Inland Rogue Agricultural Water Quality Management Area Plan

Developed by the:

Inland Rogue Local Advisory Committee

Oregon Department of Agriculture

With support from the:

Jackson, Two Rivers, and Illinois Valley Soil and Water Conservation Districts

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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
CP – Civil Penalty
CWA – Clean Water Act
CZARA – Coastal Zone Act Reauthorization Amendments
DEQ – Oregon Department of Environmental Quality
EPA – Environmental Protection Agency
EQC – Environmental Quality Commission
FOTG – Field Office Technical Guide
GWMA – Groundwater Management Area
HUC – Hydrologic Unit Code
IPM – Integrated Pest Management
LAC – Local Advisory Committee
LMA – Local Management Agency
LOC – Letter of Concern
LOW – Letter of Warning
Management Area – Agricultural Water Quality Management Area
MOA – Memorandum of Agreement
NON – Notice of Noncompliance
NPDES – National Pollution Discharge Elimination System
NRCS – Natural Resources Conservation Service
OAR – Oregon Administrative Rules
ODA – Oregon Department of Agriculture
ODFW – Oregon Department of Fish and Wildlife
ORS – Oregon Revised Statute
OSU – Oregon State University
OWEB – Oregon Watershed Enhancement Board
PMP – Pesticides Management Plan
PSP – Pesticides Stewardship Partnership
RCA – Required Corrective Action
Regulations – Agricultural Water Quality Management Area Regulations
RUSLE – Revised Universal Soil Loss Equation
SB – Senate Bill
SWCD – Soil and Water Conservation District
T – Soil Loss Tolerance Factor
TMDL – Total Maximum Daily Load
USDA – United States Department of Agriculture
US EPA – United States Environmental Protection Agency
USLE – Universal Soil Loss Equation
VOC – Volatile Organic Chemical
WPCF – Water Pollution Control Facility
WQA – Water Quality Advisory
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: Implementation Strategies. Presents goal(s), measurable objectives, timelines, and strategies to achieve these goal(s) and objectives.

Chapter 4: 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 related to agricultural activities. The Area Plan identifies strategies to prevent and control water pollution from agricultural activities and soil erosion (ORS 568.909(2)) on agricultural and rural lands within the boundaries of this Management Area (OAR 603-090-0000(3)) and to achieve and maintain water quality standards (ORS 561.191(2)). The Area Plan has been developed and revised by ODA and the LAC, with support and input from the SWCD and the Oregon Department of Environmental Quality (DEQ). The Area Plan is implemented using a combination of outreach, conservation and management activities, compliance with Area Rules 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 603-095-1440). 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 residential 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).

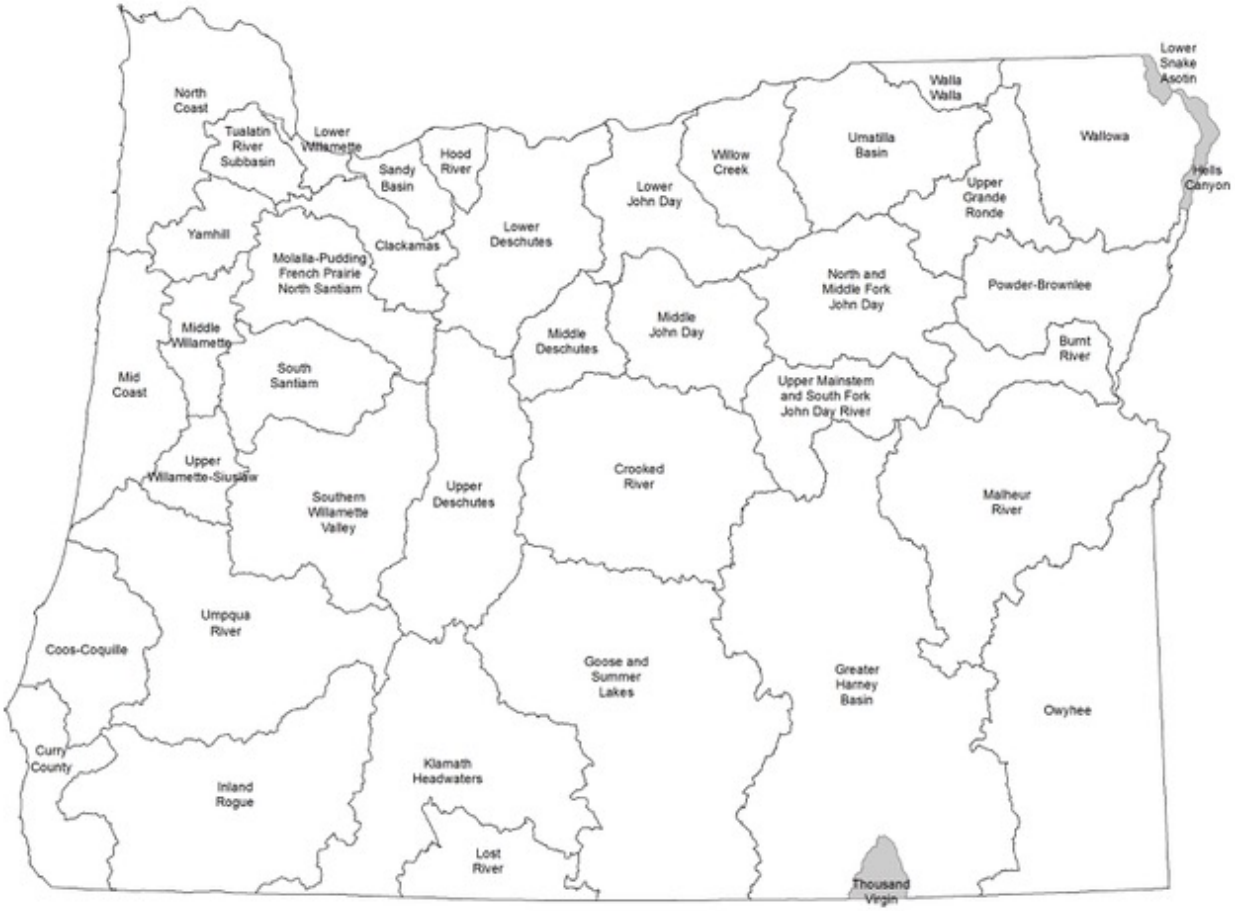
1.2 History of the Ag Water Quality Program

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). The Oregon Legislature passed additional legislation in 1995 to clarify that ODA is the lead agency for regulating agriculture with respect to water quality (ORS 561.191). The Area Plan and Area Rules were developed and subsequently revised pursuant to these statutes.

Between 1997 and 2004, ODA worked with LACs and SWCDs to develop Area Plans and Area Rules in 38 watershed-based Management Areas across Oregon (Figure 1). 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
Grey areas are not incorporated into Ag 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 that drive the establishment of an Area Plan include:

- State water quality standards.
- Load allocations for agricultural or nonpoint source pollution assigned under Total Maximum Daily Loads (TMDLs) issued pursuant to the federal Clean Water Act (CWA), Section 303(d).

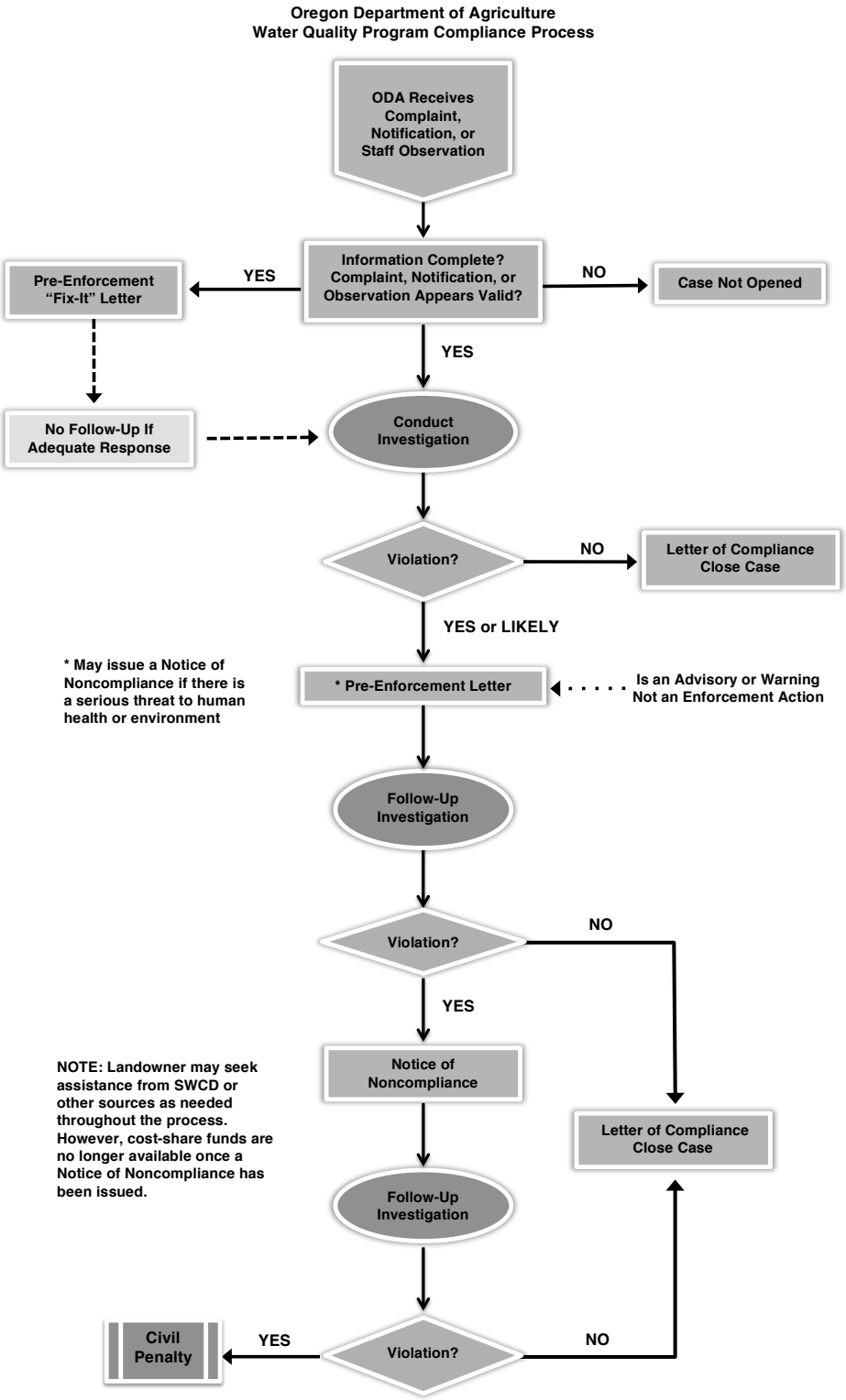
- Approved management measures for Coastal Zone Act Reauthorization Amendments (CZARA).
- Agricultural activities detailed in a Groundwater Management Area (GWMA) Action Plan (if DEQ has established a GWMA and an Action Plan has been developed).

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

Any member of the public may file a complaint, and any public agency may file a notification of a violation of an Area Rule. As a result, ODA may initiate an investigation (See Figure 2).

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

1.3.3 Local Advisory Committee

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

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

- Participate in the development and subsequent revisions of the Area Plan.
- Participate in the development and subsequent 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. However, each landowner in the Management Area is required to comply with the Area Rules. To achieve water quality goals or compliance, landowners may need to select and implement a suite of measures to protect water quality. The actions of each landowner will collectively contribute toward achievement of water quality standards.

Technical assistance, and often financial assistance, is available to landowners who want to work with SWCDs (or other local partners, such as watershed councils) to achieve land conditions that contribute to good water quality. Landowners 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 are caused by non-agricultural activities or sources, 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.
- Impacts on water quality and streamside vegetation from wildlife such as waterfowl, elk, and feral horses.
- Other circumstances not within the reasonable control of the landowner.

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

1.3.5 Public Participation

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

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

1.4 Agricultural Water Quality

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

1.4.1 Point and Nonpoint Sources of Water Pollution

There are two types of water pollution. Point source water pollution emanates from clearly identifiable discharge points or pipes. 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 waterbodies throughout Oregon do not meet state water quality standards. Many of these waterbodies 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. Water quality impairments vary by Management Area and are summarized in Chapter 2.

1.4.3 Impaired Water Bodies and Total Maximum Daily Loads

Every two years, DEQ is required by the CWA to assess water quality in Oregon. CWA 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 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 waterbody 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 National Pollutant Discharge Elimination System (NPDES) waste discharge permits, while a "load allocation" is established for 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 waterbody on the 303(d) list. Water bodies will be listed as achieving water quality standards when data show the standards have been attained.

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 the TMDL. Biennial reviews and revisions to the Area Plan and Area Rules must address agricultural or nonpoint source load allocations from relevant TMDLs.

For more general and specific information about Oregon's TMDLs, see: www.oregon.gov/deq/wq/tmdls/Pages/default.aspx. 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 (prohibited activities) states that:
"(1) Except as provided in ORS 468B.050 or 468B.053, no person shall:
(a) Cause pollution of any waters of the state or place or cause to be placed any wastes in a location where such wastes are likely to escape or be carried into the waters of the state by any means.
(b) Discharge any wastes into the waters of the state if the discharge reduces the quality of such waters below the water quality standards established by rule for such waters by the Environmental Quality Commission.
(2) No person shall violate the conditions of any waste discharge permit issued under ORS 468B.050."

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

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

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

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

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

1.4.5 Streamside Vegetation and Agricultural Water Quality

Across Oregon, the Ag Water Quality Program emphasizes streamside vegetation protection and enhancement 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 can improve water quality related to multiple pollutants, including: temperature (heat), sediment, bacteria, nutrients, and toxics (e.g., pesticides, heavy metals, etc.).
- Streamside vegetation provides fish and wildlife habitat.
- Landowners can improve streamside vegetation in ways that are compatible with their operation.
- 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 on agricultural lands. The Area Rules for each Management Area require that agricultural activities allow for the establishment and growth of vegetation consistent with site capability to provide the water quality functions equivalent to what site-capable vegetation would provide.

Occasionally, mature site-capable vegetation such as tall trees may not be needed 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 Program and are described here to recognize their link to agricultural 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 and 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 NPDES program. ODA 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.

Both 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. For more information about the CAFO program, go to 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, Oregon Department of Forestry (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.

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

The 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.

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. 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: www.oregon.gov/deq/wq/programs/Pages/dwp.aspx.

1.5.6 Oregon's Coastal Management Program and the Coastal Zone Management Act Reauthorization Amendments of 1990

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

Additional information about CZARA and Oregon's CNPCP can be found at: www.oregon.gov/LCD/OCMP/pages/watqual_intro.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. DEQ sets water quality standards and develops TMDLs for impaired waterbodies, which ultimately are approved or disapproved by the US EPA. In addition, DEQ develops and coordinates programs to address water quality including NPDES permits for point sources, the CWA Section 319 grant program, 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 and to achieve water quality goals.

1.7 Measuring Progress

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

1.7.1 Measurable Objectives

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

The AgWQ Program is working throughout Oregon with SWCDs and LACs toward establishing long-term measurable objectives to achieve desired conditions. ODA, the LAC, and the SWCD will establish measurable objectives and associated milestones for each Area Plan. Many of these measurable objectives relate to land conditions and primarily are 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.

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

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 continue making progress toward 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.
- Improved land conditions can be documented immediately.
- Reductions in water quality from agricultural activities are primarily due to changes in land conditions and management activities.

- It can be difficult to separate agriculture's influence on water quality from other land uses.
- There is generally a lag time between changes on the landscape and the resulting improvements in water quality.
- Extensive monitoring of water quality would be needed to evaluate progress, which would be cost-prohibitive and could fail to demonstrate improvements in the short term.

Water quality monitoring data will help ODA and partners to measure progress or identify problem areas in implementing Area Plans. However, as described above, water quality monitoring may be 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. The Focus Area process is SWCD-led, with ODA oversight. The SWCD delivers systematic, concentrated outreach and technical assistance in the Focus 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 watersheds 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, technical assistance, and to complete 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 the Area Rules. Finally, ODA completes a post-evaluation 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, the LAC, and the 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 located across the major land uses (forestry, agriculture, rural residential, and urban/suburban). DEQ collects water quality samples every other month throughout the year to 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.

At each biennial review, DEQ assesses the status and trends of water quality in relation to water quality standards. Parameters included in the analysis are temperature, pH, and bacteria. DEQ will add additional parameters as the data become available, depending on the water quality concerns of each Management Area. ODA will continue to work with DEQ to cooperatively summarize the data results and how they apply to agricultural activities.

Water quality monitoring is described in Chapter 3, and the data are presented in Chapter 4.

1.8.2 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, water quality monitoring, strategic initiatives, and outreach efforts over the past biennium. ODA and partners evaluate progress toward achieving measurable objectives and milestones, 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 Rules 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

2.1 Local Roles and Responsibilities

2.1.1 Local Advisory Committee (LAC)

This Area Plan was developed with the assistance of an LAC. The Inland Rogue LAC was formed in 1993 to assist with the development of the Area Plan and regulations and with subsequent biennial reviews. Members are:

Name	Location	Description
Chair: Bob Niedermeyer	Jacksonville	Alfalfa, grain, pesticide applicator
Ron Meyer	Medford	Orchards
Tom Dover	Little Butte Creek	Cattle
Paul Kay	Bear Creek	Phytotechnology
Ron Hillers	Ashland	Jackson SWCD Board
Larry Ford	Grants Pass	Two Rivers SWCD Board
Simon Hare	Josephine County	County Commissioner
Bob Crouse	Grants Pass	Row Crop & Hay Farmer
Greg Walch		
Colleen Roberts	Jackson County	County Commissioner
Denis Reich	Inland Rogue	The Freshwater Trust

Former LAC members: Keith Emerson, Keith Nelsen, Keith Corp, Ed Vaughn, John Rachor, Jim Hill, Keith Emerson, Rose Marie Davis, Richard Fujas, Jim Hutchins, Yvonne Kitchen, Sherman Lynch, Jud Parsons, Dalton Strauss, Lois Wilson, Lee Bradshaw, Mike Davis, Walt Fitzgerald, Connie Fowler, Connie E. Young, Ron Fumasi, Dave Henneman, Bill Pfohl, Nancy Tappen, Kyle White, Ashley Henry

2.1.2 Local Management Agency

The implementation of this Area Plan is accomplished through an Intergovernmental Agreement between ODA and the Jackson, Two Rivers (Josephine), and Illinois Valley SWCDs. This Intergovernmental Agreement defines the SWCDs as the Local Management Agencies for implementation of the Area Plan. The SWCDs were also involved in development of the Area Plan and associated regulations.

2.2 Area Plan and Regulations: Development and History

The Inland Rogue and Bear Creek Management Areas merged during the period of 2007-2010. The two LACs met jointly to complete biennial reviews of the two management areas in the spring of 2007. In the spring of 2010, the Inland Rogue LAC recommended changes to both the Rule language and Plan language for the periodic update of the Rules and the Plan and to accommodate the integration of the Bear Creek sub-basin into the Inland Rogue Management Area. The director of ODA approved the resulting Area Plan and Rules in 2011.

Since approval, the LAC met in 2013 to review the Area Plan and Rules. The review process included assessment of the progress of Area Plan implementation toward achievement of plan goals and objectives.

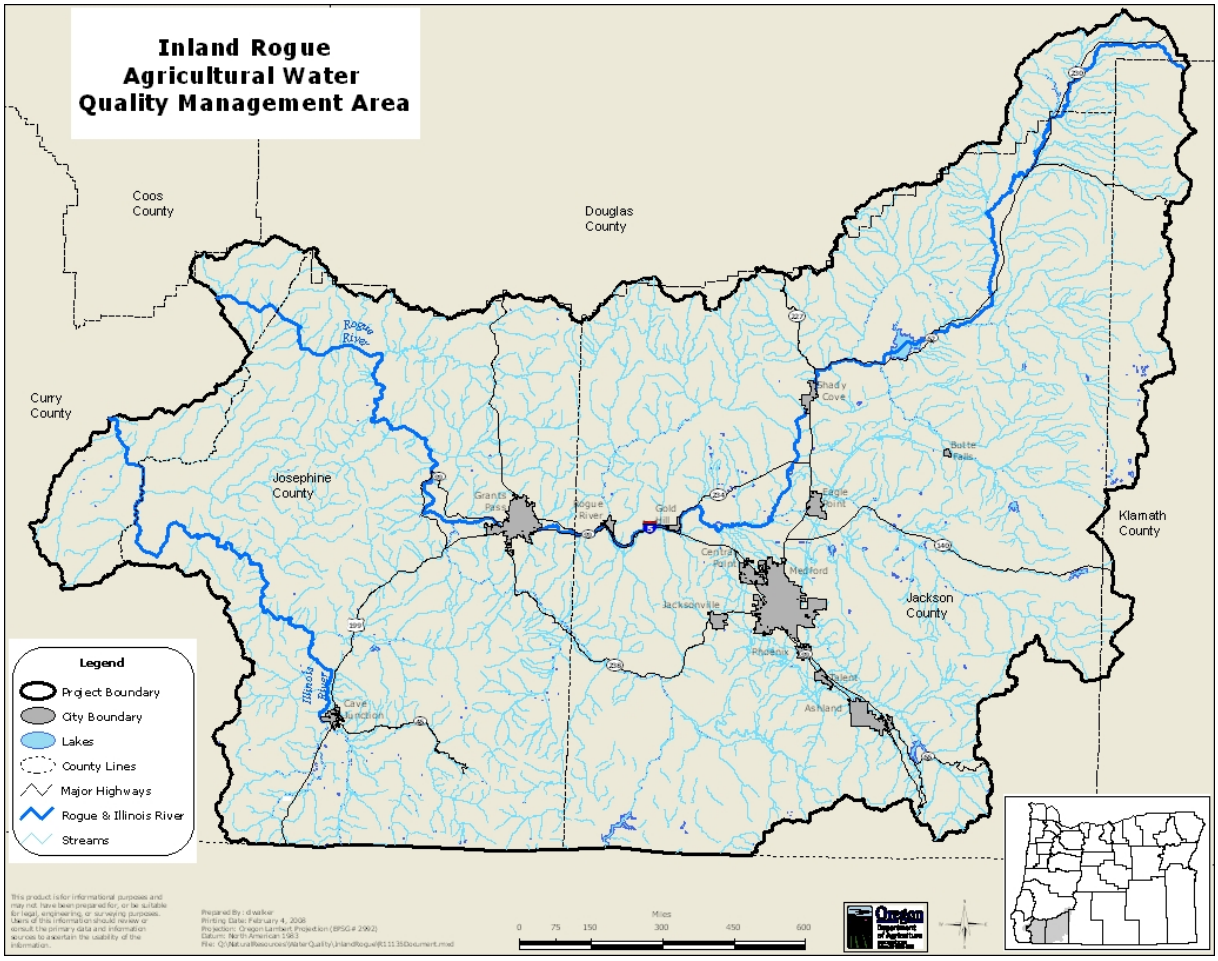
2.3 Geographical and Physical Setting

2.3.1 Geographic and Programmatic Scope

The Inland Rogue agricultural water quality planning process allows the Inland Rogue agricultural industry to take the leadership in development of a plan that contributes to the attainment of water quality standards. The areas affected by this water quality planning process are the private agricultural lands in Josephine and Jackson counties. (Please see the glossary for the definition of agricultural use.) By law, this Plan is limited to areas and activities that are covered by ODA Rules. Urban and rural residential land uses have their own water quality plans but this Plan pertains to agricultural uses on these properties. Federal lands and private commercial forestlands have their own water quality regulations, though agricultural activities and soil erosion not covered by the Forest Practices Act conducted on private forestland still fall under this basin Plan.

The Inland Rogue Management Area includes multiple subbasins that bear only slight resemblance to one another hydrologically, climatically, geomorphically, economically, and even culturally. Refer to Appendix B for ODA's divisions of the subbasins. The Upper Rogue, Applegate, Illinois Valley, Bear Creek, and the Middle Rogue portions within Josephine and Jackson counties are the subbasins of concern for this Plan. Those areas downstream of the Josephine County border will be planned for and operate under the conditions of the Curry Agricultural Water Quality Management (AgWQM) Area planning process. The Inland Rogue Local Advisory Committee (LAC) would like to recognize that the water quality of the Inland Rogue Management Area affects the areas downstream in the Lower Rogue Watershed in Curry County. While this Plan is written for the Inland Rogue Basin, subbasin descriptions and subbasin agricultural characteristics are described because it is recognized that some of the possible solutions to problem conditions that are recommended in one subbasin may be more or less effective in another.

2.3.2 Map of the Management Area



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

The Rogue Basin is formed by the Rogue River, which flows 215 miles from its headwaters on the western slope of the Cascades near Crater Lake National Park to its mouth on the Pacific Ocean at Gold Beach. Because of the unique geology and climate variations of southwest Oregon, the Rogue River runs through an extremely diverse landscape. The Rogue River finds its way through the Cascade, Klamath, and Coastal mountains. Four climate zones meet in southwest Oregon: northern temperate, southern Mediterranean, eastern high desert, and western coastal. Local weather conditions are highly variable, and combined with geologic conditions, produce widely differentiated ecology.

From the federally managed headwater areas of over 9,000 feet elevation, to the privately held, historically significant, agricultural and urbanized lowlands in Josephine and Jackson counties, the Inland Rogue River is an extremely diverse watercourse. Most of the area is steep and rugged but the broad valley bottoms have deep soils suited to agriculture. The LAC reminds agencies and individuals that the rugged landscape can isolate unusual weather events in one part of the basin, which may or may not have any impact on other parts of the basin. Appendix C contains geographic information system (GIS) maps of the private and public land base as well as land use types in the watershed.

Upper Rogue Subbasin
The Upper Rogue Subbasin has its lowest elevation with the emptying of Little Butte Creek into the Rogue River at river mile 132 and extends up to river mile 215. It contains about one-fourth of the land area in the Rogue Basin. The US Forest Service, the Bureau of Land Management, and private timber companies manage most of the 72 percent of the forested land in the Subbasin.

Douglas fir, white fir, western hemlock, cedar, and Ponderosa pine are native to the Subbasin higher elevations. Oak savannahs, which include white oak, alder, poison oak, madrone, manzanita, and big leaf maple, grow in the lower parts of the Subbasin and provide a diversity of habitat for many species of wildlife.

Agriculture and logging have been the historical bases for the economy in the Upper Rogue. Logging has greatly diminished in recent years. The higher elevations are attractive year-round to tourists and recreationists. Seasonal hunting and cattle grazing occur throughout the Subbasin. Lost Creek Lake, a multi-purpose reservoir, provides cool water for fish, vital flood control for basin residents, irrigation storage, and a year-round tourist destination.

Irrigated agriculture and livestock grazing dominate the lower portion of the system. Considerable water is transferred out of the Upper Rogue system to the Bear Creek watershed. Four irrigation districts – Talent Irrigation District, Medford Irrigation District, Rogue River Valley Irrigation District, and Eagle Point Irrigation District – obtain water from Upper Rogue streams and impoundments.

As in all the other subbasins, the lower elevations have small towns surrounded by ranches and small farms.

Applegate River Subbasin
The Applegate River Subbasin is located in both Jackson and Josephine counties. The US Forest Service and Bureau of Land Management manage over 70 percent of the 493,000 acres of publicly owned upland area of the watershed. Timber companies and private landowners own the remainder of the forested lands.

Various stages of conifer and hardwood timber provide diverse wildlife habitat. The valley floor contains grassland, oak savannahs, chaparral, and riparian vegetation. Agriculture and private forestland are the predominant land uses on the valley floor. Wine grape acreage is increasing annually.
The dam at the head of the Applegate system near the California border was completed in 1980. The dam has modified natural flow regimes relative to the creation and maintenance of fish habitat. Regulated water releases have modified the cleansing effects of flood flows on spawning gravels, riparian vegetation, and debris-filled off-channel fish protection sites. While cutting off some historical fish habitat, the dam has several beneficial impacts on both the human and salmonid populations. The dam controls flood flows, cools summer water temperatures, assures flow during normally low flow years, and is a boon for human recreation and agriculture.

Water withdrawals are used for hay and pasture irrigation, livestock watering, and watering of gardens and lawns. In earlier days, extensive mining was done in the Applegate; today most of the suction dredge mining is recreational.

Illinois River Subbasin
The Illinois Valley encompasses over 628,000 acres of heavily forested and geologically unique land. About 83 percent of this land is publicly owned with the majority being managed by the U.S. Forest Service. There are also several large tracts of privately held timberland. The private agricultural land in the Illinois Valley is primarily confined to the broad valley bottoms and deep alluvial soils of Deer,

Sucker, and Althouse creeks, and the Illinois River. Only 4 percent of the Illinois Valley land area is under some form of agricultural management practice and only 2 percent (about 14,000 acres) is irrigated.

The climate of the Illinois Valley is considered Mediterranean, with cool, wet winters and hot, dry summers. Water is plentiful during the winter but is severely limited in the summer growing season. The unique soils and geology of the Subbasin are major factors in the hydrologic character of the area. The underlying metamorphic geology in the headwaters is relatively non-porous, leading to quick saturation of the shallow, poorly developed soil, and rapid runoff of the approximately 100 inches of annual precipitation that falls in the upper reaches of the watershed. In contrast, the alluvial fans where nearly all of the agricultural and residential development has taken place may have a soil depth of over 180 feet.

Agriculture continues to be an important part of the Subbasin economy, although the tourist and service sectors are growing rapidly. Agricultural production on private land is centered on livestock, hay, and forage production. There is, however, a growing trend toward using agricultural lands to grow wine grapes, Christmas trees, and ornamental bulbs. There are no permitted CAFOs, including dairies, in the Illinois Valley Subbasin.

Middle Rogue Subbasin

The Middle Rogue includes the area from the confluence with the Rogue and the mainstem of Little Butte Creek to the Grants Pass area. Cattle ranching are a major agricultural activity with smaller farms producing a diversity of crops from Sam's Valley to Grants Pass. About 12,000 acres are under irrigation, and approximately 60 percent to 70 percent of the land in the Middle Rogue is privately owned.

Soil types in the Subbasin range from clayey Pearsoll and Jerome series, to shallow, gravelly Josephine and Beekman series. All soil layers sit on granitic or metamorphic parent rock material. In many places, hardpan is near the surface and reduces infiltration. Water runoff is high in the wet winter and low in summer when there is little precipitation. The area has a history of periodic flooding with resulting landscape and channel changes. Annual precipitation ranges from 18-inches in the lower portions to more than 60-inches in the surrounding mountains; less than one-inch falls during the summer months. Snow accounts for very little of the available moisture in the lower elevations. Valleys have deeper soils and are able to support a wider diversity of agricultural activities.

Traditionally, timber production and grazing were the primary natural resource industries within the Subbasin. Livestock production is currently the predominant form of agriculture. During the past decade, however, more than 400 acres of vineyards have been established while specialty crops such as cut flowers, herbs, and organic fruits and vegetables are also being produced.

Bear Creek Subbasin

The Bear Creek Subbasin is located around Medford, Oregon, and is entirely within Jackson County. The Bear Creek Subbasin produces approximately $60 million worth of agricultural products annually, with crops (primarily pears) contributing most of this value. Total gross farm sales have shown a steady increase since 1985 due in part to better commodity prices and increased production.

Crop production in the Bear Creek area is economically feasible only because of the availability of water for irrigation. The growing season rainfall provides only a minor portion of crop water requirements. Most of the irrigation water used in Bear Creek comes from several reservoirs and diversions from both within and outside of the watershed. Approximately 5,000 acres in the watershed receive "private" irrigation water rights from natural stream flow from Bear Creek and its tributaries and these private rights total about 105 cubic feet per second. The three irrigation districts in the watershed also hold water rights to divert natural stream flow from Bear Creek which totals approximately 100 cubic feet per second for their clients. But these (less senior) rights typically expire or are not satisfied by the end of June. In

addition, the districts deliver water from storage to nearly 39,000 acres in the watershed. The Rogue River Valley Irrigation District, lowest in the Bear Creek system, serves approximately 9,000 acres, the Medford Irrigation District serves nearly 12,300 acres, and the Talent Irrigation District, the uppermost in the system, provides water to 16,400 acres.

Rogue Basin Agricultural Production
Table 1 provides a snapshot of agriculture production in Jackson and Josephine counties. Data are taken from the 2009 Oregon Agricultural Statistics Report. Agricultural land use continues to decline in the Inland Rogue Basin.

Table 1:
Gross Farm and Ranch Sales 2008:

	All Crops	All Animals	Total
Jackson County	$55,921,000	$21,508,000	$77,429.000
Josephine County	$13,485.000	$8,348,000	$21,833,000
Total	**$69,406,000**	**$29,856,000**	**$99,262,000**

Acres of Crops Under Cultivation 2007:

	Wheat	All Hay	Nurseries and Greenhouses	Wine Grapes	Orchards (2006 data)	Total
Jackson County	Data not	22,100	125	1,306	Data not	
Josephine County	by county	6,400	200	605	by county	
Total	**900**	**28,500**	**325**	**1,911**	**5,980**	**38,571**

Livestock Inventory 2008-2009:

	All Cattle & Calves	All Sheep & Lambs
Jackson County	23,700	4,500
Josephine County	4,500	700
Total	**28,200**	**5,200**

2.3.4 Cannabis

Commercial licensing of cannabis production became legal in 2016. Since that time there has been a substantial increase in the number of cannabis operations in Jackson and Josephine counties. The State and ODA consider legal cannabis production to be an agricultural activity. Cannabis operations are required to be in compliance with the Inland Rogue Agricultural Water Quality Rules. This Plan includes information to assist cannabis operations to help ensure they do not cause pollution to surface or groundwater, including but not limited to, Table 10 in Section 2.5.7.

2.4 Agricultural Water Quality in the Management Area

2.4.1 Local Issues of Concern

Nonpoint pollution is characterized by the difficulty in identifying its source. While it is possible to monitor nonpoint source accumulations, it is generally economically unfeasible to identify its origin on anything larger than the tributary scale in the watershed. The intent of this Area Plan is to help landowners identify and reduce potential pollution due to current agricultural land conditions.

Fish habitat in the Rogue Basin has been degraded, in part, due to a reduction in stream water quality. Some of the reduction in water quality is attributed to certain agricultural land conditions. This Area Plan directly addresses the water quality component of fish habitat by controlling potential pollution sources thus fulfilling its role in the larger Oregon Plan. It also indirectly addresses physical fish habitat in that properly functioning riparian areas enhance many of the stream channel features that create more desirable fish habitat. Each Prohibited Condition has a corresponding list of possible solutions designed to control or prevent one or more potential pollution pathways.

The Inland Rogue Basin Agricultural Water Quality LAC identified the following broad categories as potential sources of agricultural pollution in this area:

- Drainage and runoff
- Livestock management
- Vegetation management
- Irrigation
- Croplands
- On-farm storage

See the menu of Better Management Practices and Prohibited Conditions sections for discussions on how to reduce the impacts of these agricultural activities.

Other Contributing Factors

There are background water quality problems that are not due to human activities. Harmful bacteria and viruses reside in streamside soils and wildlife feces. Air temperatures and direct sunlight can warm water temperature. Sediment and bank erosion are part of the natural hydrologic and geologic system. Nutrients, such as phosphorus, can be dissolved from parent rock material. Background sources of pollutants can be very hard and costly to identify and distinguish from management related sources, especially in an area as populated as the Rogue Basin.

Population increases and resulting environmental impacts have changed the face of several Rogue Basin systems over the past fifty years. Changes in fire frequency, the severity of peak and low stream flows, waste inputs, flood plain encroachment, degraded riparian areas, and airborne pollutants are all consequences of human population expansion into aquatic and terrestrial habitat. These are consequences that can be buffered but never eliminated.

Impacts to water quality can sometimes be attributed to a single, definable act or land use activity. More often than not, however, the cumulative effects within the entire watershed put the burden on all of the inhabitants of the watershed to live on the land in a manner consistent with the ideals of conservation and stewardship. The residents of the basin can address cumulative effects. The contributions to water pollution of a single inhabitant may not seem significant, but the cumulative effects of all the inhabitants do have a significant impact. Residents of the watershed should adapt their resource use and impact in such a way as to lessen even minor contributions, as there is no substitute for the stewardship of committed individuals.

Another significant contributor to impaired water quality is the lack of financial resources and incentives to accomplish the education and land use management changes necessary to address the economic realities of the landowners in the basin. The public can petition for legislation to establish incentives for landowners in the form of grants, tax breaks, low interest loans, and/or community volunteer labor. Incentives must be commensurate with reduction of production value for land or water conserved in order to be effective. It is equally important to quickly and reasonably address perceived disincentives in current water rights law and county tax code.

In section 2.5, narrative, tables, and lists focus on the mandate of agricultural water quality legislation. Agriculture activities are only a small part of the land use in this basin. The conditions identified by the farmers and ranchers of the LAC will meet the stewardship and conservation needs on private agriculture lands to help alleviate the cumulative effects of our human impacts in the Rogue Basin.

2.4.2 303(d) List of Impaired Water Bodies and Basin TMDLs

Many water bodies in Oregon do not meet water quality standards for various pollutants at certain times of the year. In the Rogue Basin, bacteria, temperature, sedimentation, pH, dissolved oxygen have been identified as water quality impairments. The TMDL for each pollutant is determined by scientific data collection and analysis to determine how much of a pollutant a water body can receive and still meet water quality standards. Water quality standards are intended to protect the most sensitive beneficial uses in a water body.

Water bodies that do not meet water quality standards are placed on a state list of impaired water bodies. Rivers, streams, or lakes that are on the list require the development of a TMDL.

The most recent 303(d) listings for the Inland Rogue Management Area can be found at:
http://www.deq.state.or.us/wq/assessment/rpt2012/search.asp

The following table was taken from the DEQ Rogue Basin Water Quality Status and Action Plan (2011). The table summarizes the status of surface water related resources in the Rogue Basin as identified through existing data or information, knowledge of DEQ staff, or from local stakeholders. It is meant to act as a compilation of the data and information to be used in identifying and prioritizing actions within the Rogue Basin.

Table 2: Surface Water Status

Surface Water	Bacteria	Biological Stressors Harmful Algae Blooms	Temperature	Dissolved Oxygen	Nutrients, pH Chlorophyll a	Altered Hydrology	Habitat Modification	Sediment / Turbidity	Toxics: Emerging Contaminants Pharmaceuticals, PCPs	Toxics: Metals	Toxics: Arsenic	Toxics: Mercury	Toxics: Pesticides
Upper Rogue													
Middle Rogue													
Lower Rogue													
Applegate Subbasin													
Illinois Subbasin													

Generally poor condition, **substantial** concern for water quality
Deteriorating condition, **moderate** concern for water quality
Generally good condition, **low** concern for water quality
Unknown condition or lack of data

In the Rogue Basin, the TMDL process began in 1992 with the development of the Bear Creek TMDL. Since that time, TMDLs have been developed for Upper and Lower Sucker Creek (1999, 2001), the Lobster Creek Watershed (2002), the Applegate Subbasin (2004), additional parameters in the Bear Creek Watershed (2007), and the remainder of the Rogue Basin (2009) (See Table 3).

Table 3: TMDLs in the Inland Rogue Basin - Parameters and Adoption Dates

Basin	Temperature	Bacteria	Sedimentation	Phosphorous and Dissolved Oxygen & pH	EPA Approval Date
Applegate Subbasin	X		X		2/11/2004
Bear Creek Watershed				X	1992
Bear Creek Watershed	X	X	X		10/2/2007
Illinois Subbasin – Upper Sucker Creek	X				5/4/1999
Illinois Subbasin - Lower Sucker Creek	X				5/30/2002
Lower Rogue - Lobster Creek Watershed	X				6/13/2002
Rogue Basin	X	X			12/29/2008

2.4.3 Groundwater Resources

Inland Rogue producers value drinking water quality. It is vital to their families and their communities. More than 470 public water systems in the Inland Rogue Management Area rely on groundwater or springs and serve a total of over 186,000 residents.

Too much nitrate in drinking water is not safe. The federal Drinking Water Act standard for nitrate is 10 parts per million (ppm), or millgrams per liter of water (mg/l). Studies have shown that nitrate levels above this standard can cause health problems for elderly and immune compromised people, as well as blue baby syndrome, which can be deadly to infants.

In 2011, data collected by DEQ showed high concentrations of nitrate in groundwater in the Inland Rogue Management Area. These data are summarized in Table 4 (the groundwater table below). DEQ's 2011 Rogue Basin Groundwater Investigation of 52 domestic wells found substantial concern for water quality related to nitrate and bacteria in the Upper Rogue, Middle Rogue, and Applegate Subbasins. The Illinois Valley showed deteriorating conditions and levels of moderate concern. The study showed that agriculture may be a contributor to the high nitrate concentrations in the groundwater. However, DEQ and partners need to conduct further monitoring to help determine the causes of the high nitrate levels.

Table 4: Ground water issues in the basin per the Rogue Basin Water Quality Status and Action Plan 2011:

Ground Water	General Quality	Quantity	Nitrate	Bacteria	Pesticides	Volatile and Synthetic Organic Compounds	Arsenic	Nickel	Lead	Fluoride
Upper Rogue										
Middle Rogue										
Lower Rogue										
Applegate Subbasin										
Illinois Subbasin										

	Generally poor condition, **substantial** concern for water quality
	Deteriorating condition, **moderate** concern for water quality
	Generally good condition, **low** concern for water quality
	Unknown condition or lack of data

In 2015, the Statewide Groundwater Monitoring Program collected groundwater quality data in the mid-Rogue basin. Data from the 2011 Rogue Basin Groundwater Investigation, which includes a comprehensive review of the Basin's groundwater data since the 1970s (Patton and Eldridge 2013), and the Oregon Health Authority's Real Estate Transaction Act (ORS 448.271) indicated some elevated nitrate concentrations in the region, particularly the Central Point area. Data collected by DEQ for the Rogue Basin Groundwater Investigation in 2011 showed elevated nitrate concentrations (3 mg/L or higher) in 35 percent of the wells tested (18 of 52 wells), including all the wells tested in Central Point and north and west of Medford. The 2011 study also investigated arsenic, fluoride, boron and vanadium concentrations (Patton and Eldridge 2013).

Using information learned from the 2011 study and guided by the objectives of the Statewide Groundwater Monitoring Program, the goals of the 2015 mid-Rogue basin groundwater study were:

- To collect high-quality data on nitrate, arsenic, coliform bacteria and pesticide concentrations in groundwater throughout the study area;
- To identify areas of groundwater contamination related to these parameters;
- To inform well water users of the results of this study and provide information regarding potential risks to human health;
- To identify areas needing additional investigation in order to describe the extent of contamination and help focus efforts to prevent further contamination.

Outside the scope of this study and report:

- Hydrogeologic characterization of the study area and contamination;
- Investigation of the sources of contamination;
- Health risk assessments.

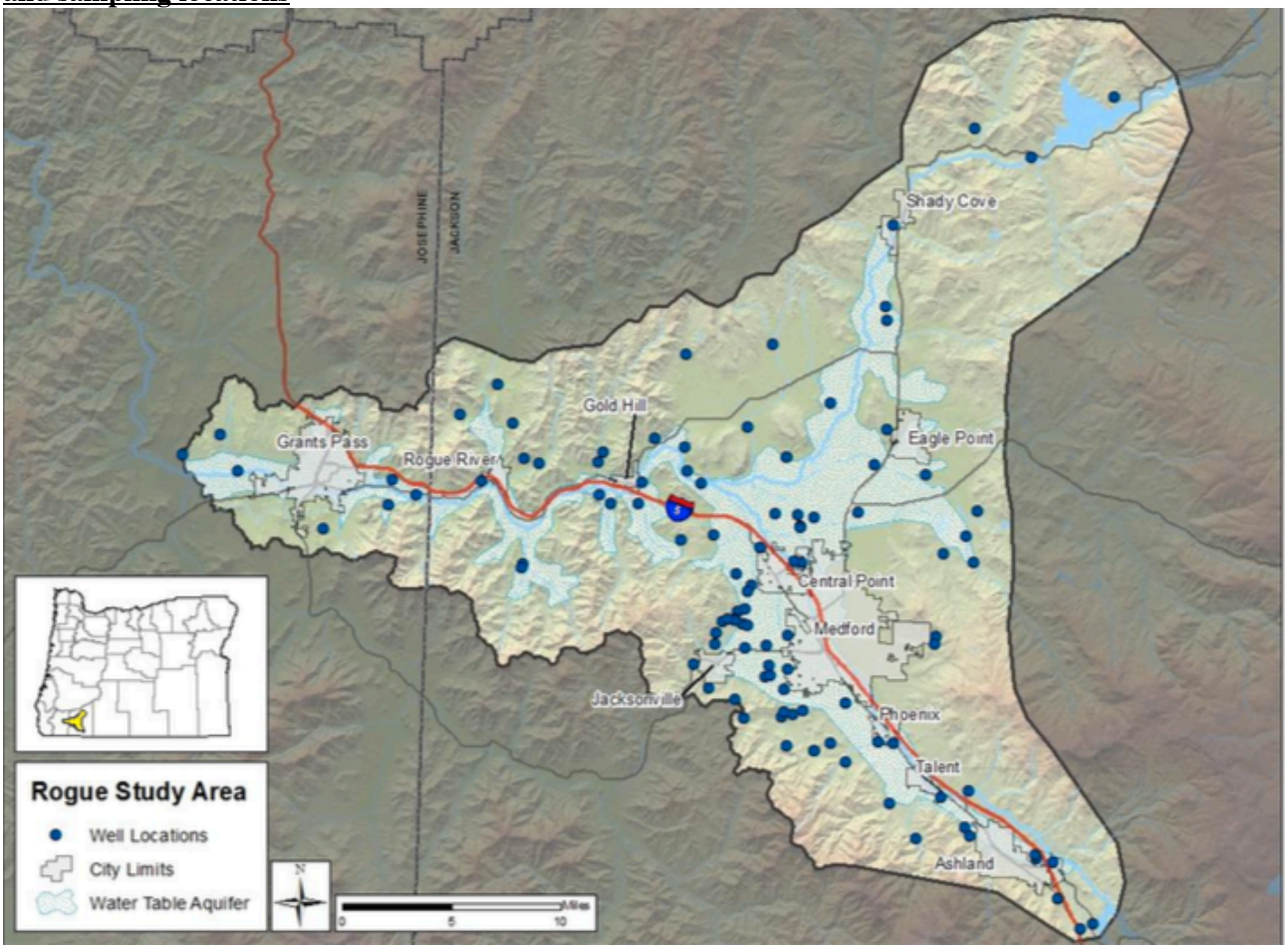
The study area spanned Jackson and Josephine counties, including the communities of Grants Pass, Shady Cove, Central Point, Medford and Ashland. DEQ staff sampled 107 private, mostly domestic, wells for nitrate, arsenic, bacteria, pesticides, metals, and common ions over two sampling events in February and October 2015. These domestic wells serve as sources of drinking water, along with other household uses such as for farm animals, outdoor garden and lawn irrigation, etc. Key findings include:

- Elevated nitrate levels [3 milligrams per liter (mg/L) or higher] in the area around Central Point and north and west of Medford. For the limited data set of wells with well logs, elevated nitrate concentrations were found only in wells with shallow water bearing zones. Four wells had nitrate concentrations above the maximum contaminant level (10 mg/L) set by the U.S. Environmental Protection Agency for public water systems;
- High arsenic [above the maximum contaminant level of 10 micrograms per liter (µg/L)] was measured in six wells. Lack of well logs for many of the wells with high arsenic results limited the interpretation of this data;
- Coliform bacteria detected in 43 percent of wells tested;
- At least one pesticide or pesticide breakdown product in 41 of the 107 wells tested. Twenty-three wells had two or more pesticide-related chemicals detected. All pesticide detections were well below their associated screening levels. However, very little research has been done on the effect of multiple chemicals on human health. Pesticide mixtures found in wells included up to four different "parent" pesticides;
- Manganese was detected in 57 of the study wells, with two of the wells above the Lifetime Health Advisory level of 300 µg/L. While low concentrations are likely due to natural geochemical processes, further investigation is necessary to determine the sources of manganese in the wells with very high concentrations;
- Low concentrations of uranium and vanadium were common;
- No seasonal trend was detected in nitrate or bacteria results. Pesticide detections and concentrations were slightly higher in the winter than the fall.

The results of this study can be used to focus outreach and education activities that encourage private well owners to routinely test wells for nitrate, bacteria and arsenic and encourage well protection and maintenance best practices to protect the aquifer. Further analysis is needed to delineate the extent of nitrate contamination in several parts of the study area, particularly around Central Point and north and west of Medford. Long-term monitoring of nitrate and pesticides is recommended, especially in the area north and west of Medford. A network of wells should be established and monitored to detect any changes over time. The 2015 report can be found online at: http://www.oregon.gov/deq/FilterDocs/gw-DEQ16-LAB-0042-TR.pdf

Agricultural practices that help limit the risk of nitrate contamination of groundwater are summarized in Section 2.5 - Prevention and Control Measures. Local agriculture is already investing in groundwater protection. For example, landowners in the Little Butte Creek Watershed have worked with the Jackson SWCD to convert 72 acres of flood irrigated pasture to sprinkler irrigation, eliminating tailwater runoff. This work continues in the Little Butte Focus Area with work to convert an additional 580-1245 acres flood irrigation systems to more efficient sprinkler systems. See chapter 3 for additional detail.

2.4.3.1 DEQ Mid-Rogue Basin 2015 Groundwater Monitoring Program - Map of the study area and sampling locations



2.4.4 Beneficial Uses

Beneficial uses in Oregon's waters are addressed according to the sensitivity of each of those uses. The beneficial uses which are most sensitive to water quality impairments are typically fish and aquatic life, public and private drinking water supply (both groundwater and surface water), and water contact recreation. Temperature, dissolved oxygen, pH, sediment and pesticides are examples of pollutants, which directly affect fish and aquatic life. Bacteria, nitrates, turbidity, radon, and toxics are examples of pollutants which directly affect human health. Agriculture can enhance these beneficial uses by decreasing its contribution to elevated water temperatures, sediment, nutrients, fecal pathogens, degraded streambank and riparian function, and reduced stream flows.

The Oregon Environmental Quality Commission (EQC) has adopted numeric and narrative water quality standards to protect designated *beneficial use*s. In practice, water quality standards have been set at a level to protect the most sensitive beneficial uses. Seasonal standards may be applied for uses that do not occur year-round. Cold-water aquatic life such as salmon and trout are the most sensitive *beneficial uses* occurring in the Rogue Basin (DEQ, 1995). The specific beneficial uses that apply to the Analysis Area are presented in Table 4 (OAR 340–041–0362).

Table 5. Beneficial Uses Rogue River (as defined in Rule: OAR 340-041-0271 Table 0217b)

Beneficial Uses	Rogue River Estuary & Adjacent Marine Waters	Rogue River Main Stem from Estuary to Lost Creek Dam	Rogue River Main Stem above Lost Creek Dam & Tributaries	Bear Creek Main Stem	Other Tributaries to Rogue River & Bear Creek
Public Domestic Water Supply		X	X	*	X
Private Domestic Water Supply		X	X		X
Industrial Water Supply	X	X	X	X	X
Irrigation		X	X	X	X
Livestock Watering		X	X	X	X
Fish & Aquatic Life	X	X	X	X	X
Wildlife & Hunting	X	X	X	X	X
Fishing	X	X	X	X	X
Boating	X	X	X	X	X
Water Contact Recreation	X	X	X	X	X
Aesthetic Quality	X	X	X	X	X
Hydro Power			X		X
Commercial Navigation & Transportation	X	X			

2.4.4.1 Drinking Water

There are over 500 public water systems within the Inland Rogue Basin. Twenty-two of these are surface water systems supplying drinking water to a total of over 196,000 people. The vast majority of water systems (more than 470) rely on groundwater or springs and serve a total of over 186,000 residents. While all land uses, and some natural sources, have the potential to contribute to water quality concerns related to drinking water, key drinking water concerns within the Inland Rogue that could have contributing sources from agricultural practices include: harmful algae blooms, turbidity, nitrate, pesticides, and *E. coli*. Additional monitoring is needed to identify sources of contamination.

Since 2010, harmful algae blooms have occurred in Lost Creek Lake, Jackson Creek, Willow Lake, Fish Lake, and Whetstone Pond and are at risk for future blooms and impacts to public drinking water. Excess nutrients and soil erosion, as well as loss of vegetation contributing to warming creek and lake temperatures, can contribute to bloom formation.

A number of surface water systems in the Inland Rogue are negatively impacted by turbidity and the formation of disinfection by-products. Soil erosion and excess sediment in runoff to waterways are known to contribute to these issues.

A number of groundwater systems in the Inland Rogue have elevated nitrate in drinking water, and some have *E. coli* issues. Agricultural practices such as proper management of animal manure and fertilizing with appropriate timing and rates can reduce agricultural inputs of these contaminants to aquifers.

Pesticides in runoff from irrigation or stormwater can enter surface water or infiltrate into the soil and reach groundwater, negatively affecting drinking water quality. During recent toxics monitoring by DEQ of untreated drinking water sources, low levels of herbicides and insecticides were confirmed in the Rogue River upstream of the intakes for the cities of Gold Hill and Grants Pass. While it is currently unknown if the low levels of these contaminants pose health concerns, it is a worthwhile precaution to monitor for status and trends, and identify sources as needed.

2.4.5 Parameters of Concern

Temperature

The temperature standard that applies to the Inland Rogue Agricultural Water Quality Management Area protects salmon and trout throughout their life histories: spawning, rearing, and migration. DEQ has designated fish-bearing streams as either core cold-water habitat or rearing and migration habitat (See map in Appendix E). Spawning areas and times have been determined for streams in the basin as well (See map in Appendix E). A simplified summary of the temperature standard would state that temperatures are not permitted to exceed 60.8°F (16°C) in cold water areas, 64.4°F (18°C) in salmon and trout rearing areas and 55.4°F (13°C) when fish are spawning. As part of the TMDL process, when temperature modeling is completed, specific temperature standards may be developed for individual streams that are higher than those temperatures listed above.

In many areas of the Rogue Basin, a major source of stream warming is the removal of near-stream vegetation leading to increased solar radiation reaching the water. Removal of near-stream vegetation has resulted from various agricultural practices, logging, and urban/rural development. Other activities that contribute to the warming of surface waters include heated wastewater discharges, channel modification, reservoirs, water withdrawals, and irrigation return flows.

Dramatic improvements in stream temperatures are expected when all sources meet their thermal pollution limits. DEQ predicts an average 12.6°F (7°C) temperature decrease to peak summer temperatures on smaller streams in the management area. Currently, operations of Lost Creek Reservoir lead to lower than natural summer peak temperatures in the Rogue River. However, during the spring and early fall the Rogue River is up to a 3.6°F (2°C) warmer than natural conditions. Cooler stream temperatures will protect salmon and trout throughout the Rogue River Basin.

Bacteria

The bacteria standard protects human health during water contact recreation in streams, rivers, and lakes by setting safe levels for exposure to bacteria. In Oregon, *E. coli* bacteria are used as an indicator of fecal contamination. *E. coli* is found in the feces of humans and other warm-blooded animals. These bacteria can enter waterways through wildlife waste, livestock waste, failing residential septic systems, wastewater treatment plant malfunctions, rural residential runoff, urban runoff, and illegal dumping of pet or sewage waste.

Not all *E. coli* bacteria are pathogenic. Pathogenic organisms include bacteria, viruses, and parasites that cause diseases and illnesses. In infected individuals, pathogenic organisms are found along with *E. coli* bacteria. If *E. coli* bacteria counts are high in a river, there is a greater chance that pathogenic organisms are also present. A person swimming in or otherwise in contact with waters with high counts of fecal bacteria has a greater chance of getting sick from disease causing organisms or pathogens.

E. coli bacteria standards are expressed as a 30-day log mean of 126 *E. coli* organisms per 100 ml, based on a minimum of five samples, with no single sample exceeding 406 *E. coli* organisms per 100 ml. A water body is considered water quality limited if more than 10 percent of the samples exceed 406 organisms per 100 ml or the 30-day log mean is greater than 126 organisms per 100 ml.

Within the management area, reductions in fecal pollution from 5 percent up to 97 percent have been identified in order to meet water quality standards and ensure that streams, rivers, and lakes are safe for water contact recreation.

Dissolved Oxygen
DEQ has identified numerous streams in the Rogue River Basin, including the Rogue River, that are impaired due to dissolved oxygen levels that do not meet standards. Dissolved oxygen levels are related to water temperature, excess nutrients, excess aquatic growth, and other processes that impact oxygen levels. Healthy riparian areas can filter out excess nutrients. There is a TMDL for dissolved oxygen in Bear Creek and there are plans to develop dissolved oxygen TMDLs for the rest of the Rogue Basin at some point in the future. DEQ does expect some improvements in dissolved oxygen levels due to the implementation of the temperature TMDL and improvements in flow. In simple terms, colder water can hold more dissolved oxygen, and aquatic organisms demand less oxygen at lower temperatures.

pH
There are pH exceedances on the Rogue River, in the Bear Creek watershed, and in the Applegate Subbasin. In the Upper Rogue Basin, North Fork Little Butte Creek and Fish Lake have experienced exceedances. pH refers to the level of acidity or alkalinity of the water. Fluctuations can be caused by several factors and are an indicator of imbalances in biological activity. There is currently a pH TMDL for the Bear Creek watershed and there are plans to develop pH TMDLs for the remainder of the Rogue Basin.

Sedimentation
Sediment impairments have been identified in the Applegate Subbasin, the Bear Creek watershed, and in the Upper Rogue Subbasin. In the Upper Rogue, there are six small tributary streams that are impaired due to excess sediment. The Applegate Subbasin and the Bear Creek watershed currently have a TMDL for sedimentation. Increased sedimentation can directly affect fish and other aquatic organisms. DEQ is in the process of developing a numeric sedimentation standard to address this water quality impairment across the Rogue Basin.

Nutrients
Nutrient impacts to water quality are typically caused by phosphorous but can include forms of nitrogen as well. Phosphorous limits have been set in the Bear Creek watersheds to limit the excessive growth of aquatic weeds and algae. The excessive growth of aquatic weeds and algae leads to daily pH swings and dissolved oxygen levels that are unhealthy for fish and aquatic life.

2.5 Prevention and Control Measures

2.5.1 How the AgWQM Area Plan Addresses the Temperature Standard

The intent of the Area Plan's riparian zone recommendations is to draw attention to the multiple beneficial functions of healthy and diverse riparian zones. The riparian zone is the streambank and top-of-bank and the vegetation on it. The riparian zone represents the area where vegetation gradually changes from water loving to upland vegetation. A variety of activities can take place within riparian zones if those activities are carefully managed to protect the beneficial functions of the vegetation and soil

structure. The Area Plan describes options to restore and protect riparian zones in the sections called Menu of Better Management Practices and Prohibited Conditions.

Six main factors influence surface water temperature: exposure to solar radiation, volume of flow, channel shape, turbidity, groundwater inflow, and air temperature. The undesirable conditions and possible solutions in Tables 5 through 11 of this Plan are designed to address four of these physical factors.

Exposure to Solar Radiation – The two major agriculturally related conditions that contribute heat to surface waters are inadequate shading from riparian vegetation and inflows of warmed irrigation surface returns. Agricultural activities that eliminate the possibility of natural regeneration of trees and shrubs along waterways are not allowed. By limiting near-stream riparian management to seasons and practices that enhance growth of grasses, shrubs, and trees, canopy vegetation is encouraged. The increased shade reduces direct solar exposure of stream water and irrigation return flows through the riparian area. Irrigation surface return flowing through a properly sized and functioning riparian area has a greater opportunity for infiltration and sub-surface return to the stream. The conditions described in this Area Plan are designed to encourage appropriate management of riparian areas to facilitate healthy riparian structure and function.

Volume of Flow – While agricultural water rights are regulated and monitored by the Oregon Water Resources Department, irrigation efficiency, uniformity, and application rates are factors controlled by individual irrigators. Perceived disincentives in current water law discourage irrigation management changes, but there are simple management activities that can both reduce overuse of irrigation water and decrease the detrimental impacts of surface return flows. The conditions described in this Area Plan are designed to encourage appropriate application of irrigation waters and water conservation by the landowners.

Properly functioning riparian areas act as sponges with the capacity to store water from high-flow events and release it slowly back to the stream during low-flow times. Riparian management focuses on seasons and practices that reduce consumption and trampling of grasses, shrubs, and trees and will enhance the function of the riparian area to capture, store, and release cool groundwater in the summer.

Channel Shape – Some channel morphology processes that are not within the control of the land manager are high-flow events, bed material composition, and off-property upland/upstream condition. However, some channel morphology factors are within the control of the land manager. Riparian buffers act as sediment traps from adjacent lands and for stream suspended sediments during high water. In this way, the banks rebuild themselves causing deepening and narrowing of the channel. These rebuilt banks are generally hydrologically well connected to the stream. A well-managed riparian area, whether excluded or properly grazed, will enhance streambank stability and will contribute to improve overall riparian condition. The conditions outlined in this Area Plan describe riparian conditions known to increase age, species, and structural diversity of the riparian vegetation for the purposes of limiting bank loss, adding large woody debris, encouraging a narrower and deeper channel profile, and connecting to a flood plain to dissipate energy associated with high flows.

Turbidity – Diverse, healthy riparian zones are able to function as sediment filters. The riparian conditions outlined in this Plan are designed to protect appropriate riparian grasses so as to eliminate the possibility of sediment-laden overland flow reaching the stream or drainage. Close attention must be paid to management strategies when allowing access for watering and grazing in riparian areas. Soil disturbance due to agricultural activities in riparian areas without employing appropriate erosion control methods should be avoided whenever possible.

2.5.2 How the AgWQM Area Plan Addresses the Bacteria Standard

Bacteria (*E. coli*) from agricultural sources may enter the surface waters of the state through the introduction of animal waste into the stream or from nearby sources through shallow groundwater flow and surface runoff. Prohibited conditions related to the bacteria standard are designed to reduce unrestricted direct deposition of manure and movement of waste by surface water from the uplands.

Direct Deposition - Livestock that loaf in riparian areas are likely to defecate directly into the waterway or onto adjacent riparian areas. By encouraging practices that move livestock through riparian pastures quickly, direct animal introduction of manure will be minimized. Manure spreading designed to distribute feedlot and dairy manure should never be done near waters of the state. Disposing of dry manure directly into waters of the state or placing it where it is likely to enter there, is already prohibited under ORS 468B.

Indirect Deposition - Bacteria can remain viable in a manure pile for over two years. Improper storage of livestock manure can be an agricultural source of *E. coli* bacteria in the water. Precipitation on a manure pile or surface flows contacting the manure can carry bacteria into a waterway. Overland flows can transport animal wastes from upland or overstocked areas, especially if the slope is poorly vegetated or highly erodible. Filter strips or flow controls can effectively prevent bacteria from reaching waterways. Streamside areas planted to dense grass and properly functioning riparian areas can act as filters preventing contaminated surface flows from reaching vulnerable waterways.

2.5.3 Sedimentation

Excessive amounts of sediments have an adverse impact on good water quality. It is important that sediment control be individually designed to fit each operation. The most important way to prevent excess sediment from accessing streams is to keep soils covered with vegetation as much as possible. No-tillage, or low-tillage methods allow a cover crop to remain established while drilling seed through the crop. Good pasture management means that livestock are rotated or numbers are maintained so the grass is never overgrazed and bare ground is not allowed to develop. Where there is runoff from farm structures, roads, or other heavy use areas, divert the runoff through grassed filters to allow the sediment to settle out as the water either infiltrates into the ground or enters a nearby waterway.

2.5.4 Nutrients

Excess nutrients such as nitrogen and phosphorus result in ecological distress such as algal blooms and instream plant growth. The increased biomass growth and decomposition results in high and low dissolved oxygen levels in the waterway. Nutrients, either in the form of chemical applications or livestock manure, must be applied at an agronomic rate – the rate at which the target crop can utilize the nutrients. All producers should utilize buffer and filter strips to slow stormwater runoff and allow it infiltrate into the soil and not outlet into a local waterway. Controlling livestock access to waterways and crossings will reduce mud and manure contributions to waterways. Manage for healthy pasture grass conditions with proper rotation and stocking. Pastures can serve as a buffer zone if properly managed.

2.5.5 Dissolved Oxygen

As noted above, excess nutrients in the waterway, from livestock manure and chemical applications, will result in decreased levels of dissolved oxygen (DO). Fish and other aquatic life need a minimum level of DO to survive and live. As excess nutrients are the primary cause of low DO levels, the attention paid to proper nutrient management will also ensure adequate DO levels in the local stream.

2.5.6 pH

The pH of water is a measurement of acidity and alkalinity present. Low pH waters are considered acidic and high pH waters are considered basic. The pH of water can affect the availability of and toxicity of metals, ammonia, and other substances. Elevated levels of nitrogen and phosphorus can result in algal blooms that create conditions for extreme pH and DO levels. Aquatic algal photosynthesis during the day can result in high pH and DO levels. At night algal decomposition and respiration can result in low DO and low pH conditions. Extreme DO and pH conditions can be injurious to the the health and survival of salmonid species and other aquatic organisms.

2.5.7 Menu of Better Management Practices

This Area Plan is designed to maintain as much flexibility in farming and ranching as possible to achieve water quality goals and objectives. The Inland Rogue LAC encourages custom-made solutions to fit the unique needs of individual landowners. The "possible solutions" listed below are intended to increase awareness, provide information, and educate the general public and the agricultural community about management methods that can be individually tailored to reduce or eliminate agricultural contributions to water pollution. ODA recommends any effective combination of these practices to prevent and control water pollution. While protecting water quality is required, the individual practices are not intended to be mandates to land managers.

Agricultural management for the Inland Rogue Basin should consist of those management practices that are generally accepted as effective, economical, and practical for the area and that address water quality issues. These activities should also maintain the economic viability of agriculture in the basin. Appropriate management for individual farms and ranches may vary with the specific cropping, topographical, environmental, and economic conditions existing at a given site. Because of these variables, it is not possible to recommend uniform Better Management Practices for every farm or ranch in the Rogue Basin. The US Department of Agriculture Natural Resources Conservation Service's (NRCS) Field Office Technical Guide (FOTG) contains extensive lists of Conservation/Management Practices.

Another important reference for conservation methods is found in the 1990 Coastal Zone Reauthorization Amendments, section 6217 (Appendix H). The Rogue Basin falls under these guidelines. This Inland Rogue Area Plan, along with other ODA water quality protection rules (i.e. Pesticide applications, CAFO) is the implementation program for those Environmental Protection Agency (EPA) recommendations in this part of the state of Oregon.

What follows is a summary of some of the practices that the ODA, the SWCD, and the LAC will encourage landowners to adopt if they haven't already. Widespread adoption of these practices should reduce or eliminate agricultural inputs to streams in the Rogue Basin.

Table 6. Drainage and Runoff Management Problems and Possible Solutions

Problems	Impacted water quality parameter	Possible Solutions Include
Nutrient Inputs from Over-Application of Fertilizers	pH/DO Chlorophyll a* Nutrients (surface and groundwater)	-Test soil to know when application rate and timing matches agronomic need -Follow instructions and label application procedures -Adopt precision agriculture management options
Concentrated Manure	Sediment pH/DO Chlorophyll a* Nutrients (surface and groundwater) Bacteria (surface and groundwater)	-Store organic material in such a way as to prevent water from precipitation or surface flows from moving through the pile and into waters of the state -Store silage and compost well away from water/drainage ways
Under annual cropping, erosion more than tolerable for the specific soil (T)**	Sediment	-Maintain vegetated filter strips -Recover tailwater for recirculation or infiltration -Use cover crops and break up effective slope length
Overwatering	Temperature Sediment Flow Modification	-Use set duration and nozzle size based on agronomic need and soil moisture holding/infiltration capacity -Use retention ponds to collect and re-use surface returns -Measure soil moisture with tensiometers, gypsum blocks, etc.
Pooling and Stagnation	Temperature	-Level field where appropriate -Clean distribution ditches and channels -Install pipe where feasible

* Chlorophyll a is a measure of excess algal growth.

**T - is defined as the tolerable soil loss level. This is a number given in the NRCS Soil Survey, which is dependent on climate, parent material, topography, and biotic factors. In OAR 603-095-0010(44) "T" means maximum average annual amount of soil loss from erosion, as estimated by the Universal Soil Loss Equation (USLE) or the Revised Universal Soil Loss Equation (RUSLE), and expressed in tons per acre per year, that is allowable on a particular soil. This represents the tons of soil (related to the specific soil series), which can be lost through erosion annually without causing significant degradation of the soil or potential for crop production.

Table 7. Vegetation Management Problems and Possible Solutions

Problems	Impacted water quality parameter	Possible Solutions
Overgrazing* the riparian area	Temperature Bacteria pH/DO Sediment Nutrients Flow Modification	-Fence where appropriate -Plant native species to enhance riparian function. Appropriate and legal non-native species may help too -Manage grazing to restore riparian function -Install off-channel livestock watering facilities -Provide animals with shade away from the riparian area
Overgrazing the uplands	Bacteria pH/DO Sediment Nutrients Flow Modification	-Salt, water and feed on hardened area -Match stocking rate to forage production capacity of the pasture -Account for slope and soil type for management -Rotate pastures: use the 8" and 4"** Rule to turn in and out
Tillage in riparian areas and exposed soils during or right before the rainy season	Sediment Nutrients	-Use settling basins consisting of depressions at the bottom of the field -Construct curtain drains at the bottom of the field -Put straw bales in unconstructed drainage ways -Plant grass filter strips designed for slope and sediment yield potential
Allowing noxious and invasive weeds to dominate riparian sites	Temperature Flow Modification	-Interrupt seeding cycle -Control root reproducers -Control weed populations systematically -Plant competitive species

*Overgrazing is described as a condition when stocking rate on a pasture is greater than the forage production capability of the pasture species, due to time of year, soil type and water availability.
**8" and 4" Rule - Turn animals into a pasture when forage averages 8-inches tall then take them out to allow re-growth when the forage has been utilized down to an average 4-inches of stubble height. Irrigated only.

Table 8. Livestock Management Problems and Possible Solutions

Problems	Impacted water quality parameter	Possible Solution
Visible gully erosion on more than 10 percent of livestock trails, paths, stream banks, and pastures	Sediment Nutrients	-Use hardened crossings -Use culvert crossings or bridge streams and ditches -Install gates and rotate pasture use -Use drainage appropriate to site: i.e. drain tile, curtain drains, etc.
Riparian pastures managed in such a way as to degrade the shade density capability of near-stream areas (The result is inadequate vegetation cover.)	Temperature Bacteria Sediment	-Attract livestock to upland areas with off-stream shade, water, and salt. Fence off riparian areas to facilitate proper management (permanent or temporary) -Use a short rotation schedule for riparian areas
Pastures managed in such a way as to reduce forage basal area coverage to less than 50 percent	Temperature Bacteria (surface and groundwater) Sediment Nutrients	-Rotate pastures: use the 8" and 4" rule to turn in and out -Use electric fences for flexibility in rotation schedule -Balance livestock numbers with regrowth potential
Accumulation of manure within 50 feet of a drainage way where it has opportunity to enter waters of the state (surface and groundwater)	Bacteria (surface and groundwater) DO/pH Nutrients (surface and groundwater) Chlorophyll a	-Store manure in covered, dry area away from surface water -Spread manure when runoff potential is minimal -Balance livestock numbers with area available
Grazing animals during irrigation in such a way as to lead to compacted soils, as indicated by ponded water and poor vegetation production	Bacteria Sediment Nutrients pH/DO	-Rotate animals off of pastures during and right after irrigation sets -Construct buffer and filter strips
In-stream livestock watering in such a way as to degrade bank stability, increase sediment yield, and increase introduction of bacteria into waters of the state	Bacteria DO/pH Sediment Nutrients Chlorophyll a Flow Modification	-Use water gaps along fenced streams -Provide off-stream watering -Create visual barriers on far side of stream -Harden stream crossings

Table 9. Irrigation Management Problems and Possible Solutions

Problems	Impacted water quality parameter	Possible Solutions
Overuse of water (indicators include growth of "wetland species" in pastures (i.e. Baltic rush, sedges, horsetail))	Temperature Flow Modification	-Improve scheduling, timing, and set changes -Improve knowledge of crop needs, i.e. specific crop water requirements -Improve distribution methods, i.e. upgrade from flood to sprinkler where feasible, or upgrade ditch and lateral system -Schedule irrigation with soil moisture measurements using gypsum blocks or other simple moisture monitoring devices -Improve diversion techniques and maintenance i.e. location of diversion -Consider leasing unneeded water rights to Water Resources Department or The Freshwater Trust
Excessive runoff/tailwater	Temperature Bacteria pH/DO Sediment Nutrients	-Improve timing and integrate with livestock rotations to prevent compaction of pasture soils (OSU Extension recommends 4-5 days after irrigation before animals are allowed back on.) -Consider collection and redistribution of tailwater -Facilitate percolation of tailwater on vegetated area with well-drained soils -See scheduling requirements above

Table 10. Cropland Management Problems and Possible Solutions

Problems	Impacted water quality parameter	Possible Solutions
Exposed slopes without effective cover going into the rainy season	Sediment Nutrients	-Plant cover crops -Leave stubble from harvest -Spread crop residue in vulnerable areas -Use other effective erosion control methods
Movement/loss of soil into waters of the state beyond the tolerable NRCS soil loss limits as defined by soil type and position	Sediment Nutrients	-Use sediment retention structures -Plant filter strips -Construct straw bale filters appropriately spaced in drainages -Use other effective erosion control methods
Excess fertilizer applications beyond agronomic need. (An excellent indicator of excess nutrient is a heavy bloom of aquatic weeds/ algae in receiving waters.)	DO/pH Nutrients (surface and groundwater) Chlorophyll a	-Mix in "Least Likely Third"* area -Test soil regularly -Time fertilizer applications to avoid periods of heavy precipitation or excess irrigation to prevent leaching and runoff
Over application of irrigation water beyond replacement of soil water holding capacity and reasonable leaching factors	Temperature Sediment Flow Modification	-Use soil moisture measurement to schedule irrigation application -Match application rate with infiltration rate of the soil
Inadequate distribution ditch maintenance causing excessive leakage and/or forcing excess flow to compensate for ditch loss	Temperature Sediment Flow Modification	-Clean and repair ditches on regular schedule to facilitate flow -Line ditches -Install pipe where applicable

Table 11. Farm Storage Problems and Possible Solutions

"Least Likely Third"* rule is recommended for all conditions below.

Problems	Impacted water quality parameter	Possible Solutions
Machinery and chemical storage within 50' of water/drainage ways (surface and groundwater)	Toxic Substances** (surface and groundwater)	-Follow label rules for chemical and petroleum storage -Avoid storing equipment in floodplains, even temporarily -Meet DEQ requirements for fuel storage and refueling
Drains from storage areas hydraulically connected to water/drainage ways (surface and groundwater)	Toxic Substances (surface and groundwater)	-Secure storage areas from leakage into water/drainage ways -Keep a Haz-Mat control kit nearby
Storage areas without containment barriers (surface and groundwater)	Toxic Substances (surface and groundwater)	-Construct an appropriately sized containment barrier around storage areas
Chemicals not in properly labeled and sealed containers (surface and groundwater)	Toxic Substances (surface and groundwater)	-Label and seal all containers -Store money instead of chemicals. Buy chemicals as needed
Silage and compost piles stored in such a way as to allow water to move through them and enter water/drainage ways (surface and groundwater)	Bacteria (surface and groundwater) pH/DO Nutrients (surface and groundwater) Chlorophyll a	-Disperse runoff from drainages and gutters away from silage and compost piles and through appropriately sized filter strips or other equally effective pollution control mechanism

*Least Likely Third: Siting strategy for potentially hazardous materials. When locating storage and staging areas on a property, select the third of the property that is least likely to allow contaminants from a spill or leak to runoff directly into waters of the state.

**Toxic substances (OAR 340-41-0033) see ODEQ Table 20; Aquatic life water quality criteria

Table 12. Potential Water Quality Problems from Cannabis Cultivation and Possible Solutions

Problems	Impacted water quality parameter	Possible Solutions
Land clearing for cannabis cultivation resulting in eroded sediment contributions to waters of the State	Sediment	- Create an erosion control plan prior to clearing - Utilize erosion control devices such as hay bales, straw wattles, silt fences, and other storm water management tools to contain potential erosion - Seed ground with groundcover immediately after disturbance from clearing - Ensure full groundcover and containment devices are in place to address any erosion issues prior to the fall rains
Improper installation of farm roads for cannabis cultivation	Sediment	- Utilize road building specifications such as the Oregon Department of Forestry's guidance for road building - Consider soil type, topography, and drainage prior to installation of road(s) - Utilize culverts, ditches, water bars, base rock, crowning, and finish rock to prevent erosion
Removal of riparian vegetation for cannabis plant cultivation	Temperature, Sediment	- Maintain vegetated areas (grass, shrubs, trees) between grow sites and streams, ditches, and ponds - Do not remove riparian vegetation without ensuring compliance with the Inland Rogue Agricultural Water Quality Rules and other applicable State and local requirements - Do not cultivate cannabis in riparian areas due to likelihood of native riparian vegetation destruction and fertilizer, pesticides, and sediment reaching waterways
Over fertilization of cannabis plants leading to runoff to streams or groundwater contamination	Chlorophyll a Nutrients (surface and groundwater) DO/pH	- Apply fertilizer at agronomic rates to avoid contamination of groundwater and/or surface water - Utilize soil tests to determine agronomic needs of the cannabis plants. - Ensure runoff from cannabis does not flow to a stream
Excessive water withdrawals leading to decreased instream flows and groundwater (surface and groundwater)	Temperature DO pH	- Utilize water from permissible sources in accordance with Oregon Water Law. Contact the local OWRD water master for assistance.

Improper disposal of waste water from indoor cannabis grow operations (surface and groundwater)	Chlorophyll a Nutrients (surface and groundwater) DO/pH	- Dumping excess irrigation water into a stream, ditch, or pond is prohibited - Collect runoff in a retention basin - Test the nitrogen levels in excess irrigation water prior to application to flat and vegetated (grass) area. • Do not spread excess irrigation water within 48 hours after a storm event or when weather conditions will lead to runoff. • Vegetation receiving the excess irrigation water must be removed. Vegetation needs to be growing to use nitrogen. Example: mow the grass and remove the cuttings from the area where wastewater is applied. If vegetation is turning yellow or dying at location of application, nitrogen levels are too high. Irrigation water may need to be diluted and spread over a larger area.

2.5.8 CZARA

In 1990, as part of the federal Coastal Zone Amendments Reauthorization Act (CZARA), Congress enacted Section 6217(g) to specifically address the impacts of nonpoint source pollution in coastal areas. Each state with an approved coastal zone management program must develop and submit to the USEPA and the National Oceanic and Atmospheric Administration (NOAA) a Coastal Nonpoint Pollution Control Program. The purpose of the program "shall be to develop and implement management measures for nonpoint source pollution to restore and protect coastal waters, working in close conjunction with other state and local authorities." Under “A Pollution Prevention and Control Program for Oregon’s Coastal Waters" the state of Oregon presented agricultural management measures to meet the requirements of the CZARA Section 6217(g). These measures have been found to be effective to control and prevent agricultural water pollution and are listed in Appendix H.

These best management practices have been developed to help agricultural operators reduce agricultural water pollution when combined with pollution control efforts from other land uses in the planning area. The best management practices have also been designed to implement the agricultural measures required by Section 6217(g) of CZARA, and suggests ways they may be achieved through flexible management solutions.

2.5.9 Prohibited Conditions

The following prohibited conditions have been identified by the LAC as those being so blatant and injurious to the land and water resources that they constitute a violation of the Inland Rogue Basin Agricultural Water Quality Area Plan Administrative Rules and are subject to the compliance procedures outlined in the rules.

The official rule language is in the box within each of the condition explanations.

Prohibited Condition #1 - Soil Loss
(Addressing Drainage and Runoff Problems)

Issue/Intent
Soil erosion is a natural process but agricultural practices can accelerate or slow it down. Unrestrained erosion deposits sediment at the bottom of slopes and can then enter the waters of the state. The intent of this LAC is not to penalize agriculture for a natural process but to encourage thoughtful, well-planned management of this most basic and essential agricultural resource.

Four groups of management measures and structures are commonly used to control erosion and limit sediment yield from an agricultural site: 1) surface protection such as mulches and vegetation; 2) mechanical treatment such as deep ripping and land surface manipulation; 3) diversion structures such as terraces and straw bales; and 4) detention structures such as artificial wetlands in upland areas that do not receive natural water flow (so as to not be governed by wetland regulations and protections), settling basins, and curtain drains. In addition, riparian setbacks are not only the most effective filtering component to keep sediments from the waters of the state but also contain multiple erosion control benefits.

Retention of soil should be the farmer's first goal. Switching from conventional tillage to no till, planting a cover or residue producing crop, and deep ripping a field, when appropriate, to improve water infiltration are some of the practices that reduce erosion. Properly designed and maintained sediment control measures such as strip cropping, catch basins, grassed waterways, cover crops, straw bales, and several other methods can be effective in preventing and retaining sediment movement.

Excessive Soil Erosion
OAR 603-095-1440(2)
(a) There shall be no visible evidence of erosion resulting from agricultural management in a location where erosion has contributed or will contribute sediment to waters of the state. Visible evidence of erosion may consist of the following features:
(A) Sheet wash, noted by visible pedestalling*, surface undulations, and/or flute marks on bare or sparsely-vegetated ground;
(B) Visibly active gullies, as defined by OAR 603-095-0010(1);
(C) Multiple rills, which have the form of gullies, but are smaller in cross-sectional area than one square foot.

*Pedestalling, referred to in the above rule language, is described as differential erosion of soil due to sheet-wash which leaves less erodible units such as grass roots or stones elevated above the eroded, sparsely-vegetated surrounding material.

Water quality parameters which may be affected: Sediment
The following terms are specifically defined in OAR 603-095-0010(1)(14)(15). As used generally, they have the following meanings.

- Sheet Erosion: soil particles that are detached and transported in water moving as a "sheet" across an exposed soil surface. Continued flow of this type will eventually differentiate itself into definable channels, rills, and gullies.
- Rill Erosion: a series of small channels less than one square foot in cross-sectional area. It often begins as sheet erosion across an unprotected soil surface. If left unprotected, rills usually converge to become gullies.
- Visibly Active Gully Erosion: a channel equal to or greater than one square foot in cross-sectional area. Gullies, if left unprotected, may carry large amounts of suspended sediment and become a physical hazard to humans and livestock.

- "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 effect a junction with natural surface or underground waters), which are wholly or partially within or bordering the state or within its jurisdiction. (ORS 468B.005(8))

Prohibited Condition #2 - Riparian Vegetation Destruction
(Addressing Vegetation Management and Grazing Lands Problems)

Issue/Intent
Properly functioning riparian areas have so many positive benefits for the agricultural landowner that it is imperative these areas be managed well. Riparian exclusion is one effective option but areas that have been previously managed may need continued management to prevent invasion and dominance of weedy or exotic plant species. This LAC does not intend to exclude riparian areas from sound/sustainable management. Farmers and ranchers must be able to provide livestock with access to adequate pasture and water. The intent is to ensure access to these resources while minimizing negative impacts on riparian vegetation, maintaining stable stream banks, and protecting water quality. Consult the OSU Extension, the SWCDs, and ODA for ideas and assistance on rotational grazing, off-stream watering, and riparian pasture management.

Riparian Vegetation Destruction
OAR 603-095-1440(3)
(a) Agricultural management of riparian areas shall not impede the development and maintenance of adequate riparian vegetation to control water pollution, provide stream channel stability, moderate solar heating, and filter nutrients and sediment from runoff.
(b) This condition is not intended to prohibit riparian grazing where it can be done while managing for riparian vegetation required in OAR 603-095-1440(3)(a))
(c) Constructed ditches that carry only irrigation delivery and drainage water are exempt from conditions described in OAR 603-095-1440(3).

Water quality parameters which may be affected: Temperature, Sediment, Bacteria, Nutrients

Prohibited Condition #3 - Irrigation Management Problems

Issue/Intent
The intent is to discourage wasteful water management practices, which are not necessary to irrigate effectively and beneficially. However, the intent of this LAC is not to prescribe a type of irrigation, nor is the intent to eliminate all surface returns. Some drainage following an irrigation set may be unavoidable. Flooding, sprinkling, and dripping have their specific applications in particular sites and situations. How the water is managed and its efficiency of management is the factors that determine a particular distribution method.

The goal is to encourage efficient use of water and to mitigate the detrimental results of excessive surface runoff. One factor is maintenance of delivery systems and another is the use of delivered water. In the Rogue Basin, irrigation water is applied by surface or subsurface dripping, flood irrigating, overhead sprinkling, or a combination of methods depending on the crops and water distribution capability. Slope of the land and type of soil have a great bearing on the efficient management of water. System type, design, and management should be consistent with the needs of the land, the crops, and the operator.

Beneficial use of delivered water is of absolute importance. While irrigation district and ditch association patrons often have little control over the timing of their water delivery, they are encouraged to make as efficient use of it as possible. Those who pump directly from the source must be sure that the water is used when needed and not wasted. Different crops have different requirements and effort should be made to determine those needs so as to plan a schedule and supply system that conforms to those needs. Too much water at the wrong time or too little can lead to inhibited plant production. Livestock owners should make every effort to rotate livestock in such a way as to allow the water to do its work without contributing to water quality degradation. Overuse of water can lead to the deterioration of the land and crop over which it is being applied.

Tailwater resulting from too rapid application should be avoided. Every possible effort should be made to collect irrigation tailwater in order to divert it to better draining soils for percolation or to distribute it where it may be applied beneficially. Steep slopes are difficult to irrigate without being terraced or at least ditched in a way that breaks the slope length and slows the water down to allow for infiltration. The diverted water is beneficially used only when it has an opportunity to percolate into the soil and supply the transpiration needs of plants or drinking requirements of livestock. It is also indirectly beneficial to stream temperatures as the water is cooled to the soil temperature before it re-enters surface waters. Unmanaged surface runoff is wasteful and ultimately of no benefit, or even harmful, to the irrigator and the resource. Surface return is defined as surface irrigation drainage re-entering waters of the state after the soil to which it is being applied is saturated. Surface returns are considered unmanaged if the source is unregulated by the operator after the soil is saturated.

Serial conveyances are special cases and are artifacts of infrastructure that require irrigation water to be passed by gravity flow through ditches and other surface features to one or more water users in series. While these special cases add complexity to management for all in a conveyance series, and obscure responsibility for potential runoff from the user last in line preceding waters of the state, each water user is responsible to not degrade water quality so that re-conveyed water would be of lesser quality than that received.

With respect to the special case of serial conveyances, the Inland Rogue Basin LAC advises the development of an inventory of affected acreage, quantification and documentation of the magnitude of the problem through voluntary monitoring, and development of solutions. Potential solutions identified include, but are not limited to, subsidized infrastructure modernization and development of specially adapted on-farm management practices; such as those described in the "Menu of Better Management Practices," but do not preempt cropping agriculturally productive land.

Irrigation scheduling decisions should be based on specific factors having to do with weather, soil conditions, fertilizer, and chemical applications. As our most limiting agricultural resource, water must be managed and not just used.

Surface Irrigation Return Flows

OAR 603-095-1440(4)

Surface Irrigation Return Flows. Runoff of surface irrigation that enters waters of the state shall not exceed water quality standards or cause pollution of the receiving water.

Runoff of surface irrigation that enters waters of the state shall not exceed water quality standards or cause pollution of the receiving water.

Water quality parameters, which may be affected: Temperature, Sediment, Bacteria, Nutrients

Prohibited Condition #4 - Crop Nutrient and Animal Waste Management Problems

Issue/Intent
It is not the intent of this LAC to eliminate the application of crop nutrients. This condition should encourage management of nutrients and animal waste to do the most benefit for the intended production goals. Application of crop nutrients, or fertilizer of any kind, can be a necessary and beneficial agricultural practice. Improper application of fertilizer, however, can be costly to the grower and harmful to the environment. Growers are encouraged to use regular soil testing to determine the nutrient needs of their crops. Using a pre-set amount of fertilizer year after year may limit crop yields and cause nutrients to run off into waters of the state. Excess nutrients in water can cause unnatural algae growth (Chlorophyll a), increased pH, and lead to a decrease in dissolved oxygen.

To prevent water from carrying concentrated animal waste, silage, and compost leachates (nutrients) to streams, they should be stored in such a way that water cannot move through the pile into waters of the state. With the small land areas that are the dominant agricultural land use in the basin, close attention must be paid to where nutrient laden materials are stored. Even if it is impossible to store materials far away from the waters of the state, the material can be covered and protected from surface flow and precipitation. ORS 468(b) applies to this condition. The statute requires that wastes be stored, managed, and disposed in such a way that they do not pollute waters of the state.

Waste
OAR 603-095-1440(5)
No person subject to these rules shall violate any provision of ORS 468B.025 or ORS 468B.050.

Water quality parameters which may be affected: Bacteria, Sediment, Nutrients, Dissolved Oxygen, pH, Chlorophyll a

Chapter 3: Goals, Objectives, and Strategies

3.1 Responsibility of the Local Advisory Committee:

OAR 603-090-0003 - Create an agricultural water quality management area plan that comprehensively outlines measures that will be taken to prevent and control pollution from agricultural activities…

- *OAR 603-090-0024(b) - Recommend strategies necessary to achieve water quality goals and objectives…*
- *OAR 603-090-0030 - Describe a program to achieve water quality goals and standards necessary to protect beneficial uses related to water quality, as required by state and federal law. An area plan shall include, but not be limited to the following:*
  - *Description of the geographic area to which the area plan applies,*
  - *A listing of water quality issues of concern,*
  - *A listing of current beneficial uses being adversely affected,*
  - *A statement that the goal is to prevent and control water pollution from agricultural activities and to achieve water quality standards,*
  - *A statement of water quality objectives of the area plan,*
  - *A description of the pollution prevention and control measures deemed necessary to achieve the goal,*
  - *A schedule for implementation adequate to meet dates described by law,*
  - *Guidelines for public participation,*
  - *Implementation and enforcement strategies.*

3.2 Intent of the Rogue Basin Agricultural Water Quality Local Advisory Committee

The intent of the Local Advisory Committee is that the Area Plan:

- Be based on scientifically defensible data,
- Protect water quality in agricultural settings,
- Protect the economic viability of the agriculture industry in the Rogue Basin,
- Help set priorities so that resources are distributed where they will be of the most benefit to help the industry meet its long-term water quality objectives,
- Address each subbasin as a unique entity,
- Develop desirable agricultural condition requirements that are not prescriptive and provide for a wide variety of agricultural practices to alleviate potential problems,
- Develop condition descriptions that allow for the unique character of specific sites.

3.3 Goals and Objectives

3.3.1 Goal of the Committee

To describe reasonable methods and practices, all people engaged in agricultural activities may use to maintain and improve water quality while preserving and enhancing economic viability in the Rogue Basin.

3.3.2 Goal of the Plan

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

3.4 Objectives

Objectives:

1) Strive to attain water quality standards that serve the beneficial uses designated for the Rogue Basin OAR 340-41-0271:
    - Public Domestic Water Supply
    - Private Domestic Water Supply
    - Industrial Water Supply
    - Irrigation
    - Livestock Watering
    - Anadromous Fish Passage
    - Salmonid Fish Rearing
    - Salmonid Fish Spawning
    - Resident Fish and Aquatic Life
    - Wildlife and Hunting
    - Fishing
    - Boating
    - Water Contact Recreation
    - Aesthetic Quality
    - Hydro Power
    - Commercial Navigation and Transportation
2) Create a high level of awareness of agricultural water quality issues and problems in the watershed.
3) Support funding necessary to achieve plan education and implementation.

3.4.1 Measurable Objectives

To achieve the Area Plan goal, the following measurable objectives, strategies, milestones, and timelines were developed:

Table 13. Jackson SWCD – Little Butte Creek Focus Area

Irrigation Conversion Focus Area Milestone for 2017-2019

- Convert 652-1371 acres (10%-20% of the 6,300 irrigated acres in the Watershed) from flood to sprinkler irrigation systems by 2022.
- Improve the efficiency of an additional 380-800 acres (6% of the 6,300 irrigated acres in the Watershed) of flood irrigation systems by 2022.

Year	Acres – Flood to Sprinkler		Acres – Flood to Improved Flood	
	Anticipated	Actual	Anticipated	Actual
2013 - 2014	72	72		
2014 – 2015	40-75	0		
2015 - 2016	150-200	0	0-100	0
2016 - 2017	100-150	0	100-200	0
2017 - 2018	90-120		10-50	
2018 - 2019	100-400		10-50	
2019 - 2020	100-200		10-50	
2020 - 2021	0-50		150-200	
2021 - 2022	0-50		100-150	
Total	**652-1317**		**380-800**	

Antelope Creek Streamside Vegetation Assessment (SVA) Milestone:
Pre-Assessment Conditions

- In 2017: [Tree + Shrub] = 191.2 acres (47.8%) *(total Ag riparian area assessed = 400.1 acres)*

Focus Area Milestone for 2017-2019

- By June 30, 2019: Increase [Tree + Shrub] by 10 acres (2.5 %) to 201.2 acres (50.3%)

Attainment of these goals will be dependent on landowner interest and continued NRCS CIS or other funding.

Antelope Creek Water Quality Milestones
Milestones may be added as deemed appropriate. This decision will be based on analysis of water quality sampling results and limitations at the end of the 2017-2019 biennium.

Two Rivers SWCD – Williams Creek Watershed Focus Area Milestone for 2017-2019
Pre-Assessment Conditions

- In 2017: [Tree + Shrub] = 94.92 acres (65.6%) *(total Ag riparian area assessed =144.62 acres)*

Focus Area Milestone for 2015-2017

- By June 30, 2019: Increase [Tree + Shrub] by 12 acres (8%) to 156.62 acres (73.6%)

Illinois Valley SWCD – Upper Deer Creek Focus Area Milestone for 2017-2019
The Streamside Vegetation Assessment for the Upper Deer Creek Focus Area will be completed by January 1, 2018. Milestones will be determined following the completion of the SVA and the availability of pre-assessment, baseline, conditions.

3.4.2 Focus Areas

The current Focus Areas for this Management Area include Jackson SWCD: Little Butte Creek, Two Rivers SWCD: Williams Creek Watershed, and Illinois Valley SWCD: Upper Deer Creek

Action Plans for the current biennium have been developed and approved by ODA outlining the key components of the process:

- Conduct a pre-assessment of current land conditions;
- Identify areas of concern;
- Conduct education and outreach to landowners;
- Offer technical assistance to landowners and financial assistance, if needed;
- Conduct a post-assessment after project implementation;
- Report progress to ODA and the LAC.

Focus Area Summaries

Jackson SWCD: Little Butte Creek

The Little Butte Watershed Focus Area comprises approximately 238,000 acres and flows into the Rogue River. The main agricultural uses include irrigated pasture and hay production. There are 6,300 acres of irrigated agricultural land in the Focus Area. There are 100-plus miles of perennial and unknown miles of seasonal streams in the Focus Area. Little Butte Creek Watershed was selected as the Jackson SWCD Focus Area due to recognition of the need to improve water quality in the watershed. The Rogue River Basin TMDL was completed in 2010. The TMDL covers temperature and bacteria loading in the Rogue Basin. The Little Butte Creek watershed is 303(d) listed as water quality limited for bacteria, temperature, sediment, pH, Chlorophyll a, dissolved oxygen, and aquatic weeds. The watershed is further limited by flow modification, habitat modification, and phosphorous. The mainstem of Little Butte Creek is rated as "poor" by the Oregon Water Quality Index (OWQI). Irrigation improvements are a priority for the entire Focus Area. Streamside vegetation and other agricultural water quality improvements area a priorty in the Antelope Creek subwatershed within the Little Butte Creek Watershed.

Two Rivers SWCD: Williams Creek Watershed

The Two Rivers Soil and Water Conservation District 2018 to 2018 Focus Area is the Williams Creek watershed (HUC 1710030905). This Focus Area is composed of three 6th level sub-watersheds (HUC12) called the East Fork Williams Creek (171003090501), West Fork Williams Creek (171003090502), and Lower Williams Creek (171003090503) into an approximate 52,000-acre basin Focus Area in the Applegate River watershed. There are approximately 23 miles of perennial streams and 63 miles of seasonal streams that drain into Williams Creek. Williams Creek ultimately flows into the Middle Applegate River. The main agricultural uses include grass hay production, plant nurseries, organic seed and produce farms, beef cattle, and dairy cows. The District selected these hydrologic units because of ongoing agricultural water quality concerns, and potential landowner willingness to participate in non-point source management reduction programs. The SWCD will prioritize projects that lower water temperature and reduce runoff of sediments and bacteria into surface water of Williams Creek watershed. Therefore, projects will focus on promoting healthy riparian corridors to shade flowing water, buffer strips to reduce runoff, and tailwater catchment. Such projects could include fencing to exclude livestock from riparian areas and conversion of flood irrigation to sprinklers.

Illinois Valley SWCD: Upper Deer Creek

The Upper Deer Creek Watershed covers approximately 18,000 acres. Land use development zoning in the watershed is approximately 8 percent agriculture, 86 percent Wildland forest, and 6 percent low density residential. The main agricultural uses in the Upper Deer Creek Watershed include hay land, pasture, orchards, vegetable gardens, and vineyards. There are 21 miles of verified or assumed fish

bearing, Class 1 streams and 25 miles of Class 2, non-fish bearing or unknown streams. The Upper Deer Creek Focus Area was selected based on proportion of privately owned property in the watershed, proportion of agricultural use in watershed, condition of streamside vegetation, and existing contacts and relationships. The Illinois Valley SWCD will provide technical assistance to willing landowners in the Upper Deer Creek Focus Area to install exclusion fencing and/or to plant native riparian vegetation. This approach will primarily address temperature and will also help reduce sediment.

Results of the assessments and targeted assistance are reported to the LAC at the Biennial Review and are summarized in Chapter 4.

3.5 Strategies for Area Plan Implementation

To protect or improve water quality, an effective strategy must increase awareness of the problems and the range of potential solutions, motivate appropriate voluntary action, and provide for technical and financial assistance to plan and implement effective water pollution prevention and control measures. The SWCDs and other partners will cooperate to implement the following strategies at the local level with landowners:

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

3.5.1 Education and Outreach

We believe that the vast majority of landowners want to do the things that will benefit land and water quality, as well as crop and livestock production. A great deal of effort and resources should be used to inform landowners and assist in the implementation of management strategies that improve both their land and the quality of their water.

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.

3.5.2 Inland Rogue AgWQ Plan Outreach and Education Strategies

Mass mailings - While the LAC agreed in 2001 that random mailings may help public awareness, timing and funding for random mailings has been discouraged. Instead, identified audiences will receive water quality management plan mailings. These should be focused on water quality activities, seasonal or

special circumstance notices (such as pasture management in drought or wet season manure handling), and proposed changes to the plan and rules that may affect the particular audience.

Demonstration projects/workshops - In conjunction with the Oregon State University (OSU) Cooperative Extension, local SWCDs, watershed councils and cooperating landowners, the local management agency (LMA) should coordinate a basin-wide series of demonstration projects related to improving water quality by restoring riparian health, implementing prudent irrigation water management and protecting soil productivity. Workshops intended for irrigation district patrons should include irrigation scheduling and efficiency assessments.

Tours - Visiting other agricultural operations is a valuable tool for consolidating a shared vision of how farming activities can work in conjunction with water quality protection. With the cooperation of the above groups, the LMA staff should schedule topic-specific agricultural water quality tours, as educational funds are available.

Neighborhood meetings/educational reviews – ODA's regional water quality specialist, along with the LMA staff, should organize local presentations with commodity groups, service clubs, schools, and individual landowners.

Technical and Financial Assistance
Watershed Councils and SWCDs should be primary resources for technical and financial assistance. (Appendix F)

3.5.3 Conservation Planning and Conservation Activities

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

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

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

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

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

Conservation activities should:

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

For a list of agencies and organizations to contact for more information about resource management, please refer to Appendix F.

3.5.4 Funding

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

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

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

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

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

For sources of financial assistance, see Appendix F.

3.5.5 Strategic Implementation Areas

The Oregon Department of Agriculture (ODA) developed Strategic Implementation Areas (SIAs) as a process to address water quality concerns and ensure compliance with agricultural water quality regulations in specific geographic areas. The SIA process includes compliance pre-evaluation; outreach, technical assistance, on the ground projects, and enforcement if necessary; and post-evaluation.

Once completed, SIA information is used to "tell the story" of how Agriculture is taking action to protect water quality and ensure regulatory compliance.

Wagner Creek SIA

In 2015, the Lower Wagner Creek watershed was selected as a SIA. As part of the Lower Wagner Creek watershed in Jackson County, the SIA area contains approximately 1,000 total agricultural acres. Agricultural areas in the watershed consist primarily of vineyards, orchards, and small acreage agriculture. Water quality concerns in the watershed include: temperature and nutrients.

After selection, the following steps were completed in the Lower Wagner Creek SIA:

1. *Coordination and Planning Meetings*: (August 2015 to November 2015) ODA coordinated with partners including the Jackson Soil and Water Conservation District (SWCD) and the Rogue River Watershed Council.
2. *Compliance Pre-Evaluation*: (October 2015 to November 2015)
   Agricultural parcels were evaluated using Google Earth imagery and other publically available information to assess the potential for agriculture activities to impact surface or ground water. Field verification from public viewpoints was conducted to confirm the remote evaluation.

   After evaluation, each parcel was categorized with one of the following levels of concern:
   - No Concern = No water quality concerns related to agricultural activities were observed;
   - Low Concern = Minimal potential for agricultural activities to impact surface or ground water or vegetation along streams may be inadequate but unable to determine if agricultural activities are limiting vegetation;
   - Moderate Concern = Possible potential for agricultural activities to impact surface or ground water or agricultural activities may be preventing adequate vegetation along streams;
   - Significant Concern = Likely potential for agricultural activities to impair surface or ground water or agricultural activities may be preventing adequate vegetation along streams (field verified);
   - Serious Concern = Field verified likely violation such as discharge of agricultural waste into waters of the state or active removal of riparian vegetation.
3. *Outreach and Compliance*:
   - Each property owner was sent an invitation to an ODA led Open House; (1/14/16; 254 landowner invitations were sent).
   - ODA held Open House (1/26/2016; 19 landowners attended).
   - For landowners with parcels evaluated with Moderate, Significant, or Serious Concern, ODA initiated 15 compliance cases (January 2016). 14 cases were closed with no investigation after further evaluation with landowners and partners.
4. *Compliance Post-Evaluation*:
   Concern levels are re-categorized after landowners worked with the SWCDs, ODA, or other partners to address any potential water quality issues.

Results from the Wagner Creek SIA can be found in Chapter 4.

Neil Creek SIA

In 2016, the Neil Creek watershed was selected as a SIA. As part of the Neil Creek watershed, the SIA contains approximately 1,750 total agricultural acres. Agricultural areas in the watershed consist primarily of vineyards, small acreage agriculture, hay, cannabis, and livestock. Water quality concerns in the watershed include: bacteria, temperature, dissolved oxygen, and nutrients.

After selection, the following steps were completed in the Neil Creek SIA:

1. *Coordination and Planning Meetings*: (August 2016 to November 2016) ODA coordinated with partners including the Jackson Soil and Water Conservation District (SWCD) and the Rogue River Watershed Council.
2. *Compliance Pre-Evaluation*: (October 2016 to November 2016)
3. *Outreach and Compliance*:
   - Each property owner was sent an invitation to an ODA led Open House; (January 11, 2017; 222 landowner invitations were sent).
   - ODA held Open House (January 25, 2017; 18 landowners attended).
   - For landowners with parcels evaluated with Moderate, Significant, or Serious Concern, ODA initiated 4 compliance cases (March 2017).
4. *Compliance Post-Evaluation*:
   Concern levels are re-categorized after landowners worked with the SWCDs, ODA, or other partners to address any potential water quality issues.

Results from the Neil Creek SIA can be found in Chapter 4.

3.5.6 Pesticide Stewardship Partnership (PSP)

The Oregon Department of Agriculture and DEQ use Pesticide Stewardship Partnerships to identify potential problems and improve water quality associated with pesticide use around Oregon. Established in 2000, the PSP approach uses local expertise combined with water quality sampling results to encourage voluntary changes in pesticide use and practices. These changes can lead to measurable environmental improvements, thus making water safer for aquatic life and humans. Healthier rivers and streams are essential for communities that may rely on them for drinking water or manufacturing processes, for people who swim and fish in these waters, and for myriad other uses.

Pesticide Stewarship Partnerships:

- Identify potential concerns and improve water quality affected by pesticide use around Oregon;
- Combine local expertise in water quality sampling results to encourage voluntary changes in pesticide use and management practices;
- Find ways to reduce pesticide levels while measuring improvements in water quality and crop management;
- Work toward measurable environmental improvements, making Oregon waters safer for aquatic life and humans.

The Bear Creek PSP was formed in 2012. The partnership has been collecting water samples from streams every year since. The water samples are analyzed by DEQ's laboratory for the presence and concentration of pesticides. The water sampling plans were designed to capture and distinguish between influences from forestry, agriculture, and urban contributors. The Bear Creek PSP Partners include: The Jackson SWCD, the Rogue River Watershed Council, OSU Extension Service, DEQ, ODA, ODF, local landowners and growers. The PSP partners are working with local stakeholders representing: agriculture, forestry, cities, the county, road departments, railroads, irrigation districts, and others to identify areas for improvement and best practices to avoid contamination of streams with pesticides.

Results of the Bear Creek PSP sampling can be found in Chapter 4 of this Plan and at:
http://www.oregon.gov/ODA/programs/Pesticides/Water/Pages/PesticideStewardship.aspx

3.5.7 Monitoring and Evaluation

The progress and success of implementation efforts will be assessed through determination of changes in land management systems and the measurement of water quality improvement over time. The number of private and public groups doing water quality trend monitoring will ensure the LAC's awareness of water quality trends throughout the basin. ODA plans to conduct land condition assessments and outreach evaluations but will likely leave water quality monitoring to those who are funded for that task.

ODA, with the cooperation and assistance of the Jackson, Two Rivers, and Illinois Valley SWCDs, the LAC, and DEQ, will assess the progress of Plan implementation toward achieving the Area Plan's goals and objectives. These assessments may include:

1. Identification of additional agricultural sources of sediment, nutrients, and other contributors to streams not addressed in the original plan.
2. An evaluation of the effectiveness of outreach and education programs designed to provide public awareness and understanding of water quality issues.
3. A review of projects, demonstrations, and tours used to showcase successful management practices and systems.
4. An evaluation of the effectiveness of the sources for technical and financial assistance that is available to the agricultural community.
5. Review of load allocations as found in Rogue Basin TMDLs and the effectiveness of this Plan in meeting agricultural load allocations.

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

Chapter 4: Implementation, Monitoring, and Adaptive Management

4.1 Progress Toward Measurable Objectives

4.1.1 Focus Areas: *Progress Toward Measurable Objectives*

Jackson SWCD – Little Butte Focus Area – Results 2013-2017

Progress Measurement: Focus Area Progress
Jackson SWCD: Little Butte Creek – Workshops/presentations: 4 (with 35 attendees), Tours: 2 (19 attendees), Landowners provided with technical assistance:19, Landowners contacted: 4, Site Visits: 37, Conservation Plans Approved: 1 (94 acres)

Table 14. Water Quality Monitoring Studies of flood to sprinkler conversion in the Little Butte Watershed: Pre and Post Assessment Results

	Temp. Increase	Turbidity	*E.coli*
2013-2014 Pre-Project Monitoring, Landowner A1	7.6ºC	2.1 NTU	4044.5MPN/100mL
2013-2014 Post-Project Monitoring, Landowner A1	0*	0*	0*
2014-2015 Pre-Project Monitoring, Landowner A2	4.2 ºC	10.8 NTU	3769.8 MPN/100mL
2015-2016 Post- Project Monitoring, Landowner A2	N/A, no project implemented		
2015-2016 Pre- Project Monitoring, Landowner B1	1.8 ºC	3.6 NTU	2027 MPN/100mL
2016-2017 Post-Project Monitoring, Landowner B1	Project plans to be implemented in 2018		

*Project essentially eliminated all tailwater at weir.

Table 15. Pre and Post Assessment of acreage using Flood Irrigation, Sprinkler Irrigation, or Modified Flood Irrigation

Year	Acres – Flood to Sprinkler		Acres – Flood to Improved Flood	
	Anticipated	Actual	Anticipated	Actual
2013 - 2014	72	72		
2014 – 2015	40-75	0		
2015 - 2016	150-200	0	0-100	0
2016 - 2017	100-150	0	100-200	0
2017 - 2018	90-120		10-50	
2018 - 2019	100-400		10-50	
2019 - 2020	100-200		10-50	
2020 - 2021	0-50		150-200	
2021 - 2022	0-50		100-150	
Total	**652-1317**		**380-800**	

Table 16. Streamside Vegetation Assessment of Antelope Creek Subwatershed
Streamside Vegetation Assessment (SVA) Results – In Acres

SVA Map Category (Alphabetical)	Initial Pre-Assessment (2015)	Updated Pre-Assessment Results (2017)	Post-Assessment (or Interim-Assessment) Results (2017)	Change Notes
Ag Infrastructure	4.9	4.9		0
Bare	6.9	6.9		0
Bare Ag	34.6	34.6		0
Grass	51.1	51.1		0
Grass Ag	80.2	80.2		0
Not Ag	371.3	371.3		0
Shrub	20.0	20.0		0
Shrub Ag	0.0	0.0		0
Tree	171.2	171.2		0
Tree Ag	0.0	0.0		0
Water	32.2	32.2		0
TOTAL ACRES	**771.4**	**771.4**		**No riparian projects implemented this biennium; therefore, 2017 = 2015**

The Jackson SWCD has significant projects lined up for the next biennium. The milestones were not met for this biennium, but willing landowners, projects, and funding are staged and ready for the next biennium.

Two Rivers SWCD – Williams Creek Watershed Focus Area – Results 2015-2017

Progress Measurement: Focus Area Progress
Two Rivers SWCD: Williams Creek – Landowner Engagement: 126, Landowners Contacted: 13, Technical Assistance: 7 landowners. Completion of aquatic weed treatment and management grant for local non-profit organization. Exclusion fencing projects for two landowners - in progress.

Outreach Events:
'Get to Know Us -1' - Outreach held September 2015 in Williams. Two staff members at local market; provided information packets, handed out Inland-Rogue AgWQMAP, answered questions and made contacts for site work. Contacts: 12 direct, one enrollment into FAAP program

'Get to Know Us - 2' - Outreach held September 2016 in Williams at local Brushriders Arena. One staff member handed out materials, Inland-Rogue AgWQMAP, answered questions and made contacts which resulted in attendees at district's mud, manure and safety classes. Contacts: 20 direct, 200 indirect. Contacts resulted in landowners opening their home for management classes to take place two months later. Copies of the Inland Rogue Ag WQ MAP distributed: 6.

Healthy Soil, Pasture Management - Held March 2016 - June 2016. 12 weeks long, six progressive water quality based classes covering soil and pasture management. District provided shipping soil samples to local laboratory.

One instructor, attendees: 23 (29 registered) Inland Rogue Ag WQMAP copies given: 23. Other water quality materials were offered with each class for pasture management tips. Speaker handed out

collegiate level instructional and informational materials at the start of each class - these ranged from 25 - 40 pgs in length.

Horse Program - Two classes - Water Quality based instruction for horse owners; managing mud, manure, safety. Interest in an outreach 'Firewise for Horse Owners' prompted these classes. One instructor. Attendees: 36. Inland Rogue Ag WQMAP copies given: 11.

Cannabis Classes - Two-day Grower Classes: Held Feb 2015- 6 speakers, 5 topics for ag soil, water resource use, management and protection. Attendees: 22. Inland Rogue Ag WQMAP copies given: 22.

Table 17. Streamside Vegetation Assessment (SVA) Results – In Acres (East Fork Williams Creek)

SVA Map Category (Alphabetical)	"Office" * Initial Pre-Assessment (2015)	"SitePre" * Updated Pre-Assessment Results (2017)	"SitePost" * Post-Assessment (or Interim-Assessment) Results (2017)	Change Notes
Ag Infrastructure	1.03			0
Bare	2.16			0
Bare Ag	4.47			0
Grass	11.25			0
Grass Ag	24.67			0
Not Ag	487.03			0
Shrub	7.59			0
Shrub Ag	.10			0
Tree	87.33			0
Tree Ag	.06			0
Water	5.96			0
TOTAL ACRES	**631.65**			

By June 30, 2017: East Fork Williams Creek Watershed : Increase [Tree + Shrub] = 106.22 acres
No riparian projects implemented this biennium; therefore 2017 = 2015.

The Focus Area Milestone was not met, primarily due to staff turnover at the Two Rivers SWCD and lack of participation from landowners in the Focus Area. Progress is expected in the next biennium.

Illinois Valley SWCD – Upper Deer Creek Focus Area – Results

Progress Measurement: Focus Area Progress
Illinois Valley SWCD: Upper Deer Creek – Landowners contacted: 180, Newsletters: 5 (609 distributed), Tours: 2, Landowner Techincal Assistance: 19, Site Visits: 9, Grant applications submitted: 2, Projects Implemented: Riparian Fencing: 1 project (561 feet), Riparian Planting: 5 projects (1 acre plus 0.6 stream miles).

Assessment Method: Stream temperature was evaluated using riparian vegetation condition as a surrogate. Aerial photos and field verification were used to evaluate riparian vegetation condition and to determine if the vegetation is adequate to provide the functions as identified in the Area Plan and Rules. The following classification system was be used to assess conditions in the Focus Area:

Table 18: Riparian Condition Classifications

Class Ø	*Class I*	*Class II*	*Class III*	*Class X*
Non-agricultural activities, e.g. forest practices, likely not allowing vegetation to moderate solar heating, stabilize stream banks, or filter out pollutants consistent with site capability. Or, GIS-identified hydrologic feature is inadequately identified.	*Vegetation likely sufficient to moderate solar heating, stabilize stream banks, and filter out pollutants consistent with site capability.*	*Agricultural activities not impairing riparian growth, but vegetation likely insufficient to moderate solar heating, stabilize stream banks, or filter out pollutants consistent with site capability.*	*Agricultural activities likely not allowing vegetation to moderate solar heating, stabilize stream banks, or filter out pollutants consistent with site capability.*	*(Applied only to properties assessed on the ground) Agricultural activities not impairing riparian growth, but channel conditions prevent appropriate vegetation from being established (e.g., eroding banks make planting unfeasible without bank restoration)*

Conditions

Riparian vegetation in riparian parcels thorughout the Upper Deer Creek Watershed were assessed in 50' by 50' sections. Sections were classified as classes I, II, III, and Ø and X**.**

Table 19. Riparian Area Condition within Focus Area

	2009*	2013	2015	2017
Class I	40.80%	57.45%	57.075%	
Class II	44.98%	35.775%	37.275%	
Class III	14.22%	6.80%	5.65%	
Class Ø	129 segments	317 segments	317 segments	
Class x	n/a	n/a	n/a	
*Assessment of 2009 Orthoimagery utilized 100' x 100' areas; Later assessments cover 50' x 50' areas				

From 2013 to 2015, we documented the following changes:

- *Percent of streams in Class I increased by .0375 percent*
- *Percent of streams in Class II increased by 1.5 percent*
- *Percent of streams in Class III decreased by 1.5 percent*

Table 20. Focus Area Milestone for 2015-2017

2015 Conditions (From Pre-Assessment)

In 2015: Riparian parcels include 24.5 acres (5.3% of 463 acres) in riparian Class III.

Focus Area Milestone for 2015-2017

- By June 30, 2017: Reduce the percentage of riparian parcels in riparian Class III by 25% (6 acres reduction)

The Focus Area Milestone was not met, primarily due to staff turnover at the Illinois Valley SWCD and lack of participation from landowners in the Focus Area. Progress is expected in the next biennium.

4.2 Implementation and Accomplishments

Many conservation activities and implementation monitoring tracks have been implemented to benefit water quality. The SWCD and NRCS track activities that have been implemented through quarterly reports to ODA and through a NRCS database, respectively. Projects that have received funding from the OWEB are tracked in OWEB's restoration database. In addition, partner agencies can submit reports of projects and activities in the Management Area that improve water quality.

Implementation Summary (October 2015 – October 2017)

AgWQ Outreach and Education:
Illinois Valley SWCD: Landowners Contacted: 12, Presentations/Workshops: 5 (315 participants), Tours/Demonstrations: 1 (2 attendees), Displays/Info Booths: 2 (310 visitors), Fact Sheets/Brochures Developed: 1, Fact Sheets/Brochures Distributed: 183, Newsletters: 5 (250 distributed), Newspaper Articles: 11

Two Rivers SWCD:
Landowner contact - Office visitors and phone assistance: Total for the biennium of office visits: 80. 5 copies of the Inland Rogue AgWQMAP were given out to visitors. Other: Horse owner Packets distributed through local feed store: 20. These have an Inland Rogue AgWQMAP plus other. WQ information of interest for horse owners - pasture management, waste management, etc.

Josephine County Fair: Held Aug 2015 - manned booth. Four days, two staff, four directors. Met with local constituents, handed out soil books, made contact with both FAAP and LMA residents. Contacts: 400+. Inland Rogue AgWQMAP copies distributed: 110.

Agricultural Chemical Collection Event: (protecting in-ground and surface waters) Assisted with setting up a collection day in Grants Pass. Participants could discard unusable or unneeded herbicide and pesticide anonymously and without charge. Held March 2016 with number of participants 100+. Inland Rogue AgWQMAP *copies distributed: 7*.

Cannabis: One day Event: Held Feb 2016 - 23 speakers, 21 agricultural and resource sound vendors, 475 registered attendees. Inland Rogue AgWQMAP copies dsitributed: 475+. Total visitors 600+.

Horse/Small Acreage Program:
Firewise Program: 45 total participants of two district developed FW communities gathered for a single meeting. A short presentation was given regarding Ag water quality. Of this one group of 28 requested more information/education regarding Ag WQ and invited the district to events being held at the Brushrider Arena in Williams (FAAP). Copies of the Inland Rogue AgWQMAP were given out to landowners at this meeting: 15.

Held October 2016: Four classes covering basic winter and spring pasture, mud and manure management classes for commercial operations (horse facilities), small acreage and horse owners of all ages. One staff and One instructor, 21 attendees. Various materials for management tips and practices plus the Inland Rogue Ag WQMAP copies were given to each participant.

Jackson SWCD: held and/or presented at 42 workshops with a total of 1,737 participants. We also held 5 tours with 121 participants. The District had booths or displays at 13 events with an estimated 480 visitors. We also developed 66 fact sheets or brochures that were distributed to approximately 740 people. Finally, the District and its staff were featured in 5 newspaper articles.

Rogue River Watershed Council: Although water quality has not been the focus of our outreach efforts, we highlight various aspects of our water-quality related word in our ongoing social media posts and quarterly

newsletters. Education efforts that focused on water quality included one day of Salmon Watch in 2015, one day in 2016, and one day in 2017. Approximately 80 children were reached in each of these events.

AgWQ Technical assistance & Planning:
Illinois Valley SWCD: Landowners Provided with technical assistance: 64, On-site visits: 10, Fund applications submitted: 3

Two Rivers SWCD: Landowners provided technical assistance: 86, Site Visits: 18

Jackson SWCD: Provided 431 landowners with direct technical assistance and 313 landowners with on-site visits evaluations.

Rogue River Watershed Council: Partnering with Medford Water Commission to develop Water Qualtiy Improvement Plan for Little Butte Creek, Partnering with TFT to facilitate the Rogue Basin Partnership Agricultural Working Group, Water rights research on Birdseye Creek, and conversion of irrigation water right on Salt Creek to protected instream flow right (research, water right valuation, contract development, and OWRD instream flow transfer application development with Trout Unlimited).

The Freshwater Trust: This has been the focus of The Freshwater Trust's new work in the biennium. With the support of a fall 2014 OWEB TA TFT released the REST (Riparian Extent and Status Tool) to the public and partners in 2016. REST is a webmap whose primary objective is prioritizing best bang-for-buck riparian restoration projects in the Inland Rogue that also align with planning objectives.
http://freshwatertrust.maps.arcgis.com/apps/webappviewer/index.html?id=8fe03d5fa9964a12a2aa52e6352cd753

In 2017 TFT procured support from the Drinking Water Providers Partnership to model and map sites that are most vulnerable to erosion and sediment loading in the Little Butte system. The SLAM (Sediment Loading Analysis and Measurement) tool is on track for a 2018 release. Similar to REST the tool incorporates the latest GIS modelling techniques with guidance from a local expert advisory group.

Projects implemented to improve water quality on agricultural lands:
Illinois Valley SWCD: 0.4 acres riparian planting

Two Rivers SWCD: Two Irrigation Projects - projects were funded by OWEB small grant program.
1) *Efficiency and Management* - WQ practices: proper water use and eliminated runoff and sediment. Landowner installed irrigation mainline allowing him to reduce the amount of water used on a hayfield and eliminate runoff. As part of the match, the City of Grants Pass donated a flow meter to the project.
2) *Conveyance* - WQ practices: eliminate water loss and introduction of sediment into water, cooled water temperature. 900 feet of corrugated pipe was installed in an earthen ditch allowing water to be carried along the length of the ditch. The loss of water from the ditch previously resulted in artificial wetland development, loss of water to other users, warmed water and conveyance for sediment. A headgate was installed to allow for continued access to the water right. Recent monitoring revealed excellent results - artificial wetland was gone, water temperature dramatically reduced, no addition of sediment along the 900 ft pipe and no water loss. The success of this particular project has led to two more landowner installations of conveyance pipe immediately past this project, with other landowners preparing to continue this kind of project in the upcoming year.

Installation of manure storage for one landowner in northern part of the district - WIP.
Riparian planting planning with rancher on the Rogue River to protect historically grazed pastures from further erosion - WIP.

Jackson SWCD: Thirteen Ag. Water Quality projects were implemented on 94.5 acres acres (does not include SIA or Focus Area). Additionally, 14 conservation plans have been completed totaling 173 acres.

Rogue River Watershed Council: 1 riparian project completed (Bitterlick Creek [2 acres]), 2 riparian restoration projects in implementation (Wagner Creek SIA [12 acres] and Sugarpine Creek [4 acres]), and 1 upland project in planning (manure facility, irrigation conversion, buffer strip, and drainage problems in the Neil Creek SIA).

The Freshwater Trust:
Bear Creek: Neil RM 2.0: At a working active ranch on the outskirts of Ashland, 14 acres of riparian restoration, about 50 large wood placements for instream juvenile salmonid habitat, and 2 miles of livestock fencing and off-channel watering were installed in 2015-16.

South Fork Little Butte Creek: Four large wood projects between RM 1.0 and RM 4.0 were installed on working agricultural land during the instream window of 2015. Together these four projects included over 100 large wood placements for instream habitat improvement and bank stabilization, eight acres of riparian restoration and a quarter mile of livestock exclusion fencing with a crossing and watering system.

All these projects will provide some combination of sediment, nutirent, bacteria or temperature loading mitigation on streams.

Monitoring:
Jackson SWCD: The District monitored 6 sites for pesticides on 4 different streams (sights changed throughout the two years of monitoring), from early spring to early fall. Additionally monitoring for turbidity levels, E.coli, temperature and flow rate was completed on 1 site for a flood to sprinkler irrigation conversion to measure the amount of pollution no longer contributed to the watershed.

Rogue River Watershed Council:

- Partnered with Jackson SWCD to develop water quality monitoring program for Antelope Creek in the Little Butte Creek Focus Area.
- Bear Creek Temperature Monitoring: Deployed 12 temperature loggers in Bear Creek in 2015 and 5 temperature loggers on Wagner Creek in 2016, and 10 loggers in various tributaries as part of a Bear Creek study in partnership with RVCOG and TFT.
- ODA-Wagner Creek Temperature Monitoring: Deployed 3 temperature loggers in Wagner Creek
- Established photopoints at 8 properties associated with Wagner Creek SIA riparian restoration
- Snorkel monitoring to track juvenile salmonids in Wagner Creek (2016 and 2017).
- Manage WISE Pre-Project Effectiveness Monitoring project in partnership with RVCOG, Jackson SWCD, and Jackson Watermaster's Office. Monitoring includes 4 data sondes (2 in Bear Creek, 2 in Little Butte Creek) that collect temperature, DO, pH, specific conductivity, and turbidity readings every 15 min. Montoring expanded to include chlorophyll-a in summer 2017. Continuous monitoring is supplimented with nutrient and bacteria grab samples. Visual algae surveys were conducted in 2016.

The Freshwater Trust: Vegetation at Neil RM 2.0 is monitored and reported on to track progress toward a "free-to-grow" standard. Free-to-grow was developed in partnership with Bureau of Reclamation staff as part of meeting the riparain zone restoration action prescribed in the 2012 Rogue Biological Opinion for SONCC Coho Salmon.

In addition to the vegetation monitoring at Neil RM 2.0 all these sites are monitored only for large wood durability and habitat benefits. No monitoring on water quality. Potential benefits of exclusion actions and revegetation actions at all sites are modelled using the Nutrient Tracking Tool (NTT) for sediment and phosphorous, and Shade-a-lator for temperature.

Funding and Grants:
Illinois Valley SWCD: ODA: $145,348.00, OWEB: $7,558, NRCS Emergency Watershed Protection: $289,181.00

Two Rivers SWCD: ODA/OWEB support to LAC: $100,000 to the District to accomplish the annual Scope of Work, plus $41,860 in Admin funding. Project Funding: Two Irrigation Efficiency Grants (see above). Two Riparian Weed (Perennial Pepperweed) Grants. OWEB and ODA supported two singular grants for the treatment of Perennial Pepperweed found during a restoration project conducted by Freshwater Trust. This isolated stand of pepperweed was the first known site in Josephine County and second known site in Southern Oregon, triggering rapid response resulting in successful survey, planning, repeated treatment, and mapping. 2017 DEQ 319 grant: Support was provided to local lab seeing trends in WQ. Assisted with proposal for data entry and mapping project by local soil and water testing lab.

Jackson SWCD: The District received 14 funding applications to complete planned projects, totaling $79,861 of District Funds and leveraging $98,000.00 from other funding agencies. We were also able to utilize USDA NRCS funds for on-ground landowner projects through the CIS program.

Rogue River Watershed Council:

- OWEB Capacity Grants – $118,425
- Medford Water Commission Contracts (Water quality improvement planning in Little Butte Creek and project development) – $50,000
- ODA/OWEB SIA Grants (Neil Creek SIA) – $96,371
- OWEB Techncial Assistance Grant (Landowner Outreach) – $34,676
- OWEB Monitoring Grant (2 grants for WISE Pre-Project Effectiveness Monitoring) – $67,222 + $41,497
- OWEB Sugarpine Creek (riparian planting component) - $15,000
- ODEQ Monitoring Grant (2 grants for WISE Pre-Project Effectiveness Monitoring) – $13,307 + $37,899
- ODA Long-Term Stream Temperature Monitoring Grant (Wagner Creek) – $2,744
- Jackson SWCD District Funds Grants (Wagner Creek SIA) - $15,000
- Private Foundation Grants (Wagner Creek SIA) - $8,000
- Partner Contributions (WISE Monitoring) - $5,000
- Rogue Basin Partnership (monitoring and agricultural working groups) - $6,000
- Trout Unlimited contracts (Flow restoration) - $18,000

The Freshwater Trust: Received the DWPP grant in 2017 to fund development of the SLAM tool (described in technical assistance and planning).

In 2017 TFT was ranked to receive an OWEB restoration grant to stabilize an agricultural landowners bank (on Little Butte Creek mainstem) with large wood habitat. This will be partnered with livestock exclusion and revegetation. If approved by OWEB board in October 2017 this will be a Summer 2018 project.

In 2016-17 received Title II / BLM funding to improve habitat and explore alternatives for irrigation water withdrawal from a Waters Creek landowner (tributary to Slate Creek near Wonder, OR). Landowner is currently using a fish barrier for damming and withdrawing irrigation water. Due for 2018 implementation.

4.3 Strategic Implementation Areas

Pre and Post Compliance Evaluation Results:
Wagner Creek SIA

Total Parcels in Assessment Area = 1,104
- 815 (N/A) (Federal Land, Not Ag, etc.)
289 Parcels Evaluated

Evaluation Categories		*Pre-evaluation*	*Post-evaluation*
No Concern	=	234 parcels	244 parcels
Low Concern	=	40 parcels	43 parcels
Moderate Concern	=	12 parcels	2 parcels *
Significant Concern	=	3 parcels	0 parcels
Serious Concern	=	0 parcels	0 parcels
Total	=	289 Parcels	289 Parcels

As part of the SIA process, properties initially identified as Moderate and Significant Concern were re-classified as No or Low Concern following conservation or restoration activities. Properties categorized as No or Low Concern are considered in compliance or likely in compliance with Agricultural Water Quality Rules.

The Jackson SWCD applied for and received a restoration grant in the amount of $198,517 to implement water quality improvement projects within the Lower Wagner Creek watershed.

* Unable to locate and contact landowners.

Neil Creek SIA

Total Parcels in Assessment Area = 1,134
837 (N/A) (Federal Land, Not Ag, Less than 1 Acre, etc.)
297 Parcels Evaluated

Evaluation Categories		*Pre-evaluation*	*Post-evaluation as of 9.13.17*
No Concern	=	274 parcels	276 parcels
Low Concern	=	19 parcels	19 parcels
Moderate Concern	=	3 parcels	1 parcels
Significant Concern	=	1 parcels	1 parcels
Serious Concern	=	0 parcels	0 parcels
Total	=	297 Parcels	297 Parcels

As part of the SIA process, properties initially identified as Moderate and Significant Concern were re-classified as No or Low Concern following conservation or restoration activities. Properties categorized as No or Low Concern are considered in compliance or likely in compliance with Agricultural Water Quality Rules.

The Jackson SWCD applied for and received a restoration grant in the amount of $96,317 to implement water quality improvement projects within the Neil Creek watershed.

4.4 Monitoring—Status and Trends

4.4.1 Water Quality

4.4.1.1 Jackson SWCD – Little Butte Creek Focus Area Water Monitoring

The following summary was taken from the Jackson SWCD report: "Flood Irrigation Tailwater in Jackson County: Summary of Case Studies 2009-2016". The full report is available from the Jackson SWCD.

The purpose of the tailwater monitoring effort by Jackson Soil and Water Conservation District (JSWCD) was to establish a baseline of pollutant concentrations (*E. coli*, temperature and turbidity) that flood irrigation water picks up as it moves across cattle pastures or hay fields. The summary includes monitoring done on 5 separate irrigation efficiency projects before best management practice (BMP) implementation. Post completion monitoring was not necessary because tailwater was at trace levels or non-existent as a result of the BMP implementation and the pollutants were therefore removed from the impacted waterways. BMP's implemented were conversion from flood irrigation to pressurized sprinkler irrigation and irrigation water management.

Tailwater is the water that runs off the end of a flood-irrigated field during irrigation and is typically of lower quality (more polluted) at the end of the field than at the beginning of the field. This low-quality water can enter waterways and contribute to the poor water quality in many creeks and rivers in Jackson County; especially Little Butte Creek. In most areas in Jackson County, tailwater is not captured or reused in the initial field but instead flows off into the next downstream waterway where it can ultimately affect natural drainages. Eliminating or reducing tailwater from irrigated fields is a tool that is widely used across the nation as a way to improve water quality in the associated waterbody.

Results from 5 studies we conducted from 2009-2016 show that flood irrigation tailwater is higher in temperature and contains higher concentration of bacteria compared with the irrigation source (point of diversion). *E. coli* bacteria, in all tailwater, was above the DEQ standard of 406 MPN/100ml. Tailwater temperature increased 5-13°F above the DEQ standard (60.8 °F) in all cases. Turbidity levels were higher in the tailwater than at the point of diversion in 3 cases, but in 2 cases, turbidity levels were reduced in the irrigation water during flood irrigation. Tailwater flow rate in all cases peaked at over 50% of the diversion flow rate onto the field which means that at a time during irrigation, over 50% of the irrigation water applied to field was lost off the end of the field.

Based on the monitoring JSWCD has accomplished since 2009, we can see how the BMPs applied to individual fields effect water quality. The next step is to determine how reducing or eliminating the known pollutants in tailwater is impacting associated waterways.

JSWCD is currently working with Rogue River Watershed Council (RRWC) on monitoring efforts to include entire watersheds such as Antelope Creek. Our monitoring efforts in Antelope Creek will look at the same parameters as above but will last 3 to 5 years, starting with the 2017 irrigation season. We will focus on instream water quality related to irrigation modernization BMP projects such as the Rogue River Valley Irrigation District (RRVID) Bradshaw Drop Project where hundreds of acres are scheduled to convert from flood irrigation to pressurized irrigation by year 2020.

4.4.1.2 Middle Rogue Pesticide Stewardship Partnership (PSP) Results

The following table displays the detection frequencies for analyzed pesticides in the Middle Rogue PSP from the beginning of the project, 2012, through 2016. Streams were sampled by local partners including staff from the Jackson SWCD, Rogue River Watershed Council, DEQ, and ODA. Water samples were collected, submitted to, and analyzed by the DEQ laboratory in Portland.

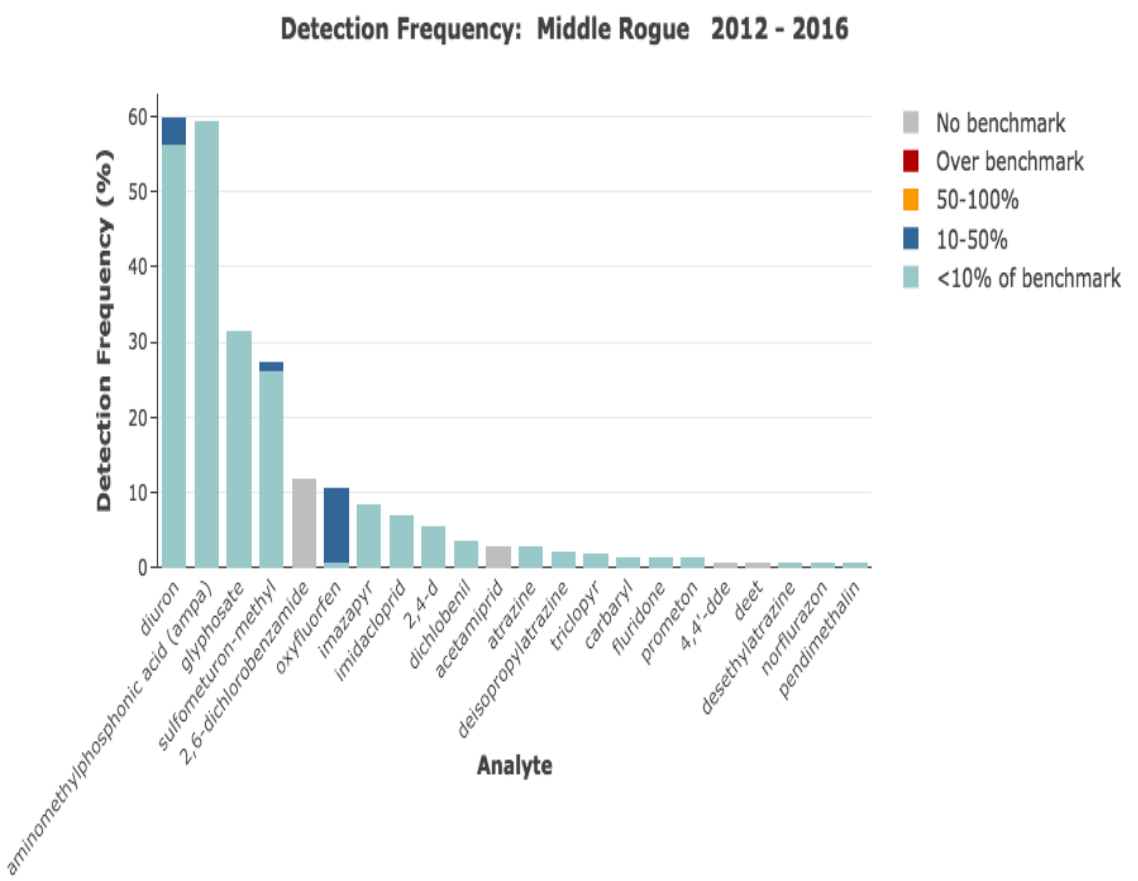
Streams sampled: Griffin Creek, Jackson Creek, Wagner Creek, Payne Creek, Larson Creek, and Coleman Creek.

Two pesticide waste collection events have also taken place in the Inland Rogue area since 2012. The first event took place in Medford in 2015 collected 10,585 pounds of waste pesticides from 25 participants. The collection event in Grants Pass in March 2016 collected 10,929 pounds of waste pesticides from 12 participants.

Outreach to agricultural operations, especially vineyards and orchards, has been conducted by OSU Extension entomologist, Rick Hilton. The Jackson SWCD and Rogue River Watershed Council have also conducted outreach to spread awareness of the studies and resulting information from the Middle Rogue PSP.

Monitoring, Outreach, and Implementation for the Middle Rogue PSP will continue in upcoming years.

Table 21:



4.3.1.3 Water Quality Data - DEQ analysis

The information in this section was taken from the document "Inland Rogue Subbasin: DEQ's Water Quality Status and Trends Analysis for the Oregon Department of Agriculture's Biennial Review of the Agricultural Area Rules and Plans" (July 2017). The document was compiled by DEQ to assist with the Biennial Review process and can be accessed at:
https://deq15.deq.state.or.us/sc/WQWebReporting/InlandRogueV6.html

Purpose
Present data and analysis that will help DEQ fulfill its roles in the biennial review process described in the Memorandum of Agreement between ODA and DEQ. This report presents an analysis of water quality data readily accessible from public databases and available in sufficient quantity to indicate status and trends. DEQ will use available water quality data to answer the following questions:

- What is the status of water quality parameters downstream of agricultural land?
- What is the trend in water quality at key locations downstream of agricultural land?
- Are sites downstream of agricultural land meeting TMDL agricultural load allocations?

Data Sources
Analysts retrieved data from DEQ, EPA and USGS databases. The time period for the query was from 2000-01-01 to 2017-06-01. Parameters included in the query were temperature, pH, dissolved oxygen, total suspended solids, total phosphorus, and bacteria.

Analysis
The data returned were evaluated for data quality. DEQ data included A, B, C data determined following the DEQ's Laboratory Quality Manual. EPA and USGS data were included unless result comments indicated problems with the data. Recent data (after June 2014) from the USGS was marked as provisional data and included in this analysis. Data was evaluated against the applicable Oregon water quality criterion.

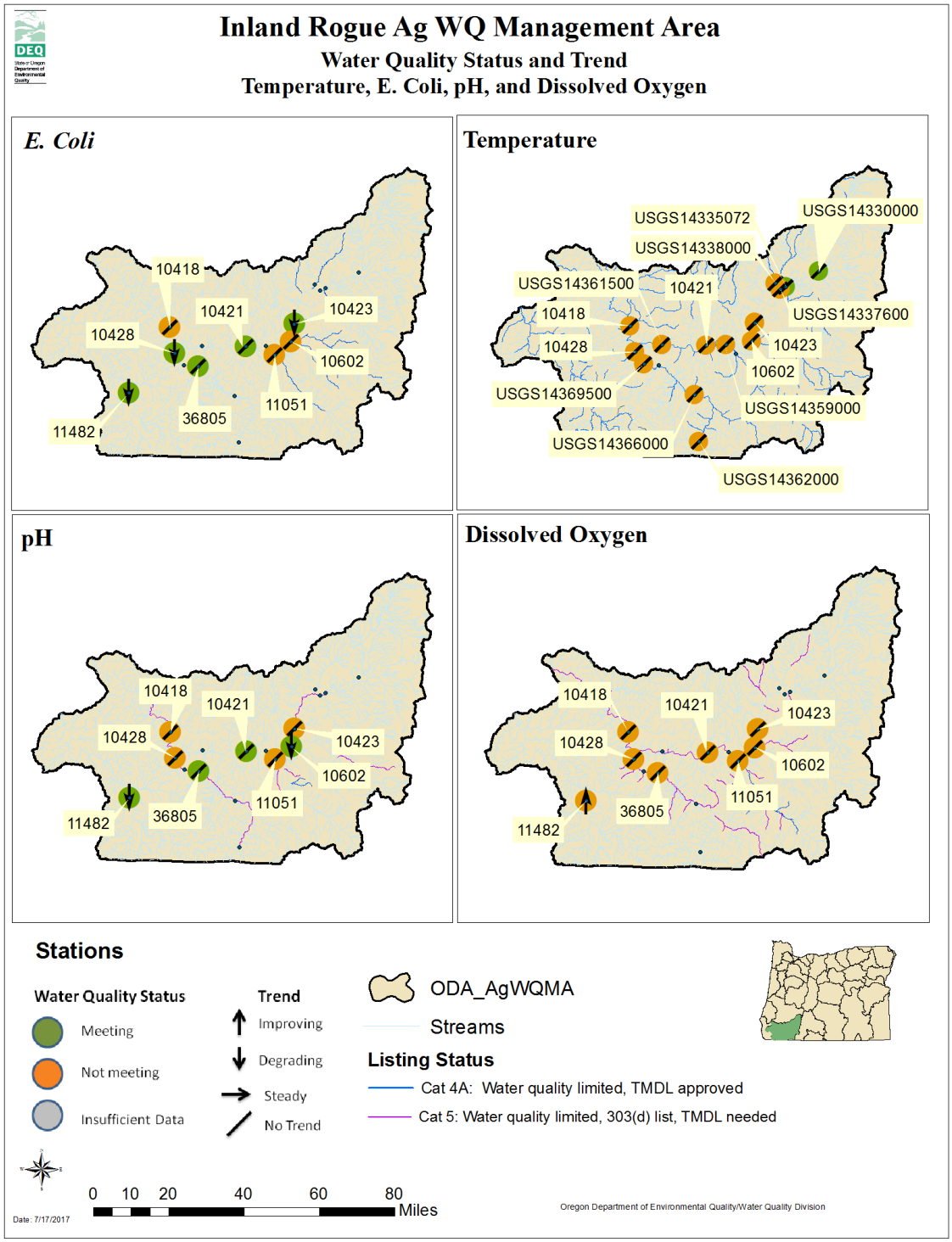
Land Use Filter for Agricultural Lands
Data from water quality monitoring stations that have >20% Agriculture and Range land use coverage in the upstream watershed were used in the analysis and report. (Source: 2011 NAIP)

Table 22. Summary of Monitoring Stations Status and Trend, where 'exceed' represents one or more exceedances of the water quality standard within the last two years of available data. Note: DO = dissolved oxygen; 'NULL' means that the station did not fit the criteria to assess status and/or trends for given station.

Station ID	Station Description	Bacteria Status	Bacteria Trend	Temp Status	Temp Trend	pH Status	pH Trend	DO Status	DO Trend
10418	Rogue River at Robertson Bridge (Merlin)	Exceeds	No Sig Trend	Exceeds	NULL	Exceeds	No Sig Trend	Exceeds	No Sig Trend
10421	Rogue River at Hwy 234 (north of Gold Hill)	Meets	No Sig Trend	Exceeds	NULL	Meets	No Sig Trend	Exceeds	No Sig Trend
10423	Rogue River at Hwy 234 (Dodge Park)	Meets	Degrading	Exceeds	NULL	Exceeds	No Sig Trend	Exceeds	No Sig Trend
10428	Applegate River at Hwy 199 (near Wilderville)	Meets	No Sig Trend	Exceeds	NULL	Exceeds	No Sig Trend	Exceeds	No Sig Trend
10602	Little Butte Creek at Agate Road (White City)	Exceeds	No Sig Trend	Exceeds	NULL	Meets	Degrading	Exceeds	No Sig Trend
11051	Bear Creek at Kirtland Road (Central Point)	Exceeds	No Sig Trend	NULL	NULL	Exceeds	No Sig Trend	Exceeds	No Sig Trend
11482	Illinois River downstream of Kerby	Meets	Degrading	NULL	NULL	Meets	Degrading	Exceeds	Improving
36805	Applegate River at Murphy, OR	Meets	NULL	NULL	NULL	Meets	NULL	Exceeds	NULL
USGS-14330000	ROGUE RIVER BELOW PROSPECT, OR	NULL	NULL	Meets	NULL	NULL	NULL	NULL	NULL
USGS-14335072	ROGUE R AT COLE M RIVERS F HATCHERY NR MCLEOD, OR	NULL	NULL	Meets	NULL	NULL	NULL	NULL	NULL
USGS-14337600	ROGUE RIVER NEAR MCLEOD, OR	NULL	NULL	Exceeds	NULL	NULL	NULL	NULL	NULL
USGS-14338000	ELK CREEK NEAR TRAIL, OR	NULL	NULL	Exceeds	NULL	NULL	NULL	NULL	NULL
USGS-14339000	ROGUE RIVER AT DODGE BRIDGE, NEAR EAGLE POINT, OR	NULL	NULL	Exceeds	NULL	NULL	NULL	NULL	NULL
USGS-14359000	ROGUE RIVER AT RAYGOLD NEAR	NULL	NULL	Exceeds	NULL	NULL	NULL	NULL	NULL

Station ID	Station Description	Bacteria Status	Bacteria Trend	Temp Status	Temp Trend	pH Status	pH Trend	DO Status	DO Trend
	CENTRAL POINT, OR								
USGS-14361500	ROGUE RIVER AT GRANTS PASS, OR	NULL	NULL	Exceeds	NULL	NULL	NULL	NULL	NULL
USGS-14362000	APPLEGATE RIVER NEAR COPPER, OR	NULL	NULL	Exceeds	NULL	NULL	NULL	NULL	NULL
USGS-14366000	APPLEGATE RIVER NEAR APPLEGATE, OR	NULL	NULL	Exceeds	NULL	NULL	NULL	NULL	NULL
USGS-14369500	APPLEGATE RIVER NEAR WILDERVILLE, OR	NULL	NULL	Exceeds	NULL	NULL	NULL	NULL	NULL

Figure 3. Summary of stations that fit the criteria for status and trend analysis. One or more exceedances of the applicable criterion within the last two years of available data defined whether a station was 'Meeting' or 'Not Meeting'. Trend was determined by statistically significant trends associated with long-term datasets.



Conclusions

What are the overall trends?
Temperature: There are fourteen monitoring stations that contain sufficient data to calculate the seven-day average daily maximum and therefore assess status and trends of temperature in the Inland Rogue Subbasin. Two monitoring stations (USGS 14330000 and USGS 14335072) meet the applicable criterion for temperature when looking at the last two years of available data.

pH: Eight monitoring stations contain sufficient data to assess status and/or trends of pH in the Inland Rogue Subbasin. Four monitoring stations (11482, 10602, 36805, 10421) are in compliance with the applicable criterion for pH within the last two years (2014-2017) and two monitoring stations have significant degrading trends (11482, 1602)

E. coli: Eight monitoring stations contain sufficient data to assess status and/or trends of *E. coli* in the Inland Rogue Subbasin, five of them in compliance with the applicable criterion for bacteria within the last two years of available data (2014-2017). Three monitoring stations have significant degrading trends (11482, 10418, 10423).

Dissolved Oxygen: Eight monitoring stations contain sufficient data to assess status and/or trends of dissolved oxygen within the Inland Rogue Subbasin. None of the monitoring stations are in compliance with the applicable criterion for dissolved oxygen within the last two years of available data (2014-2017). One monitoring station (11482) has a significant improving trend.

Is the monitoring data adequate to tell if progress is being made to meet WQ standards and TMDL load allocations?
Monitoring stations 11051, 10602, and 10421 have the greatest percentage of agricultural coverage within their upstream catchment. Station 11051, with the greatest agricultural land use, is not in compliance of the water quality standard within the last two years of available data for *E. coli*, pH, and dissolved oxygen. The status of monitoring station 10602 is not in compliance of the water quality standard for *E. coli,* dissolved oxygen, and temperature. It is in compliance with pH and has a significant degrading trend. Station 10421 meets the water quality standard within the last two years for *E. coli* and pH but is not in compliance for temperature and dissolved oxygen.

All monitoring stations with sufficient data to assess status and/or trends of dissolved oxygen had consistent exceedances of the water quality standard throughout the analyzed timeframe (2000-2017). State of Oregon Department of Environmental Quality.

Additional data is needed to evaluate streamside vegetation on the agricultural land, which would require remote sensing data to determine tree heights and calculate effective shade.

4.3.2 Land Conditions

4.3.2.1 Aerial Photo Monitoring of Streamside Vegetation

This summary presents the results of the ODA riparian condition monitoring. These basins were originally assessed in 2006, and this report documents changes in riparian condition seen in aerial photographs taken in 2011.

Use of remotely-sensed imagery allows us to assess the condition of large areas without requiring as much labor as with a ground-based effort. In addition, using GIS-compatible imagery allows for direct comparison of the same locations to identify long-term trends.

Aerial photographs were taken in late May 2011. Ground truthing was done in mid-May and early June 2011. Weather conditions made it difficult to do ground truthing at the same time as the photography, because of unusually late storms in the spring of 2011. However, this made it similar to conditions that occurred in 2006. Most of the photographs were shot over a three-day period in between storm events.

Data from this monitoring can be converted into numeric values, which are used to provide a riparian index score (RIS) for each stream. This score will represent the status of the riparian vegetation relative to overstory, consisting of trees, shrubs, grasses, or bare ground. A higher riparian index score indicates greater abundance of desirable conditions, such as trees and shrubs, in the assessed area.

Inland Rogue Basin

Nine different streams were assessed in the Inland Rogue basin in 2011. Jumpoff Joe Creek, photographed in 2006, was not re-shot because it was found to have very little agricultural land. Streams in this basin had a wide range of characteristics, with riparian index scores (RIS) ranging from 39 to 60. Some streams with relatively high index scores still had significant amounts of bare agricultural land. Four streams had increased RIS in 2011, while only one had a declining score. Of the ones with increased RIS, one had a 6.5 percent increase, with the others increasing by less than 5 percent. Thompson Creek had a 10 percent reduction in RIS, the largest change observed in this monitoring program. Most of this score reduction was due to loss of tree cover, though bare and bare/agriculture land did not change appreciably.

Constance Creek had improved visibly with a more stable channel that had increased grass cover. The riparian vegetation was more mature, leading to more trees and shrubs being counted by the points of analysis placed on the photographs. The 2006 photographs showed this stream having a visibly eroding channel. Lateral bars on Evans Creek showed mature riparain vegetation, leading to stabilization. Some lateral and mid-channel bars had been transported away since the 2006 photographs, and some lateral migration of the channel was apparent. The Illinois River was much like Evans Creek but not with as much improvement. Maturing riparian vegetation along the Illinois was very noticeable.

Whetstone Creek had only a minor improvement in RIS, but conversations with ODFW stream habitat surveyors revealed that they had seen a notable increase in deciduous trees along this stream going back to 2000. ODFW staff also provided useful insight into the large changes seen in the Inland Rogue streams. They had surveyed Thompson and Whetstone creeks in 2000, 2003, and 2006, along with some other streams in the basin. They also surveyed Whetstone in 2009. Their observations suggest that streams in the Inland Rogue showed much channel erosion by the storms of 1996 and 1997, and the improvements we observed between 2006 and 2011 are at least in part to the channels still recovering from those storm events.

Bear Creek Basin

A total of three streams in this basin were examined. These were Emigrant Creek, Griffin Creek, and Meyer Creek. Two streams assessed in 2006 – Frog and Gaerky creeks – were not photographed in 2011. The streams photographed showed a wide variety of landscape cover conditions with tree cover ranging from less than 10 percent to over 95 percent in single bands. Bare agricultural land ranged from zero to over 16 percent in single bands. Griffin Creek had the lowest percent tree cover and the greatest percent of bare agricultural land, and it also had the lowest riparian index score (36.04). However, Griffin Creek was the only stream in this basin that showed a significant improvement in riparian score from 2006, with an 8 percent increase. This increase was due to an increase in tree cover in the 30-foot bands and less bare agricultural land in the 60- and 90-foot bands of the right side of the stream. Overall, Griffin Creek had the highest percentage of active agricultural land. No significant changes in riparian condition were apparent in Emigrant and Meyer creeks.

Irrigation canals were visible crossing Griffin Creek running underneath the stream. Much of Griffin Creek is ditched or otherwise confined, both in agricultural land and in suburban development. Most of the bare agricultural land consisted of tilled fields adjacent to the stream. An irrigation diversion was visible on Meyer Creek but this diversion did not severely disrupt riparian conditions.

4.5 Biennial Reviews and Adaptive Management

2017: The Inland Rogue LAC met on November 14, 2017 and February 28, 2018. Chapter 1 edits were made by ODA and were primarily grammatical in nature. Chapter 2 edits included new sections on cannabis, groundwater resources, drinking water. At DEQ's request, new information was also added regarding sedimentation, nutrients, dissolved oxygen, and pH. Language regarding CZARA was updated. Chapter 3 edits included updated Measurable Objectives and Milestones for each of the three SWCD Focus Areas. New sections on activities and progress related to the Wagner and Neil Strategic Implementation Areas and the Bear Creek Pesticide Stewardship Partnership were also added. Chapter 4 updates included implementation information from local partners and a summary of the DEQ Status and Trends Report for the Inland Rogue. The LAC was pleased that the water quality issues related to the boom in cannabis operations have been included in the Plan and that the SWCDs and ODA have been conducting outreach to this new agricultural group. The LAC has requested that the SWCDs and ODA update and implement the Inland Rogue AgWQ Education and Outreach Strategy Plan. The SWCDs have begun to update and add to the draft Inland Rogue AgWQ Education and Outreach Strategy Plan.

2015: The Inland Rogue LAC met on October 15, 2015, November 16, 2015, and March 23, 2016. Changes to the Plan included conversion to the chapter format and the addition of measurable objectives. The LAC stated several impediments to Plan implementation and recommendations for modifications. The LAC would like to see more effective outreach and education to agricultural landowners in the Inland Rogue Management Area regarding the Plan and Rules. The LAC expressed concern regarding local, county, and city riparian ordinances and how the ordinances may inhibit implementation of the Plan or may require more than what is required by state law. The LAC would like to see more coordination between agencies and for local planning department staff to have a good understanding of the Plan and Rules. The LAC would also like more information regarding what agriculture can do to protect groundwater resources. ODA staff plan to work with the Inland Rogue Chair and LAC to find ways to address these issues.

References

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

Appendix A: Inland Rogue Basin Area Water Quality Plan Glossary

Agricultural Use - means the use of land for the raising or production of livestock or livestock products, poultry or poultry products, milk or milk products, fur-bearing animals; or for the growing of crops such as, but not limited to, grains, small grains, fruit, vegetables, forage grains, nursery stock, Christmas trees; or any other agricultural or horticultural use or animal husbandry or any combination thereof. Wetlands, pasture, and woodlands accompanying land in agricultural use are also defined as in agricultural use. (OAR 603-095-0010(4)).

Channel Morphology — Shape of the stream channel. (Example: wide and shallow vs. narrow and deep).

Cold Water Aquatic Life — Organisms that require cold water as part of their physiological requirements.

Contact Recreation — Recreational activities that put humans in direct contact with the water, i.e. swimming, boating, etc.

Field Office Technical Guide — Means the localized document currently used by the soil and water conservation district and developed by the U.S. Department of Agriculture, Natural Resources Conservation Service which provides:

- Soil descriptions
- Sound land use alternatives
- Adequate conservation treatment alternatives
- Standards and specifications of conservation practices
- Conservation cost-return information
- Practice maintenance requirements
- Soil erosion prediction procedures and
- A listing of local natural resource related laws and regulations

Geomorphic — The shape or surface configuration of the earth.

Hydraulically Connected — Groundwater and surface waters influenced by each other's condition.

Farm Plan — (Same as voluntary conservation plan.) Is developed to facilitate daily and seasonal management decisions which impact production and resource quality. While not required, they are still a good operational idea and strongly encouraged.

Least Likely Third — Siting strategy for potentially hazardous materials. When locating storage and staging areas on a property, select the third of the property that is least likely to allow contaminants from a spill or leak to run off directly into waters of the state.

Parent Material — The underlying rock from which surface soils are formed. (Example: Serpentine rock formations give rise to serpentinitic soils).

Riparian Vegetation — Plants and plant communities dependent upon or tolerant of saturated soil near the soil surface for at least part of the year. (Example: Willows, sedges, and rushes can grow in saturated

soils). Riparian areas are commonly described as the area from the average high-water level up to the area no longer influenced by the stream as defined by changes in soils and plant communities.

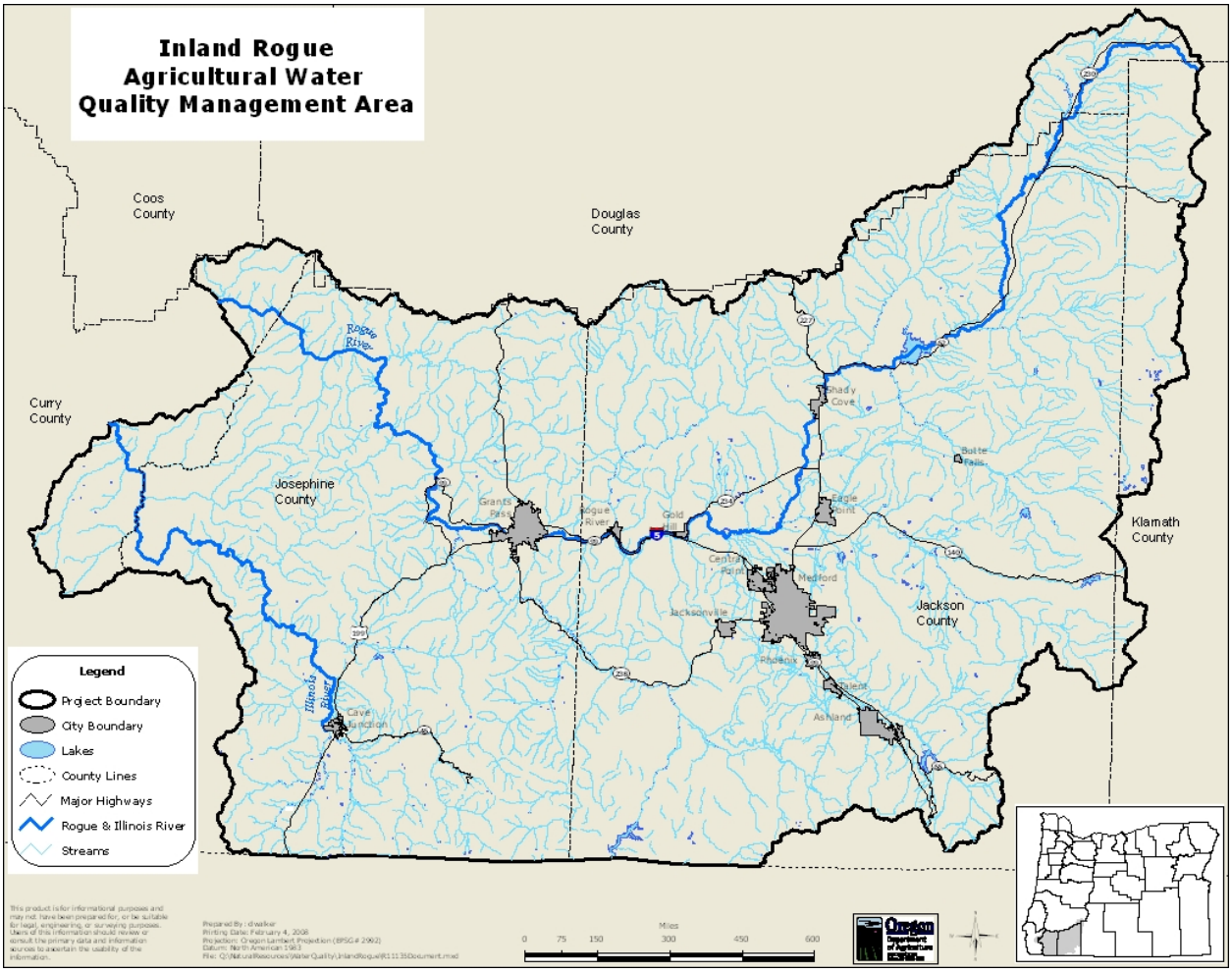
Riparian Setback — The purposefully designated or protected area away from the stream's normal flow mark back to a point where riparian functions for that site will not be adversely affected by land management practices.

Soil loss tolerance factor or "T" — Means maximum average annual amount of soil loss from erosion, as estimated by the Universal Soil Loss Equation (USLE) or the Revised Universal Soil Loss Equation (RUSLE), and expressed in tons per acre per year, that is allowable on a particular soil. This represents the tons of soil (related to the specific soil series) that can be lost through erosion annually without causing significant degradation of the soil or potential for crop production. (OAR 603-095-0010(45)).

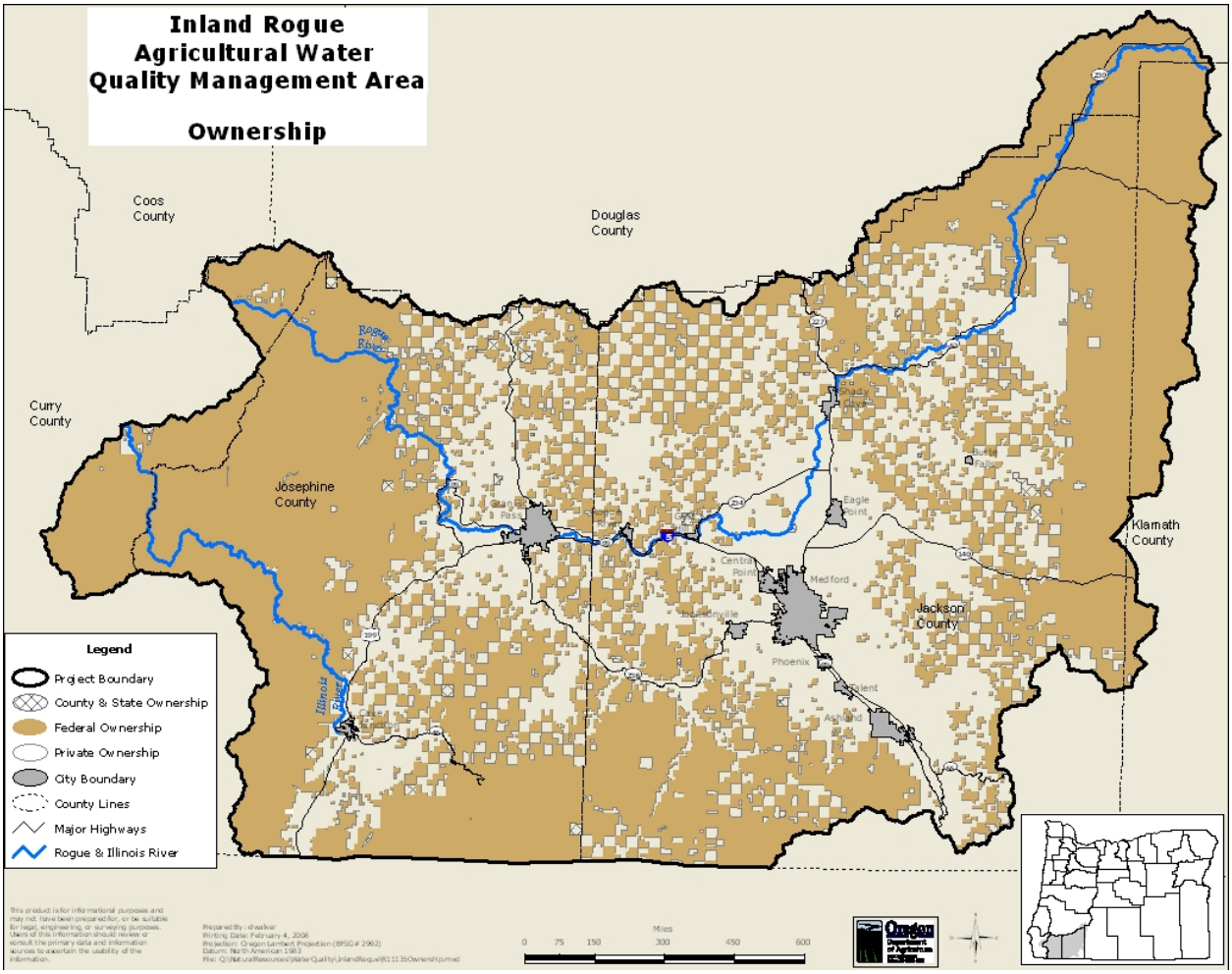
Streambank — Means the boundary of protected waters and wetlands, or the land abutting a channel at an elevation delineating the highest water level which has been maintained for a sufficient period of time to leave evidence upon the landscape; commonly that point where the natural vegetation changes from predominantly aquatic to predominantly terrestrial. For perennial streams or rivers, the streambank shall be at the ordinary high-water mark. (OAR 603095-0010(46)).

Top of Bank — The first major change in the slope of the incline from the ordinary high water level of a water body. A major change is a change of 10 degrees or more. If there is no major change within a distance of 50 feet from the ordinary high-water level, then the top of bank will be the elevation 2 feet above the ordinary high water level.

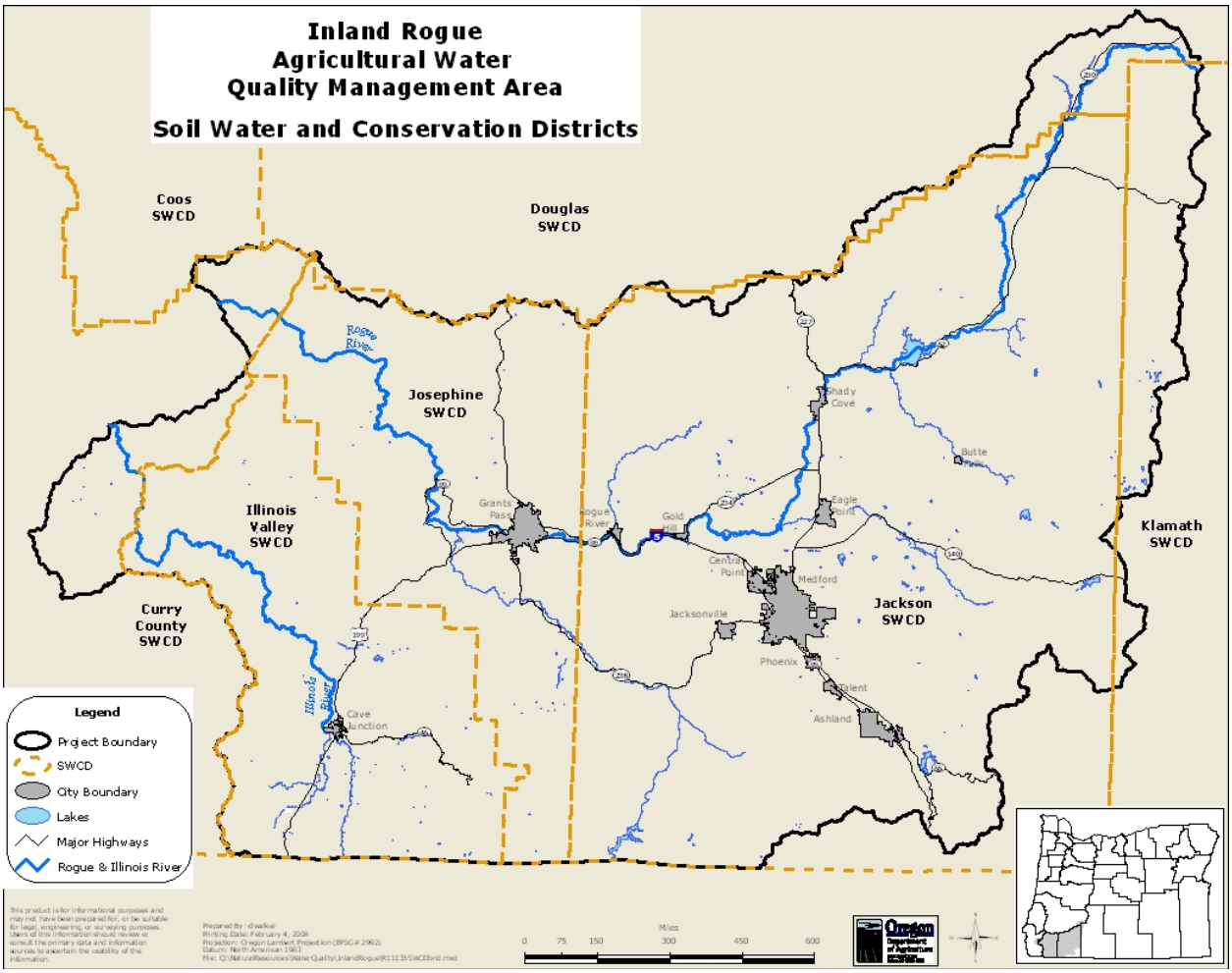
Appendix B: Inland Rogue AgWQM Area



Appendix C: Inland Rogue AgWQM Area Ownership



Appendix D: Inland Rogue AgWQM Area SWCD Boundaries



Appendix E: Fish Use Designations

*Figure 271A: Fish Use Designations**
Rogue Basin, Oregon

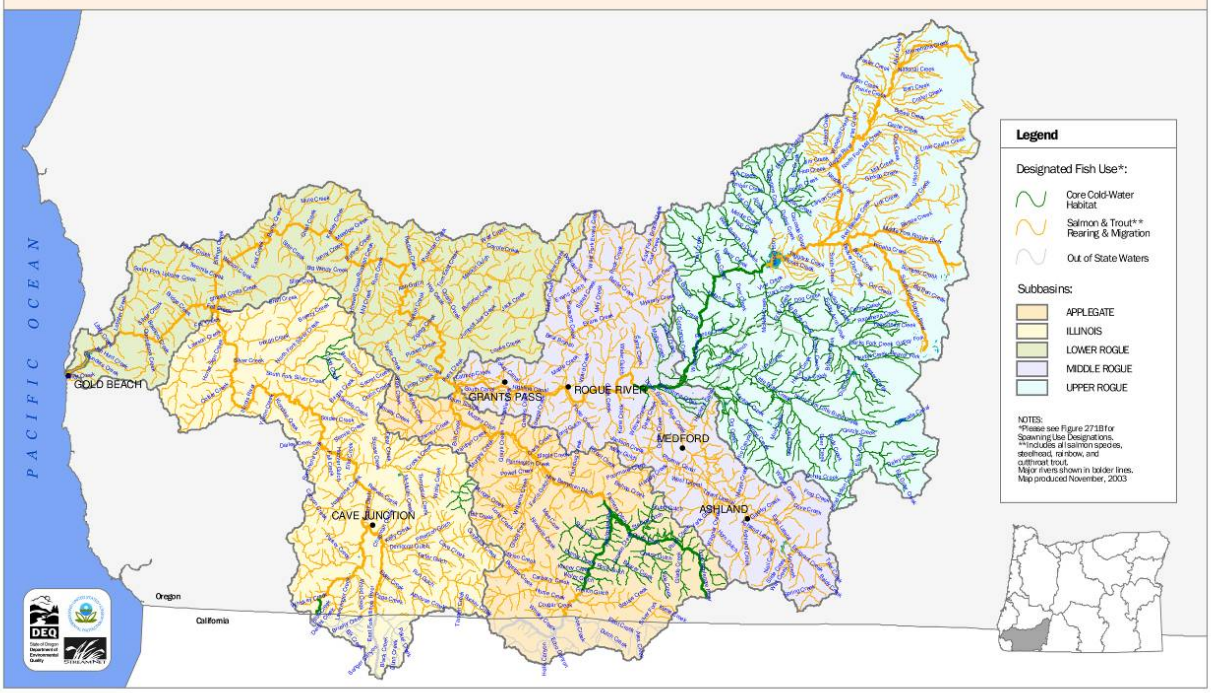
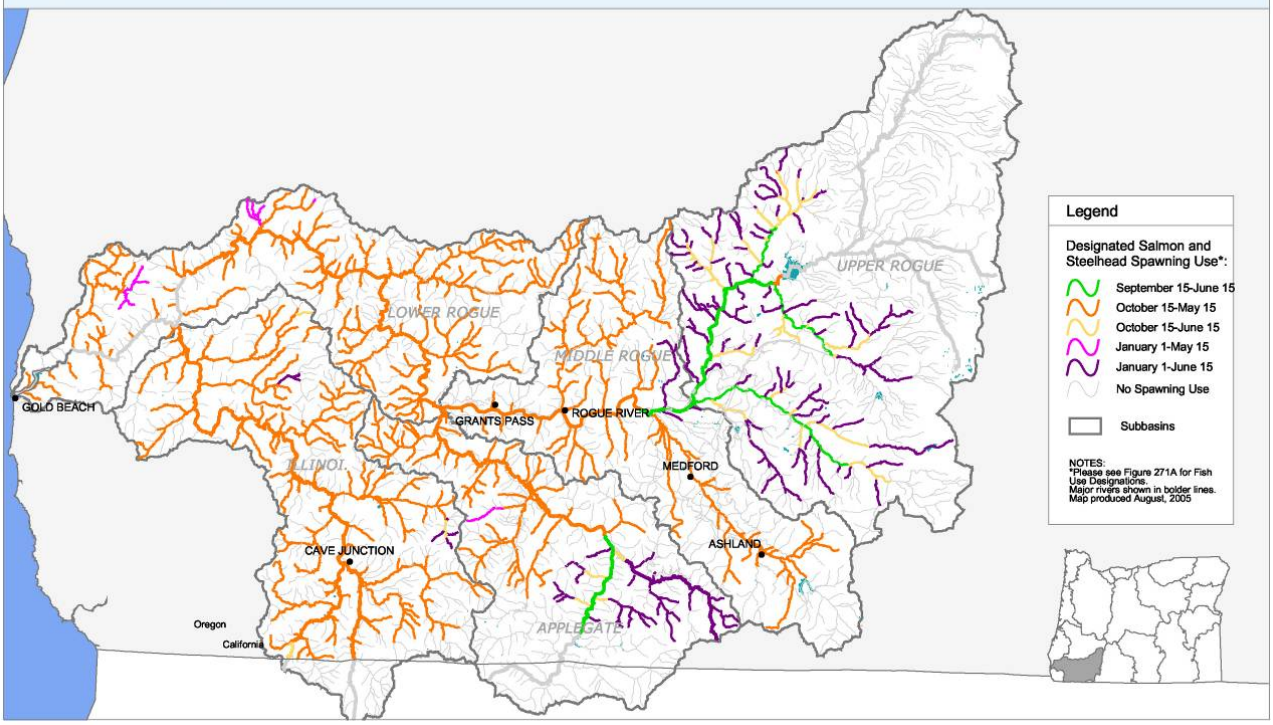


*Figure 271B: Salmon and Steelhead Spawning Use Designations**
Rogue Basin, Oregon



Appendix F: Watershed Council, SWCD, and Financial Assistance Information

Watershed Councils
Applegate Partnership & Watershed Council
3259 Tahitian Avenue
Medford, OR 97504
Email: contact@apwc.info, www.applegatepartnershipwc.org

Illinois Valley Watershed Council
PO Box 352
Cave Junction, OR 97523
(541) 592-3731, www.ivstreamteam.org

Rogue River Watershed Council
89 Alder Street
Central Point, OR 97502
(541) 664-1070 ext. 432, www.rogueriverwc.org

Seven Basins Watershed Council
P.O. Box 909
Gold Hill, OR 97525
(541) 261-7796, Email: contact@sevenbasins.org

Williams Creek Watershed Council
PO Box 94
Williams, OR 97544
(541) 846-9175, williamswatershed.org

Soil and Water Conservation Districts
Jackson Soil and Water Conservation District
89 Alder Street
Central Point, OR 97502
(541) 664-1070 ext. 5, https://jswcd.org

Two Rivers (Josephine) Soil and Water Conservation District
1440 Parkdale Drive
Grants Pass, OR 97527
(541) 474-6840, Email: joswcd@outreachinternet.com

Illinois Valley Soil and Water Conservation District
PO Box 352
Cave Junction, OR 97523
(541) 592-3731, www.ivstreamteam.org

Available Technical and Financial Assistance

Since most agricultural landowners are unable to make a living directly from their land-based enterprise, financial incentives are required to encourage basin-wide adoption of sound and sustainable management practices. While recordkeeping of various aspects of the operation may be required for various government incentives (for example, the Conservation Security Program requires two years of records to be kept before you can apply for Best Management Practice payments), VOLUNTARY, PRIVATE recordkeeping is encouraged as a tool for operational and strategic decision-making. Some government programs do NOT require recordkeeping.

- **CREP** - Conservation Reserve Enhancement Program (541-734-3143 or 541-476-5856) makes available money to pay rent to landowners who set aside areas immediately adjacent to anadromous fish-bearing streams. It is intended to protect water quality and enhance spawning, rearing, and habitat quality.

- **OWEB** - Oregon Watershed Enhancement Board (541-471-2886) provides funding for watershed enhancement projects under the general categories of education/public awareness, monitoring, management, and assessment/action planning.

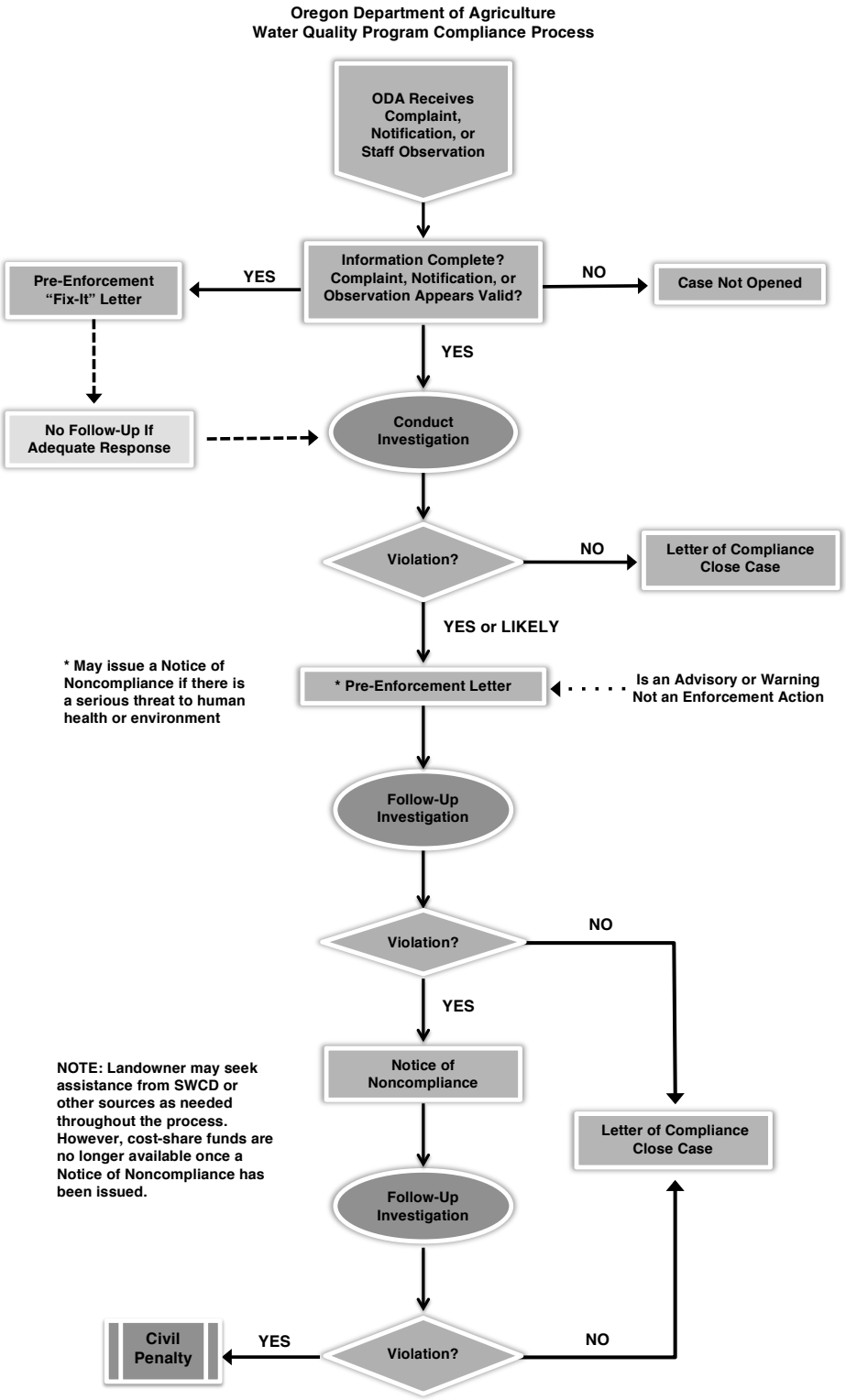
- **EPA 319** - Environmental Protection Agency administers the 1972 Clean Water Act section 319 grants through DEQ (541-776-6010) to help meet its water quality mandates. The projects EPA likes to fund are those with directly measurable benefits for water quality and endangered species. Check out EPA's Ag Info Center: http://www.epa.gov/agriculture/index.html and Oregon DEQ's 319 program: https://www.oregon.gov/deq/wq/programs/Pages/Nonpoint-319-Grants.aspx.

- **NRCS** - Natural Resources Conservation Service (541-476-5856) can provide technical assistance and administers a number of cost-share programs for on-farm projects that improve farm production while protecting natural resources and improving wildlife (including fish) habitat. To reach the Jackson County NRCS, call (541) 664-1070.

- **The Freshwater Trust** (503-222-9091 in Portland) offers lease and buy-out options for abandoned or unused water rights. This market-based approach to increasing stream flow may also be used to fund irrigation system changes in watersheds identified as priorities for The Freshwater Trust.

- **OSU Cooperative Extension** (541-476-6613 in Josephine County and 541-772-5165 in Jackson County) offers a wide variety of levels of technical assistance and planning help. OSU has been instrumental in the Oregon Cattlemen's extremely successful Watershed Ecosystem Education Program workshops helping ranchers and farmers understand their watersheds and stream function better through assessment and monitoring.

Appendix G: Compliance Procedures Flow Chart



Letter of Compliance – A Letter of Compliance (LOC) tells the owner/operator that at the time of the inspector's site visit, the property was in compliance with all Area Rules and there were no conditions observed during the investigation; such as, manure piles near drainages or heavily grazed areas, that are likely to cause a water quality problem in the near future.

Water Quality Advisory - A Water Quality Advisory (WQA) means the owner/operator is in compliance because there were no violations of Area Rules documented at the time of the inspector's visit, but the conditions on the property have the potential to violate the Area Rules in the future. Examples: a riparian area is in poor condition, and if management changes are not made, conditions will not improve; there is manure in a corral that could be transported to surface water in a rain event; there is build-up of sediment in a sediment basin.

A WQA letter includes a description of the conditions that have the potential to violate the Area Rules, the statute or rule that may be violated and recommended corrective actions. The letter may also refer the landowner to other sources of technical assistance, and summarize other issues discussed during the investigation. The inspector will usually follow up to see if the changes effectively reduced the potential for a water quality problem.

Letter of Warning - A Letter of Warning (LOW) means the inspector found a violation of Area Rules during the investigation, but the pollution-causing activity was not egregious and was not done intentionally to cause water pollution. The (LOW) is an official warning (not defined in Administrative Rule) that gives the landowner or operator at least one opportunity to correct the problem before he/she receives a Notice of Noncompliance. Although a LOW is a formal action by ODA, it is not an enforcement action.

A LOW includes a description of the conditions that violate the Area Rules, the statute or rule that is violated, and recommended corrective actions. The letter may also refer the landowner to other sources of technical assistance, and summarize other issues discussed during the investigation. Although the landowner has the flexibility to choose the recommended actions or other practices best suited to correct the problem on the operation, the operator must achieve compliance, and the inspector will follow up to see if the violation has been addressed.

Notice of Noncompliance/Plan of Correction - A Notice of Noncompliance (NON) means the inspector found a violation of Area Rules during the investigation, and the violation was either (1) egregious or done to intentionally cause water pollution, or (2) a second violation after being issued a LOW. A NON includes a description of the conditions that violate the Area Rules, the statute or rule that is violated, consequences of current documented violations, and a schedule of required corrective actions. The letter may also refer the landowner to other sources of technical assistance, and summarize other issues discussed during the investigation. A Plan of Correction usually accompanies a NON if the corrective actions require more than 30 days and directs the landowner to take specific steps to correct the problem. An inspector will follow up to confirm the landowner completed the required corrective actions and effectively addressed the violation.

Civil Penalty - A Civil Penalty is a fine that is assessed to a landowner whose agricultural activities caused either a willful and intentional violation of Area Rules, or who repeatedly failed to take steps to correct a violation. ODA's Division 90 rules include a matrix for calculating the value of civil penalties for the Water Quality Program.

Appendix H: Coastal Zone Management Act Measures

In 1990, the Federal Coastal Zone Reauthorization Amendments (CZARA) were enacted. This law mandated that all states and territories with approved coastal zone management programs develop and implement coastal nonpoint pollution control programs. Listed below are the Coastal Zone Management measures that were developed for use in Oregon for coastal basins such as the Rogue. CZARA management measures for agricultural sources can be found at:
http://www2.epa.gov/sites/production/files/2015-09/documents/czara_chapter2_agriculture.pdf

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

Several of the measures reference the NRCS FOTG. The eFOTG can be accessed at: https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/fotg/. A clickable map helps users navigate to Oregon and then to Jackson and/or Josephine Counties.

1. Erosion and Sediment Control Management Measure
Apply the erosion component of a Conservation Management System (CMS) as defined in the FOTG of the USDA NRCS to minimize the delivery of sediment from agricultural lands to surface waters; or

Design and install a combination of management and physical practices to settle the settleable solids and associated pollutants in runoff delivered from the contributing area for storms of up to and including a 10-year, 24-hour frequency.

2. Facility Wastewater and Runoff from Confined Animal Facility Management
(g) Guidance Management Measure (Large Units)
Limit the discharge from the confined animal facility to surface waters by:

1. Storing both the facility wastewater and the runoff from confined animal facilities that is caused by storms up to and including a 25-year, 24-hour frequency storm. Storage structures should:
    a. Have an earthen lining or plastic membrane lining, or
    b. Be constructed with concrete, or
    c. Be a storage tank; and,
2. Managing stored runoff and accumulated solids from the facility through an appropriate waste utilization system.

(g) Guidance Management Measure (Small Units):
Design and implement systems that collect solids, reduce contaminant concentrations, and reduce runoff to minimize the discharge of contaminants in both facility wastewater and in runoff that is caused by storms up to and including a 25-year, 24-hour frequency storm.

Implement these systems to substantially reduce significant increases in pollutant loadings to ground water.

Manage stored runoff and accumulated solids from the facility through an appropriate waste utilization system.

3. Nutrient Management Measure
Develop, implement, and periodically update a nutrient management plan to: (1) apply nutrients at rates necessary to achieve realistic crop yields, (2) improve the timing of nutrient application, and (3) use

agronomic crop production technology to increase nutrient use efficiency. When the source of the nutrients is other than commercial fertilizer, determine the nutrient value and the rate of availability of the nutrients. Determine and credit the nitrogen contribution of any legume crop. Soil and plant tissue testing should be used routinely. Nutrient management plans contain the following core components:

A. Farm and field maps showing acreage, crops, soils, and waterbodies.
B. Realistic yield expectations for the crop(s) to be grown based primarily on the producer's actual yield history, State Land Grant University yield expectations for the soil series, or NRCS Soils-5 information for the soil series.
C. A summary of the nutrient resources available to the producer, which at a minimum include:
    1. Soil test results for pH, phosphorus, nitrogen, and potassium;
    2. Nutrient analysis of manure, sludge, mortality compost (birds, pigs, etc.), or effluent (if applicable);
    3. Nitrogen contribution to the soil from legumes grown in the rotation (if applicable); and
    4. Other significant nutrient sources (e.g., irrigation water).
D. An evaluation of field limitations based on environmental hazards or concerns, such as:
    1. Sinkholes, shallow soils over fractured bedrock, and soils with high leaching potential,
    2. Lands near surface water,
    3. Highly erodible soils, and
    4. Shallow aquifers.
E. Use of the limiting nutrient concept to establish the mix of nutrient sources and requirements for the crop based on a realistic yield expectation.
F. Identification of timing and application methods for nutrients to: provide nutrients at rates necessary to achieve realistic crop yields; reduce losses to the environment; and avoid applications as much as possible to frozen soil and during periods of leaching or runoff.
G. Provisions for the proper calibration and operation of nutrient application equipment.

4. Pesticide Management

To reduce contamination of surface water and ground water from pesticides:

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

5. Grazing Management

I. Riparian Areas: Implement one or more of the following as necessary to protect water quality, streambanks, stream channels, wetlands, estuaries, ponds, lakeshores, and riparian soils and vegetation:
    (A) For privately owned lands, implement (1) or (2) below:
        (1) Implement one or more of the following:
            a) Provide stream crossings or hardened watering access for drinking;
            b) Provide alternative drinking water locations away from the stream channel and sensitive areas;

c) Locate salt and additional shade, if needed, away from sensitive areas;
d) Use improved grazing management techniques including the application of scientifically sound grazing systems. The following are some examples of such techniques:
1. Include riparian areas in separate pastures and manage them under separate objectives and strategies, including periodic rest.
2. Fence or, where appropriate, herd livestock out of riparian areas for as long as necessary to avoid negative impacts to streambanks.
3. Control the timing of grazing in riparian areas to (1) protect streambanks when they are most vulnerable to damage; and (2) coincide with the physiological needs of key plant species.
4. Add rest, as needed, to the grazing cycle to increase plant vigor and encourage more desirable plant species composition.
5. Limit grazing intensity, frequency, and duration to a level that will maintain desired plant species composition and vigor.
6. Manage livestock away from riparian areas that are at high risk or with poor recovery potential.
e) Exclude livestock from sensitive areas.
(2) Implement a Conservation Management System (CMS) as defined in the Field Office Technical Guide of the USDA Natural Resource Conservation Service (NRCS) by applying the progressive planning approach of the USDA NRCS.
(B) For publicly owned or managed lands, maintain rangelands, pasturelands, and other grazing lands in accordance with plans established by the responsible agency such as the USDI Bureau of Land Management, the USDA Forest Service.

II. Uplands: To protect water quality from grazing impacts on upland areas that are not protected under (I),
(A) For privately owned lands, implement (1) or (2) below:
(1) Implement one or more of the following:
a) Locate livestock watering facilities away from sensitive areas such as springs and seeps;
b) Locate salt and additional shade, if needed, away from sensitive areas;
c) Use improved grazing management techniques including the application of scientifically sound grazing systems. The following are some examples of such techniques:
1. Control the timing of grazing to (1) protect soils and vegetation when they are most vulnerable to damage; and (2) coincide with the physiological needs of key plant species.
2. Add rest to the grazing cycle to increase plant vigor, or encourage more desirable plant species composition.
3. Limit grazing intensity, frequency, and duration to a level that will maintain desired plant species composition and vigor.
(2) Implement a CMS as defined in the Field Office Technical Guide of the USDA NRCS by applying the progressive planning approach of the USDA NRCS.
(B) For publicly owned or managed lands, maintain rangelands, pasturelands, and other grazing lands in accordance with plans established by the responsible agency such as the USDI Bureau of Land Management, the USDA Forest Service.

6. Irrigation Water Management

To reduce nonpoint source pollution of surface waters caused by irrigation:

A. Operate the irrigation system so that the timing and amount of irrigation water applied matches crop water needs. This will require, as a minimum: (a) the accurate measurement of

soil-water depletion volume and the volume of irrigation water applied, and (b) uniform application of water.

B. When chemigation is used, include backflow preventers for wells, minimize the harmful amounts of chemigated waters that discharge from the edge of the field, and control deep percolation. In cases where chemigation is performed with furrow irrigation systems, a tailwater management system may be needed.

The following limitations and special conditions apply:

A. In some locations, irrigation return flows are subject to other water rights or are required to maintain stream flow. In these special cases, on-site reuse could be precluded and would not be considered part of the management measure for such locations.

B. By increasing the water use efficiency, the discharge volume from the system will usually be reduced. While the total pollutant load may be reduced somewhat, there is the potential for an increase in the concentration of pollutants in the discharge. In these special cases, where living resources or human health may be adversely affected and where other management measures (nutrients and pesticides) do not reduce concentrations in the discharge, increasing water use efficiency would not be considered part of the management measure.

C. In some irrigation districts, the time interval between the order for and the delivery of irrigation water to the farm may limit the irrigator's ability to achieve the maximum on-farm application efficiencies that are otherwise possible.

D. In some locations, leaching is necessary to control salt in the soil profile. Leaching for salt control should be limited to the leaching requirement for the root zone.

E. Where leakage from delivery systems or return flows supports wetlands or wildlife refuges, it may be preferable to modify the system to achieve a high level of efficiency and then divert the "saved water" to the wetland or wildlife refuge. This will improve the quality of water delivered to wetlands or wildlife refuges by preventing the introduction of pollutants from irrigated lands to such diverted water.

F. In some locations, sprinkler irrigation is used for frost or freeze protection, or for crop cooling. In these special cases, applications should be limited to the amount necessary for crop protection, and applied water should remain on-site.

Appendix I: Common Agricultural Water Quality Parameters of Concern

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

Parameters

Template Language

Descriptions of Common Agricultural Parameters of Concern: This language can be used or added to existing language.

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

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

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

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

Mercury: Mercury occurs naturally and is used in many products. It enters the environment through human activities and from volcanoes and can be carried long distances by atmospheric air currents. Mercury passes through the food chain readily and has significant public health and wildlife impacts from consumption of contaminated fish. Mercury in water comes from erosion of soil that carries naturally

occurring mercury (including erosion from agricultural lands and streambanks) and from deposition on land or water from local or global atmospheric sources. Mercury bio-accumulates in fish, and if ingested can cause health problems.

Nitrate: While nitrate occurs naturally, the use of synthetic and natural fertilizers can increase nitrate in drinking water (ground and surface water). Applied nitrate that is not taken up by plants is readily carried by runoff to streams or infiltrate to ground water. High nitrate levels in drinking water cause a range of human health problems, particularly with infants, the elderly, and pregnant and nursing women.

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

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

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

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