OREGON DEPARTMENT OF AGRICULTURE

Inland Rogue Agricultural Water Quality Management Area Plan

June 2022

Developed by the

Oregon Department of Agriculture

and the

Inland Rogue Local Advisory Committee

with support from the

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

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Acronyms and Terms

Ag Water Quality Program – Agricultural Water Quality Program
Area Plan – Agricultural Water Quality Management Area Plan
Area Rules – Agricultural Water Quality Management Area Rules
CAFO – Confined Animal Feeding Operation
CWA – Clean Water Act
DEQ – Oregon Department of Environmental Quality
GWMA – Groundwater Management Area
HUC – Hydrologic Unit Code
LAC – Local Advisory Committee
LMA – Local Management Agency
Management Area – Agricultural Water Quality Management Area
NRCS – Natural Resources Conservation Service
OAR – Oregon Administrative Rules
ODA – Oregon Department of Agriculture
ORS – Oregon Revised Statute
OWEB – Oregon Watershed Enhancement Board
OWRI – Oregon Watershed Restoration Inventory
PSP – Pesticide Stewardship Partnership
SIA – Strategic Implementation Area
SWCD – Soil and Water Conservation District
TMDL – Total Maximum Daily Load
US EPA – United States Environmental Protection Agency

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Foreword

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

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

Required Elements of Area Plans

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

Plan Content

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

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

Chapter 3: Implementation Strategies. Describes activities to make and track progress towards the goals of the Area Plan. Presents goals, measurable objectives, strategic initiatives, proposed activities, and monitoring efforts.

Chapter 4: Progress and Adaptive Management. Describes progress toward achieving Area Plan goals and measurable objectives by summarizing accomplishments and monitoring results.

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Chapter 1: Agricultural Water Quality Program

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

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

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

Each Area Plan is accompanied by Area Rules that describe local agricultural water quality regulatory requirements. ODA will exercise its regulatory authority for the prevention and control of water pollution from agricultural activities under the Ag Water Quality Program's general regulations (OAR 603-090-0000 to 603-090-0120) and under the Area Rules for this Management Area (OAR 603-095-1440). The general regulations guide the Ag Water Quality Program, and the Area Rules for the Management Area are the regulations with which landowners must comply. Landowners are encouraged through outreach and education to implement conservation and management activities.

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

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

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

1.2 History of the Ag Water Quality Program

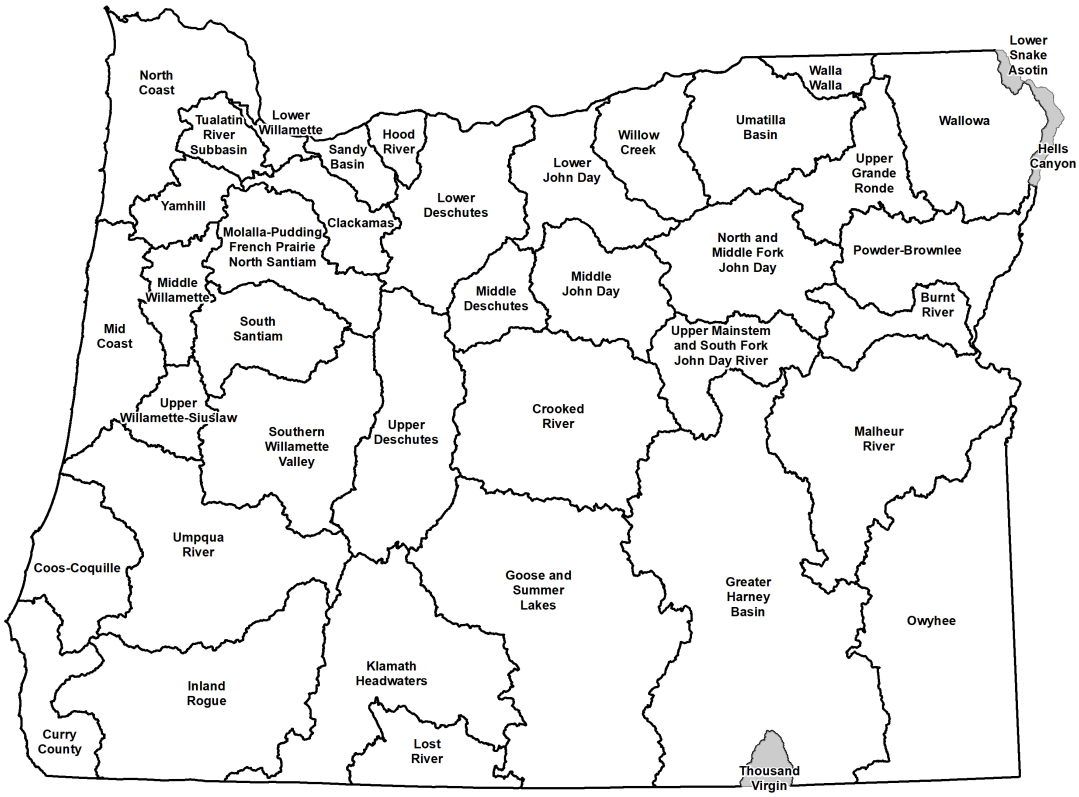
In 1993, the Oregon Legislature passed the Agricultural Water Quality Management Act directing ODA to develop plans to prevent and control water pollution from agricultural activities and soil erosion and achieve water quality standards and to adopt rules as necessary (ORS 568.900 through ORS 568.933).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

561.191). The Area Plan and Area Rules were developed and subsequently revised pursuant to these statutes.

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

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

Figure 1.2 Map of 38 Agricultural Water Quality Management Areas*



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

1.3 Roles and Responsibilities

1.3.1 Oregon Department of Agriculture

ODA is the agency responsible for implementing the Ag Water Quality Program (ORS 568.900 to 568.933, ORS 561.191, OAR 603-090, and OAR 603-095). The Ag Water Quality Program was established to develop and implement water quality management plans for the prevention

and control of water pollution from agricultural activities and soil erosion. State and federal laws that drive the establishment of an Area Plan include:

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

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

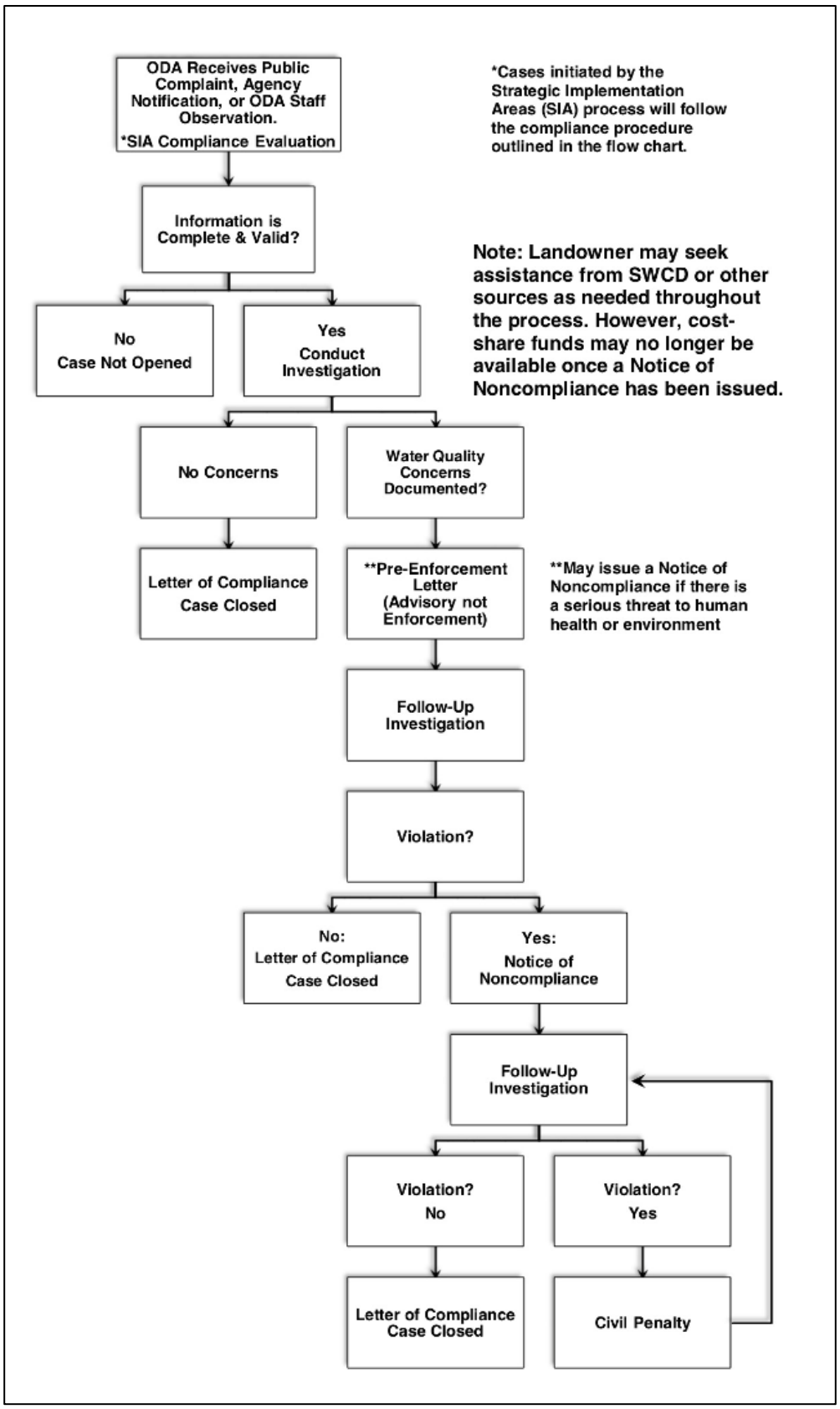
1.3.1.1 ODA Compliance Process

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

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

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

Figure 1.3.1 Compliance Flow Chart



1.3.2 Local Management Agency

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

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

1.3.3 Local Advisory Committee

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

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

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

1.3.4 Agricultural Landowners

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

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

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

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

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

1.3.5 Public Participation

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

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

1.4 Agricultural Water Quality

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

1.4.1 Point and Nonpoint Sources of Water Pollution

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

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

1.4.2 Beneficial Uses and Parameters of Concern

Beneficial uses related to water quality are defined by DEQ for each basin. The most sensitive beneficial uses usually are fish and aquatic life, water contact recreation, and public and private domestic water supply. These uses generally are the first to be impaired because they are affected at lower levels of pollution. While there may not be severe impacts on water quality from a single source or sector, the combined effects from all sources can contribute to the impairment of beneficial uses in the Management Area. Beneficial uses that have the potential to be impaired in this Management Area are summarized in Chapter 2.4.1.1.

Many waterbodies throughout Oregon do not meet state water quality standards. The most common water quality concerns statewide related to agricultural activities are temperature, bacteria, biological criteria, sediment, turbidity, phosphorous, nitrates, algae, pH, dissolved oxygen, harmful algal blooms, pesticides, and mercury. Water quality impairments vary across the state; they are summarized for this Management Area in Chapter 2.4.

1.4.3 Impaired Waterbodies and Total Maximum Daily Loads

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

A TMDL includes an assessment of conditions (based on water quality data, land condition data, and/or computer modeling) and describes a plan to achieve water quality standards. TMDLs specify the daily amount of pollution a waterbody can receive and still meet water quality standards. TMDLs generally apply to an entire basin or subbasin, not just to an individual waterbody on the 303(d) list. In the TMDL, point sources are assigned waste load allocations that are then incorporated into National Pollutant Discharge Elimination System permits. Nonpoint sources (agriculture, forestry, and urban) are assigned a load allocation to achieve.

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

The 303(d) list, the TMDLs, and the agricultural load allocations for the TMDLs that apply to this Management Area are summarized in Chapter 2.4.1.

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

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

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

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

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

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

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

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

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

1.4.5 Streamside Vegetation and Agricultural Water Quality

Across Oregon, the Ag Water Quality Program emphasizes streamside vegetation protection and enhancement. Streamside vegetation can provide three primary water quality functions: shade to reduce stream temperature warming from solar radiation, streambank stability, and

filtration of pollutants. Other water quality functions from streamside vegetation include water storage in the soil for cooler and later season flows, sediment trapping that can build streambanks and floodplains, narrowing and deepening of channels, and biological uptake of sediment, organic material, nutrients, and pesticides. In addition, streamside vegetation provides habitat for numerous species of fish and wildlife. Streamside vegetation conditions can be monitored to track progress toward achieving conditions that support water quality.

Site-Capable Vegetation

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

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

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

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

1.4.6 Soil Health and Agricultural Water Quality

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

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

1.5 Other Water Quality Programs

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

1.5.1 Confined Animal Feeding Operation Program

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

1.5.2 Groundwater Management Areas

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

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

Any GWMA in this Management Area is described in Chapter 2.4.1.5. Any Measurable Objectives for the GWMA will be described in Chapter 3.1.5.

1.5.3 The Oregon Plan for Salmon and Watersheds

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

1.5.4 Pesticide Management and Stewardship

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

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

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

Any PSPs in this Management Area are described in Chapter 3.1.4.

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

1.5.5 Drinking Water Source Protection

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

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

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

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

1.6.2 Other Partners

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

1.7 Measuring Progress

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

1.7.1 Measurable Objectives

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

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

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

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

The measurable objective(s) and associated milestone(s) within the Management Area are in Chapter 3.1 and progress toward achieving the measurable objective(s) and milestone(s) is summarized in Chapter 4.1.

1.7.2 Land Conditions and Water Quality

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

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

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

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

1.7.3 Focused Implementation in Small Geographic Areas

Focus Areas

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

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

Any Focus Areas in this Management Area are described in Chapter 3.1.2. SWCDs will also continue to provide outreach and technical assistance to the entire Management Area.

Strategic Implementation Areas

Strategic Implementation Areas (SIAs) are small watersheds selected by ODA, in consultation with partners, based on a statewide review of water quality data and other available information. ODA conducts an evaluation of likely compliance with Area Rules and contacts landowners with the results and next steps. The Oregon Watershed Enhancement Board (OWEB) and other partners make funding and technical assistance available to support conservation and restoration projects. These efforts should result in greater ecological benefit than relying solely

on compliance and enforcement. Landowners have the option of working with the SWCD or other partners to voluntarily address water quality concerns. ODA follows up, as needed, to enforce the Area Rules. Finally, ODA completes a post-evaluation to document progress in the SIA.

Any SIAs in this Management Area are described in Chapter 3.1.3.

1.8 Progress and Adaptive Management

1.8.1 Biennial Reviews

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

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

1.8.2 Agricultural Water Quality Monitoring

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

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

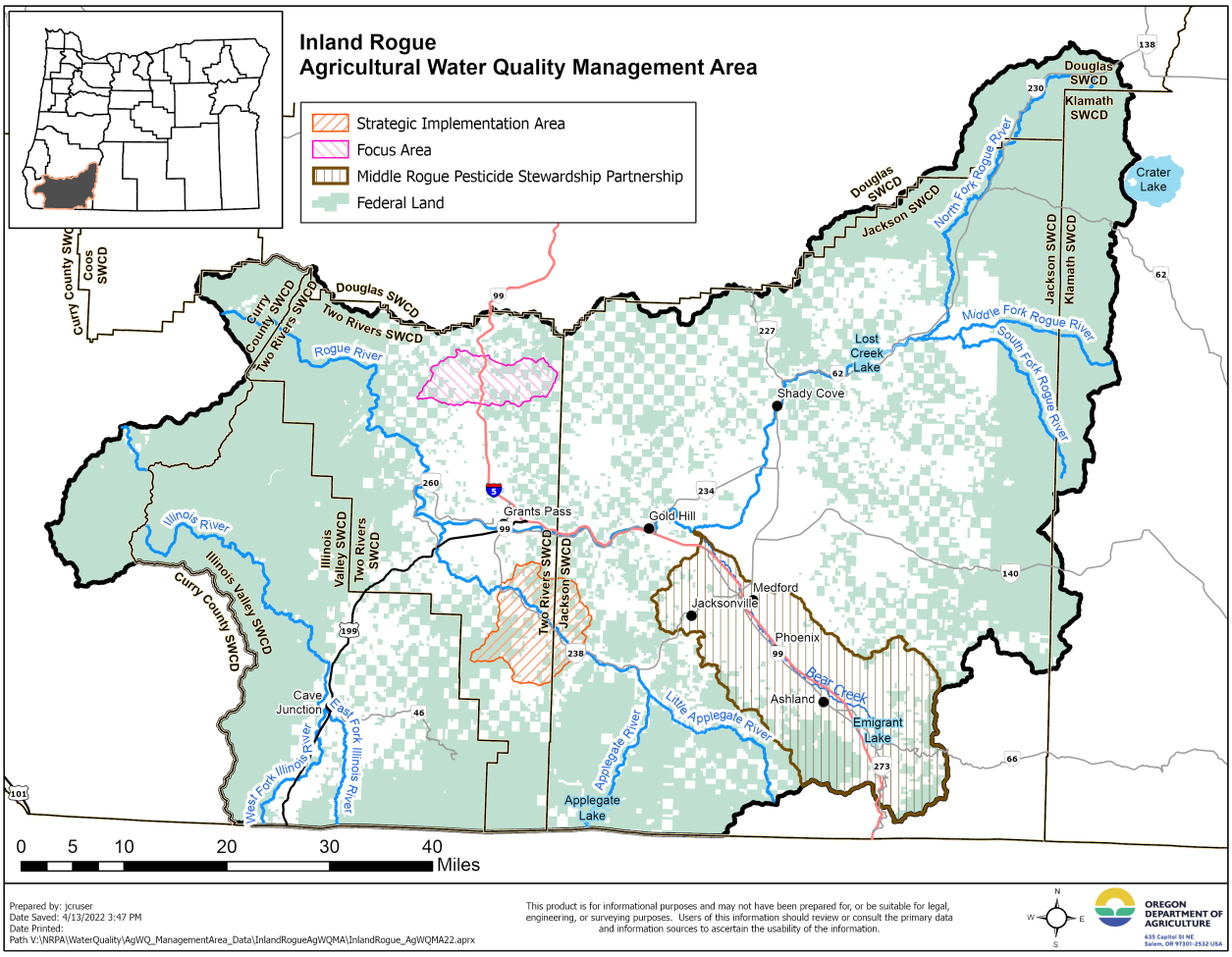
DEQ provides status and trends reports for selected parameters in relation to water quality standards. ODA will continue to work with DEQ to summarize the data results and how they apply to agricultural activities.

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

Chapter 2: Local Background

Chapter 2 provides the local geographic, water quality, and agricultural context for the Management Area. It also describes the water quality issues, Area Rules, and potential practices to address water quality issues.

Figure 2 Inland Rogue Management Area



2.1 Local Roles

2.1.1 Local Advisory Committee

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

Table 2.1.1 Current LAC members

Name	Geographic Representation	Description
Bob Niedermeyer (Chair)	Jacksonville	Alfalfa, grain, pesticide applicator
Bob Crouse	Grants Pass	Row crop, hay farmer
Greg Walch	Gold Hill	Conservation, small livestock
Paul Kay	Phoenix	Water technology innovations
Ron Hillers	Ashland	Jackson SWCD board
Ron Meyer	Medford	Orchards
Tom Dover	Little Butte Creek	Cattle
Dave Picanso	Jackson County	Livestock and hay producer
Gordon Jones	Jackson and Josephine Counties	OSU Extension Service agent
Rhett Nelson	East Illinois Valley	Hay, vegetables, flowers
Bob Webb	West Illinois Valley	Small-scale livestock
Vacant		

Former LAC members: Larry Ford, Colleen Roberts, Simon Hare, Denis Reich, 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

SWCDs implement Area Plans through OWEB capacity grants, with details negotiated between ODA and each SWCD. The resulting Scopes of Work define the SWCDs as the LMAs for implementation of the Ag Water Quality Program in specific Management Areas. The LMAs for this Management Area are Jackson, Two Rivers (Josephine), and Illinois Valley SWCDs. These SWCDs were also involved in development of the Area Plan and Area Rules.

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

2.2 Area Plan and Area Rules: Development and History

The director of ODA approved the initial Area Plan and Area Rules in 2011.

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

2.3 Geographical and Physical Setting

2.3.1 Geographic and Programmatic Scope

The Inland Rogue agricultural water quality planning process allows the Inland Rogue agricultural industry to take 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 lands with agricultural activities in Josephine and Jackson counties. Urban, rural residential, federal lands, and private commercial forestlands have their own water quality plans.

The Inland Rogue Management Area includes multiple subbasins that bear only slight resemblance to one another hydrologically, climatically, geomorphically, economically, and even culturally. 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 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.

Bear Creek Subbasin
The Bear Creek Subbasin is located around Medford 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.

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 U.S. 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.

Middle Rogue Subbasin
The Middle Rogue Subbasin includes the area from the confluence with the Rogue and the mainstem of Little Butte Creek to the Grants Pass area. Cattle ranching is 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 1 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.

Applegate River Subbasin

The Applegate River Subbasin is located in both Jackson and Josephine counties. The U.S. 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.

Rogue Basin Agricultural Production

Table 2.3.2 provides a snapshot of agriculture production in Jackson and Josephine counties. Data are taken from the 2017 USDA Census of Agriculture. Agricultural land use continues to decline in the Inland Rogue Basin.

Table 2.3.2 Agricultural production in Jackson and Josephine counties

Gross Farm and Ranch Sales 2017

	All Crops	All Animals	Total
Jackson County	$53,044,000	$18,003,000	$71,048,000
Josephine County	$8,605,000	$8,893,000	$17,498,000
Total	**$61,649,000**	**$26,896,000**	**$88,545,000**

Top Crops in Acres 2017

	Forage	Pears	Grapes	Vegetable Seeds	Vegetables Harvested, All	Berries	Corn for silage or greenchop	Total
Jackson County	20,307	3,818	2,847	Not available, data withheld by USDA	458			27,440
Josephine County	4,424		733		118	83	Not available, data withheld by USDA	5,358
Total	**24,731**	**3,818**	**3,580**	**--**	**576**	**83**	**--**	**32,798**

Livestock Inventory 2017

	Cattle and Calves	Sheep and Lambs	Horses and Ponies	Goats	Chickens	Hogs and Pigs	Turkeys
Jackson County	20,787	2,612	3,777	2,587	678	491	412
Josephine County	5,373	1,490	1,224	653	5,057	406	36
Total	**26,160**	**4,102**	**5,001**	**3,240**	**5,735**	**897**	**448**

2.3.3 Marijuana and Hemp

Commercial licensing of recreational marijuana production became legal in 2016. Hemp production became legal nationwide in 2018. 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. Illegal cannabis operations are under the jurisdiction of law enforcement. Cannabis operations are required to be in compliance with the Inland Rogue Agricultural Water Quality Rules. This Plan includes

information to assist cannabis operators to help ensure they do not cause pollution to surface or groundwater, including, but not limited to, Table 2.5.3g.

A significant increase in acreage planted in hemp occurred in 2020. Many agricultural fields that had either previously been uncultivated or were used for other crops such as pasture or hay, were tilled up and used to grow hemp. The market for hemp was not ready for the influx of product and farmers were most often not able to sell their crop for a meaningful profit. Hemp acreage was reduced significantly in 2021.

A significant increase in legal and illegal marijuana production occurred in 2021. The issue far exceeded the law enforcement, state agency, and county resources available to Jackson and Josephine counties. Illegal large scale production was also commonly associated with issues such as organized crime and human trafficking, and therefore safety was an issue for natural resource investigators. The increase also led to unprecedented illegal water use and extraction for irrigation of marijuana crops. This coincided with a prolonged severe drought in the region. Concerns over impacts to domestic wells and ecological impacts to aquatic stream life were raised across both counties.

The Illinois Valley SWCD produced a report of its findings regarding the impacts from the cannabis explosion on the watershed. The report can be found at: https://ivswcd.specialdistrict.org/cannabis-industry-impacts-to-the-environmental-health-of-the-illinois-river-basin-the-community-well-being

2.4 Agricultural Water Quality

2.4.1 Water Quality Issues

While this Area Plan applies to all agricultural water pollution, the objectives and strategies currently emphasize parameters on the 303(d) list and those with an approved TMDL.

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 Chapter 2.5 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 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 50 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 to be effective. It is equally important to quickly and reasonably address perceived disincentives in current water rights law and county tax code.

In Chapter 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 their human impacts in the Rogue Basin.

2.4.1.1 Beneficial Uses

Beneficial uses describe the activities that a water body supports. Water quality standards are established to protect the most sensitive beneficial uses of the state's waters. Multiple beneficial uses in the Inland Rogue River Management Area require clean water, including drinking water,

recreational activities, aquatic life, and agriculture (OAR 340-041-0271)
https://secure.sos.state.or.us/oard/viewSingleRule.action?ruleVrsnRsn=256045

While there may not be severe impacts on water quality from a single source or activity, the combined effects from all sources may contribute to the impairment of beneficial uses.

Table 2.4.1.1 Designated Beneficial Uses

OAR 340-041-0271
Table 271A
Designated Beneficial Uses
Rogue Basin

Beneficial Uses	Rogue River Estuary & Adjacent Marine Waters	Rogue River Main Stem from Estuary to Lost Creek Dam	Rogue River Main Stem above Lost Dam & Tributaries	Bear Creek Main Stem	All Other Tributaries to Rogue River & Bear Creek
Public Domestic Water Supply[1]		X	X	*	X
Private Domestic Water Supply[1]		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[2]	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			

[1] With adequate pretreatment (filtration & disinfection) and natural quality to meet drinking water standards
[2] See also Figures 271A and 271B for fish use designations for this basin.
* Designation for this use is presently under study

2.4.1.2 Water Quality Parameters of Concern

According to the 2018/20 Integrated Report, stream temperature and bacteria are the most common water quality impairments in the Rogue Basin. https://www.oregon.gov/deq/wq/Pages/epaApprovedIR.aspx.
Other primary water quality impairments in the Rogue Basin include sedimentation, pH, and dissolved oxygen. Water quality standards are intended to protect the most sensitive beneficial uses in a water body. These pollutants and others affect the most sensitive beneficial uses of water in the Rogue Basin including fish and aquatic life and water contact recreation.

Temperature
The temperature standard that applies to the Inland Rogue 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. Historical land use decisions and current management practices have led to non-point sources of thermal pollution including the removal of streamside trees and other vegetation, channel modification, warm water discharges from dams and irrigation canals, and flow modification. TMDLs have been established for the Rogue Basin that require actions to limit thermal loading to the waterbodies. Reducing stream temperature is important because excessive summer water temperatures threaten the survival of fish and other aquatic organisms.

Sediment/Turbidity
Sedimentation is a concern throughout the Rogue Basin. Sediment is a natural part of a healthy stream system with an equilibrium between sediment input, transport, and instream storage. This balance is disrupted by human activity including construction, road building, streambank stabilization and some forestry and agricultural practices. High turbidity events in the Rogue River cause drinking water suppliers to experience periodic shutdowns. Reeder Reservoir on Ashland Creek in the Middle Rogue and Beaver Creek in the Applegate subbasin have TMDLs in place to address sedimentation. DEQ is in the process of developing a statewide sedimentation assessment methodology that could be used for implementing the state's current narrative sedimentation standard.

Dissolved Oxygen/pH/Nutrients
Several stream reaches in the Inland Rogue Management Area are water quality limited due to low dissolved oxygen concentrations and pH exceedances. Excess nutrients found in urban and agricultural runoff can cause prolific algal growth. When algae decomposes in the water column oxygen is depleted. Low dissolved oxygen levels are harmful or fatal to aquatic life. Warm stream temperatures can also result in low dissolved oxygen levels. The dissolved oxygen, pH, and aquatic weeds or algae impairments in the Bear Creek watershed are being addressed through the Bear Creek TMDLs.

Flow/Habitat
While flow and habitat modifications are not considered pollutants, they directly impact instream temperatures and fish and aquatic life. Currently, most of the Inland Rogue River Management Area is closed to additional surface water rights. Many of these areas have been closed to further appropriation since the late 1950s when it was determined that natural surface water flow quantities were not adequate to satisfy all water rights. The regulation of flow is under the jurisdiction of the Oregon Water Resources Department.

Bacteria
Escherichia coli (E. coli) concentrations are measured to determine the risk of infection and disease to people. E. coli is a subset of fecal coliform bacteria that are found in the feces of humans and other warm blooded animals such as pets and livestock. High concentrations of bacteria in the Rogue Basin can result from runoff from streets, lawns, agricultural lands, and other sources of bacteria. Fecal coliform bacteria by themselves are not pathogenic but are a good indicator that disease causing organisms are present such as illness-causing bacteria, viruses, and parasites.

Harmful Algal Blooms
The occurrence of excessive algae and toxic algal blooms can be associated with excess nutrients, warm temperatures, and low rates of flow. Harmful algal bloom advisories have been issued for Willow Lake, Lost Creek Lake, Whetstone Pond, Lake Selmac, and Fish Lake. Several lakes have been identified as being of potential concern for excessive aquatic growth that could include harmful algal blooms: Agate Reservoir, Emigrant Reservoir, Horshoe Lake, and Indian Lake Reservoir.

Domestic Water Supply
Groundwater is the main source of domestic water for many rural residents. The primary water quality concerns in the Inland Rogue Management area are nitrate and bacteria in the valley and lowlands; and arsenic, salts and minerals, fluoride, and boron in the hills and mountain areas. Nitrate and bacteria are likely present due to human activities. Groundwater quantity is also an increasing concern as regions within the basin are experiencing a rapidly dropping water table.

Toxics
Toxics, including pesticides, pharmaceuticals from wastewater treatment plants, agricultural runoff, and urban stormwater sources, have been identified as a potential concern in the Inland Rogue Management Area. These compounds could impact surface water used for drinking as well as impact fish and aquatic life. Mercury has been detected in fish within the basin. Polychlorinated biphenyls (PCBs) and chlorinated pesticides have also been detected in fish and water samples in the basin.

Mercury
Primary sources of mercury in the Management Area include atmospheric deposition from global sources, land management activities, and natural conditions that result in runoff or sediment erosion that can transport mercury to streams as well as regulated point sources (wastewater, stormwater, and industrial discharges). Mercury is tightly bound to organic matter in soils, and has accumulated over long periods of time, resulting in legacy concentrations in soil. Mercury is toxic to humans and aquatic life at high concentrations and can accumulate via the food chain in fish that humans consume. Mercury sources have resulted in fish consumption advisories in the Inland Rogue Management Area.

Pesticides
Pesticides may harm human or animal life through acute or chronic exposures. In addition, the cumulative effects of multiple pesticides at low concentrations may increase the level of harm in ways that are currently not full understood. The US EPA has set acute and chronic exposure standards and benchmarks for the humans and aquatic species. In the Management Area, pesticide levels exceeding benchmarks to protect fish and invertebrates have been detected.

2.4.1.3 TMDLs and Agricultural Load Allocations

Many waterbodies 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, and 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 waterbody.

Waterbodies that do not meet water quality standards are placed on a state list of impaired waterbodies. 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

Table 2.4.1.3a was taken from the DEQ Rogue Basin Water Quality Status and Action Plan (2011) and 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 2.4.1.3a 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 (2008) (See Table 2.4.1.3b).

Table 2.4.1.3b TMDLs in the Inland Rogue Basin – Parameters and Adoption Dates

Basin	Temperature	Bacteria	Sedimentation	Phosphorous and Dissolved Oxygen and 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

ODA has recently initiated annual reporting to DEQ for agricultural water quality implementation related to TMDLs. See Chapter 4.2 for results for this Management Area.
Despite the best and most earnest efforts, natural events may interfere with or delay attainment of the TMDL and/or its associated surrogates. Such events could be but are not limited to flood, fire, insect infestations, and drought. Under the prevention and control measures in the Area Rules, landowners are not responsible for mitigating or dealing with factors that do not result from agricultural activities.

2.4.1.4 Drinking Water

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

Inland Rogue producers value drinking water quality. It is vital to their families and their communities. A total of 324 public water systems obtain domestic drinking water from groundwater and surface water sources to serve approximately 193,780 persons regularly in the Inland Rogue Agricultural Water Quality Management Area. Drinking water is an important beneficial use under the federal Clean Water Act. When Clean Water Act standards are met in source waters, a drinking water treatment plant using standard technology can generate water meeting the Safe Drinking Water Act maximum contaminant limits (MCLs).

Several public water systems have had alerts for Total Coliform or *E. coli* in the past 10 years. Seven public systems have recent MCL violations for *E. coli* (2018-21).

Twenty-four public water systems have had alerts for elevated nitrate concentrations in the past 10 years. A total of 634 of 8,569 private well tests for which there are data in the area (from 1989 to 2018) had elevated nitrate (≥3 mg/L) concentrations. Fifty-seven of these wells had nitrate concentrations greater than the MCL (10 mg/L). Contaminants in water supplies such as bacteria and nutrients can come from agricultural and residential sources. In the Management Area, private wells, and aquifers could be at risk of contamination.

Agricultural land uses (hay/pasture, livestock, grapes, cannabis, flowers and herbs, orchards) are present near many of the public water system wells and springs in the Management Area. The agricultural lands are dispersed throughout the Management Area.

DEQ's 2011 Rogue Basin Groundwater Investigation

Too much nitrate in drinking water is not safe. The federal Drinking Water Act standard for nitrate is 10 parts per million (ppm), or milligrams per liter of water (mg/l). Studies have shown that nitrate levels above this standard can cause health problems for elderly and immunocompromised 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 2.4.1.4a (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 2.4.1.4a 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 database (required by 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.

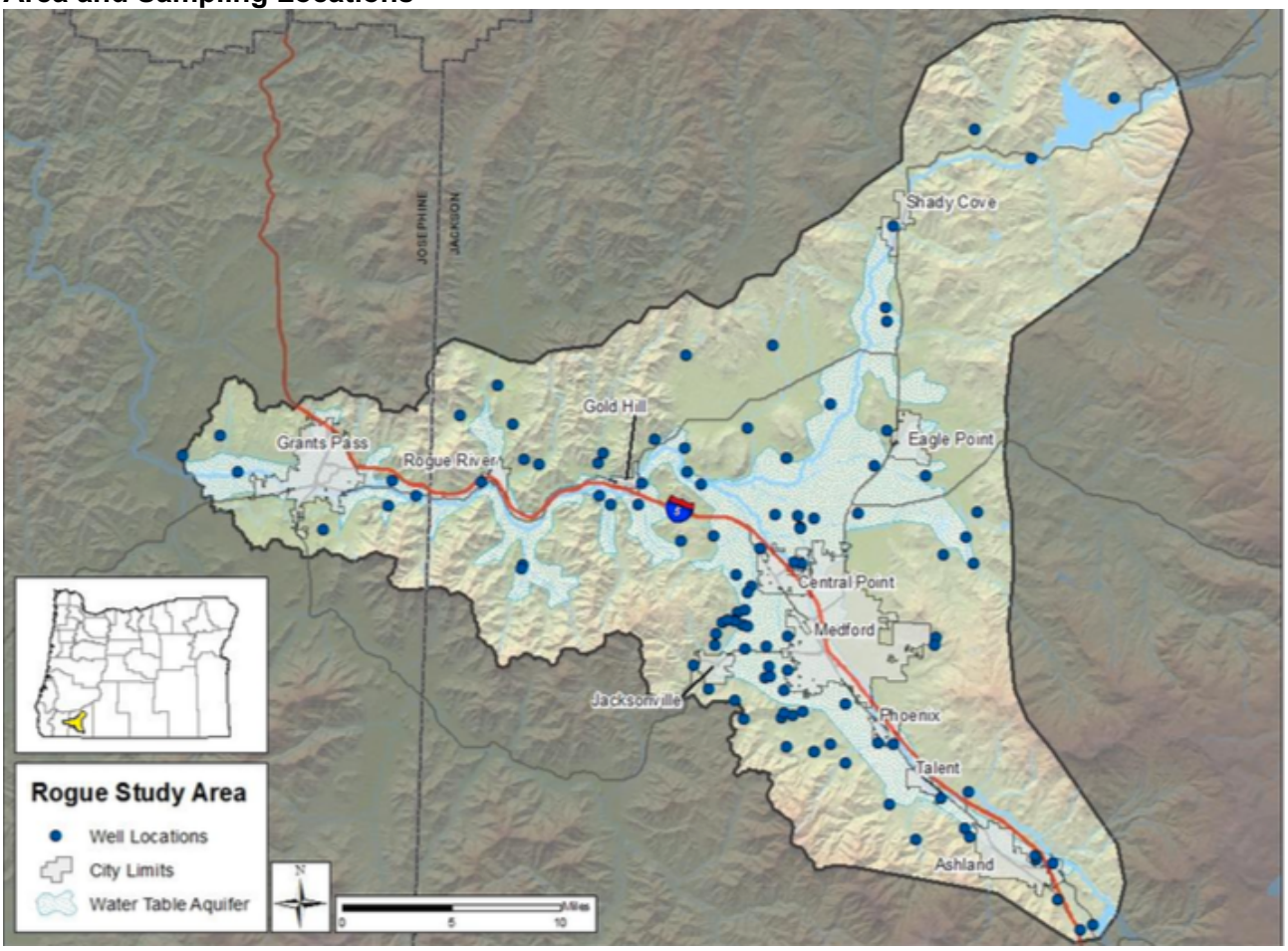
The study area spanned Jackson and Josephine counties, including the communities of Grants Pass, Shady Cove, Central Point, Medford, and Ashland. DEQ staff sampled 107 private, mostly domestic, wells for nitrate, arsenic, bacteria, pesticides, metals, and common ions over two sampling events in February 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 US EPA 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, 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 Chapter 2.5. Local agriculture is already investing in groundwater protection.

2.4.1.4b DEQ Mid-Rogue Basin 2015 Groundwater Monitoring Program Map of the Study Area and Sampling Locations



A follow-up analysis of the data from this study was conducted by Patton Environmental LLC for the Jackson SWCD. The following is a summary of the main conclusions from the 2017 report.

- The data for the study was collected by the Oregon DEQ in its Statewide Groundwater Quality testing, done in the Rogue Basin in 2015. Additional data was used from previous DEQ groundwater samples collected in the basin between 1992-2011. In the 2015 DEQ study, pesticides were detected in 38 percent of the wells tested (41/107), though at very low concentrations. A total of 21.5 percent of wells tested had two or more pesticides present. Some wells had four to seven different pesticides present. These are drinking water wells. The majority of detections were atrazine, simazine, and their breakdown products. The second most commonly detected pesticide was 2,6-Dichlorobenzamide, a breakdown product of dichlorbenil. Legacy, or banned pesticides (4,4-DDD) were analyzed for only 43/107 wells tested and were detected in 14 of those wells.

- Thirteen wells were sampled in both spring (February/March) and fall (October) to look for seasonal differences. Most wells had higher concentrations of pesticides in the spring than in the fall.

- There was a positive correlation between nitrate concentrations in the wells tested and pesticide detections.

2.5 Regulatory and Voluntary Measures

2.5.1 Area Rules

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 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 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 that 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.

- 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.
- 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.
- 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.
- "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 streambanks, 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 that 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 are 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 the 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 that 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 that may be affected: Bacteria, Sediment, Nutrients, Dissolved Oxygen, pH, Chlorophyll a

2.5.2 Agricultural Management Strategies to Address Water Quality Standards

2.5.2.1 How the 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 Agricultural Management Practices for Water Quality (Chapter 2.5.3) and Prohibited Conditions (Chapter 2.5.1).

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 2.5.3a through 2.5.3g 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 streamwater 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 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 Area 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.

2.5.2.2 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.

2.5.2.3 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.

2.5.2.4 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 to 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. Producers are encouraged to manage for healthy pasture grass conditions with proper rotation and stocking. Pastures can serve as a buffer zone if properly managed.

2.5.2.5 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.

2.5.2.6 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.

2.5.3 Menu of Better Agricultural Management Practices for Water Quality

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 B). 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 US EPA recommendations in this part of the state of Oregon.

What follows is a summary of some of the practices that 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 2.5.3a Drainage and Runoff Management Problems and Possible Solutions

Problem	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 waterways/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) that can be lost through erosion annually without causing significant degradation of the soil or potential for crop production.

Table 2.5.3b Vegetation Management Problems and Possible Solutions

Problem	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-inch and 4-inch 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-inch and 4-inch 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 2.5.3c Livestock Management Problems and Possible Solutions

Problem	Impacted Water Quality Parameter	Possible Solution
Visible gully erosion on more than 10 percent of livestock trails, paths, streambanks, 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-inch and 4-inch 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 2.5.3d 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 2.5.3e 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.

*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.

Table 2.5.3f Farm Storage Problems and Possible Solutions

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

Problem	Impacted Water Quality Parameter	Possible Solutions
Machinery and chemical storage within 50 feet 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 Aquatic life water quality criteria.

Table 2.5.3g 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 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 Oregon Water Resources Department 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.

Chapter 3: Implementation Strategies

Chapter 3 describes efforts to make and track progress toward the goals of the Area Plan. It presents the goals, measurable objectives, strategic initiatives, proposed activities, and monitoring efforts.

Responsibility of the Local Advisory Committee

OAR 603-090-0000 (3): 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 603-090-0020(4)(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.

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.

Goals

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.

Goal of the Plan: Prevent and control water pollution from agricultural activities and soil erosion, and to achieve applicable water quality standards.

The LAC established these objectives to achieve the Area Plan goal:

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
    - Hydropower
    - 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.

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

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

3.1 Measurable Objectives and Strategic Initiatives

Measurable objectives allow the Ag Water Quality Program to evaluate progress toward meeting water quality standards and TMDL load allocations. Any measurable objectives are stated here. Progress is reported in Chapter 4.1.

3.1.1 Management Area

ODA is working with SWCDs and LACs throughout Oregon toward establishing long-term measurable objectives to achieve desired conditions. Currently, ODA and the Inland Rogue SWCDs are using Focus Area measurable objectives and the Applegate SIA to show progress in this Management Area. These are described below.

3.1.2 Focus Areas and Other Coordinated Efforts in Small Watersheds

Focus Area 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.

Starting with the 2021-2023 biennium, Focus Areas are optional for SWCDs. All four of the Focus Areas closed since the last Area Plan update: Jackson SWCD: Little Butte Creek; Two Rivers SWCD: Williams Creek Watershed and Sunny Valley; and Illinois Valley SWCD: Upper Deer Creek. Progress up to the closure date for these Focus Areas is included in Chapter 4.

3.1.2.1 Jackson SWCD: Little Butte Creek Focus Area

The Little Butte Creek Watershed Focus Area closed June 30, 2021. The following is a brief description of the Focus Area. Final results are included in Chapter 4. The Jackson SWCD is continuing work in the Little Butte Creek Watershed as its Priority Area. The Priority Area does not have the same tracking, reporting, or measurable objective mechanisms as the Focus Area structure.

The Little Butte Creek 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. Irrigation improvements are a priority for the entire Focus Area. Streamside vegetation and other agricultural water quality improvements area a priority in the Antelope Creek subwatershed within the Little Butte Creek Watershed.

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

Streamside Vegetation Measurable Objectives and Associated Milestones:

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, 2021: Increase [Tree + Shrub] by 10 acres (2.5 %) to 201.2 acres (50.3%)

Irrigation Improvement Assessment Method: An inventory of flood, sprinkler, improved flood irrigated agricultural acreage within the Little Butte watershed was completed using GIS imagery and local knowledge. Open flood refers to traditional methods of flood irrigating fields such as filling field cross ditches so they overflow or opening headgates to allow flooding of fields. Sprinkler irrigation refers to the use of sprinkler systems such as pod irrigation systems, wheel lines, or pivots. Improved flood irrigation refers to the use of techniques such as gated pipe to control flood irrigation distribution, volume, and timing.

Irrigation Improvement Measurable Objectives and Associated Milestones:

Irrigation Conversion Focus Area Milestone for 2019-2021:

It is anticipated that work in this Focus Area will not be completed until sometime in fiscal year 2022. For this reason, the SWCD set its milestones for 2022.

Convert 742-940 acres (12 percent to 15 percent of the 6,300 irrigated acres in the watershed) from open flood to sprinkler irrigation systems by 2022.

Improve the efficiency of an additional 380-800 acres (6 percent to 13 percent of the 6,300 irrigated acres in the watershed) of open flood irrigation systems by 2022.

The majority of the work in the Focus Area for the 2019-2021 biennium is devoted to completion of projects started in the previous biennium and recruiting landowners, planning, designing and securing funding for new projects and completing implementation of current projects.

Table 3.1.2.1 Anticipated and Actual Changes of Irrigation Improvements

Year	**Acres - Flood to Sprinkler/Drip**		**Acres - Flood to Improved Flood**	
	Anticipated	Actual	Anticipated	Actual
2013-2014	72	72		
2014-2015	40-75	0		
2012016	150-200	0		0
2016-2017	100-150	0		0
2017-2018	90-120	0		0
2018-2019	90	94.4		0
2019-2020	200-300	48.9	0-60	0
2020-2021	0-20	Results reported in Chapter 4	0-100	Results reported in Chapter 4
2021-2022	0-75		0-60	
Total	**742-940**	**215.3**	**0-220**	**0**

Water Quality Sampling Assessment Method: The Jackson SWCD has developed and continues to implement a water quality monitoring project for the Antelope Creek subwatershed

in the Little Butte Creek watershed. The purpose of the Antelope Creek Monitoring Project (Project) is to document measurable changes in water quality parameters (which may include water temperature, *E. coli*, total phosphorus, turbidity, pH, dissolved oxygen (DO), nitrates and nitrites) in Antelope Creek that relate to the Hopkins Canal Piping Project and on-farm irrigation improvements that will result from the piping project. The Project will monitor water quality and instream flows at locations above and below 538 acres of irrigated agricultural lands served by the Hopkins Canal, as well as at the mouth of Antelope Creek.

Measurable Objectives and Associated Milestones: Measureable Objectives were not created for this monitoring project.

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

3.1.2.2 Two Rivers SWCD: Williams Creek Watershed Focus Area

The Williams Creek Watershed Focus Area closed June 30, 2021, and had been a Focus Area for the Two Rivers Soil and Water Conservation District since the 2015-2017 biennium. 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, dairy cows, and cannabis. 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.

Assessment Method: Streamside vegetation was evaluated with ODA's Streamside Vegetation Assessment (SVA) to characterize the type of ground cover within 35 feet of the stream. The metric is the number and percent of acres of different types of land cover viewed on aerial photographs.

Measurable Objectives and Associated Milestones:

- Baseline: In 2017: [Tree + Shrub] = 94.92 acres (65.6 percent) *(total Ag riparian area assessed =144.62 acres)*
- Milestone: By June 30, 2021: Increase Tree + Shrub by 12 acres (8 percent)

3.1.2.3 Two Rivers SWCD: Sunny Valley Focus Area

The Sunny Valley Focus Area closed June 30, 2021. The following is a brief description of the Focus Area. Final results are included in Chapter 4. The Two Rivers SWCD continues to provide outreach and technical assistance to landowners in this area.

Sunny Valley is located within the Klamath Range sheltered between two small ranges in the northernmost part of the district. The Sunny Valley Focus Area is about 28 square miles, with 18 percent in agricultural use. The primary types of agriculture include hay, livestock, horses, orchards, truck gardens, and cannabis. There are approximately 35 miles of streams in the Focus Area.

The original decision made in 2018-2019 fiscal year to open a Focus Area was based on a high landowner response to outreach and education opportunities provided in this area. Many of the landowners, both long term and newly arrived, are proactive in continual learning, planning, implementing, and maintaining personal property. They have since reached out to work with various organizations such as ODF, OWRD and NRCS for additional resource management assistance. The landowners in this area demonstrate that mindful management can improve their community and positively affect resource protection and sustainability.

Assessment Method: Streamside vegetation was evaluated with ODA's Streamside Vegetation Assessment (SVA) to characterize the type of ground cover within 35 feet of the stream. The metric is the number and percent of acres of different types of land cover viewed on aerial photographs.

Table 3.1.2.3 Assessment Results

SVA Map Category (Alphabetical)	2019: Pre-Assessment (or Conditions at Beginning of Biennium)*	2021: Post-Assessment (or Conditions at End of Biennium)	Reason for Change in Acreage
Ag Infrastructure	0.04	0.04	
Bare	3.74	3.74	
Bare Ag	6.56	6.56	
Grass	1.83	1.83	
Grass Ag	25.58	25.58	
Not Ag	2,133.88	2,133.88	
Shrub	15.41	15.41	
Shrub Ag	0.00	0.00	
Tree	291.88	291.88	
Tree Ag	0.00	0.00	
Water	14.54	14.54	
Total Acres	2,493.45	2,493.45	
Total Ag Acres Assessed (= Total Minus "Not Ag")	359.57	359.57	

Measurable Objectives and Associated Milestones: Measurable Objectives have not been created for this Focus Area.

3.1.2.4 Illinois Valley SWCD: Upper Deer Creek Focus Area

The Upper Deer Creek Focus Area closed June 30, 2021. 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 the 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.

Assessment Method: The Streamside Vegetation Assessment (SVA) was not completed.

Measurable Objectives and Associated Milestones: Measurable Objectives could not be set due to the SVA not being completed.

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

3.1.3 Strategic Implementation Areas (SIA)

Applegate River SIA (Initiated 2019)

The Applegate River SIA was initiated in collaboration with the Jackson SWCD, Two Rivers SWCD, and the Applegate Partnership and Watershed Council. The SIA includes sections of the Applegate River and the Caris Creek, Powell Creek, Slagle Creek, and Lower Williams Creek watersheds. The local agriculture includes nurseries, vineyards, livestock, dairies, cannabis, and orchards. The water quality concerns are for stream temperature, dissolved oxygen, nutrients, sediment, and bacteria.

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

Opportunity levels:

- **Likely in Compliance (LC):** ODA identified no likely agricultural water quality regulatory concerns, and the goals of the Area Plan are likely being achieved.
- **Restoration Opportunity (RO):** ODA identified no likely agricultural water quality regulatory concerns, but there is likely some opportunity for improvement through voluntary measures to reach the goals of the Area Plan.
- **Compliance Opportunity (CO):** ODA identified that agricultural activities may impair water quality or evaluation was inconclusive. There also may be an opportunity for improvement through voluntary measures to reach the goals of the Area Plan.
- **Potential Violation (PV):** During the Field Evaluation, ODA observed a potential violation of the Area Rules. There also may be an opportunity for improvement through voluntary measures to reach the goals of the Area Plan.

Measurable Objective:
By November 25, 2023, all 30 tax lots identified as a Potential Violation or a Compliance Opportunity will be downgraded to Restoration Opportunity or Likely in Compliance.

Monitoring: The monitoring plan was not completed.

3.1.4 Pesticide Stewardship Partnerships (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.

Middle Rogue PSP
The Middle Rogue Pesticide Stewardship Partnership (MRPSP) was established in 2014. Each year the MRPSP team collects water samples, which are analyzed by DEQ. MRPSP uses the results to identify pesticides of interest and concern; assess their use; and inform outreach and education efforts about water quality and pesticide use with MRPSP's stakeholders. Stakeholders include agricultural applicators; state and county agencies; irrigation districts; landscape contractors; public and private forestry managers; urban residents; industrial and commercial operations; and municipalities. The goal of the MRPSP is to reduce the frequency of detection and concentrations of pesticides within the monitored watersheds.

The Middle Rogue PSP Strategic Plan can be found here:
https://www.jswcd.org/middle-rogue-pesticide-stewardship-partnership-strategic-plan

Assessment Method:
The MRPSP monitors 134 pesticides and their constituents in four subwatersheds in the Bear Creek Watershed. Currently subwatersheds are: Jackson Creek, Larson Creek, Payne Creek, and Wagner Creek.

Results are included in Chapter 4.__

Measurable Objectives and Associated Milestones:
The overarching goal of the MRPSP is to reduce the frequency of pesticides detected at concentrations greater than 50 percent of the aquatic life benchmark within the monitored watersheds. More specifically, the goal is for any detection of a given pesticide to be categorized by DEQ as a Low Level of Concern. There are currently no dates or interim milestones attached to this goal.

3.1.5 Groundwater Management Area (GWMA)

There is no GWMA in this Management Area.

3.2 Proposed Activities

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

Table 3.2 Planned Activities for 2022-2025 throughout the Management Area by Jackson, Two Rivers, and Illinois Valley SWCDs

Activity	4-year Target	Description
Landowner Engagement		
# events that actively engage landowners (workshops, demonstrations, tours)	125	
# landowners participating in active events	2,500	
Technical Assistance (TA)		
# landowners provided with TA (via phone/walk-in/email/booth/site visit)	1,200	
# site visits	600	
# conservation plans written*	25	
On-the-ground Project Funding		
# funding applications submitted	40	
* Definition: any written management plan to address agricultural water quality concerns, such as: nutrients, soil health, grazing, irrigation, and streamside vegetation. Can include farm and ranch plans (including small acreages) and NRCS-certified plans. Excludes projects with weak connection to agricultural water quality.		

3.3 Additional Agricultural Water Quality and Land Condition Monitoring

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.

3.3.1 Water Quality

3.3.1.1 DEQ Ambient Monitoring

DEQ monitors water quality in the Management Area as part of its ambient monitoring network.

3.3.1.2 Long Term Stream Temperature Monitoring

The Rogue River Watershed Council is participating in a statewide, long-term project spearheaded by ODA to determine whether reduced summer stream temperatures can be documented as a result of streamside vegetation enhancement on agricultural lands. Monitoring started in 2017 and will continue for 20 years. Data are collected on stream temperature, air temperature, stream flows, and streamside vegetation. The Watershed Council selected Wagner Creek because it is a small watershed with productive agricultural lands, has a legacy of successful ODA-funded riparian restoration projects, and has a near-real time flow monitoring network. They are monitoring four sites; stream temperature data are provided to DEQ annually and are incorporated in DEQ's Status and Trends Reports. ODA will write the final report.

3.3.2 Land Conditions

There is no additional land condition monitoring.

Results of these additional monitoring activities are presented in Chapter 4.3.

Chapter 4: Progress and Adaptive Management

Chapter 4 describes progress toward achieving Area Plan goals and measurable objectives by summarizing accomplishments and monitoring results. Tracking activities is straightforward; monitoring water quality or land conditions takes more effort; relating changes in land conditions to changes in water quality is important but more challenging.

4.1 Measurable Objectives and Strategic Initiatives

The following tables provide the assessment results and progress toward measurable objectives and milestones in the past four years (2018-2021). See Chapter 3.1 for background and assessment methods.

4.1.1 Management Area

The Inland Rogue Management Area currently does not have Management Area-wide assessments or measurable objectives. ODA is working with SWCDs and LACs throughout Oregon toward establishing long-term measurable objectives to achieve desired conditions.

4.1.2 Focus Areas and Other Focused Efforts in Small Watersheds

Table 4.1.2.1 Jackson SWCD: Little Butte Creek Focus Area

Current Conditions

Progress Toward Measurable Objectives and Milestones

SVA: There was no change as a result of projects to the status of the riparian areas assessed in the SVA.

Irrigation Improvements:
There were 266.3 acres converted from the anticipated 742-940.

Year	Acres - Flood to Sprinkler/Drip		Acres - Flood to Improved Flood	
	Anticipated	Actual	Anticipated	Actual
2013-2014	72	72		
2014-2015	40-75	0		
2015-2016	150-200	0		0
2016-2017	100-150	0		0
2017-2018	90-120	0		0
2018-2019	90	94.4		0
2019-2020	200-300	48.9	0-60	0
2020-2021	0-20	51	0-100	0
2021-2022	0-75		0-60	
Total	**742-940**	**266.3**	**0 - 220**	**0**

Water Quality Sampling Assessment Method: Measureable Objectives were not created for this monitoring project.

Activities and Accomplishments	
Community and Landowner Engagement	
# active events that target landowners/ operators	**14**
# landowners/operators participating in active events	**117**
Technical Assistance (TA)	
# landowners/operators provided with TA	**212**
# site visits	**167**
# conservation plans written	**10**
Ag Water Quality Practices Implemented in the Focus Area	
Pond	**5 acres**
Irrigation Pipeline	**36,347 feet**
Irrigation System, Sprinkler	**89.2 acres**
Irrigation Water Management	**109.2 acres**
Pumping Plant	**62 #**
Structure for Water Control	**3 #**
Adaptive Management Discussion	
This Focus Area closed June 30, 2021. The Jackson SWCD plans to continue focused work in this area, as its Priority Area, for the foreseeable future.	

Table 4.1.2.2 Two Rivers SWCD: Williams Creek Watershed Focus Area

Measurable Objective and Milestone	
• Baseline: In 2017: [Tree + Shrub] = 94.92 acres (65.6 percemt) *(total Ag riparian area assessed =144.62 acres)* • *Milestone: By June 30, 2021: Increase* Tree + Shrub by 12 acres (8 percent)	
Current Conditions	
Progress Toward Measurable Objectives and Milestones SVA: There was no change as a result of projects to the status of the riparian areas assessed in the SVA.	
Activities and Accomplishments	
Community and Landowner Engagement	
# active events that target landowners/ operators	**8**
# landowners/operators participating in active events	**28**
Technical Assistance (TA)	
# landowners/operators provided with TA	**92**
# site visits	**2**
# conservation plans written	**0**
Ag Water Quality Practices Implemented in the Focus Area	
	0
Comments: Limited progress due to staff out on leave and limited landowner interest in implementing projects.	
Adaptive Management Discussion	
This Focus Area closed June 30, 2021.	

Table 4.1.2.3 Two Rivers SWCD: Sunny Valley Creek Focus Area

Measurable Objective
The Streamside Vegetation Assessment was completed. Measurable Objectives and Milestones had not been created for this Focus Area.
Current Conditions
Progress Toward Measurable Objectives and Milestones SVA: There was no change as a result of projects to the status of the riparian areas assessed in the SVA.

Activities and Accomplishments	
Community and Landowner Engagement	
# active events that target landowners/ operators	**1**
# landowners/operators participating in active events	**1**
Technical Assistance (TA)	
# landowners/operators provided with TA	**13**
# site visits	**1**
# conservation plans written	**1**
Ag Water Quality Practices Implemented in the Focus Area	
	0
Comments: Limited progress due to staff out on leave and limited landowner interest in implementing projects.	
Adaptive Management Discussion	
This Focus Area closed June 30, 2021. The SWCD continues to provide outreach and technical assistance to landowners in this area.	

Table 4.1.2.4 Illinois Valley SWCD: Upper Deer Creek Focus Area

Measurable Objective and Milestones	
Assessment Method: The Streamside Vegetation Assessment (SVA) was not completed. Measurable Objectives and Associated Milestones: Measurable Objectives could not be set due to the SVA not being completed.	
Activities and Accomplishments	
Community and Landowner Engagement	
# active events that target landowners/ operators	**6**
# landowners/operators participating in active events	**19**
Technical Assistance (TA)	
# landowners/operators provided with TA	**16**
# site visits	**27**
# conservation plans written	**0**
Ag Water Quality Practices Implemented in the Focus Area	
Irrigation Diversions	2 #
Erosion Control	5 acres
Surface Drain, Field Ditch	2 #
Fence	135 feet
Riparian Forest Buffer	0.1 acre
Irrigation System, Microirrigation	0.1 acre
Comments: Limited progress due to staff out on leave and limited landowner interest in implementing projects.	
Adaptive Management Discussion	
This Focus Area closed June 30, 2021.	

4.1.3 Strategic Implementation Areas

Table 4.1.3 2019 Applegate River SIA

Evaluation Results		
As of November 25, 2019, 30 tax lots were identified as either a Potential Violation or a Compliance Opportunity. PV = 0, CO = 30, RO = 97, LC = 1,609		
Measurable Objective		
By November 25, 2023, all 30 tax lots identified as a Potential Violation or a Compliance Opportunity will be downgraded to Restoration Opportunity or Likely in Compliance.		
Post Evaluation		
As of March 6, 2022, 26 tax lots identified as a Potential Violation or a Compliance Opportunity were downgraded to Restoration Opportunity or Likely in Compliance. PV = 0, CO = 4, RO = 123, LC = 1,609. The measurable objective was not achieved. ODA was unable to contact three landowners, who own a combined four tax lots, after multiple mailings and voicemail messages. The concerns were unable to be verified from a public viewpoint and those tax lots remain a Restoration Opportunity.		
Adaptive Management Discussion *Was measurable objective achieved?*		
SIA is closed and no additional work is able to be completed. ODA and partners did not meet their measurable objective due to wildfires, COVID-19 pandemic, and limited partner staff capacity. In addition, landowners were unresponsive to mailing campaigns or attending online meetings hosted by ODA and partners.		
Monitoring Activities		
Activity	**Accomplishment**	**Description**
ODA		
# acres evaluated	25,764	
# stream miles evaluated	67	
# landowners at Open House	2	Mutliple mailings, live online meeting, recorded meeting posted online and on SWCD website.
# landowners receiving outreach materials	183	
SWCD and Conservation Partners		
# landowners provided with technical assistance	0	
# site visits	0	
# conservation plans written	0	
SIA and Project Funding		
# funding applications submitted		$125,000 OWEB Grant for TA and monitoring

4.1.4 Pesticide Stewardship Partnerships

High concern pesticides for 2016-2021 are imidacloprid, metsulfuron methyl, diuron, and oxyfluorfen. These pesticides are in products registered for use by almost all watershed users, such as right of ways and industrial sites, not just agriculture.

Table 4.1.4 Middle Rogue Pesticide Stewardship Partnership

MRPSP pesticides of concern. Bars in the detection frequency column indicate annual values 2016-2021.

Compound	Selected Trade Names	# of Detections	Detection Frequency (%)		Number of Aquatic Life Benchmark Exceedances
Imidacloprid (Insecticide)	*Admire, Gaucho*	11	18		11
Metsulfuron-Methyl (Herbicide)	*Escort, Ally*	11	20		0
Diuron (Herbicide)	*Karmex, Direx, Kovar*	14	25		0
Oxyfluorfen (Herbicide)	*Goal, Goaltender, Galigan*	1	2		0

Measurable Objective (established 2021)
By December 31, 2026, reduce all pesticides of high concern to low concern. It will be difficult to meet the objective for imidacloprid because it is commonly used and will probably continue to be used as a substitute for other pesticides that are no longer available.
Current Conditions
High concern pesticides for 2016-2021 are imidacloprid, metsulfuron methyl, diuron, and oxyfluorfen
Activities and Accomplishments
-Since 2020 the MRPSP has created annual summaries, summarizing the previous year's sampling efforts and data. -Since 2020, The MRPSP has hosted annual meetings for local stakeholders and community members to summarize monitoring efforts and data results. -The MRPSP has participated in various community tabling events prior to 2020. -The MRPSP supports the Integrated Pesticide Management Festivals hosted by OSU's Southern Oregon Research & Extension Center. Additional information regarding the Middle Rogue PSP can be found at: https://www.jswcd.org/the-middle-rogue-pesticide-stewardship-partnership

4.1.5 Groundwater Management Area

There is no GWMA in this Management Area.

4.2 Activities and Accomplishments

ODA, the LAC, the LMA, and other partners identified the following priority activities to track progress toward meeting the goals and objectives of the Area Plan.

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

Many conservation activities have been implemented to benefit water quality. The SWCDs track activities that have been implemented through quarterly reports to ODA. 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.

Table 4.2a Activities conducted 2018-2021 throughout the Management Area by the Jackson SWCD, Two Rivers SWCD, Illinois Valley SWCD, and The Freshwater Trust

Activity	2-year results	Description
Landowner Engagement		
# events that actively engage landowners (workshops, demonstrations, tours)	104	Jackson SWCD: Mud and manure; water rights and irrigation water management; hemp cultivation practices; pond; pasture management; grazing management; soil protection; ag water quality management; National Water Quality Initiative Plan; weed control strategies
	11	Two Rivers SWCD: Booths – County Fair, What the HEMP x2, Displays, Wolf Creek satellite office. Engagement Event: fish passage and irrigation with local W/C
	24	Illinois Valley SWCD
	5	The Freshwater Trust
# landowners participating in active events	858	Jackson SWCD
	791	Two Rivers SWCD
	755	Illinois Valley SWCD:
Ag Water Quality Outreach Materials Distributed	347	Two Rivers SWCD
	6549	Illinois Valley SWCD
Technical Assistance (TA)		
# landowners provided with Technical Assistance (via phone/walk-in/email/booth/site visit)*	779	Jackson SWCD: Irrigation Improvement projects – flood to sprinkler; Irrigation conveyance -

		Hopkins Canal, Phillips ditch; Soil erosion control; Riparian Restoration; Rotational Grazing and general grazing management, fencing, and pasture management; Soil Health; invasive species; dryland pasture management; post wildfire rangeland recovery and riparian management next to pasture/hay fields; Joint system canal pipeline project; no-till seeding with District's equipment; irrigation water management including conversion to center pivots
	167	Two Rivers SWCD: Phone, walk-in, aerial & soil maps, hemp/cannabis, irrigation district landowners
	166	Illinois Valley SWCD:
# site visits	579	Jackson SWCD
	3	Two Rivers SWCD
	62	Illinois Valley SWCD
# conservation plans written**	21	Jackson SWCD
	3	Two Rivers SWCD
Projects implemented without grant funding	3	Hardened surface, seeding pasture (2)
		The Freshwater Trust: Modeled and mapped 124 stream miles and 41,430 acres of riparian land to prioritize areas that are most vulnerable to erosion and sediment loading in the Little Butte system using the Little Butte SLAM (Sediment Loss Analysis and Measurement) tool.
On-the-ground Project Funding		
# funding applications submitted	16	Jackson SWCD
	1	Two Rivers: Fish Passage + Irrigation Improvement TA (collaboration with local W/C)
	15	Illinois Valley SWCD

# funding applications awarded	18	Jackson SWCD: Includes Conservation Assistance Program funds directly from district, which help leverage funds from outside grantors, e.g., OWEB, DEQ, OWRD, etc. Also partnered with NRCS on CIS funding for on-farm irrigation conversion projects. Also, helped RRVID secure funding for the design and construction of the Hopkins Canal pipeline.
	2	Two Rivers SWCD: OWEB Large Grant, JoCo Economic Development
	8	Illinois Valley SWCD: $180,000 grants written and secured
		The Freshwater Trust: DWPP grant to fund development of the SLAM tool. Title II / BLM funding to improve habitat irrigation diversion. OWEB grants for ag water quality and habitat improvement in Little Butte Creek. USFS grant to reduce sediment inputs from agricultural lands and forest roads to protect Wild and Scenic Rivers. Contract with the city of Ashland to develop a thermal credit program to restore riparian areas. TFT's work since 2012 in the Rogue Basin has leveraged $13.3 million in funding and investments with an additional $7-10 million secured for restoration work

* Number reported likely double-counts some landowners due to tracking methods.
** Definition: any written management plan to address agricultural water quality concerns, such as: nutrients, soil health, grazing, irrigation, and streamside vegetation. Can include farm and ranch plans (including small acreages) and NRCS-certified plans. Excludes projects with weak connection to agricultural water quality.

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

Table 4.2b Implementation funding (cash and in-kind) for projects on agricultural lands reported 1997-2020 (OWRI data include most, but not all projects, implemented in the Management Area.)

Landowners	OWEB	DEQ	NRCS*	BOR	All other sources**	TOTAL
$1,625,907	$7,428,656	$236,807	$621,352	$36,333,200 (primarily the Savage Rapids Dam Removal)	$5,626,106	$51,872,028

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

Table 4.2c Miles and acres treated on agricultural lands reported 1997-2020 (OWRI data include most, but not all projects, implemented in the Management Area.)

Activity Type*	Miles	Acres	Count**	Activity Description
Upland		2,214		Irrigation system improvements, vegetation management
Road	5		20	
Streamside Vegetation	241	1,068		Tree plantings, treatment for nonnative and noxious plants, fencing
Wetland		8		
Instream Habitat	19			
Instream Flow	108		16 cfs	
Fish Passage	738		52	Dam removal, fish screen installation
TOTAL	**1,111**	**3,290**	**--**	

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

4.3.1 Water Quality

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

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

DEQ's ambient monitoring sites in the Inland Rogue Management Area include:
Rogue River at Robertson Bridge (Merlin), Rogue River at Rock Point Bridge (Gold Hill), Rogue River at Dodge Park, Applegate River at Highway 199, Little Butte Creek at Agate Road (White City), Bear Creek at Kirtland Road, Illinois River downstream of Kerby. These sites are shown as shaded in Table 4.3.1

The Oregon Department of Agriculture received funding in the 2011 Legislative Session to conduct water quality monitoring at agriculturally-influenced sites around the state. ODA worked with DEQ to select sites that would specifically determine trends in water quality from agricultural lands. The Applegate River at Murphy site (Station ID 36805) is located at river mile 12.75 and was selected as an agricultural specific site in the Inland Rogue Management area.

The site is representative of agricultural, as well as rural residential and forest land use upstream and is show as dark shading in Table 4.3.1

Table 4.3.1 shows surface waters with statistically significant trends of improving, degrading or holding steady for the period of 2016-2019. This table is a small subset of the over 1050 sites and parameters examined in the 2020 Status and Trends report. Sites that are degrading should be examined more closely to determine the potential source of the degradation while those sites that are improving or holding steady should seek to continue or improve current actions. The Applegate River at Murphy agricultural site is showing a steady trend for pH and no statistically significant trends for the other water quality parameters collected at that site.

Table 4.3.1 Surface waters showing improving, degrading, or steady statistical trends in the Rogue Basin (2016-2019).
Shaded sites are DEQ ambient sites. Dark shaded is ODA selected ambient chosen to examine potential agricultural impacts.

Station ID	Station Name	Subbasin Name	Parameter	Status[1,2] 2016-2019	Trend
11482-ORDEQ	Illinois River downstream of Kerby	Illinois	Dissolved oxygen (DO)	Attaining	**Improving**
14366000	APPLEGATE RIVER NEAR APPLEGATE, OR	Applegate	Temperature, water	Not Attaining	**Improving**
14369500	APPLEGATE RIVER NEAR WILDERVILLE, OR	Applegate	Temperature, water	Not Attaining	**Improving**
10421-ORDEQ	Rogue River at Hwy 234 (north of Gold Hill)	Middle Rogue	Total Phosphorus, mixed forms	Unassessed	**Improving**
10602-ORDEQ	Little Butte Creek at Agate Road (White City)	Upper Rogue	Total Phosphorus, mixed forms	Unassessed	**Improving**
11051-ORDEQ	Bear Creek at Kirtland Road (Central Point)	Middle Rogue	Total Phosphorus, mixed forms	Not Attaining	**Improving**
11051-ORDEQ	Bear Creek at Kirtland Road (Central Point)	Middle Rogue	Dissolved oxygen (DO)	Not Attaining	**Degrading**
10428-ORDEQ	Applegate River at Hwy 199 (near Wilderville)	Applegate	Escherichia coli	Not Attaining	**Degrading**
11482-ORDEQ	Illinois River downstream of Kerby	Illinois	Escherichia coli	Attaining	**Degrading**
10602-ORDEQ	Little Butte Creek at Agate Road (White City)	Upper Rogue	pH	Attaining	**Degrading**
11051-ORDEQ	Bear Creek at Kirtland Road (Central Point)	Middle Rogue	pH	Not Attaining	**Degrading**
11482-ORDEQ	Illinois River downstream of Kerby	Illinois	pH	Attaining	**Degrading**
14338000	ELK CREEK NEAR TRAIL, OR	Upper Rogue	Temperature, water	Not Attaining	**Degrading**
14359000	ROGUE AT RAYGOLD - CENTRAL POINT	Middle Rogue	Temperature, water	Not Attaining	**Degrading**
14361500	ROGUE RIVER AT GRANTS PASS, OR	Middle Rogue	Temperature, water	Not Attaining	**Degrading**
14362000	APPLEGATE RIVER NEAR COPPER, OR	Applegate	Temperature, water	Not Attaining	**Degrading**
10421-ORDEQ	Rogue River at Hwy 234 (north of Gold Hill)	Middle Rogue	Total suspended solids	Unassessed	**Degrading**
11051-ORDEQ	Bear Creek at Kirtland Road (Central Point)	Middle Rogue	Total suspended solids	Unassessed	**Degrading**
10423-ORDEQ	Rogue River at Hwy 234 (Dodge Park)	Upper Rogue	pH	Attaining	**Steady**
36805-ORDEQ	Applegate River at Murphy, OR	Applegate	pH	Attaining	**Steady**
14337600	ROGUE RIVER NEAR MCLEOD, OR	Upper Rogue	Temperature, water	Attaining	**Steady**

10418-ORDEQ	Rogue River at Robertson Bridge (Merlin)	Lower Rogue	Total Phosphorus, mixed forms	Unassessed	**Steady**
10423-ORDEQ	Rogue River at Hwy 234 (Dodge Park)	Upper Rogue	Total Phosphorus, mixed forms	Unassessed	**Steady**
10428-ORDEQ	Applegate River at Hwy 199 (near Wilderville)	Applegate	Total Phosphorus, mixed forms	Unassessed	**Steady**
11482-ORDEQ	Illinois River downstream of Kerby	Illinois	Total Phosphorus, mixed forms	Unassessed	**Steady**
11482-ORDEQ	Illinois River downstream of Kerby	Illinois	Total suspended solids	Unassessed	**Steady**

[1] Total Phosphorus will be marked as unassessed because DEQ has no benchmark for total phosphorus in this Management Area. ODA benchmark for potential water quality concerns = 0.08 mg/L total phosphorus.
[2] TSS will be marked as unassessed because DEQ has no benchmark for Total Suspended Solids in this Management Area
Source DEQ Status and Trends Report: www.oregon.gov/deq/wq/programs/Pages/wqstatustrends.aspx

4.3.2 Land Conditions

There is no additional land condition monitoring.

4.4 Biennial Reviews and Adaptive Management

ODA, the LAC, the LMA, and other partners met on June 23, 2022, to review implementation of the Area Plan and provide recommendations for the future (Tables 4.4a and 4.4b).

Table 4.4a Summary of biennial review discussion

Progress
Jackson SWCD continues to make significant progress in its Little Butte Priority Area (formerly a Focus Area). Impressive irrigation pipeline projects in partnership with irrigation districts, support for landowners recovering from wildfire, and a skilled, respected, and expanding staff are among its ongoing accomplishments. The Applegate SIA nearly achieved its Measurable Objective, with only two remaining Opportunity for Improvement concerns. All other concerns were addressed through ODA's process. The Illinois Valley SWCD produced a stunning report capturing the impacts from illegal cannabis operations in its watershed. This report was used to inform the public, legislators, agencies, and others. Two Rivers SWCD gained additional staff are are pursuing projects as well as strengthening partnerships in its district.
Impediments
The past several years have brought a prolonged drought to the region. This has created unprecedented low volumes of irrigation water available to irrigation districts in the Management Area. For example, the irrigation season for the Talent Irrigation District, that serves much of the Bear Creek Watershed, was terminated in early July 2021. Previously viable wells were running dry. There has been a dramatic increase in marijuana and hemp production over the past four years in the Inland Rogue MA. There are implications for water quality and water quantity. The region experienced rampant illegal water use without water rights during a severe drought. Decreased water instream is likely to result in water quality degradation including increased stream temperature, higher concentrations of pollutants, increased algal blooms, etc. Excessive sediment, nutrients, and pesticides, as well as riparian vegetation removal, are all common occurrences and concerns associated with the cannabis boom.

Impacts from wildfires, exacerbated by the drought, are negatively affecting already stressed ecological systems. During and following wildfires, additional sediment and nutrients can enter the waterways. The loss of trees for shade can increase stream temperatures. This makes it even more important that additional stressors, such as agricultural impacts, are minimized.

Recommended Modifications and Adaptive Management

- Prioritize outreach regarding Ag Water Quality Rules, Plan, Program to relevant groups, ag landowners new to the area.
- Consider adding Ag Water Quality information to the 4-H, FFA curriculum.
- Add Ag Water Quality information to the memos/mailings from the various irrigation districts.
- Prioritize funding for monitoring. Request for DEQ to train SWCD monitoring staff.
- Identify ag water quality concern hot spots. Focus work in those areas.
- Convene the LAC more often to discuss concerns and make progress.

Table 4.4b Number of ODA compliance activities in 2018-2021

Location	Cases		Site Visits	Agency Actions				
				Letter of Compliance		Pre-Enforcement Notification	Notice of Noncompliance	Civil Penalty
	New	Closed		Already in compliance	Brought into compliance			
Outside SIA	35	38	45	7	18	31	1	0
Within SIA	1	2	2	0	1	1	0	0

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 603-095-0010(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: Pollution Prevention and Control Program for Oregon's Coastal Waters-Coastal Zone Act Reauthorization Amendments of 1990 Management Practices

Developed to meet the requirements of Section 6217(g) of the Coastal Zone Act Reauthorization Amendments of 1990.

This state program was developed to meet the requirements of Section 6217(g) of the Coastal Zone Act Reauthorization Amendments (CZARA) of 1990. It was submitted to the federal government by the DEQ and the Oregon Department of Land Conservation & Development.

The USEPA explains the history and reasoning for the CZARA in part as follows:

On November 5, 1990, Congress enacted the CZARA of 1990. These Amendments were intended to address several concerns, a major one of which is the impact of nonpoint source pollution on coastal waters.

Nonpoint source pollution is increasingly recognized as a significant factor in coastal water degradation. In urban areas, storm water and combined sewer overflow are linked to major coastal problems, and in rural areas, runoff from agricultural activities may add to coastal pollution.

To address more specifically the impacts of nonpoint source pollution on coastal water quality, Congress enacted section 6217, "Protecting Coastal Waters," which was codified as 16 U.S.C. -1455b. This section provides that each state with an approved coastal zone management program must develop and submit to EPA and the National Oceanic and Atmospheric Administration for approval 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,” to meet the requirements of the CZARA of 1990 6217(g), the following management measures for agriculture were developed, based upon the original measures provided in the USEPA's "Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters."

MANAGEMENT MEASURES FOR AGRICULTURE

1. Erosion and Sediment Control Management Measure
Apply the erosion component of a Conservation Management System (CMS) as defined in the Field Office Technical Guide 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 when 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.