (OHA). 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 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 program.

Through the PSP, state agencies and local partners work together to monitor pesticides in streams and to improve water quality (https://www.oregon.gov/deq/wq/programs/Pages/Pesticide.aspx). ODA, DEQ, and Oregon State University (OSU) 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.

Oregon Department of Agriculture 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 resources.

1.5.5 Drinking Water Source Protection

Oregon implements its drinking water protection program through a partnership between DEQ and OHA. The program provides individuals and communities with information on how to protect the quality of Oregon's drinking water. The DEQ and OHA encourage preventive management strategies to ensure that all public drinking water resources are kept safe from current and future contamination. For more information see: https://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 Oregon to implement the federal CWA in our state. DEQ is the lead state agency with overall authority to implement the CWA in Oregon. DEQ coordinates with other state agencies, including ODA and ODF, to meet the requirements of the CWA. The DEQ sets water quality standards and develops TMDLs for impaired waterbodies, which ultimately are approved or disapproved by the EPA. In addition, DEQ develops and coordinates programs to address water quality including NPDES permits for point sources, the CWA Section 319 grant program, Source Water Protection, the CWA Section 401 Water Quality Certification, and GWMAs. DEQ also coordinates with ODA to help ensure successful implementation of Area Plans.

A Memorandum of Agreement (MOA) between DEQ and ODA recognizes that ODA is the state agency responsible for implementing the Ag Water Quality Program. ODA and DEQ updated the MOA in 2012.

The MOA includes the following commitments:

- ODA will develop and implement a monitoring strategy, as resources allow, in consultation with DEQ.
- ODA will evaluate the effectiveness of Area Plans and Area Rules in collaboration with DEQ.
    - ODA will determine the percentage of lands achieving compliance with Area Rules.
    - ODA will determine whether the target percentages of lands meeting the desired land conditions, as outlined in the goals and objectives of the Area Plans, are being achieved.
- ODA and DEQ will review and evaluate existing information to determine:
    - Whether additional data are needed to conduct an adequate evaluation.
    - Whether existing strategies have been effective in achieving the goals and objectives of the Area Plans.
    - Whether the rate of progress is adequate to achieve the goals of the Area Plans.

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

Oregon Department of Agriculture and SWCDs work in close partnership with local, state, and federal agencies and organizations, including: DEQ (as indicated 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.

1.7 Measuring Progress

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

1.7.1 Measurable Objectives

Measurable objectives allow the Ag Water Quality Program to better evaluate progress towards improved water quality. 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 needed to achieve the measurable objective.

The Oregon Department of Agriculture, LAC, and LMA will establish measurable objectives and associated milestones for each Area Plan. Many of these measurable objectives relate to land conditions and primarily are implemented through focused work in small geographic areas (section 1.7.3), with a long-term goal of developing measurable objectives and monitoring methods at the Management Area scale.

At each biennial review, ODA and its partners will evaluate progress toward the most recent milestone(s) and why they were or were not achieved. ODA, the LAC, and LMA will evaluate whether changes are needed to keep on track for achieving the measurable objective(s) and will revise strategies to address obstacles and challenges.

The measurable objectives and associated milestones for the Area Plan are in Chapter 3 and progress toward achieving the measurable objectives and milestones 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, streamside vegetation generally is used as a surrogate for water temperature, because shade blocks solar radiation from warming the stream. In addition, sediment can be used as a surrogate for pesticides and phosphorus because they 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.
- 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 resultant improvements in the water. Extensive monitoring of water quality is needed to evaluate progress, which is expensive and may fail to demonstrate improvements in the short term.
- Improved land conditions can be documented immediately, but there may be significant lag time before water quality improves or water quality impacts due to other sources.
- Reductions in water quality from agricultural activities are primarily through changes in land conditions and management activities.

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 less likely to document the short-term effects of changing land conditions on water quality parameters such as temperature, bacteria, nutrients, sediment, and pesticides.

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. Through the Focus Area process, the SWCD delivers systematic, concentrated outreach and technical assistance in a small geographic area. A key component of this approach 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 geographic areas and is supported by a large body of scientific research (e.g. Council for Agricultural Science and Technology, 2012. Assessing the Health of Streams in Agricultural Landscapes: The Impacts of Land Management Change on Water Quality. Special Publication No. 31. Ames, Iowa).

Systematic implementation in Focus Areas provides the following advantages:

- Measuring progress is easier in a small watershed than across an entire Management Area,
- Water quality improvement may be faster since small watersheds generally respond more rapidly,
- A proactive approach can address the most significant water quality concerns,
- Partners can coordinate and align technical and financial resources,

- Partners can coordinate and identify appropriate conservation practices and demonstrate their effectiveness,
- A higher density of projects allows neighbors to learn from neighbors,
- A higher density of projects leads to opportunities for increasing the connectivity of projects,
- Limited resources can be used more effectively and efficiently,
- Work in one Focus Area, followed by other Focus Areas, will eventually cover the entire Management Area.

Soil and Water Conservation Districts select a Focus Area in cooperation with ODA and other partners. The scale of the Focus Area matches the SWCD's capacity to deliver concentrated outreach and technical assistance, and to complete (or initiate) projects. The current Focus Area for this Management Area is described in Chapter 3. The SWCD will also continue to provide outreach and technical assistance to the entire Management Area.

Strategic Implementation Areas

Strategic Implementation Areas (SIAs) are small watersheds selected by ODA in cooperation 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. 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 Area Rules. Finally, ODA completes a post-assessment to document progress made in the watershed. Chapter 3 describes any SIAs in this Management Area.

1.8 Monitoring, Evaluation, and Adaptive Management

The Oregon Department of Agriculture, LAC, and LMA will assess the effectiveness of the Area Plan and Area Rules by evaluating the status and trends in agricultural land conditions and water quality (Chapter 4). This assessment will include an evaluation of progress toward measurable objectives. ODA will utilize other agencies' and organizations' local monitoring data when available. ODA, DEQ, SWCDs, and LACs will examine these results during the biennial review and will revise the goal(s), measurable objectives, and strategies in Chapter 3 as needed.

1.8.1 Agricultural Water Quality Monitoring

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

Other partners may have water quality data that is described in Chapter 3 and presented in Chapter 4.

1.8.2 Statewide Aerial Photo Monitoring of Streamside Vegetation

Starting in 2003, ODA began evaluating streamside vegetation conditions using aerial photos. Stream segments representing 10 to 15 percent of the agricultural lands in each Management Area were randomly selected for long-term aerial photo monitoring. Stream segments are generally 3-5 miles long. ODA evaluates streamside vegetation at specific points within 30-, 60-, and 90-foot bands along both sides of

stream segments from the aerial photos and assigns each segment a score based on streamside vegetation. The score can range from 70 (all trees) to 0 (all bare ground). The same stream segments are re-photographed and re-scored every five years to evaluate changes in streamside vegetation conditions over time. Because site-capable vegetation varies across the state, there is no single "correct" streamside vegetation index score. The purpose of this monitoring is to measure positive or negative change for an individual reach.

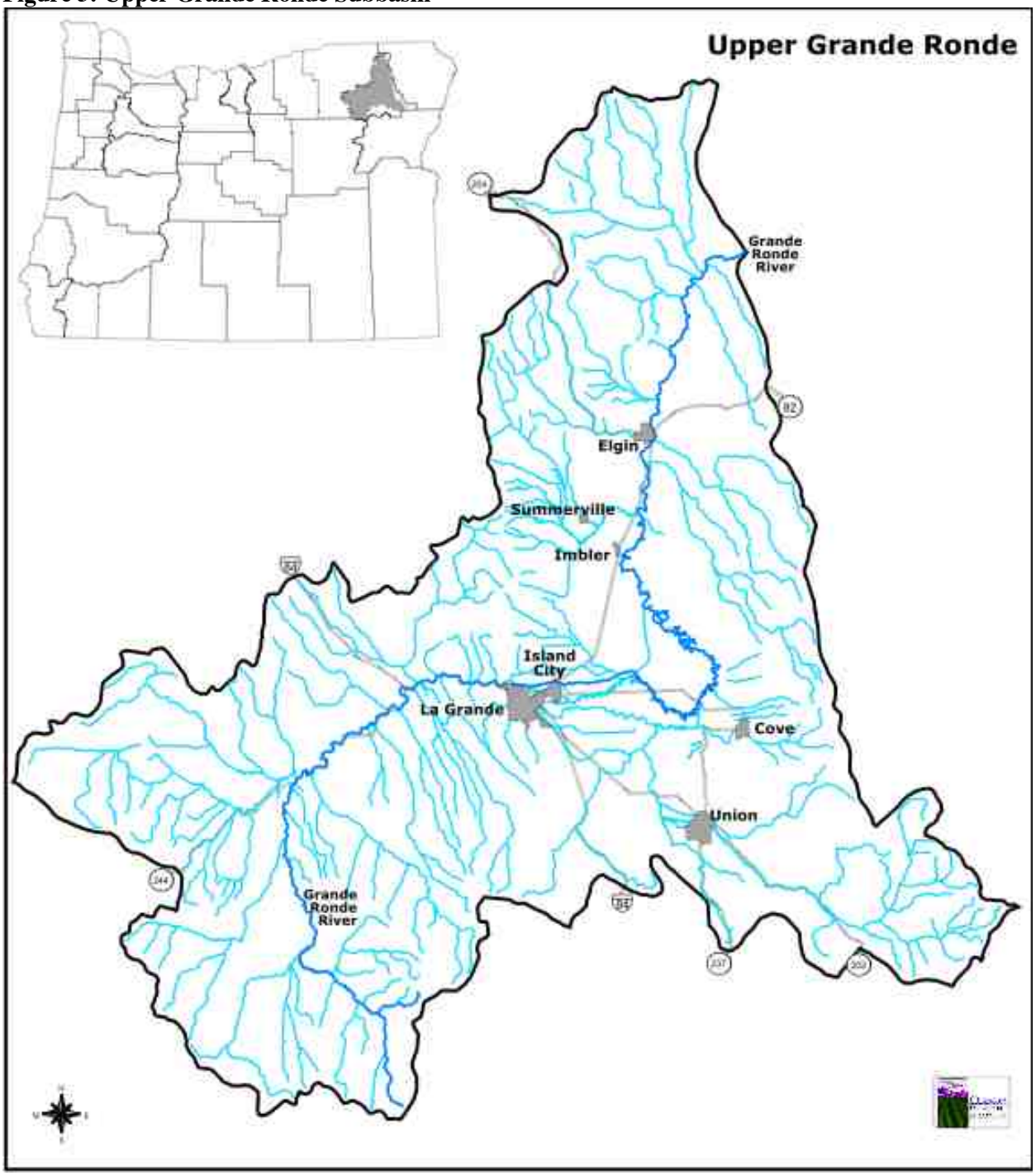
1.8.3 Biennial Reviews and Adaptive Management

All Area Plans and Area Rules around the state undergo biennial reviews by ODA and the LAC. As part of each biennial review, ODA, DEQ, SWCDs, and the LAC discuss and evaluate the progress on implementation of the Area Plan and Area Rules. This evaluation includes discussion of enforcement actions, land condition and water quality monitoring, and outreach efforts over the past biennium. ODA and partners evaluate progress toward achieving measurable objectives, and revise implementation strategies as needed. The LAC submits a report to the Board of Agriculture and the director of ODA describing progress and impediments to implementation, and recommendations for modifications to the Area Plan or Area Plans necessary to achieve the goal of the Area Plan. ODA and partners will use the results of this evaluation to update the measurable objectives and implementation strategies in Chapter 3.

Chapter 2: Local Background

The Management Area consists of all the lands draining to the Grande Ronde River from its headwaters to its confluence with the Wallowa River, a land area of 1,640 square miles. The Area Plan refers to this area as the Upper Grande Ronde Subbasin (UGR Subbasin) to conform with the US Geological Survey system of naming drainages.

Figure 3: Upper Grande Ronde Subbasin



2.1 Local Roles and Responsibilities

2.1.1 Local Advisory Committee

The Area Plan was developed with the assistance of the LAC. The LAC was formed in 1997 to assist with the development of the Area Plan and Area Rules and with subsequent biennial reviews.

Table 1: Current LAC Members

Name	Location	Description
Dale Counsell, Chair	Ladd Creek	Farmer / Rancher
Ross Bingaman	North Central	Farmer / Rancher
David Axelrod	La Grande	Environmentalist / Author
Allen Childs	Basin-wide	Habitat / Confederated Tribes of the Umatilla Indian Reservation
Gene Hardy	North End	Rancher / SWCD
Jed Hassenger	Catherine Creek	Farmer
William Howell	Grande Ronde	Farmer / Rancher
Dave Ricker	Catherine Creek	Rancher
Maarteen Tromp Val Holst	Indian Creek	Rancher
John Schiller	Upper Grande Ronde	Rancher

2.1.2 Local Management Agency

The implementation of the Area Plan is accomplished through an Intergovernmental Agreement between ODA and the Union SWCD. This Intergovernmental Agreement defines the SWCD as the LMA for implementation of the Area Plan. The SWCD was also involved in development of the Area Plan and Rules.

2.2 Area Plan and Rules: Development and History

The director of ODA approved the Area Plan and Rules in 1999.

Since approval, the LAC met in 2002, 2005, 2008, 2010, 2012, and 2015 to review the Area Plan and Rules. The biennial review process includes an assessment of progress toward achieving the goals and objectives in the Area Plan.

2.3 Geographical and Physical Setting

The Grande Ronde River flows through the Blue Mountains. Topography within the UGR Subbasin varies from rugged high elevation mountains to broad, nearly flat mountain-enclosed valleys. Elevations range from about 7,800 feet to slightly less than 2,300 feet. Average annual precipitation ranges from 12 to 25 inches below 3,000 feet to more than 50 inches above 5,000 feet. Typical summers are hot and dry, and winters tend to be cold and wet. Peak flows in the main stem of the Grande Ronde generally occur in April or May when mean monthly flows usually are around 2,000 cubic feet per second. August and September are months of low flow, and the mean monthly flows for these months is at or below 30 cubic feet per second.

Perhaps the most prominent physical feature in the planning area is the 360 square-mile Grande Ronde Valley. This valley is the heart of agricultural and urban activities in the Subbasin. Farmers and ranchers use their land to grow wheat, grass seed, mint, alfalfa, livestock, and several other crops. Many ranchers

graze their livestock in the summer months on private and publicly owned lands in the mountainous regions of the Subbasin.

Estimated 2012 income from crops and livestock in Union County was $68,370,000. In terms of sales, the following crops were the most important:

- Mint
- Cattle and calves
- Grains
- Grass and legume seeds

2.4 Agricultural Water Quality

2.4.1 Water Quality Issues

This Area Plan addresses the following water quality issues and conditions related to lands in agricultural use:

- Erosion and surface water management,
- Nutrient management,
- Livestock management including CAFOs,
- Near-stream management areas.

Beneficial Uses

Beneficial uses in the UGR include public, private, and industrial water supply, irrigation, livestock watering, salmonoid fish rearing and spawning, anadromous fish passage, resident fish, and aquatic life, wildlife and hunting, boating, fishing, water contact recreation, and aesthetics *(OAR 340-41-0151, Table151A*).

DEQ has determined that cold-water fish species are the most sensitive beneficial use not being adequately supported in the Grande Ronde. Spring/summer Chinook salmon, summer steelhead, bull trout, rainbow trout, and brook trout are some of the cold-water fish species that use the UGR Subbasin for all or part of their life cycles. There are three endangered species located in parts of the Upper Grande Ronde watershed, they are Chinook salmon (Oncorhynchus tshawytscha) rainbow trout (Oncorhynchus mykiss) and bull trout (Salvelinus confluentus).

WQ Parameters and 303(d) list

Many of the streams in the UGR Basin do not meet standards or TMDL load allocations for one or more of the following factors:

- Dissolved oxygen
- pH
- Sediment
- Temperature
- Bacteria
- Aquatic weeds and algae
- Phosphorus
- Biological criteria
- Metals

Out of 70 stream segments in the Subbasin, 40 are on the 303(d) list because their temperatures exceed the water quality standards. Water temperatures affect most aspects of an aquatic environment. Research

has shown that temperatures as high as 77°F can be lethal to Chinook salmon and steelhead if they are exposed to these temperatures for several hours. Temperatures of 70°F can cause 50 percent mortality, and water less than 70°F can still cause problems for the fish problems. These sub-lethal temperatures can reduce growth, increase susceptibility to disease and increase competition from warm-water species.

See Appendix A for the current 303(d) Water Quality Limited list.

2.4.2 Basin TMDLs and Agricultural Load Allocations

The UGR TMDL was developed by DEQ and approved by the US EPA in May 2000. TMDL targets have been established to address temperature, dissolved oxygen, pH, and sedimentation. The TMDL quantitatively focuses on temperature and nutrients, relying on these objectives to address all other water quality limited issues. The UGR Basin TMDL can be accessed via the DEQ website: (*http://www.oregon.gov/deq/wq/tmdls/Pages/TMDLs-Basin-Grande-Ronde.aspx*).

DEQ has set TMDLs for nitrogen and phosphorus for the UGR Subbasin as well. This was done because excess levels of nutrients spur algae growth, which is the main cause of the dissolved oxygen and pH problems in the Subbasin.

Table 2. Agricultural Load Allocations for various TMDLs.

Parameter	Standard	Load Allocations
Temperature	Temperature standard, targeting no measurable human-caused warming of streams.	Maximum radiant heat load, also expressed as LA surrogates with numeric targets for percent effective shade (longitudinal graph for mainstem, generic shade-channel width plots for tributaries), channel width, width/depth ratio, sinuosity. Qualitatively, also calls for instream flow protection.
Bacteria	Bacteria standard: single sample and geometric mean targets for *E. coli*.	Relies on the temperature and nutrient LAs. No additional LAs are established. Monitoring is recommended to support ongoing targeting of the *E. coli* criteria.
Sedimentation	Narrative standard for bottom deposits.	Relies on temperature LA. No additional LAs are established.
Dissolved Oxygen (DO)/pH (Nutrients)	DO and pH standards, targeting minimum DO and maximum pH concentrations.	Maximum DIN* and orthophosphate concentrations are calculated to achieve DO and pH criteria. The LAs are expressed as percent reductions of nutrient loads, varying by stream segment and based on nitrogen limitation. These LAs are assessed based on cooler streams via the temperature TMDL, or in the event that sufficient effort towards cooling is not achieved on current riparian conditions.

*DIN: dissolved inorganic nitrogen (nitrite + nitrate + ammonia)

2.4.3 Sources of Impairment

Many agencies and groups have been collecting water quality data in the UGR Subbasin for several years. These data indicate that nonpoint source pollution contributes to water quality problems.

For example, water quality problems begin upstream of the La Grande wastewater discharge point and persist well below both the La Grande and Union discharges.

Nonpoint source pollution is the result of many human activities that occur in a basin. Effects from poor land management, while having a small influence on water quality locally, can accumulate and become significant problems at the watershed level. The opposite is true as well. Sound management may have only a small local effect, but broadly applied practices will lead, in time, to significant improvements overall. For these reasons, this Area Plan applies uniformly to all agricultural and rural lands in the Subbasin. It is also important to treat all landowners in the planning area as fairly as possible.

Some general categories related to agriculture that could influence water quality are:

- Soil management
- Nutrient application
- Animal manure management
- Livestock management
- Near stream management

Clearly, agricultural activities do not cause all water quality problems in the Grande Ronde. For example, the city wastewater discharges are an important source of nutrients. Storm water runoff from the urban areas contributes nutrients as do poorly maintained septic tanks. Poorly maintained roads and bridges increase sediment loads in streams and rivers. Forestry activities can cause increases in stream temperatures as well as sediment and nutrient concentrations in streams. Many other activities not listed here can also influence water quality.

Other factors besides human management influence water quality. The geology of the UGR Management Area influences both surface and groundwater quality. For example, the highly alkaline soils found in the UGR Management Area can increase the pH of surface and ground water. This is especially true in the southern end of the UGR Management Area and in the portion of Catherine Creek downstream from the town of Union.

The climate and topography of the UGR Management Area also have a profound influence on water quality. Because the Grande Ronde River originates in low elevation mountains, and eastern Oregon's climate is hot and dry, water temperatures are naturally high and flows are low late in the summer. Low flows concentrate nutrients, which along with high temperature, increase algae growth. Excessive algae growth is the main cause of the observed dissolved oxygen and pH fluctuations.

One way of correcting low late season flows is to build multi-purpose reservoirs. These reservoirs could capture spring runoff and augment flows for instream purposes during the dry season along with using conservation irrigation systems. As stated earlier, a higher volume of water requires more energy to heat. Higher flows could also help dilute the nutrient concentrations, thereby reducing the pH and dissolved oxygen problems in the Grande Ronde Valley.

Another aspect that multipurpose reservoirs could help would be in controlling flooding in the valley. Many areas flood frequently in the spring, causing extensive damage to stream banks. This damage contributes to sedimentation problems, the nutrients bound to the sediment contribute to pH and dissolved oxygen problems, and the flooding can destroy existing riparian vegetation and impede the establishment of new vegetation.

In the past, several agencies have studied the feasibility of building reservoirs and have developed plans to do so. The limiting factor has been protecting the salmon and steelhead runs in the basin. Among the options available that could protect the runs and store water is to build off-channel reservoirs or small dams on several tributaries of the Grande Ronde and Catherine Creek rivers. A study conducted by the

Bureau of Reclamation (USDI – BOR), 1981, identified 40 potential dam sites on tributaries in the headwaters of these two rivers. The Bureau estimated that at least 20 small dams are needed to control a 10-year flood event (Grande Ronde Cooperative River Basin Study, 1996).

In October 2016, the Oregon Water Resources Commission approved the request from ODA to extend the terms of the two Reservations of Unappropriated Water in the Grande Ronde Basin for an additional 20-years, or to expire on January 7, 2037. The two reservations are in the:

(1) Upper Grande Ronde Subbasin -- 26,900 ac-ft (OAR 690-508-0110)
(2) Middle Grande Ronde Subbasin -- 9,000 ac-ft (OAR 690-508-0120)

Water from the reservations is to be stored in a surface or subsurface multipurpose reservoir; used for future economic development in agriculture, and has a priority date of November 6, 1992. Uses include but are not limited to irrigation, stockwater; agricultural, municipal or commercial use, recreation and hydropower generation.

Another factor influencing current water quality is past management practices. One example is the State Ditch. This ditch captures the Grande Ronde River just downstream from Island City. It has changed what historically was 33 miles of meandering river channel. Most of this old river channel is now supplied with water only from Catherine Creek. The part of the old channel the State Ditch cut off is now farmed and houses and barns have been built in its path. Under this Area Plan, we assume that the State Ditch will remain intact.

It should be noted that landowners and agencies have implemented many practices and completed many projects to benefit water quality in this basin. Implementation of this Plan will encourage this work to continue and to expand; water quality can only improve as a result.

2.5 Voluntary and Regulatory Measures

This Area Plan was created by the LAC, ODA, and the Union SWCD. The purpose of the Area Plan is to prevent and control water pollution from agricultural activities and soil erosion in the UGR Subbasin. The LAC, ODA, and the SWCD believe proper agricultural practices and widespread adoption of these practices will improve water quality. They also believe that ensuring the economic viability of agriculture is necessary to achieve this improvement in water quality. Achieving the goals in the Area Plan, which includes maintaining the economic viability of agriculture, will lead to preserving and protecting beneficial uses.

This Area Plan is part of an adaptive management strategy. Periodically ODA, the LAC, and the SWCD will review this Area Plan and revise it, if necessary, to ensure that we are achieving our mission and goals. Monitoring will play a key role in this adaptive management. For example, a good monitoring program will help us determine more precisely agriculture's role in water quality concerns in the UGR Subbasin.

2.5.1 Area Rules

Area Rules are presented in this Area Plan, for information purposes, and indicated by bold type within a border.

Through adoption of OARs 603-095-0400 through 603-095-0460 formalizing specific requirements of this Plan, the following conditions are prohibited:

603-095-0440 Prohibited Conditions
All landowners or operators conducting activities on lands in agricultural use shall be in compliance with the following criteria. A land occupier shall be responsible for only those prohibited conditions caused by activities conducted on land managed by the landowner or occupier. Criteria do not apply to conditions resulting from unusual weather events or other exceptional circumstances, which could not have been reasonably anticipated. Limited duration activities may be exempted from these conditions subject to prior approval by the department.

2.5.2 Soil Erosion Prevention and Control

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

Healthy upland areas provide several important ecological functions, including:

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

'Active channel erosion' means gullies or channels which at the largest dimension have a cross sectional area of at least one square foot and which occur at the same location for two or more consecutive years (OAR 603-095-0010(1)).

'Surface drainage field ditches' are graded ditches for collecting excess water in a field (OAR 603-095-0010(47)).

(1) Soil erosion: By January 1, 2003

(a) No agricultural land management or soil disturbing activity shall cause sheet or rill erosion in excess of the soil loss tolerance factor (T) on cropland, and no agricultural land management or soil disturbing activity shall cause active channel erosion that delivers sediment directly into the waters of the state, or

(b) No agricultural land management or soil disturbing activity shall exceed an alternative standard, approved by the Department, that assures protection of water quality, or

(c) No agricultural land management or soil disturbing activity shall cause a discharge of sediment to the waters of the state in excess of water quality standards.

(4) By January 1, 2003 construction and maintenance of surface drainage field ditches shall not result in sediment delivery to waters of the state from soil erosion caused by excessive channel slope, unstable channel cross-section or placement of disposed soils.

2.5.3 Nutrient Management

Crop nutrient applications, including manure, sludge, commercial fertilizer, and other added nutrient

inputs, should always be done at a time and in a manner that reduces the possibility of runoff into any nearby stream or waterway. Fertilizers should be applied in accordance with nutrient budgets developed for each crop by the use of current yield estimates, water analysis, soil tests, tissue tests and/or other appropriate tests and information. Sources of information are found in the NRCS Field Office Technical Guide (FOTG) and OSU Extension Service informational fact sheets for most commercial crops.

Surface applied nutrients should not be applied to frozen soil, on snow, or when significant rainfall (more than 1 inch) is predicted as imminent (greater than a 67 percent probability within 24 hours of application) by the National Weather Service. Extra care shall be used when utilizing surface (rill or flood) irrigation to minimize nutrient contamination of tail water. In no case should chemigated or fertigated irrigation water be allowed to flow directly to streams.

(3) By January 1, 2003 nutrient application rates and timing shall not exceed specific crop requirements. Crop requirements will be based on recommendations from the best available data applicable to a specific site.

2.5.4 Riparian/Streamside Area Management

Vegetation, both in the uplands and in the riparian area, plays a critical role in water quality. Extensive research conducted in eastern Oregon and throughout the west confirms this.

'Riparian vegetation' consists of plant communities consisting of plants dependent upon or tolerant of the presence of water near the ground surface for at least part of the year (OAR 603-095-0010(36)).

Generally, healthy plant communities:

- Hold soil in place,
- Protect stream banks,
- Capture, store and safely release precipitation,
- Filter nutrients from both the ground water and surface runoff,
- Provide shade to moderate water temperatures.

In addition to the water quality benefits, healthy terrestrial vegetation improves fish habitat. Riparian vegetation protects spawning, rearing and holding areas by trapping sediment that could smother eggs and improving the recruitment of large woody debris. This debris helps to create pools for fish to rest in, provides hiding cover and habitat diversity. Vegetation provides organic debris to feed aquatic insects. These insects are an essential element in the diets of many fish.

Many factors influence stream temperatures. Some of the most important factors are:

- Volume of water flowing in the stream,
- Width-to-depth ratio of the stream,
- Ground water recharge,
- Shade.

Vegetation affects all these factors. Riparian vegetation can help narrow and deepen stream channels, which protects water from heating by exposing less stream surface area to the surrounding environment. Healthy vegetation in both the uplands and in the riparian area will capture, store, and safely release water later in the season. Releasing water later in the summer will reduce temperatures in two ways. The first is that a higher volume of water requires more energy to heat it. Secondly, infusion of ground water, usually between 45 and 55°F, can help hold down stream temperatures.

Shade, provided by tall vegetation, blocks solar radiation, and solar radiation is the single most important energy source for heating streams during daytime conditions (Beschta, 1997). Thus streamside vegetation, via the shade it produces, moderate summertime stream temperatures. In much of the UGR Subbasin, the historic and natural potential streamside vegetation is a natural riparian forest consisting variously of conifers or cottonwood, willow, alder, and other tree species as well as a herbaceous understory. The TMDL targets such 'system potential' vegetation to moderate solar heating and promote natural channel form and function that provides for water quality.

Clearly, restoring healthy, functioning vegetation communities, especially riparian vegetation, will improve critical fish habitat necessary to support the three endangered fish species in this Subbasin.

(2) By January 1, 2003 no agricultural land management or soil disturbing activity shall cause streambanks to breakdown, erode, tension-crack, shear or slump beyond the level that would be anticipated from natural disturbances given existing hydrologic characteristics.

(5) By January 1, 2003 agricultural activities shall allow the development of riparian vegetation to control water pollution by providing control of erosion, filtering of sediments and nutrients, moderation of solar heating, and infiltration of water into the soil profile. Evaluation of riparian vegetation development will consider site-specific capabilities and anticipated levels of natural disturbance. Where cropping or resource protection activities have occurred, an adequate vegetative buffer or equally effective pollution control practice must be in place.

2.5.5 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. Existing statutes and rules that regulate water quality remain in effect and are enforced by other designated management agencies.

See Section 1.4.4 for statute and definitions.

Wastes include livestock manure from situations like seasonal feeding and birthing areas, gathering pastures and corrals, rangelands and pasture, and any other situations not already covered by Oregon's CAFO laws. Indicators of noncompliance include: 1) runoff flowing through areas of high livestock usage and carrying wastes into waters of the state, 2) livestock waste accumulated in drainage ditches or areas of flooding, and 3) fecal coliform (*E. coli*) counts that exceed State water quality standards. Livestock grazing is allowed to the extent it does not cause conditions that violate state water quality standards and complies with the Prevention and Control Measures in the Area Rules. Livestock facilities located near streams should employ an adequate runoff control system. Compliance with the riparian objectives will help keep wastes from running into waters of the state.

(6) Waste discharges: Effective upon adoption of these rules:

(a) No person conducting agricultural land management or earth disturbing practices shall 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) No person conducting agricultural land management or earth disturbing practices shall discharge any wastes into any waters of the state if the discharge reduces the quality of such waters below the water quality standards established by rule by the Environmental Quality Commission.

(c) No person conducting agricultural land management or earth disturbing practices shall violate the conditions of any waste discharge permit issued pursuant to ORS 468B or ORS 568.

2.5.6 Livestock Management

A landowner or operator's responsibility under this Area Plan is to implement measures that prevent and control water pollution from livestock operations. Careful management of areas used for grazing, feeding, and handling is critical to the success of livestock operations and have potential to affect water quality.

Livestock management (including handling facilities, pastures, rangeland, and confinement areas) should 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 should promote and maintain adequate vegetative cover, for protection of water quality, by consideration of intensity, frequency, duration, and season of grazing.

Grazing near streams should be managed to 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. Offstream watering systems, upland water developments, feed, salt and mineral placement are examples of methods to be considered as ways to reduce impacts of livestock to streamside areas. Establishment and spread of noxious weeds should be prevented by appropriate weed control practices and grazing management.

Factors used to evaluate effectiveness of management may include:

- Safe diversion 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,
- Plant community is neither dominated by invasive annual plant species nor by overgrowth of native woody species,
- Plant cover (plants plus plant litter) is adequate to protect site,
- Distribution and amount of bare ground does not exceed what is expected for site,
- Livestock utilization patterns do not exhibit excessive sustained use in key areas,
- Plant vigor levels and regeneration are sufficient to protect long term site integrity.

(5) Livestock Management

(a) Pastures and rangeland must be managed to prevent sediment, nutrient and bacterial contributions to waters of the state. Adequate vegetative buffers or filter strips must be installed and maintained, and vegetative cover must be maintained or restored after use as needed to control contaminated runoff or weed infestations. Where appropriate, waste management systems must be installed to collect, store and utilize animal wastes.

(b) Barnyards, feedlots, drylots, confinement and non-pasture areas, and other livestock facilities located near waters of the state must employ an adequate runoff control system, or an equally effective pollution control practice. Where necessary to prevent waste delivery, waste management systems must be installed to collect, store and utilize animal wastes.

(c) Grazing must be done in a manner that does not degrade waters of the state or negatively impact the stability of streambanks. Grazing management systems must allow for recovery of plants and leaves adequate vegetative cover to ensure streambank stability, reduce sediments entering the stream, and provide stream-side shading consistent with site capability. The grazing management system must maintain or develop the desired vegetative cover.

Chapter 3: Strategic Initiatives

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

LAC Mission
Maintain the economic viability of the agricultural industry, while pursuing ecological integrity through maintenance, restoration, education, and monitoring.

Objectives
To achieve the Area Plan mission and goals, the following land conditions must be achieved on agricultural lands throughout the Management Area:

- Ongoing, natural recruitment of desirable riparian or upland plant species that provide streambank stability, filtration of overland flow, and moderation of solar heating, consistent with site capability,
- Management activities maintain at least 50% of each year's growth of woody vegetation - both trees and shrubs,
- Management activities minimize the degradation of established native vegetation,
- Maintenance or recruitment of woody vegetation–both trees and shrubs,
- Streambank integrity capable of withstanding 25-year flood events,
- No visible sediment loss from cropland through precipitation or irrigation induced erosion,
- No significant bare areas within 50 feet of streams on pasturelands and/or rangelands,
- Active gullies have healed or do not exist on pasturelands,
- Livestock manure is stored under cover during the winter and in a location that minimizes risk to surface and groundwater.

These conditions will be achieved by:

- Reducing soil erosion from agricultural land in the basin,
- Improving bank stability,
- Improving riparian conditions,
- Improving nutrient, animal waste, and irrigation management.

Section 3.2.3 has management practices that are generally accepted as the most effective, economical, and practical for the area to address water quality issues.

3.1 Measurable Objectives

Measurable objectives allow the Ag Water Quality Program to better evaluate progress toward meeting water quality standards and load allocations where TMDLs have been completed. Many of these measurable objectives relate to land condition and are mainly implemented through focused work in small geographic areas.

3.1.1 Management Area

Management Area-wide objectives have not yet been determined. Landscape conditions must first be assessed to determine baseline values.

ODA is planning to work with LMAs to conduct land condition assessments at the management area level. These assessments will allow ODA and partners to track improvements in land conditions over time. Often, improvements in land conditions are detectable much earlier than changes in water quality. For example, when a landowner restores a streamside area, land conditions improve rapidly, even though it may take 20 years for streamside vegetation to reach the height that it can positively affect stream temperatures.

ODA will work with LMAs and other partners to design and conduct an assessment of streamside areas along agricultural lands in the UGR Subbasin prior to the next biennial review.

The following milestones and timelines were developed in cooperation with ODA, the LAC, and the SWCD.

Targets:

- By 2020, the Management Area will be evaluated for likelihood of pollution from runoff or discharge of wastes. Methods will include review of existing aerial photography, viewing from public access points and local knowledge.
- Long-term targets will be identified at the 2021 Biennial Review based on the results from the initial assessment.

Targets:

- By 2020, uplands will be evaluated for erosion potential. The method is still to be determined.
- Long-term targets will be identified at the 2021 Biennial Review based on the results from the initial assessment.

Targets:

- By 2020, perennial stream reaches will be evaluated for vegetative water quality function.
- Long-term targets will be identified at the 2021 Biennial Review based on the results from the initial assessment.

Targets:

- By 2020, perennial stream reaches will be evaluated for vegetative water quality function.
- Long-term targets will be identified at the 2021 Biennial Review based on the results from the initial assessment.

3.1.2 Focus Area(s)

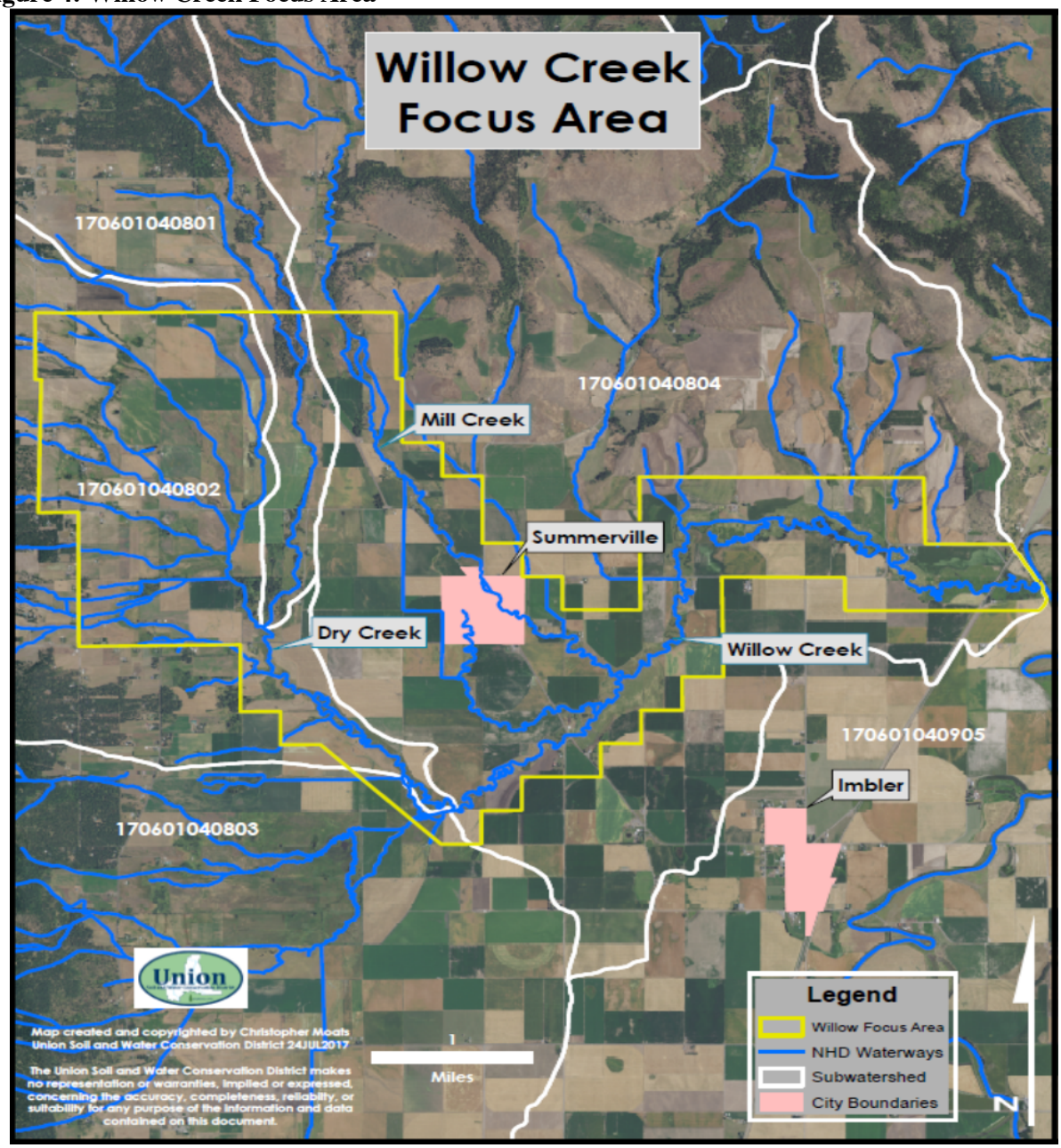
The Union Soil and Water Conservation District's (USWCD) Focus Area (FA) was Little Creek the largest of four tributaries to Catherine Creek. The SWCD abandoned work in this FA after two years due to the lack of landowners support. The Union SWCD started working in a new FA Willow Creek in 2017.

Willow Creek was selected as the FA because of the large amount of agricultural activity, a high level of conservation and restoration opportunities perceived by the District and ODA personnel, interest by planning partners to implement and fund implementation, and interest by landowners and local managers. Irrigation withdrawal of water from the Willow Creek and tributaries, and encroachment on riparian areas and stream channels have impacted riparian vegetation and ecological conditions, and reduced the quality of fish and wildlife habitat.

Willow Creek FA is approximately 11.3 square miles. It consist of four 12-digit HUCs (Dry Creek, Upper Willow Creek, End Creek, and Lower Dry Creek. Approximately 80 percent of the land within the FA has agricultural uses with the primary types being annual row crops, perennial grass seed, grass and alfalfa hay, cattle, and sheep. There is approximately 21 miles of perennial and intermitent streams within the FA. The primary agricultural Water Quality concerns are stream temperatures and sediment.

The primary projects planned to address temperature are riparian exclusion and restoration planting for shade and promote floodplain water storage and exchange. The primary projects planned to address sediment concerns are riparian exclusion and restoration planting for filtering and to stabilize streambanks.

Figure 4: Willow Creek Focus Area



Streamside Assessment definition:
Streamside vegetation was evaluated with ODAs Streamside Vegetation Assessment (SVA) to characterize the type of ground cover within 35 feet to the stream. The metric is the percent of the different types of land cover (agricultural infrastructure, bare ground, bare due to agricultural activities, grass, agricultural grass, shrubs, trees, and water) viewed on aerial phtographs.

Table 3: Streamside Vegetation Assessment (SVA) Results – In Acres

SVA Map Category (Alphabetical)	2017: Pre-Assessment (or Conditions at Beginning of Biennium)	2019: Post-Assessment (or Conditions at End of Biennium)	Reason for Change in Acreage
Ag Infrastructure	1.2		
Bare	2.9		
Bare Ag	0.4		
Grass	81.1		
Grass Ag	105.4		
Not Ag	8.2		
Shrub	17.7		
Shrub Ag	0.0		
Tree	55.8		
Tree Ag	0.0		
Water	30.3		
Total Acres	**303**		
Total Ag Acres Assessed (= Total Minus "Not Ag")	**294.8**		

Current Conditions (From Pre-Assessment)

- In 2017: Shrubs is 17.7 acres or 6% percent of Total Ag Acres

Focus Area Milestone for 2017-2019

- By June 30, 2019: Increase shrub acres 20.2 acres or 6.7% to 37.72 acres

3.1.3 Strategic Implementation Area

There are currently no SIAs in the Management Area.

3.2 Strategies and Activities

The SWCD, acting as the LMA, will be responsible for day-to-day implementation of this Plan. The following guidelines will apply for public participation in implementation and review of the Area Plan. ODA and the SWCD intend to encourage participation in this water quality improvement program by the following strategies:

3.2.1 Education and Outreach

- ❖ Providing educational programs to raise public awareness and understanding of water quality issues and solutions.

As resources allow, the SWCDs, in partnership with other agencies and local organizations, will develop educational programs to improve the awareness and understanding of agricultural water quality issues. They will strive to provide the most current information in a manner that avoids conflict and encourages cooperative efforts to solve problems. Implementation of the Area Plan is a priority element in the SWCD's Annual Work Plan and Long-range Business Plan.

The following elements are part of an effective educational program:

- Develop an outreach strategy,

- Showcase successful projects and systems by conducting tours for landowners and media,
- Recognize successful projects and systems through appropriate media and newsletters,
- Promote cooperative on-the-ground projects to solve critical problems identified by landowners/operators and in cooperation with partner organizations,
- Conduct educational programs to promote public awareness of agricultural water quality,
- Evaluate current research and scientifically valid monitoring results.

3.2.2 Funding

- ❖ Providing incentives for the development and implementation of best management practices (BMPs) for prevention and control of agricultural pollution.

A variety of funding sources are available to private landowners to assist in implementing BMPs. Some examples are as follows:

- The Oregon Watershed Enhancement Board (OWEB),
- Bonneville Power Administration (BPA) through the Grande Ronde Model Watershed Program (GRMWP),
- Oregon Department of Fish and Wildlife's (ODFW) Access and Habitat Program,
- NRCS programs (e.g. EQIP,WRP, CRP, CREP and others).

3.2.3 Best Management Practices

Agricultural BMPs for the UGR Subbasin are those management practices that are generally accepted as the most effective, economical and practical for the area, and they address water quality issues. These practices should also maintain the economic viability of agriculture in the subbasin. Appropriate management practices for individual farms and ranches may vary with the specific cropping, topographical, environmental, and economic conditions that exist at a given site. Because of these variables, it is not possible to recommend any uniform BMPs for farms or ranches in the UGR Subbasin.

However, the LAC discussed a variety of practices, which based on their experience are appropriate for this subbasin. The NRCS Field Office Technical Guide contains extensive lists of BMPs as well.

The worksheets in Appendix B capture the LAC's discussions. Please refer to these pages to learn more details about the LAC's thoughts on BMPs. These worksheets are intended to increase awareness and provide information and education to the general public and the agricultural community. They are not intended to be mandates to farmers. The Agricultural Water Quality Management Program was designed to maintain as much flexibility in farming and ranching as possible. What follows is a summary of some of the BMPs that the ODA, SWCD, and the LAC encourage landowners to adopt, if they have not already. Widespread adoption of these practices will address the water quality parameters of concern in the Grande Ronde River. Appendix B provides more guidance for assistance available for implementation of BMPs and adoption of BMPs will be tracked through future monitoring efforts. The BMPs are grouped by the water quality issues they influence.

Temperature and Aquatic Habitat

- Near Stream Management Area Practices
  - Establish and maintain riparian buffers composed of desirable riparian plant species,
  - Site capable vegetation sufficient to protect channel form, provide stream shading and filter pollutants,

    - To the extent feasible, all streams should have riparian buffers on both sides throughout their length,
    - TMDL goals encourage trees and woody riparian vegetation,
    - Streambank integrity capable of withstanding 25-year flood events,
- Improve livestock management and distribution through:
    - Riparian pastures as part of a rotational grazing scheme,
    - Off-stream water development,
    - Salting,
    - Herding,
    - Fencing where appropriate,
    - Improved management of big game herds.

Sediment

- Improve bank stability
    - Critical Area Planting where appropriate - Promote vegetation that is consistent with site capability,
    - Install rock barbs and rip-rap where appropriate - Designed to promote longterm stability and to minimize impairment of natural channel form and function,
    - Bank shaping where appropriate. Designed to promote longterm stability and to minimize impairment of natural channel form and function,
    - Improve riparian grazing management,
    - Harden (rock) water gaps and animal crossings.
- Ag field erosion
    - Plant and maintain buffer strips,
    - Use grass waterways,
    - Plant perennial crops,
    - Use conservation tillage where appropriate,
    - Use sediment traps,
    - Install terraces and diversion ditches,
    - Plant windbreaks to control wind erosion.

Bacteria

- Animal waste management
    - Plant and protect buffer zones,
    - Install settling ponds to capture runoff,
    - Install clean water diversions around livestock concentration areas,
    - Grazing management,
    - Runoff controls,
    - Fencing,
    - Off-channel watering.

Nitrogen and Phosphorus (Dissolved Oxygen and pH)

- Fertilizer management
    - Encourage soil and foliage testing in support of minimizing exess application,
    - Plant and protect buffer strips to filter nutrients.
- Bank Stability and field erosion
    - Plant and protect buffer strips,
    - See Sediment Section.

Flow Modification

- Irrigation Management
  - Improve irrigation efficiency by:
    - Pump testing,
    - Sizing mainlines properly,
    - Use proper nozzle sizes,
    - Fix leaks,
    - Install headgates at diversion points and/or improve existing structures,
    - Conversion of surface systems to buried mainline,
    - Monitor soil moisture levels,
    - Line or pipe irrigation ditches.
- Alternative water for irrigation
  - Use city wastewater,
  - Use deep well water when feasible.
- Consider instream water rights, voluntary purchasing or leasing of water rights, OWRD conserved water program

Agriculture's contribution to water quality problems (effectiveness of management practices)
In the UGR Subbasin, an ongoing effort is needed to monitor and assess agriculture's contribution to local water quality problems. Targets are set forth in the Area Plan objectives that will track, over time, the improvement in land conditions that influence water quality. What follows is an outline of the monitoring and assessment process the SWCD; with funding and cooperation from the DEQ, ODA, GRMWP, USFS, and OWEB, will conduct, if resources are available, to address the LAC's concerns.

Nutrients
Potential nutrient loss varies greatly from site to site because of differing soil properties and other factors. Using existing information and resources, the monitoring program will assess the relative vulnerability of sites throughout the subbasin for nutrient loss using some of the following information:

- Soil erosion potential
- Site runoff class
- Current land use information

To better understand agriculture's contribution to water quality problems, if any, agencies currently collecting data need to expand their programs. Some examples of new activities are as follows:

- Sample water from irrigation ditches, drain tiles and drainage ditches,
- Set up a limited network of shallow groundwater sampling wells,
- Correlate this information with land uses, soil properties and other factors.

The agencies, in cooperation with landowners, need to implement more intensive "nutrient budget" demonstration project. A nutrient budget would entail among other things:

- Measuring the ground water before it passes under a field and after it leaves,
- Soil nutrient sampling,
- Nutrient analysis of irrigation water and natural precipitation,
- Nutrient analysis of the agricultural crop.

If done properly on a variety of soil and crop combinations, these projects can help assess agriculture's contribution and assess management practices.

Erosion

Agencies need to inventory and rank soil types on their potential to contribute sediment to the waters of the state in the UGR Subbasin. This inventory will help determine agriculture's potential contribution to water quality problems. This process should incorporate at least the following items:

- Erodibility of soils
- Bank erosion
- Slope
- Length of slope
- Presence and nature of cover

Non-Confined Animal Feeding Operations

Livestock operations not subject to Confined Animal Feeding Operation (CAFO) permits are a potential source of nutrients, sediment, and bacteria. This is an instance where several "nutrient budget" demonstration projects could help identify agriculture's potential contribution to water quality problems. As with the suggested demonstration projects in the Nutrient section, these projects would monitor all sources of water entering and leaving winter feeding grounds, for example. Land managers could conduct several of these projects on several different soil types and topographical situations.

3.2.4 Voluntary Water Quality Farm Plans

- ❖ Offering technical assistance for the development and implementation of voluntary water quality farm plans.

Voluntary efforts of individual landowners are the primary means of preventing and controlling nonpoint source pollution from agricultural and rural lands in the UGR Subbasin. Local, state, and federal agencies will assist by providing information, educational opportunities, technical, and financial assistance. Both the SWCD and ODA believe this will be the most effective means to improve water quality. To determine the success of this plan, the SWCD and ODA will participate in a monitoring program.

In keeping with the spirit of voluntary cooperation, the SWCD encourages landowners to develop individual farm plans to address water quality. Land managers will develop these plans to help them make decisions about applying BMPs that will conserve soil, water, plant, and animal resources. These plans outline specific measures necessary to prevent and control water pollution. Depending on the operation and the specific site, they may contain any or all of the following elements:

- Erosion Control
- Nutrient Management
- Irrigation Management
- Animal Manure Management
- Livestock Management
- Near-stream Management

3.2.5 Monitoring and Evaluation

- ❖ Developing a monitoring program to identify current and potential water quality problems.

Monitoring and assessment are critical parts of this water quality management plan. A good monitoring program will enable local land managers and agencies to determine if progress is being made towards meeting program goals.

3.3 Monitoring and Evaluation

DEQ monitors three sites in the Management Area as part of their ambient monitoring network (Grande Ronde River at Hilgard Junction, Island City, and North Elgin).

DEQ retrieved data from DEQ, EPA, and USGS databases for January 1, 2000 to December 1, 2018 for the Management Area. DEQ determined status for stations with data from 2016 through 2018 and trends for stations with at least eight years of data. Their report is summarized in Chapter 4 and can be found at http://www.oregon.gov/deq/wq/programs/Pages/wqstatustrends.aspx. The report will be updated for future biennial reviews.

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

Chapter 4: Implementation, Monitoring, and Adaptive Management

4.1 Progress Toward Measurable Objectives

4.1.1 Management Area

Management Area objectives have not yet been determined.

4.1.2 Focus Areas

Willow Creek was selected as the Focus Area because of the large amount of agricultural activity, a high level of conservation and restoration opportunities perceived by the District and ODA personnel, interest by planning partners to implement and fund implementation, and interest by landowners and local managers. Irrigation withdrawal of water from the Willow Creek and tributaries, and encroachment on riparian areas and stream channels have impacted riparian vegetation and ecological conditions, and reduced the quality of fish and wildlife habitat.

4.2 Activities and Accomplishments

Table 4: Accomplishments Reported by Area Plan Objectives

Goals

- Prevent and control water pollution from agricultural activities and soil erosion and achieve applicable water quality standards
- Protect economic viability
- Preserve private property rights

Objectives	Accomplishments
Sustain and/or improve water quality by: • Reducing soil erosion from agricultural land in the basin • Improving bank stability • Improving riparian conditions • Improving nutrient, animal waste, and irrigation management	District has planned and developed conservation projects with landowners and partners to reduce erosion and improve bank and soil stability, riparian vegetation conditions, and fish and wildlife habitat. • District made 220 Landowner contacts; 45 technical site visits • District assisted in design development, environmental permitting, and construction planning for 3 projects District completed projects to address water quality degradation by improving grazing management and agricultural and forest practices by implementing the following tasks: • Fenced and protected 12 acres of riparian habitat • Forest restoration/thinning of 17 acres • Implemented best grazing mngmt practices on 20 acres • Implemented 26 acres of woody residue treatment • Eliminated/improved 3 livestock stream crossings • Upgraded irrigation systems on 1950 acres, installed 26 feet of pipeline, 11 water control structures, and 3 pumps
Promote landowner stewardship by encouraging the adoption of best management practices	The District continued to promote USDA programs to landowners for technical assistance and cost-share incentive programs to implement conservation practices. The District is the lead sponsor

	for the RCPP grant to provide funding focused on water quantity and quality improvements. • District staff recommended NRCS assistance to over 30 landowners • District attended 2 NRCS Local Working Group meetings to set Farm Bill funding priorities • RCPP funds of over $1M were obligated for conservation projects on 16,072 acres • 1,500 acres of CRP projects applied for promoting cropland conservation and soil improvement
Increase public awareness and understanding of agriculture's contributions to improving water quality through coordinated watershed outreach activities	• District completed and distributed 2016-17 and 2017-18 Annual Report's - total distribution of approximately **22,000** • District assisted in organizing the 2017 and 2018 Union County Farmer/Merchant banquet; presented Good Steward Award - two landowners completed projects improving water quality – 300 people attended each banquet • District co-hosted 2017 and 2018 Crop and Conservation Tours with OSU Ag. Ext Office - over **300** people attended • District assisted NRCS in developing and distributing info brochures/fact sheets to landowners of the RCPP program • District staff joined NRCS staff as guests on The Morning Buzz radio talkshow to promote conservation practices and the RCPP
Pursue funding for private landowners to implement water quality improvement projects	• District developed and submitted proposals; received funding for **4** OWEB grant projects and 2 BPA projects • Distruct submitted proposals; received funding for 2 OWEB Small Grant projects • District developing **1** potential OWEB regular grant project proposal, 2 OWEB small grant proposals and 1 BPA project proposal to submit for the 2019-2020 funding cycle • As an active member of the Grande Ronde Basin Partnership, the District collaborates to implement conservation strategies through an OWEB Focused Investment Partnership • District continues to work w/NRCS to manage RCPP Grant
Participate in a monitoring program that: • Identifies current water quality conditions and assesses water quality trends • Assesses the implementation of the Area Plan • Assists in delisting water quality limited streams in the Upper Grande Ronde Subbasin • Assesses compliance with the Undesirable Conditions in this Plan	• District continues to implement Upper Grande Ronde/Catherine Creek Assessment Study Plan with landowners and partnership agency staff • District is participating as a member of Implementation Team Adaptive Management sub-committee to develop a consistent monitoring approach • District is a stakeholder partner for the OWRD Place-Based Integrated Water Resources Planning grant awarded to Union County

4.3 Monitoring—Status and Trends

4.3.1 Water Quality (DEQ analysis)

DEQ

For this biennial review, DEQ reviewed data from 132 monitoring stations, of which 18 had sufficient data for this status and trends analysis (DEQ. *Upper Grande Ronde AgWQ Management Area: DEQ's Water Quality Status and Trends Analysis for the Oregon Department of Agriculture's Biennial Review of Agricultural Area Rules and Plan*. 71pp. 2018). This report is incomplete because it does not include data collected by volunteer monitors. DEQ expects to include these data in their next report.

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

Table 5: DEQ Analysis of Upper Grande Ronde River

Site ID	Site Description	*E. coli* (mpn/100mL)	pH	Dissolved Oxygen (mg/L)	Temperature (deg C)	Total Phosphorus[2] (mg/L)	Total Suspended Solids[3] (mg/L)
		# exceeding standard/N[1]				median; N[1]	median; N[1]
Likely influenced by agriculture in the Management Area							
10719	**Grande Ronde River at Hwy 92 (North Elgin)**	1/105	3/108	18/108		-	8; 105
11521	**Grande Ronde River at Peach Lane (Island City)**	1/95[6]	2/100	11/100[4,5]		-	4; 88[5,6]
Likely not influenced by agriculture							
10720	**Grande Ronde River at Hilgard Park**	1/100[6]	2/102	9/103		-	2; 92[6]
134	**Below Indian Lake spillway**	1/14	0/56	0/54[5,6]		0.04; 14[5,6]	-
varies	**14 sites**	-	-	-	See text	-	-

[1] N = total # of observations
[2] DEQ has no benchmark for total phosphorus in this Management Area; ODA benchmark for potential water quality concerns = 0.08 mg/L
[3] DEQ has no benchmark for TSS in this Management Area
[4] Statistically significant degrading trend
[5] Statistically significant improving trend
[6] Statistically significant seasonal patterns

Water quality decreases as the Grande Ronde flows from Hilgard Junction to North Elgin.

Temperature: most sites were on the Wallow-Whitman National Forest. Temperatures at all locations except for Southern Cross Lower (5030) and the headwaters of Chicken Creek (WWNF-033) and Clear Creek (WWNFJ-040) consistently exceeded water quality criteria in the summer in the last two years.

E. coli and pH: no issued identified in this analysis. *E. coli* values increase slightly as the Grand Ronde River flows downstream.

Dissolved oxygen: this parameter was of greatest concern. Dissolved oxygen decreases as the Grande Ronde River flows downstream, and has dropped significantly at Island City since the year 2000.

Total phosphorus: measured at only one location. The values were almost all approximately 0.4, with a barely discernible improving trend.

Total suspended solids: Sediment in the Grande Ronde River increases as it flows downstream. The improving downward trend at Island City is barely discernible.

4.3.2 Land Conditions

The only current information on land conditions is from the previous Little Creek Focus Area.

4.4 Biennial Reviews and Adaptive Management

The February 21, 2019 biennial review consisted mostly of a discussion of implementation activities and efforts to show progress.

There are currently two compliance cases in the management area. (12/31/2018)

APPENDIX A: 303(d) LIST

Upper Grande Ronde Subbasin – 2012 Category 4A (TMDL Approved) 303(d) listings

Stream	Segment (River miles)	Parameter	Season
Grande Ronde River	80.7 to 162.4	Phosphorus	Summer
Catherine Creek	0 to 11.7	Phosphorus	Summer
Grande Ronde River	80.7 to 162.4	pH	Summer
Catherine Creek	0 to 11.7	pH	Summer
State Ditch	0 to 4.4	pH	Summer
Dark Canyon	0 to 9.6	Sedimentation	Undefined
McCoy Creek	0 to 18.3	Sedimentation	Undefined
Sheep Creek	0 to 5.1	Sedimentation	Undefined
McIntyre Creek	0 to 7.3	Sedimentation	Undefined
Little Fly Creek	0 to 7.2	Sedimentation	Undefined
Meadow Creek	0 to 23.5	Sedimentation	Undefined
Grande Ronde River	200.6 to 204.8	Sedimentation	Undefined
Lookout Creek	0 to 6	Sedimentation	Undefined
Clear Creek	0 to 7.2	Sedimentation	Undefined
Mottet Creek	0 to 10.3	Sedimentation	Undefined
Sheep Creek	5.1 to 10.8	Sedimentation	Undefined
Grande Ronde River	80.7 to 162.4	Sedimentation	Undefined
Grande Ronde River	162.4 to 200.6	Sedimentation	Undefined
Chicken Creek	0 to 2.4	Sedimentation	Undefined
Little Catherine Creek	0 to 8.6	Sedimentation	Undefined
Jordan Creek	0 to 8	Sedimentation	Undefined
North Fork Catherine Creek	0 to 2.8	Sedimentation	Undefined
Fly Creek	0 to 13.3	Sedimentation	Undefined
Beaver Creek	0 to 13.5	Sedimentation	Undefined
South Fork Catherine Creek	5.2 to 8.3	Sedimentation	Undefined
Limber Jim Creek	0 to 5	Sedimentation	Undefined
Lookingglass Creek	0 to 11.1	Sedimentation	Undefined
Meadow Creek	0 to 23.5	pH	Summer
Grande Ronde River	162.4 to 200.6	pH	Summer
Gekeler Slough	7.7 to 9.8	Temperature	Summer
State Ditch	0 to 4.4	Phosphorus	Summer
Dark Canyon	0 to 9.6	Dissolved Oxygen	Year Round (Non-spawning)
East Sheep Creek	0 to 6.7	Temperature	Summer
Limber Jim Creek	5 to 8.1	Temperature	Summer
Grande Ronde River	193.4 to 196.2	Temperature	Summer
Lookout Creek	0.6 to 6	Dissolved Oxygen	September 1 - June 15
Lookout Creek	0 to 6	Dissolved Oxygen	Year Round (Non-spawning)
Grande Ronde River	80.7 to 162.4	Temperature	Summer

Upper Grande Ronde Subbasin – 2012 Category 4A (TMDL Approved) 303(d) listings

Stream	Segment (River miles)	Parameter	Season
Grande Ronde River	162 to 193	Temperature	Summer
Bear Creek	0 to 7.7	Temperature	Summer
Beaver Creek	0 to 13.5	Temperature	Summer
Burnt Corral Creek	0 to 7.9	Temperature	Summer
Middle Fork Catherine Creek	0 to 2.5	Temperature	Summer
North Fork Catherine Creek	0 to 2.8	Temperature	Summer
South Fork Catherine Creek	5.2 to 8.3	Temperature	Summer
Catherine Creek	0 to 11.7	Temperature	Summer
Catherine Creek	11.7 to 31.3	Temperature	Summer
Chicken Creek	0 to 2.4	Temperature	Summer
West Chicken Creek	0 to 1.6	Temperature	Summer
Clark Creek	0 to 16.6	Temperature	Summer
Dark Canyon	0 to 9.6	Temperature	Summer
Five Points Creek	0 to 8.7	Temperature	Summer
Little Fly Creek	0 to 7.2	Temperature	Summer
Fly Creek	0 to 13.3	Temperature	Summer
Indiana Creek	0 to 2.1	Temperature	Summer
Indian Creek	0 to 9.3	Temperature	Summer
Jarboe Creek	0 to 8.3	Temperature	Summer
Lick Creek	0 to 4	Temperature	Summer
Limber Jim Creek	0 to 5	Temperature	Summer
South Fork Limber Jim Creek	0 to 2.8	Temperature	Summer
Lookout Creek	0 to 6	Temperature	Summer
Little Lookingglass Creek	0 to 10.8	Temperature	Summer
Lookingglass Creek	0 to 7	Temperature	Summer
McCoy Creek	0 to 18.3	Temperature	Summer
Meadow Creek	0 to 23.5	Temperature	Summer
Mottet Creek	0 to 10.3	Temperature	Summer
Pelican Creek	0 to 9.1	Temperature	Summer
Rock Creek	0 to 16.4	Temperature	Summer
Sheep Creek	0 to 5.1	Temperature	Summer
Spring Creek	0 to 2.8	Temperature	Summer
State Ditch	0 to 4.4	Temperature	Summer
Waucup Creek	0 to 6.9	Temperature	Summer
Catherine Creek	0 to 11.7	Dissolved Oxygen	June 1 - September 30
Grande Ronde River	80.7 to 162.4	Aquatic Weeds Or Algae	Summer
Catherine Creek	0 to 11.7	Aquatic Weeds Or Algae	Summer
State Ditch	0 to 4.4	Aquatic Weeds Or Algae	Summer
Grande Ronde River	35.6 to 172.4	Temperature	Year Round (Non-spawning)

Lower Snake/Upper Grande Ronde HUC 17060104

Upper Grande Ronde Subbasin – 2012 Category 5 (TMDL Needed) 303(d) listings

Stream	Segment (River miles)	Parameter	Season
Little Rock Creek	0 to 9.7	Biological Criteria	Year Round
Pelican Creek	0 to 9.1	Biological Criteria	Year Round
Unnamed Stream	0 to 3	Biological Criteria	Year Round
Limber Jim Creek	0 to 1.3	Biological Criteria	Year Round
Meadow Creek	12.7 to 23.5	Biological Criteria	Year Round
McCoy Creek	0 to 1.7	Biological Criteria	Year Round
Grande Ronde River	97.5 to 122.8	E. Coli	Summer
Mill Creek	0 to 10.3	E. Coli	Summer
Mill Creek	0 to 7.6	E. Coli	Summer
Grande Ronde River	65.9 to 104.9	Dissolved Oxygen	January 1 - May 15

APPENDIX B: RESOURCES ISSUE WORKSHEETS

STREAM TOPOGRAPHY

Needs	Recommended Practices	Done by Whom
Bank Stability		
Reasonably stable banks are important for agricultural production and water quality for several reasons.	Pursue Multi-purpose Upstream Storage – could control peak flows that can cause some of the excessive erosion seen in the valley. Storing some of the peak flows could provide water to increase late summer and early fall flows.	Landowners, advocacy groups, ODA
Protect structures (protect a barn for example).	Restoration of stream bank and channel. See Bureau of Reclamation's report for the Imbler Floodplain Management group. Contact Union SWCD for a copy. -Critical area planting where conditions permit, -Barbs and rip-rap where appropriate, -Bank shaping/sloping where appropriate, -Dike setbacks combined with vegetation restoration can increase carrying capacity of the river and trap sediments, filter nutrients and prevent erosion.	NRCS, SWCD, OSU Ext., ODFW, GRMWP: technical assistance and some financial assistance SWCD, ODA: information and education Landowners: riparian area management
Protect productive ag fields from flooding and channel changes.	See stream bank and channel restoration.	see Protecting Structures
Excessive erosion contributes to high sediment loads.	See stream bank and channel restoration.	see Protecting Structures
Erosion is one of the main ways excessive levels of phosphorus enter streams and rivers. Research suggests 60-90 percent of phosphorus enters streams this way.	See stream bank and channel restoration	see Protecting Structures
Lack of vegetation reduces bank stability. Plant roots can do a good job of holding soil in place.	Critical area planting where conditions permit.	see Protecting Structures
Ice flows combined with natural and artificial blockages can cause bank scouring and erosion even with vegetation in place.	Modify blockages such as bridges and culverts, if possible, to prevent ice jam buildups. Important to assess structures frequently.	see Protecting Structures
A river's tendency to meander, especially in flat valleys like the Grande Ronde.	See stream bank and channel restoration. It is important to inform the public about stream dynamics (one example is the Proper Functioning Condition assessment methods).	see Protecting Structures
Livestock/wildlife disturbing the banks.	Create opportunities for animal control through off-stream water, fencing, rocking water gaps among many other practices. Provide input to ODFW on big game issues.	see Protecting Structures

CROP MANAGEMENT

Needs	Recommended Practices	Done by Whom
Nutrient management	• Encourage soil and foliage testing to determine proper nutrient application needs • Increase operator awareness of crop nutrient needs through educational outreach	NRCS, SWCD, OSU Extension, ODFW, GRMWP crop consultants: technical assistance SWCD, ODA: information and education Landowners: management

IRRIGATION

Needs	Recommended Practices	Done by Whom
More water	• Pursue upstream structural storage • Increase the quantity of late-season water if conditions upstream improve. We can accomplish this through better forest, grazing, road and recreation management.	Storage: OWRD, Landowners, ODA Management: Landowners, US Forest Service
Improve efficiency of the use of available water for irrigation	• Recognizing that crop water needs are a complex issue, irrigation timing could be done by monitoring soil moisture (no over or under application of water). OSU Extension is currently testing this idea here in the Grande Ronde. • With the conversion to sprinkler irrigation, it should be recognized that farmers are not too far from peak efficiency already	Education: SWCD, ODA, OSU Extension, OWRD, others Landowners: management
Delivery system efficiency	Efficiency can be improved by: • Pump testing • Sizing mainlines properly • Using proper nozzle size • Fixing leaks • Installing headgates at diversion points • Improve existing diversion structures • Converting surface systems to buried main lines (bring back ACP cost share) • Lining or piping water through irrigation ditches Concerns: Costs are prohibitive for most ditch companies to do this. Public funds are not available. However, landowners have concerns about the government requiring in-stream rights as a condition for using public money. A possible solution may be the conserve water statutes that allow for increased water for both irrigators and streams.	Education: SWCD, ODA, OSU Extension, OWRD, others Management: Landowners
Erosion from irrigation	Erosion from irrigation can be reduced by:	Education: SWCD,

	• Managing irrigation so that you eliminate surface runoff • Use settling ponds where appropriate • Buffer strips to catch sediment and prevent erosion (among other things)	ODA, OSU Extension, OWRD, others Management: Landowners
Explore alternate sources of water	• Some farmers could use the effluent from the cities of Union and La Grande sewage treatment plants. • Where it is economically feasible, some farmers could convert from surface sources to deep well water. Concerns with this option: Is there overuse of the groundwater resource? Plenty of water available now, but how long is it going to be there? Preliminary studies show some evidence of deep groundwater recharge. A study continues of the area's geology. The results of this study will help us understand these aquifers better.	Education: SWCD, ODA, OSU Extension, OWRD, others Management: Landowners
Recognition that irrigation is listed as a beneficial use of water. Additionally, it must be recognized that water enhances the profitability and value of the land.	The agricultural community and agencies need to educate the public about this fact.	

SOIL MANAGEMENT

Needs	Recommended Practices	Done by Whom
Erosion	• Plant buffer strips around edges of fields and near waterways. • Grass and sod waterways to stabilize banks. • Plan perennial crops to build soil and provide ground cover year round. • Install runoff/settling ponds to trap sediment coming off fields. • For crops such as winter wheat, early fall planting will help to minimize water and wind erosion. • Employ conservation tillage techniques where appropriate to reduce soil disturbance. • Install diversion ditches and terraces to reduce surface runoff.	NRCS, SWCD, OSU Extension, ODFW, GRMWP: technical assistance Landowners: management
Minimize bare soil		
Improve upland conditions	• Utilize sound grazing management. • Encourage landowners to develop grazing management plans. • Prevent and control the spread of noxious weeds.	NRCS, SWCD, OSU Extension, ODFW, GRMWP: technical assistance Landowners: management

GRAZING

Needs	Recommended Practices	Done by Whom
Improved Livestock Management and Distribution	Fencing, cross-fencing, water development, salting, herding, and rotational grazing are all potential solutions, but each situation is different. Landowner education is key.	SWCD, OSU Extension, ODA: education NRCS: technical assistance Landowners: management
Efficient Use of Resources (vegetation) - avoid over and/or under-utilization of vegetation	See Actions for Improved Livestock Management and Distribution	
Uniform and consistent protocols for utilization monitoring on Forest Service and private lands	Pursue improved protocols and once they are established, promote private landowners using them on their own lands.	USFS, OSU Range Department Landowners
Controlling Noxious Weeds	Use herbicides, biological controls and proper grazing management for prevention and control of weed invasions.	SWCD and ODA County, tri-county weed board: education NRCS: technical assist Landowners: management
Maintain economic viability by protecting grazing opportunities	Educating landowners Manage grazing to a certain stubble height to control the vegetation composition in riparian areas.	
Address habitat degradation by wildlife. Big game can cause damage in a number of ways. Among them are: -trampling and soil compaction during the wet season -heavy grazing at inappropriate times -disturbance to riparian areas, especially shrub browsing Damage hurts the landowner's farming/ranching operations. Concerned their livestock will be blamed for damage. Big game forage usage could also make it impossible to meet some of the utilization standards on some public lands.	Provide landowner input to ODFW on big game management Educate landowners about programs available to manage big game on their property. Compensation for damage by wildlife.	Landowners and ODFW
Riparian area grazing	Manage as appropriate to maintain desirable vegetation composition. Allowing grazing in riparian areas might be better for water quality than cropping right to the stream's edge. Establish riparian pastures. Use grazing as a tool. With proper timing and intensity of grazing woody vegetation in riparian areas can increase with time. An	SWCD, OSU Extension, ODA: education NRCS: technical assistance Landowners: management

	example is the Hall Ranch on Catherine Creek. See Actions for Improved Distribution and Control.	
Rangeland Restoration	Must control noxious weeds. See Actions for Noxious Weed Control Section. Rangeland seeding can be very beneficial. Proper management and utilization can go a long way to restore rangeland. See Actions for Livestock Control. Landowner education/management is key.	
Winter Feeding Runoff management – prevent animal waste from running directly into creek	Grass buffer zones can work. These zones can also be grazed in the summer. Divert runoff so that water runs through vegetation to filter nutrients and bacteria. Settling ponds work well. Land managers should consider clean water diversions. Lot surface maintenance, such as scraping or mounding improve things as well.	
Noxious weeds from hay	Feed weedless hay	
Trampling and compaction of streambanks resulting from cows going to creek for water	Rock water gaps to prevent erosion. Provide off-stream water.	
Trampling and compaction of pastures from having cows and wildlife on field during wet times of the year.	Rotate where cattle are fed.	
Waste management is especially critical for “small feedlot” area.	See Actions for the Runoff management section. Again education is the key along with financial assistance.	
Grazing on Small Hobby Farms Noxious weeds are a large problem on these lands.	Education and outreach are critical for progress to be made. Need to explore new avenues to reach these landowners. Some possible ways are through the local schools and through programs put on by local veterinarians and horse clubs.	