Inland Rogue Agricultural Water Quality Management Area Plan

Developed by the:

Inland Rogue Local Advisory Committee

Oregon Department of Agriculture

With support from the:

Jackson, Josephine, and Illinois Valley Soil and Water Conservation Districts

Date:
March 23, 2016

ODA and SWCD Contact Information

Oregon Department of Agriculture
Water Quality Program
635 Capitol Street NE
Salem, Oregon 97301
Phone: (503) 986-4700
www.oregon.gov/ODA/NRD/pages/water_quality_front.aspx

Jackson SWCD
89 Alder St., Central Point, OR 97502
(541) 664-1070
https://jswcd.org/

Josephine SWCD
1440 Parkdale Drive, Grants Pass, OR 97527
(541) 474-6840

Illinois Valley SWCD
PO Box 352
102 S Redwood Highway
Cave Junction, OR 97523
(541) 592-3731
http://www.ivstreamteam.org/

Table of Contents

Acronyms and Terms Used in this Document i

Foreword 1

Required Elements of Area Plans 1

Plan Content 1

Chapter 1: Agricultural Water Quality Management Program Purpose and Background 3

1.1 Purpose of Agricultural Water Quality Management Program and Applicability of Area Plans 3

1.2 History of the Ag Water Quality Program 3

1.3 Roles and Responsibilities 4

1.3.1 Oregon Department of Agriculture 4

1.3.2 Local Management Agency 7

1.3.3 Local Advisory Committee 7

1.3.4 Agriculture's Role 7

1.3.5 Public Participation 8

1.4 Agricultural Water Quality 8

1.4.1 Point and Nonpoint Sources of Water Pollution 8

1.4.2 Beneficial Uses and Parameters of Concern 8

1.4.3 Impaired Water Bodies and Total Maximum Daily Loads (TMDLs) 9

1.4.4 Water Pollution Control Law – ORS 468B.025 and ORS 468B.050 9

1.4.5 Streamside Vegetation and Agricultural Water Quality 10

1.5 Other Water Quality Programs 11

1.5.1 Confined Animal Feeding Operation (CAFO) Program 11

1.5.2 Groundwater Management Areas 11

1.5.3 The Oregon Plan for Salmon and Watersheds 12

1.5.4 Pesticide Management and Stewardship 12

1.5.5 Drinking Water Source Protection 13

1.5.6 Oregon's Coastal Management Program and Coastal Zone Management Act Reauthorization Amendments of 1990 13

1.6 Partner Agencies and Organizations 13

1.6.1 Oregon Department of Environmental Quality 13

1.6.2 Other Partners 14

1.7 Measuring Progress 14

1.7.1 Measurable Objectives 14

1.7.2 Land Conditions and Water Quality 15

1.7.3 Focused Implementation in Small Geographic Areas 15

1.8 Monitoring, Evaluation, and Adaptive Management 16

1.8.1 Statewide Aerial Photo Monitoring of Streamside Vegetation 16

1.8.2 Agricultural Ambient Water Quality Monitoring 17

1.8.3 Biennial Reviews and Adaptive Management 17

Chapter 2: Local Background 19

2.1 Local Roles and Responsibilities 19

2.1.1 Local Advisory Committee (LAC) 19

2.1.2 Local Management Agency 19

2.2 Area Plan and Regulations: Development and History 19

2.3 Geographical and Physical Setting 19

2.3.1 Geographic and Programmatic Scope 19
2.3.2 Map of the Management Area 20
2.3.3 Location, Water Resources, Land Use, Land Ownership, Agriculture 21
2.4 Agricultural Water Quality in the Management Area 24
2.4.1 Local Issues of Concern 24
2.4.2 303(d) List of Impaired Water Bodies and Basin TMDLs 25
2.4.3 Beneficial Uses and Parameters of Concern 26
2.5 Prevention and Control Measures 29
2.5.1 How the AgWQM Area Plan Addresses the Temperature Standard 29
2.5.2 How the AgWQM Area Plan Addresses the Bacteria Standard 30
2.5.3 Menu of Better Management Practices 30
2.5.4 Prohibited Conditions 36

Chapter 3: Goals, Objectives, and Strategies 41
3.1 Responsibility of the Local Advisory Committee: 41
3.2 Intent of the Rogue Basin Agricultural Water Quality Local Advisory Committee 41
3.3 Goals and Objectives 41
3.3.1 Goal of the Committee 41
3.3.2 Goal of the Plan 41
3.4 Objectives 42
3.4.2 Measurable Objectives 42
3.5 Strategies for Area Plan Implementation 46
3.5.1 Education and Outreach 46
3.5.2 Inland Rogue AgWQ Plan Outreach and Education Strategies 46
3.5.3 Conservation Planning and Conservation Activities 47
3.5.3 Funding 48
3.5.4 Monitoring and Evaluation 48

Chapter 4: Implementation, Monitoring, and Adaptive Management 51
4.1 Implementation and Accomplishments 51
4.2 Water Quality Monitoring—Status and Trends 53
4.3 Progress Toward Measurable Objectives 53
4.4 Aerial Photo Monitoring of Streamside Vegetation 53
4.5 Biennial Reviews and Adaptive Management 55

References 57

Appendix A - Inland Rogue Basin Area Water Quality Plan Glossary 59

Appendix B - Inland Rogue AgWQM Area 61

Appendix C - Inland Rogue AgWQM Area Ownership 62

Appendix D - Inland Rogue AgWQM Area Soil and Water Conservation District Boundaries 63

Appendix E - Fish Use Designations 64

Appendix F - Watershed Council, SWCD, and Financial Assistance Contact Information 65

Appendix G - Compliance Procedures Flow Chart 67

Appendix H - Coastal Zone Management Act Measures 69

Appendix I - Common Agricultural Water Quality Parameters of Concern 71

Acronyms and Terms Used in this Document

Ag Water Quality Program – Agricultural Water Quality Management Program
Area Plan – Agricultural Water Quality Management Area Plan
Area Rules – Agricultural Water Quality Management Area Rules
CAFO – Confined Animal Feeding Operation
CNPCP – Coastal Nonpoint Pollution Control Program
CP – Civil Penalty
CWA – Clean Water Act
CZARA – Coastal Zone Act Reauthorization Amendments
DEQ – Oregon Department of Environmental Quality
EPA – Environmental Protection Agency
EQC – Environmental Quality Commission
FOTG – Field Office Technical Guide
GWMA – Groundwater Management Area
HUC – Hydrologic Unit Code
IPM – Integrated Pest Management
LAC – Local Advisory Committee
LMA – Local Management Agency
LOC – Letter of Concern
LOW – Letter of Warning
Management Area – Agricultural Water Quality Management Area
MOA – Memorandum of Agreement
NON – Notice of Noncompliance
NPDES – National Pollution Discharge Elimination System
NRCS – Natural Resources Conservation Service
OAR – Oregon Administrative Rules
ODA – Oregon Department of Agriculture
ODFW – Oregon Department of Fish and Wildlife
ORS – Oregon Revised Statute
OSU – Oregon State University
OWEB – Oregon Watershed Enhancement Board
PMP – Pesticides Management Plan
PSP – Pesticides Stewardship Partnership
Regulations – Agricultural Water Quality Management Area Regulations
RUSLE – Revised Universal Soil Loss Equation
SB – Senate Bill
SWCD – Soil and Water Conservation District
T – Soil Loss Tolerance Factor
TMDL – Total Maximum Daily Load
USDA – United States Department of Agriculture
US EPA – United States Environmental Protection Agency
USLE – Universal Soil Loss Equation
VOC – Volatile Organic Chemical
WQA – Water Quality Advisory
WQPMT – Water Quality Pesticides Management Team

Foreword

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

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

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

Plan Content

Chapter 1: Agricultural Water Quality Management Program Purpose and Background. The purpose is to have consistent and accurate information about the Ag Water Quality Program.

Chapter 2: Local Background. Provides the local geographic, water quality, and agricultural context for the Management Area. Describes the water quality issues, Agricultural Water Quality Management Area Rules (Area Rules), and available or effective practices to address water quality issues.

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

Chapter 4: Local Implementation, Monitoring, and Adaptive Management. Summarizes land condition and water quality status and trends to assess progress toward the goals and objectives in Chapter 3.

Chapter 1: Agricultural Water Quality Management Program Purpose and Background

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

As part of Oregon's Agricultural Water Quality Management Program (Ag Water Quality Program), the Area Plan guides landowners and partners such as Soil and Water Conservation Districts (SWCDs) in addressing local agricultural water quality issues. The purpose of the Area Plan is to identify strategies to prevent and control water pollution from agricultural activities and soil erosion (ORS 568.909(2)) on agricultural and rural lands for the area 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 Agricultural Water Quality Management Area Local Advisory Committee (LAC), with support and input from the SWCD and the Oregon Department of Environmental Quality (DEQ). The public was invited to participate in the original development and approval of the Area Plans and is invited to participate in the biennial review process. The Area Plan is implemented using a combination of outreach, conservation and management activities, compliance, 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 OAR regulations 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 regulations for this Management Area (OAR 603-095-1440). The Ag Water Quality Program's general OARs guide the Ag Water Quality Program, and the OARs for the Management Area are the regulations that landowners are required to follow.

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

- Large commercial farms and ranches.
- Small rural properties grazing a few animals or raising crops.
- Agricultural lands that lay idle or on which management has been deferred.
- Agricultural activities in urban areas.
- Agricultural activities on land subject to the Forest Practices Act (ORS 527.610).

1.2 History of the Ag Water Quality Program

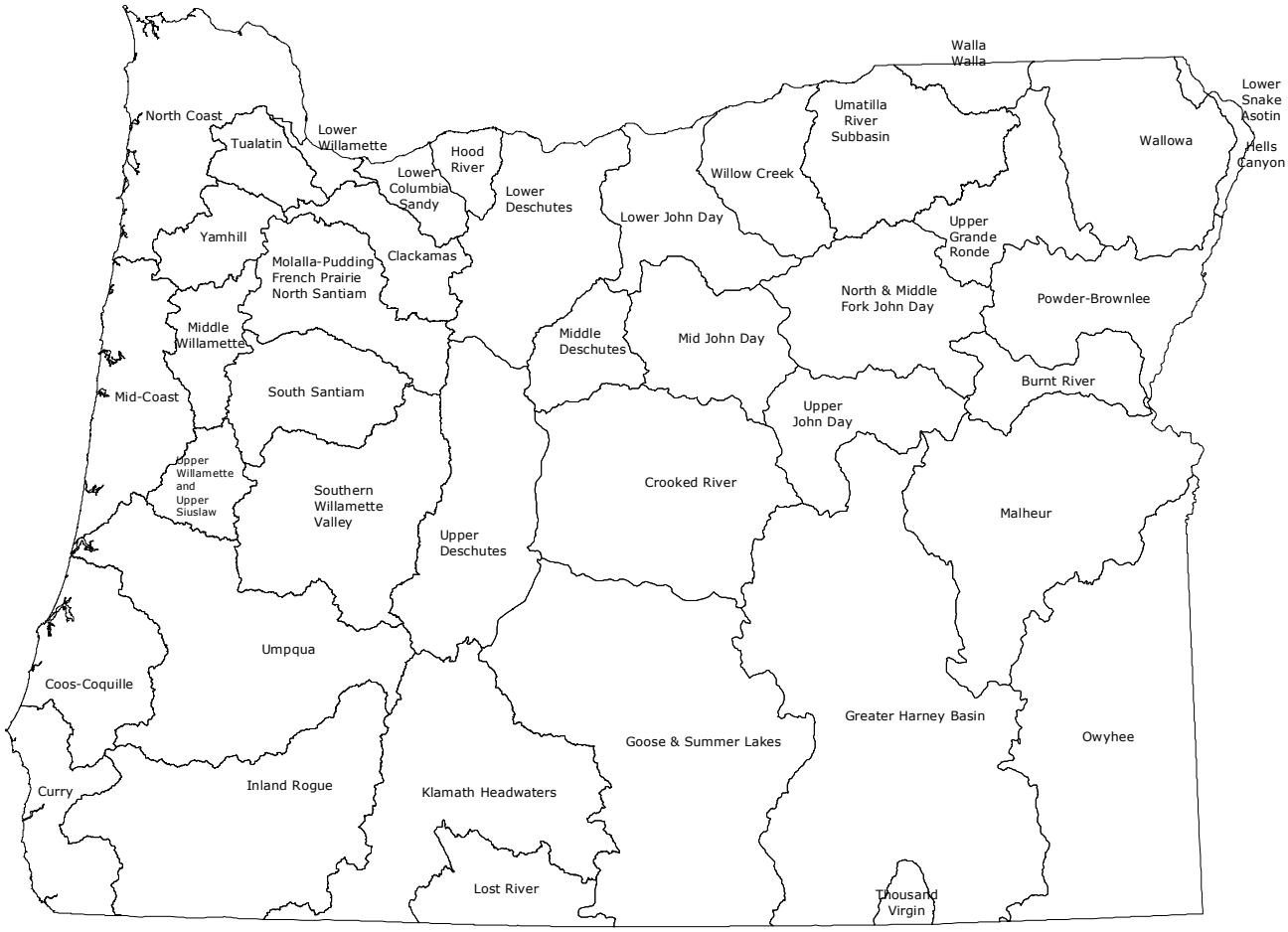
In 1993, the Oregon Legislature passed the Agricultural Water Quality Management Act (formerly known as "Senate Bill 1010") directing ODA to develop plans to prevent and control water pollution from agricultural activities and soil erosion, and to achieve water quality standards (ORS 568.900 through ORS 568.933). Senate Bill 502 was passed in 1995 to clarify that ODA regulates agriculture with respect to water quality (ORS 561.191). The Area Plan and its associated regulations were developed and subsequently revised pursuant to these statutes.

Between 1997 and 2004, ODA worked with LACs and SWCDs to develop Area Plans and associated regulations in 38 watershed-based Management Areas across Oregon (Figure 1). Since 2004, ODA, LACs, SWCDs, and other partners have focused on implementation including:

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

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

Figure 1: Map of the 38 Agricultural Water Quality Management Areas



1.3 Roles and Responsibilities

1.3.1 Oregon Department of Agriculture

The Oregon Department of Agriculture is the agency responsible for implementing the Ag Water Quality Program (ORS 568.900 to 568.933, ORS 561.191, OAR 603-090, and OAR 603-095). The Ag Water Quality Program is intended to meet the needs and requirements related to agricultural water pollution including:

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

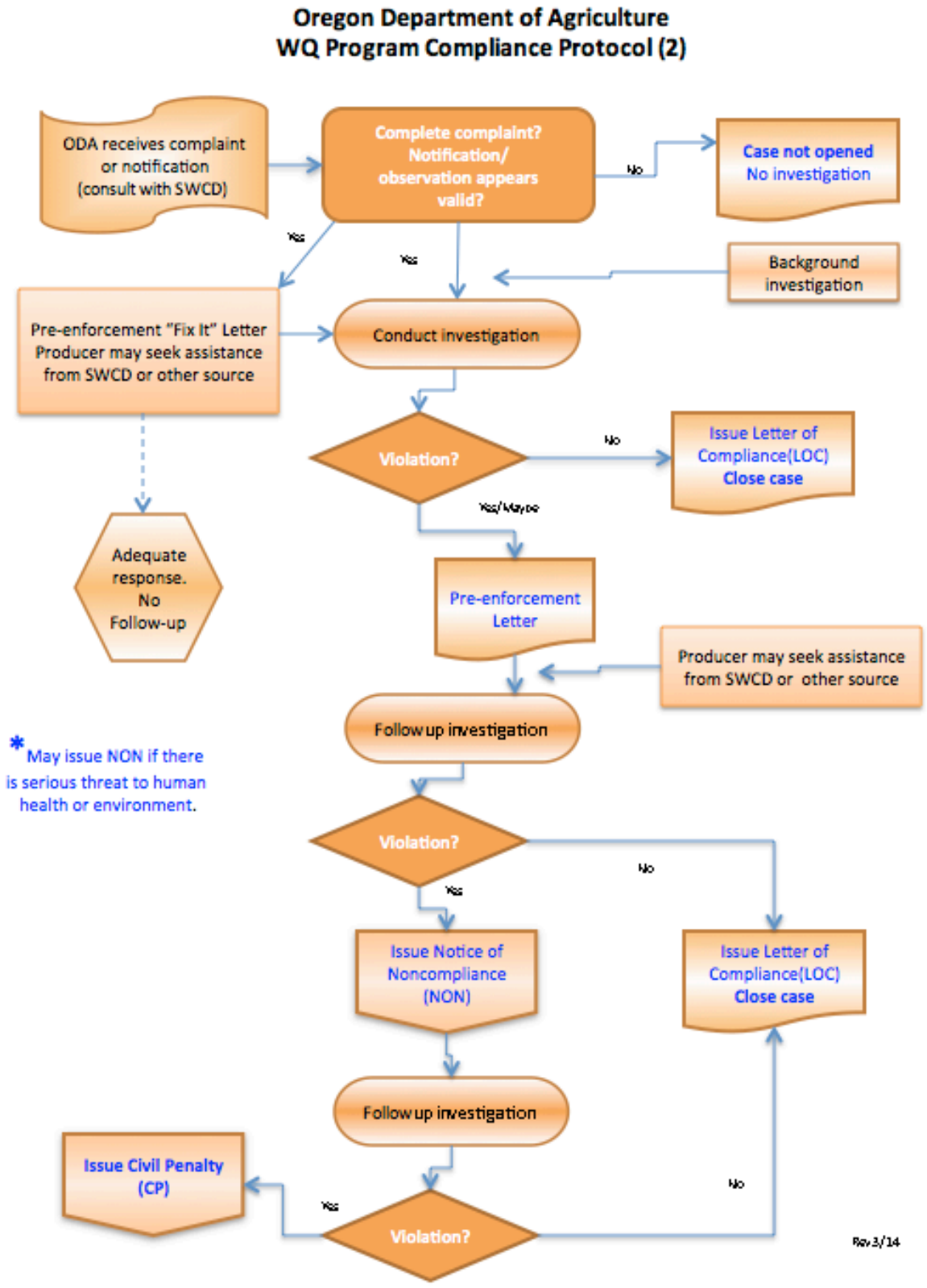
- Approved management measures for Coastal Zone Act Reauthorization Amendments (CZARA).
- Agricultural activities detailed in a Groundwater Management Area (GWMA) Action Plan (if a GWMA has been established and an Action Plan developed).

The Oregon Department of Agriculture has the legal authority to develop and implement Area Plans and associated regulations for the prevention and control of water pollution from agricultural activities and soil erosion, where such plans are required by state or federal law (ORS 568.909 and ORS 568.912). ODA bases Area Plans and regulations 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 associated regulations. ODA has responsibility for any actions related to enforcement or determination of noncompliance with regulations (OAR 603-090-0080 through OAR 603-090-0120). ORS 568.912(1) and ORS 568.912(2) give ODA the authority to adopt regulations that require landowners to perform actions necessary to prevent and control pollution from agricultural activities and soil erosion.

The emphasis of the Area Plan is on voluntary action by landowners or operators to control the factors affecting water quality in the Management Area. The regulations are outlined as a set of minimum standards that landowners and operators must be meet on all agricultural or rural lands.

The Oregon Department of Agriculture will use enforcement where appropriate and necessary to gain compliance with agricultural water quality regulations. Figure 2 outlines ODA's compliance process. Any enforcement action will be pursued 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 Order such as a Notice of Noncompliance. If a Notice of Noncompliance is issued, ODA will direct the landowner or operator to remedy the condition through required corrective actions (RCAs) under the provisions of the enforcement procedures outlined in OAR 603-090-060 through OAR 603-090-120. If a landowner does not implement the RCAs, civil penalties may be assessed for continued violation of the regulations. See the Compliance Flow Chart for a diagram of the compliance process. If and when other governmental policies, programs, or regulations conflict with the Area Plan or associated regulations, ODA will consult with the appropriate agency to resolve the conflict in a reasonable manner.

Figure 2: Compliance Flow Chart



1.3.2 Local Management Agency

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

The day-to-day implementation of the Area Plan is accomplished through an intergovernmental agreement between ODA and each SWCD. Each SWCD implements the Area Plan by providing outreach and technical assistance to landowners. SWCDs also work with ODA and the LAC to establish implementation priorities, evaluate progress toward meeting Area Plan goals and objectives, and revise the Area Plan and associated regulations 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 to assist with the development and subsequent biennial reviews of the local Area Plan and associated regulations. The LAC serves in an advisory role to the director of ODA and to the Board of Agriculture. LACs are made up primarily of agricultural landowners in the Management Area and must reflect a balance of affected persons.

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

- Participate in the development and ongoing revisions of the Area Plan.
- Participate in the development and revisions of the regulations.
- 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 regulations.
- Submit written biennial reports to the Board of Agriculture and the ODA director.

1.3.4 Agriculture's Role

Each individual landowner or operator in the Management Area is required to comply with the regulations, which set minimum standards. However, the regulations alone are not enough. To achieve water quality standards, individual landowners also need to attain land conditions that achieve the goals and objectives of the voluntary Area Plan. Each landowner or operator is not individually responsible for achieving water quality standards, agricultural pollution limits, or the goals and objectives of the Area Plan. These are the responsibility of the agricultural community collectively. Achieving water quality standards will take the collective efforts of all people and land uses within the watershed, with agriculture playing its role.

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

Under the Area Plan and associated regulations, agricultural landowners and operators are not responsible for mitigating or addressing factors that do not result from agricultural activities, such as:

- Conditions resulting from unusual weather events.
- Hot springs, glacial melt water, extreme or unforeseen weather events, and climate change.

- Septic systems and other sources of human waste.
- Public roadways, culverts, roadside ditches, and shoulders.
- Dams, dam removal, hydroelectric plants, and non-agricultural impoundments.
- Housing and other development in agricultural areas.
- Other circumstances not within the reasonable control of the landowner or operator.

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

1.3.5 Public Participation

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

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

1.4 Agricultural Water Quality

1.4.1 Point and Nonpoint Sources of Water Pollution

There are two types of water pollution. Point source water pollution emanates from clearly identifiable discharge points or pipes. Significant point sources are required to obtain permits that specify their pollutant limits. Agricultural operations regulated as point sources include permitted Confined Animal Feeding Operations (CAFOs), and many are regulated under ODA's CAFO Program. Pesticide applications in, over, or within three feet of water are also regulated as point sources. Irrigation water discharges may be at a defined discharge point but they do not currently require a permit.

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

1.4.2 Beneficial Uses and Parameters of Concern

Beneficial uses related to water quality are defined by DEQ in OARs for each basin. They may include: public and private domestic water supply, industrial water supply, irrigation, livestock watering, fish and aquatic life, wildlife and hunting, fishing, boating, water contact recreation, aesthetic quality, hydropower, and commercial navigation and transportation. The most sensitive beneficial uses are usually fish and aquatic life, water contact recreation, and public and private domestic water supply. These uses are generally 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 contribute to the impairment of beneficial uses in the Management Area. Beneficial uses that have the potential to be impacted in this Management Area are summarized in Chapter 2.

Many water bodies throughout Oregon do not meet state water quality standards. Many of these water bodies have established water quality management plans that document needed pollutant reductions. The most common water quality concerns related to agricultural activities are temperature, bacteria, biological criteria, sediment and turbidity, phosphorous, algae, pH, dissolved oxygen, harmful algal blooms, nitrates, pesticides, and mercury. These parameters vary by Management Area and are summarized in Chapter 2.

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

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

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

Total Maximum Daily Loads generally apply to an entire basin or subbasin, and not just to an individual water body on the 303(d) list. Once a TMDL is developed for a basin, the basin's impaired water bodies are removed from the 303(d) list, but they remain on the list of impaired water bodies. Water bodies will be listed as achieving water quality standards when data show the standards have been attained.

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

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

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

Following passage of the Agricultural Water Quality Management Act in 1993, the Oregon Legislature passed Senate Bill 502 in 1995 to clarify that ODA is the state agency responsible for regulating farming activities to protect water quality. Codified as ORS 561.191, this statute states that ODA "… shall develop and implement any program or rules that directly regulate farming practices, as defined in ORS 30.930, that are for the purpose of protecting water quality …" It further 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 Senate Bill 502, ODA incorporated ORS 468B into all of the Area Plans and associated regulations in the state.

ORS 468B.025 states that:

> "(1) ... 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."

The aspects of ORS 468B.050 that apply to the Ag Water Quality Program, state that:

"(1) Except as provided in ORS 468B.053 or 468B.215, without holding a permit from the Director of the Department of Environmental Quality or the State Department of Agriculture, which permit shall specify applicable effluent limitations, a person may not:

(a) Discharge any wastes into the waters of the state from any industrial or commercial establishment or activity or any disposal system."

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

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

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

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

1.4.5 Streamside Vegetation and Agricultural Water Quality

Across Oregon, the Ag Water Quality Program emphasizes streamside vegetation protection and enhancement to prevent and control agricultural water pollution. Streamside vegetation provides three primary water quality functions: shade for cooler stream temperatures, streambank stability, and filtration of pollutants. Other water quality functions include: water storage for cooler and later season flows, sediment trapping that builds streambanks and floodplains, narrowing and deepening of channels, and biological uptake of sediment, organic material, nutrients, and pesticides.

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

- Streamside vegetation improves water quality related to multiple pollutants, including: temperature (heat), sediment, bacteria, nutrients, toxics, and pesticides.
- Streamside vegetation provides fish and wildlife habitat.

- Landowners can improve streamside vegetation in ways that are compatible with their operation.
- Streamside vegetation condition can be monitored readily to track the status and trends of agriculture's progress in addressing water quality concerns.

Site-Capable Vegetation

The Ag Water Quality Program uses the concept of "site-capable vegetation" to describe the vegetation that agricultural streams can provide to protect water quality. Site-capable vegetation is the vegetation that can be expected to grow at a particular site, given natural site factors (e.g., elevation, soils, climate, hydrology, wildlife, fire, floods), and historical and current human influences (e.g., channelization, roads, modified flows, past 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 local or regional scientific research. ODA does not consider invasive, non-native plants, such as introduced varieties of reed canary grass and blackberry, to be site-capable vegetation.

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 all streams flowing through agricultural lands. The agricultural water quality regulations for each Management Area require that agricultural activities provide the water quality functions equivalent to what site-capable vegetation would provide.

In some cases, for narrow streams, mature site-capable vegetation such as tall trees may not be needed. 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.

1.5 Other Water Quality Programs

1.5.1 Confined Animal Feeding Operation (CAFO) Program

The Oregon Department of Agriculture is the lead state agency for the CAFO Program. The CAFO Program was developed to ensure that operators do not contaminate ground or surface water with animal manure. Since the early 1980s, CAFOs in Oregon have been registered to a general Water Pollution Control Facility permit designed to protect water quality, while allowing the operators and producers to remain economically viable. A properly maintained CAFO does not pollute ground or surface water. To assure continued protection of ground and surface water, the 2001 Oregon Legislature directed ODA to convert the CAFO Program from a Water Pollution Control Facility permit program to a federal National Pollutant Discharge Elimination System (NPDES) program. ODA and DEQ jointly issue the NPDES CAFO Permit, which complies with all CWA requirements for CAFOs. This permit does allow discharge in certain circumstances as long as the discharge does not violate water quality standards.

Oregon NPDES CAFO permits require the registrant to operate according to a site-specific, ODA-approved Animal Waste Management Plan that is incorporated into the NPDES CAFO permit by reference.

1.5.2 Groundwater Management Areas

Groundwater Management Areas (GWMAs) are designated by DEQ where groundwater has elevated contaminant concentrations resulting, at least in part, from nonpoint sources. Once the GWMA is declared, a local groundwater management committee comprised of affected and interested parties is

formed. The committee works with and advises the state agencies that are required to develop an action plan that will reduce groundwater contamination in the area.

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

1.5.3 The Oregon Plan for Salmon and Watersheds

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

1.5.4 Pesticide Management and Stewardship

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

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

Through the PSP, state agencies and local partners work together to monitor pesticides in streams and to improve water quality (www.deq.state.or.us/wq/pesticide/pesticide.htm). Department of Environmental Quality, ODA, 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.

Oregon Department of Agriculture led the development and implementation of a Pesticides Management Plan (PMP) for the state of Oregon (www.oregon.gov/ODA/PEST/water_quality.shtml). 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 currently approved for use by the United States Environmental Protection Agency (US EPA) and Oregon in both agricultural and non-agricultural settings, the PMP sets forth a process for preventing and responding to pesticide detections in Oregon's ground and surface water resources.

1.5.5 Drinking Water Source Protection

Oregon implements its drinking water protection program through a partnership between DEQ and OHA. The program provides individuals and communities with information on how to protect the quality of Oregon's drinking water. The Department of Environmental Quality and OHA encourage community-based protection and preventive management strategies to ensure that all public drinking water resources are kept safe from current and future contamination. For more information see: www.deq.state.or.us/wq/dwp/dwp.htm. Agricultural activities are required to meet those water quality standards that contribute to safe drinking water.

1.5.6 Oregon's Coastal Management Program and 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 (NOAA) 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 associated regulations as the state's strategy to address agricultural measures. The Area Plan and associated regulations 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 located 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 under the federal CWA for protection of water quality in Oregon. In turn, DEQ is the lead state agency with overall authority to regulate water quality in Oregon. DEQ coordinates with other state agencies, including ODA and ODF, to meet the requirements of the CWA. The Department of Environmental Quality set water quality standards and develops TMDLs for impaired waterbodies. In addition, DEQ develops and coordinates programs to address water quality including NPDES permits for point sources, the CWA Section 319 grant program, Source Water Protection, the CWA Section 401 Water Quality Certification, and GWMAs. DEQ also coordinates with ODA to help ensure successful implementation of Area Plans.

The Department of Environmental Quality designated ODA as the Designated Management Agency (DMA) for water pollution control activities on agricultural and rural lands in Oregon to coordinate meeting agricultural TMDL load allocations.

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

The MOA includes the following commitments:

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

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

1.6.2 Other Partners

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

1.7 Measuring Progress

Agricultural landowners and operators 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. ODA is working with SWCDs, LACs, and other partners to develop and implement strategies that will produce measurable outcomes for agricultural water quality. ODA is working also with partners to develop monitoring methods to document progress.

1.7.1 Measurable Objectives

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

After ODA, the LAC, and the LMA establish measurable objectives and associated milestones, they will evaluate progress toward the milestones at each biennial review of the Area Plan. Using adaptive management, the biennial review will evaluate progress toward the most recent milestone(s) and why they were or were not achieved. ODA, the LAC, and LMA will evaluate whether changes are needed to keep

on track for achieving the longer-term measurable objective(s), and will revise strategies to address obstacles and challenges.
Measurable objectives allow the Ag Water Quality Program to better evaluate progress toward meeting water quality standards. Many of these measurable objectives relate to land conditions and are primarily implemented through focused work in small geographic areas (section 1.7.3), with a long-term goal of developing measurable objectives and monitoring methods at the Management Area scale. The measurable objectives and associated milestones for the Area Plan are in Chapter 3 and progress toward achieving the measurable objectives and milestones is summarized in Chapter 4.

1.7.2 Land Conditions and Water Quality

Land conditions can serve as useful surrogates (indicators) for water quality parameters. For example, streamside vegetation is generally used as a surrogate for water temperature, because shade blocks solar radiation from warming the stream. In addition, sediment can be used as a surrogate for pesticides and nutrients, because many pesticides and nutrients adhere to sediment particles.

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

- Landowners can see land conditions and have direct control over them.
- It can be difficult to separate agriculture's influence on water quality from other land uses.
- Extensive monitoring of water quality is needed to evaluate progress, which is expensive and may fail to demonstrate improvements in the short term.
- Improved land conditions can be documented immediately, but there may be significant lag time or a need for additional implementation before water quality improves.
- Agricultural improvements in water quality are primarily through changes in land conditions and management activities.

Water quality monitoring data may help ODA and partners to measure progress or identify problem areas in implementing Area Plans. However, as described above, water quality monitoring may be less likely to document the short-term effects of changing land conditions on water quality parameters such as temperature, bacteria, nutrients, sediment, and pesticides.

1.7.3 Focused Implementation in Small Geographic Areas

Focus Areas
A Focus Area is a small watershed with significant water quality or land condition concerns that are associated with agriculture. Through the Focus Area process, the SWCD delivers systematic, concentrated outreach and technical assistance in a small geographic area. A key component of this approach is measuring conditions before and after implementation, to document the progress made with available resources. The Focus Area approach is consistent with other agencies' and organizations' efforts to work proactively in small geographic areas, and is supported by a large body of scientific research (e.g., Council for Agricultural Science and Technology, 2012).

Systematic implementation in Focus Areas provides the following advantages:

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

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

Soil and Water Conservation Districts select a Focus Area in cooperation with ODA and other partners. In some cases, a Focus Area is selected because of efforts already underway or landowner relationships already established. The scale of the Focus Area matches the SWCD's capacity to deliver concentrated outreach and technical assistance, and to complete (or initiate) projects over a biennium. The current Focus Area for this Management Area is described in Chapter 3.

Working within a Focus Area is not intended to prevent implementation within the remainder of the Management Area. The SWCD will also continue to provide outreach and technical assistance to the entire Management Area.

Strategic Implementation Areas

Strategic Implementation Areas (SIAs) are small watersheds selected by ODA, in cooperation with partners based on a statewide review of water quality data and other available information. ODA conducts an evaluation of likely compliance with agricultural water quality regulations, and contacts landowners with the results and next steps. Landowners have the option of working with the SWCD or other partners to voluntarily address water quality concerns. ODA follows up, as needed, to enforce agricultural water quality regulations. Finally, ODA completes a post-assessment to document progress made in the watershed. Chapter 3 describes any SIAs that are currently underway in this Management Area.

1.8 Monitoring, Evaluation, and Adaptive Management

The Oregon Department of Agriculture, the LAC, and the LMA will assess the effectiveness of the Area Plan and associated regulations by evaluating the status and trends in agricultural land conditions and water quality data. This assessment will include an evaluation of progress toward measurable objectives across the entire Management Area and within the Focus Area. ODA conducts land condition and water quality monitoring at the statewide level and will analyze this and other agencies' and organizations' local monitoring data. The Area Plan summarizes the results and findings in Chapter 4 for each biennial review. ODA, DEQ, SWCDs, and LACs will examine these results during the biennial review and will revise the goal(s), measurable objectives, and strategies in Chapter 3, as needed.

1.8.1 Statewide Aerial Photo Monitoring of Streamside Vegetation

Starting in 2003, ODA began evaluating streamside vegetation conditions using aerial photos acquired specifically for this purpose. ODA focuses on land condition monitoring of streamside areas because these areas have such a broad influence over water quality. Stream segments representing 10 percent to 15 percent of the agricultural lands in each Management Area were randomly selected for long-term aerial photo monitoring. Stream segments are generally 3-5 miles long. ODA evaluates streamside vegetation at specific points within 30-, 60-, and 90-foot bands along both sides of stream segments from the aerial photos and assigns each segment a score based on streamside vegetation. The score can range from 70 (all trees) to 0 (all bare ground). The same stream segments are re-photographed and re-scored every five years to evaluate changes in streamside vegetation conditions over time. Because site capable vegetation varies across the state, there is no single "correct" streamside vegetation index score. The purpose of this monitoring is to measure positive or negative change. The results for this Management Area are summarized in Chapter 4.

1.8.2 Agricultural Ambient Water Quality Monitoring

The Oregon Department of Agriculture evaluates water quality data from DEQ's long-term monitoring sites to determine trends in water quality at agricultural sites statewide. Results from monitoring sites in this Management Area, along with local water quality monitoring data, are described in Chapter 4.

1.8.3 Biennial Reviews and Adaptive Management

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

Chapter 2: Local Background

2.1 Local Roles and Responsibilities

2.1.1 Local Advisory Committee (LAC)

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

Name	Location	Description
Chair: Bob Niedermeyer	Jacksonville	Alfalfa, grain, pesticide applicator
Ron Meyer	Medford	Orchards
Tom Dover	Little Butte Creek	Cattle
Paul Kay	Bear Creek	Phytotechnology
Ron Hillers	Ashland	Jackson SWCD Board
Larry Ford	Grants Pass	Josephine SWCD Board
Simon Hare	Josephine County	County Commissioner
Bob Crouse	Grants Pass	Row Crop & Hay Farmer

Former LAC members: Keith Emerson, Keith Nelsen, Greg Walch, 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, Ron Fumasi, Dave Henneman, Bill Pfohl, Nancy Tappen, Kyle White, Ashley Henry

2.1.2 Local Management Agency

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

2.2 Area Plan and Regulations: Development and History

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

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

2.3 Geographical and Physical Setting

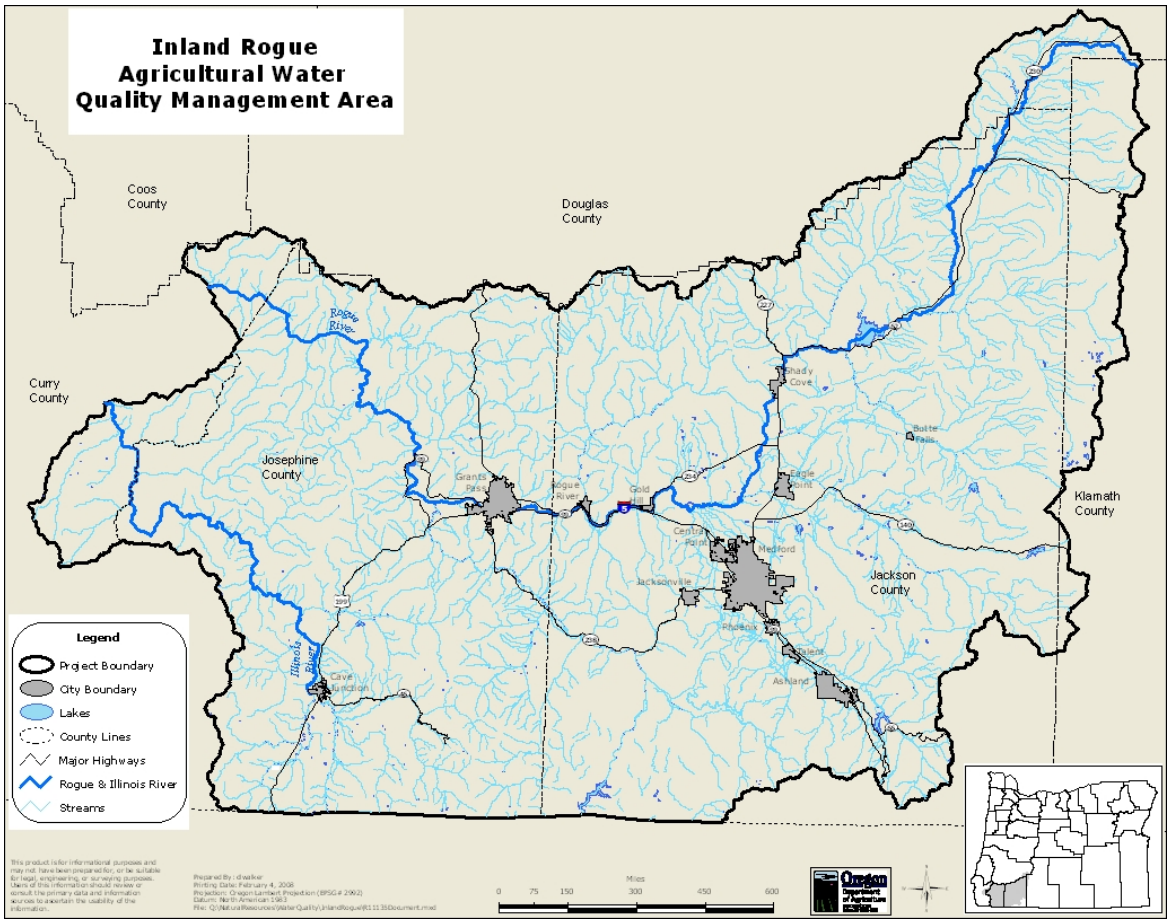
2.3.1 Geographic and Programmatic Scope

The Inland Rogue agricultural water quality planning process allows the Inland Rogue agricultural industry to take the leadership in development of a plan that contributes to the attainment of water quality

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

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

2.3.2 Map of the Management Area



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

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

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

Upper Rogue Subbasin

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

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

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

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

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

Applegate River Subbasin

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

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

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

Illinois River Subbasin

The Illinois Valley encompasses over 628,000 acres of heavily forested and geologically unique land. About 83 percent of this land is publicly owned with the majority being managed by the U.S. Forest Service. There are also several large tracts of privately held timberland. The private agricultural land in the Illinois Valley is primarily confined to the broad valley bottoms and deep alluvial soils of Deer, Sucker, and Althouse creeks, and the Illinois River. Only 4 percent of the Illinois Valley land area is under some form of agricultural management practice and only 2 percent (about 14,000 acres) is irrigated.

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

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

Middle Rogue Subbasin

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

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

accounts for very little of the available moisture in the lower elevations. Valleys have deeper soils and are able to support a wider diversity of agricultural activities.

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

Bear Creek Subbasin

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

Crop production in the Bear Creek area is economically feasible only because of the availability of water for irrigation. The growing season rainfall provides only a minor portion of crop water requirements. Most of the irrigation water used in Bear Creek comes from several reservoirs and diversions from both within and outside of the watershed. Approximately 5,000 acres in the watershed receive "private" irrigation water rights from natural stream flow from Bear Creek and its tributaries and these private rights total about 105 cubic feet per second. The three irrigation districts in the watershed also hold water rights to divert natural stream flow from Bear Creek which totals approximately 100 cubic feet per second for their clients. But these (less senior) rights typically expire, or are not satisfied by the end of June. In addition, the districts deliver water from storage to nearly 39,000 acres in the watershed. The Rogue River Valley Irrigation District, lowest in the Bear Creek system, serves approximately 9,000 acres, the Medford Irrigation District serves nearly 12,300 acres, and the Talent Irrigation District, the uppermost in the system, provides water to 16,400 acres.

Rogue Basin Agricultural Production

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

Table 1: Gross Farm and Ranch Sales 2008:

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

Acres of Crops Under Cultivation 2007:

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

Livestock Inventory 2008-2009:

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

2.4 Agricultural Water Quality in the Management Area

2.4.1 Local Issues of Concern

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

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

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

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

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

Other Contributing Factors

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

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

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

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

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

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

Many water bodies in Oregon do not meet water quality standards for various pollutants at certain times of the year. In the Rogue Basin, bacteria, temperature, sedimentation, pH, 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 water body.

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

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

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

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

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

2.4.3 Beneficial Uses and Parameters of Concern

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

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

Table 4. Beneficial Uses Rogue River

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		X	X	*	X
Private Domestic Water Supply		X	X		X
Industrial Water Supply	X	X	X	X	X
Irrigation		X	X	X	X
Livestock Watering		X	X	X	X
Fish & Aquatic Life	X	X	X	X	X
Wildlife & Hunting	X	X	X	X	X
Fishing	X		X	X	X
Boating	X	X		X	X
Water Contact Recreation	X			X	X
Aesthetic Quality	X			X	X
Hydro Power					X
Commercial Navigation & Transportation	X				

Temperature

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

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

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

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

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

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

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

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

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

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

2.5 Prevention and Control Measures

2.5.1 How the AgWQM Area Plan Addresses the Temperature Standard

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

Six main factors influence surface water temperature: exposure to solar radiation, volume of flow, channel shape, turbidity, groundwater inflow, and air temperature. The undesirable conditions and possible solutions in Tables 5 through 10 of this Plan are designed to address four of these physical factors.

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

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

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

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

loss, adding large woody debris, encouraging a narrower and deeper channel profile, and connecting to a flood plain to dissipate energy associated with high flows.

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

2.5.2 How the AgWQM Area Plan Addresses the Bacteria Standard

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

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

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

2.5.3 Menu of Better Management Practices

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

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

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

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

Table 5 Drainage and Runoff Management Problems and Possible Solutions

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

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

Table 6 Vegetation Management Problems and Possible Solutions

Problems	Impacted water quality parameter	Possible Solutions
Overgrazing* the riparian area	Temperature Bacteria 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	Sediment Flow Modification	-Salt, water and feed on hardened area -Match stocking rate to forage production capacity of the pasture -Account for slope and soil type for management -Rotate pastures: use the 8" and 4"** Rule to turn in and out
Tillage in riparian areas and exposed soils during or right before the rainy season	Sediment	-Use settling basins consisting of depressions at the bottom of the field -Construct curtain drains at the bottom of the field -Put straw bales in unconstructed drainage ways -Plant grass filter strips designed for slope and sediment yield potential
Allowing noxious and invasive weeds to dominate riparian sites	Temperature Flow Modification	-Interrupt seeding cycle -Control root reproducers -Control weed populations systematically -Plant competitive species

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

Table 7 Livestock Management Problems and Possible Solutions

Problems	Impacted water quality parameter	Possible Solution
Visible gully erosion on more than 10 percent of livestock trails, paths, stream banks, and pastures	Sediment	-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 Sediment Bacteria	-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 Sediment Bacteria	-Rotate pastures: use the 8" and 4" rule to turn in and out -Use electric fences for flexibility in rotation schedule -Balance livestock numbers with regrowth potential
Accumulation of manure within 50 feet of a drainage way where it has opportunity to enter waters of the state	Bacteria Nutrients DO/pH 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	Sediment Bacteria Nutrients DO/pH	-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	Sediment Bacteria Flow Modification Nutrients DO/pH Chlorophyll a	-Use water gaps along fenced streams -Provide off-stream watering -Create visual barriers on far side of stream -Harden stream crossings

Table 8 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 Nutrients Sediment	-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 9 Cropland Management Problems and Possible Solutions

Problems	Impacted water quality parameter	Possible Solutions
Exposed slopes without effective cover going into the rainy season	Sediment	-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	-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.)	Chlorophyll a Nutrients DO/pH	-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 Flow Modification	-Clean and repair ditches on regular schedule to facilitate flow -Line ditches -Install pipe where applicable

Table 10 Farm Storage Problems and Possible Solutions
"Least Likely Third"* rule is recommended for all conditions below.

Problems	Impacted water quality parameter	Possible Solutions
Machinery and chemical storage within 50' of water/drainage ways	Toxic Substances**	-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	Toxic Substances	-Secure storage areas from leakage into water/drainage ways -Keep a Haz-Mat control kit nearby
Storage areas without containment barriers	Toxic Substances	-Construct an appropriately sized containment barrier around storage areas
Chemicals not in properly labeled and sealed containers	Toxic Substances	-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	Chlorophyll a Nutrients DO/pH Bacteria	-Disperse runoff from drainages and gutters away from silage and compost piles and through appropriately sized filter strips or other equally effective pollution control mechanism

*Least Likely Third: Siting strategy for potentially hazardous materials. When locating storage and staging areas on a property, select the third of the property that is least likely to allow contaminants from a spill or leak to runoff directly into waters of the state.
**Toxic substances (OAR 340-41-0033) see ODEQ Table 20; Aquatic life water quality criteria

2.5.4 Prohibited Conditions

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

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

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

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

Four groups of management measures and structures are commonly used to control erosion and limit sediment yield from an agricultural site: 1) surface protection such as mulches and vegetation; 2) mechanical treatment such as deep ripping and land surface manipulation; 3) diversion structures such as terraces and straw bales; and 4) detention structures such as artificial wetlands in upland areas that do

not receive natural water flow (so as to not be governed by wetland regulations and protections), settling basins, and curtain drains. In addition, riparian setbacks are not only the most effective filtering component to keep sediments from the waters of the state but also contain multiple erosion control benefits.

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

Excessive Soil Erosion
OAR 603-095-1440(2)
(a) There shall be no visible evidence of erosion resulting from agricultural management in a location where erosion has contributed or will contribute sediment to waters of the state. Visible evidence of erosion may consist of the following features:

(A) Sheet wash, noted by visible pedestalling*, surface undulations, and/or flute marks on bare or sparsely-vegetated ground;

(B) Visibly active gullies, as defined by OAR 603-095-0010(1);

(C) Multiple rills, which have the form of gullies, but are smaller in cross-sectional area than one square foot.

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

Water quality parameters which may be affected: Sediment

The following terms are specifically defined in OAR 603-095-0010(1)(14)(15). As used generally, they have the following meanings.

- Sheet Erosion: soil particles that are detached and transported in water moving as a "sheet" across an exposed soil surface. Continued flow of this type will eventually differentiate itself into definable channels, rills, and gullies.
- Rill Erosion: a series of small channels less than one square foot in cross-sectional area. It often begins as sheet erosion across an unprotected soil surface. If left unprotected, rills usually converge to become gullies.
- Visibly Active Gully Erosion: a channel equal to or greater than one square foot in cross-sectional area. Gullies, if left unprotected, may carry large amounts of suspended sediment and become a physical hazard to humans and livestock.
- "Water" or "the waters of the state" include lakes, bays, ponds, impounding reservoirs, springs, wells, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Pacific Ocean within the territorial limits of the state of Oregon, and all other bodies of surface or underground waters, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters which do not combine or effect a junction with natural surface or underground waters), which are wholly or partially within or bordering the state or within its jurisdiction. (ORS 468B.005(8))

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

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

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

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

Prohibited Condition #3 - Irrigation Management Problems

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

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

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

contributing to water quality degradation. Overuse of water can lead to the deterioration of the land and crop over which it is being applied.

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

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

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

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

Surface Irrigation Return Flows
OAR 603-095-1440(4)
Surface Irrigation Return Flows. Runoff of surface irrigation that enters waters of the state shall not exceed water quality standards or cause pollution of the receiving water.

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

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

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

Issue/Intent
It is not the intent of this LAC to eliminate the application of crop nutrients. This condition should encourage management of nutrients and animal waste to do the most benefit for the intended production goals. Application of crop nutrients, or fertilizer of any kind, can be a necessary and beneficial agricultural practice. Improper application of fertilizer, however, can be costly to the grower and harmful to the environment. Growers are encouraged to use regular soil testing to determine the nutrient needs of

their crops. Using a pre-set amount of fertilizer year after year may limit crop yields and cause nutrients to run off into waters of the state. Excess nutrients in water can cause unnatural algae growth (Chlorophyll a), increased pH, and lead to a decrease in dissolved oxygen.
To prevent water from carrying concentrated animal waste, silage, and compost leachates (nutrients) to streams, they should be stored in such a way that water cannot move through the pile into waters of the state. With the small land areas that are the dominant agricultural land use in the basin, close attention must be paid to where nutrient laden materials are stored. Even if it is impossible to store materials far away from the waters of the state, the material can be covered and protected from surface flow and precipitation. ORS 468(b) applies to this condition. The statute requires that wastes be stored, managed, and disposed in such a way that they do not pollute waters of the state.

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

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

Chapter 3: Goals, Objectives, and Strategies

3.1 Responsibility of the Local Advisory Committee:

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

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

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

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

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

3.3 Goals and Objectives

3.3.1 Goal of the Committee

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

3.3.2 Goal of the Plan

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

3.4 Objectives

Objectives:

1) Strive to attain water quality standards that serve the beneficial uses designated for the Rogue Basin OAR 340-41-0271.
   - Public Domestic Water Supply
   - Private Domestic Water Supply
   - Industrial Water Supply
   - Irrigation
   - Livestock Watering
   - Anadromous Fish Passage
   - Salmonid Fish Rearing
   - Salmonid Fish Spawning
   - Resident Fish and Aquatic Life
   - Wildlife and Hunting
   - Fishing
   - Boating
   - Water Contact Recreation
   - Aesthetic Quality
   - Hydro Power
   - Commercial Navigation and Transportation

2) Create a high level of awareness of agricultural water quality issues and problems in the watershed.
3) Support funding necessary to achieve plan education and implementation.

3.4.2 Measurable Objectives

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

Jackson SWCD

Current Conditions (From Pre-Assessment)

- In 2013: 6,300 flood irrigated acres in the Little Butte Creek Watershed
- Streamside Vegetation Assessment (SVA) will be completed for Antelope Creek (2016)

Focus Area Milestone for 2015-2017

- Convert 372 acres (5.9% of the 6,300 irrigated acres in the Watershed) from open flood to sprinkler irrigation systems by 2015.
- Convert 475 acres (7.0% of the 6,300 irrigated acres in the Watershed) from open flood to sprinkler irrigation systems by 2017.
- Convert 1,025 acres (16.0% of the 6,300 irrigated acres in the Watershed) from open flood to sprinkler irrigation systems by 2022.
- Improve the efficiency of an additional 1,550 acres (23% of the 6,300 irrigated acres in the Watershed) of open flood irrigation systems by 2022.

Antelope Creek SVA: *(Estimates will be entered following completion of the SVA)*

- Improve riparian buffers along _____ stream miles (____% of the _____ stream miles in the

Antelope Creek Watershed by 2017.

- Improve riparian buffers along _____ stream miles (____% of the _____ stream miles in the Antelope Creek Watershed by 2020.
- Improve riparian buffers along _____ stream miles (____% of the _____ stream miles in the Antelope Creek Watershed by 2022.
- *Attainment of these goals will be dependent on landowner interest and continued NRCS CIS or other funding.*

Year	Acres – Flood to Sprinkler		Acres – Flood to Improved Flood	
	Anticipated	**Actual**	**Anticipated**	**Actual**
2013 - 2014	72	72		
2014 – 2015	40-75	0		
2015 - 2016	150-200		0-100	
2016 - 2017	100-200		100-200	
2017 - 2018	100-200		200-300	
2018 - 2019	100-200		200-300	
2019 - 2020	50-100		200-300	
2020 - 2021	0-50		150-200	
2021 - 2022	0-50		100-150	
Total	**612-1,025**		**950-1,550**	

Josephine SWCD

The objective is to reduce water temperature and prevent non-point source pollutants from entering the East Fork of Williams Creek. Therefore, the SWCD will utilize restoration and conservation practices that will restore riparian vegetation, the buffer strips between crop and pasture areas, the vegetative conditions around intermittent streams. The ODA Streamside Vegetation Assessment will be used as the assessment method.

Current Conditions (From Pre-Assessment) – Temperature, Dissolved Oxygen, Bacteria, and sedimentation

- In 2015 (*or other date*) for:
  - East Fork Williams Creek Watershed: [Tree + Shrub + Grass + Bare] = 108.33 acres
  - West Fork Williams Creek Watershed: TBD after Pre-assessment classification
  - Lower Williams Creek: TBD after Pre-assessment classification

Focus Area Milestone for 2015-2017: Increase categories that provide WQ functions

- By June 30, 2017:
  - East Fork Williams Creek Watershed : Increase [Tree + Shrub + Grass + Bare] = 119.63 acres
  - West Fork Williams Creek Watershed: TBD after Pre-assessment
  - Lower Williams Creek: TBD after Pre-assessment classification

Illinois Valley SWCD

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

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

Current Conditions (From Pre-Assessment)

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

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

From 2013 to 2015, we documented the following changes:

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

Focus Area Milestone for 2015-2017

- By June 30, 2017: Reduce the percentage of riparian parcels in riparian Class III by 25 percent3.4.3 Focus Areas

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

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

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

Jackson SWCD: Little Butte Creek

The Little Butte Watershed Focus Area comprises approximately 238,000 acres and flows into the Rogue River. The main agricultural uses include irrigated pasture and hay production. There are 6,300 acres of irrigated agricultural land in the Focus Area. There are 100-plus miles of perennial and unknown miles of seasonal streams in the Focus Area. Little Butte Creek Watershed was selected as the Jackson SWCD Focus Area due to recognition of the need to improve water quality in the watershed. The Rogue River Basin TMDL was completed in 2010. The TMDL covers temperature and bacteria loading in the Rogue Basin. The Little Butte Creek watershed is 303(d) listed for 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 (OWRI). Irrigation improvements are a priority for the entire Focus Area. Streamside vegetation and other agricultural water quality improvements area a priorty in the Antelope Creek subwatershed within the Little Butte Creek Watershed.

Josephine SWCD: Williams Creek Watershed

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

Illinois Valley SWCD: Middle Deer Creek

The Middle 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 Middle 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 Middle Deer Creek Focus Area was selected based on proportion of privately owned property in the watershed, proportion of agricultural use in watershed, condition of streamside vegetation, and existing contacts and

relationships. The Illinois Valley SWCD will provide technical assistance to willing landowners in the Middle Deer Creek Focus Area to install exclusion fencing and/or to plant native riparian vegetation. This approach will primarily address temperature and will also help reduce sediment.

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

3.5 Strategies for Area Plan Implementation

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

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

3.5.1 Education and Outreach

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

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

The following elements are part of an effective educational program:

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

3.5.2 Inland Rogue AgWQ Plan Outreach and Education Strategies

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

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

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

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

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

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

3.5.3 Conservation Planning and Conservation Activities

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

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

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

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

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

Conservation activities should:

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

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

3.5.3 Funding

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

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

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

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

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

For sources of financial assistance, see Appendix F.

3.5.4 Monitoring and Evaluation

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

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, Josephine, 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.

Chapter 4: Implementation, Monitoring, and Adaptive Management

4.1 Implementation and Accomplishments

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

Implementation Summary (September 2013 - September 2015)

AgWQ Outreach and Education:
Illinois Valley SWCD: Two presentations at local schools on riparian processes with assistance from BLM and ODFW. News articles posted to website covering local educational outreach. Educational articles posted to website. Subject matter includes: drought mitigation; fertilizer application guidelines; native plants and shrubs; Inland Rogue AgWQ Plan and Rules. Two Native Plant Sales in Quarters 3 & 7. Three newspaper articles in IV News including AgWQ requirements. Seven Water Quality Quarterly Newsletters mailed to landowners in the MDCFA. District Manager was invited to speak to local civic groups resulting in one presentation to local Rotarians about the Focus Area.

Josephine SWCD: Classes/Presentations/Workshops: 14 (193 participants), Displays: 4 (5,000 viewer estimated), Landowner contact: 231, Publications distributed: 3,000

Jackson SWCD: Workshops/Presentations Held: 60, Workshop/Presentation Attendees: 1,455, Tours/Demonstrations: 19, Tours/Demonstrations, Attendees: 258, Displays/Information Booths: 13, Display/Information Booth Visitors: 1,296, Fact Sheets/Brochures Developed: 18, Fact Sheets/Brochures Distributed: 1,353, Newspaper Articles: 6

Illinois Valley Watershed Council: Partnered with the Middle Rogue Steelheaders in hands-on demonstration of AgWQ best management practices at 3 local events utilizing a stream simulation table.

AgWQ Technical assistance & Planning:
Illinois Valley SWCD: Provided technical assistance to 17 landowners. Identified three property landowners to cooperate on future projects. Site visits and assessments on four parcels of agricultural land –resulting in two riparian planting projects and one livestock exclusion fence and willow planting. Consultation on culvert repair after storm damage, provided technical information on livestock watering solutions, assessment of proposed hog farm adjacent to Davis Creek; erosion mitigation on the East Fork Illinois River; researching the Seyforth Ditch for water-right holders. Partnered with ODFW and Josephine County Planning Department to develop and secure the annual development permit to accomplish riparian enhancement work in the District.

Josephine SWCD: Phone Contact: Erosion 12, Fencing 0, Inland Rogue 5, Irrigation 16, Mud/Manure 5, Nutrient Management 1, Pasture Management 12, Whole Farm Planning 17, Riparian 9, Soils 11
On Site T/A Evaluations: Erosion 7, Fencing 0, Irrigation 7, Mud/Manure 9, Pasture Management 7, Riparian 1, Water Quality Evaluation 1
Other: Soil Quality Development and Management 3, Weed control in riparian areas and pastures 1

Jackson SWCD: Landowners Provided Technical Assistance: 3008, On-site evaluations/On-site Visits: 303, Fund Applications Submitted For, Landowner Projects: 13, Water Quality Projects Implemented: 8, Total Acres in Implemented Water Quality Projects: 329, Conservation Plans Approved: 16, Total Acres in Approved Conservation Plans: 161

Illinois Valley Watershed Council: Provided 74 hours of AgWQ technical assistance and mentoring to the IVSWCD Water Quality Specialist. Provided 46 hours of AgWQ planning assistance and mentoring to the IVSWCD Water Quality Specialist. Distributed approximately 500 pieces of AgWQ outreach materials (IVSWCD brochures, fact sheets, etc.) at events to local residents. Partnered with IVSWCD to develop AgWQ aspects of the Deer Creek Streamflow and Channel Restoration project within the Middle Deer Creek Focus Area.

Projects implemented to improve water quality on agricultural lands:
Illinois Valley SWCD: Deer Creek Riparian Livstock Exclosure, Villa Novia Vineyard Riparian Restoration, LBMS Riparian Projects

Josephine SWCD: 3 projects completed (others in various stages of implementation). Projects implemented for mud/manure, pasture restoration, and irrigation improvement

NRCS: 3 irrigation efficiency projects in various stages of implementation

Monitoring:
Jackson SWCD: Pesticide monitoring at the mouth of 5 tributaries to Bear Creek

Funding and Grants:
Illinois Valley SWCD: ODA/OWEB support to LAC: $100,000 to the District to accomplish the annual Scope of Work, plus $41,860 in administrative funding. 2013-2015 OWEB Small Grants $6,497

Josephine SWCD: ODA/OWEB support to LAC: $100,000 to the District to accomplish the annual Scope of Work, plus $41,860 in administrative funding. 5 OWEB Small Grants were submitted, 3 were funded

Jackson SWCD: ODA/OWEB support to LAC: $100,000 to the District to accomplish the annual Scope of Work, plus $41,860 in administrative funding. District Funds Grants: 8 projects at $34,605. Oregon Watershed Enhancement Board - $58,595

NRCS: $150,596.00 obligated for direct implementation cost-share of conservation practices

Illinois Valley Watershed Council: OWEB Capacity Grant - $ 88,275

Progress Measurement: Focus Area Progress
Illinois Valley SWCD: Deer Creek – 1.5 percent of parcels in Riparian Class III were re-classified as Class II.

Josephine SWCD: Williams Creek –

Outreach and Capacity Building	**Totals**
Landowner Contact - phone and mailings	167
Landowner meeting	10
Agency calls	39
Partnership meetings	7
Partnership Calls	13
Proposals submitted	1
Implementation	
Landowner commitments	4
Uplands reseeded	20.0 acres
Off-stream water development proposed	2
Off stream exclusion fencing	3.75 acres

Jackson SWCD: Little Butte Creek –
Acres converted = 72, Landowners Contacted = 330, Landowners with projects Installed = 1, Landowners in Planning Phase = 2, Landowners in design phase = 2, Stream Miles affected by conversion = 16, Water Quality Monitoring Projects Completed = 1, Current Water Quality Monitoring Projects = 1, Grants Received by the District for Conversion Projects = $58,595.00, District Funds Allocated to Conversion Projects = $10,000

4.2 Water Quality Monitoring—Status and Trends

The Oregon Water Quality Index (OWQI) is a single number that expresses water quality by integrating measurements of eight water quality variables (temperature, dissolved oxygen, biochemical oxygen demand, pH, ammonia + nitrate nitrogen, total phosphorus, total solids, and fecal coliform). Its purpose is to provide a simple and concise method for expressing the ambient water quality of Oregon's streams. The index allows users to easily interpret data. The OWQI improves comprehension of general water quality issues, communicates water quality status, and illustrates the need for and effectiveness of protective practices. The OWQI alone does not describe all the possible stressors to water quality. DEQ is developing water quality basin assessments (status reports and action plans) for basins across the state that look at a wide range of factors affecting water quality.

As of July 2015, The Dodge Park site had a Water Quality Index score of 93 giving it an Excellent rating by DEQ. However, it did have a declining water quality trend for BOD and ammonia.

Little Butte Creek (at Agate Road, near White City) continued to have problems with elevated BOD, TS, TP, and *E*. coli concentrations. The TP concentrations were reported to have a declining trend, and the overall Water Quality Index score for the station was 71, giving it a ranking of Poor.

A new ambient site added by ODA on the Applegate River at Murphy also had enough data to be analyzed. This site had a Water Quality Index score of 90 ranking it as Excellent. However, it did score poorly for BOD and TS. There were no trends among the analytes at this site.

ODA has also started to use the monitoring station on the Rogue River at Rock Point. Recent data for this site showed a Water Quality Index score of 85 ranking it as Good. However, it also had BOD and TP concentrations that ranked Poor. No trends were apparent for any of the analytes at this station.

4.3 Progress Toward Measurable Objectives

See section 3.4.2 for information on progress toward Measurable Objectives. This section will be updated at every Biennial Review.

4.4 Aerial Photo Monitoring of Streamside Vegetation

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

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

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

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

Inland Rogue Basin

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

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

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

Bear Creek Basin

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

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

4.5 Biennial Reviews and Adaptive Management

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

References

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

Appendix A - Inland Rogue Basin Area Water Quality Plan Glossary

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

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

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

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

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

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

Geomorphic — The shape or surface configuration of the earth.

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

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

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

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

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

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

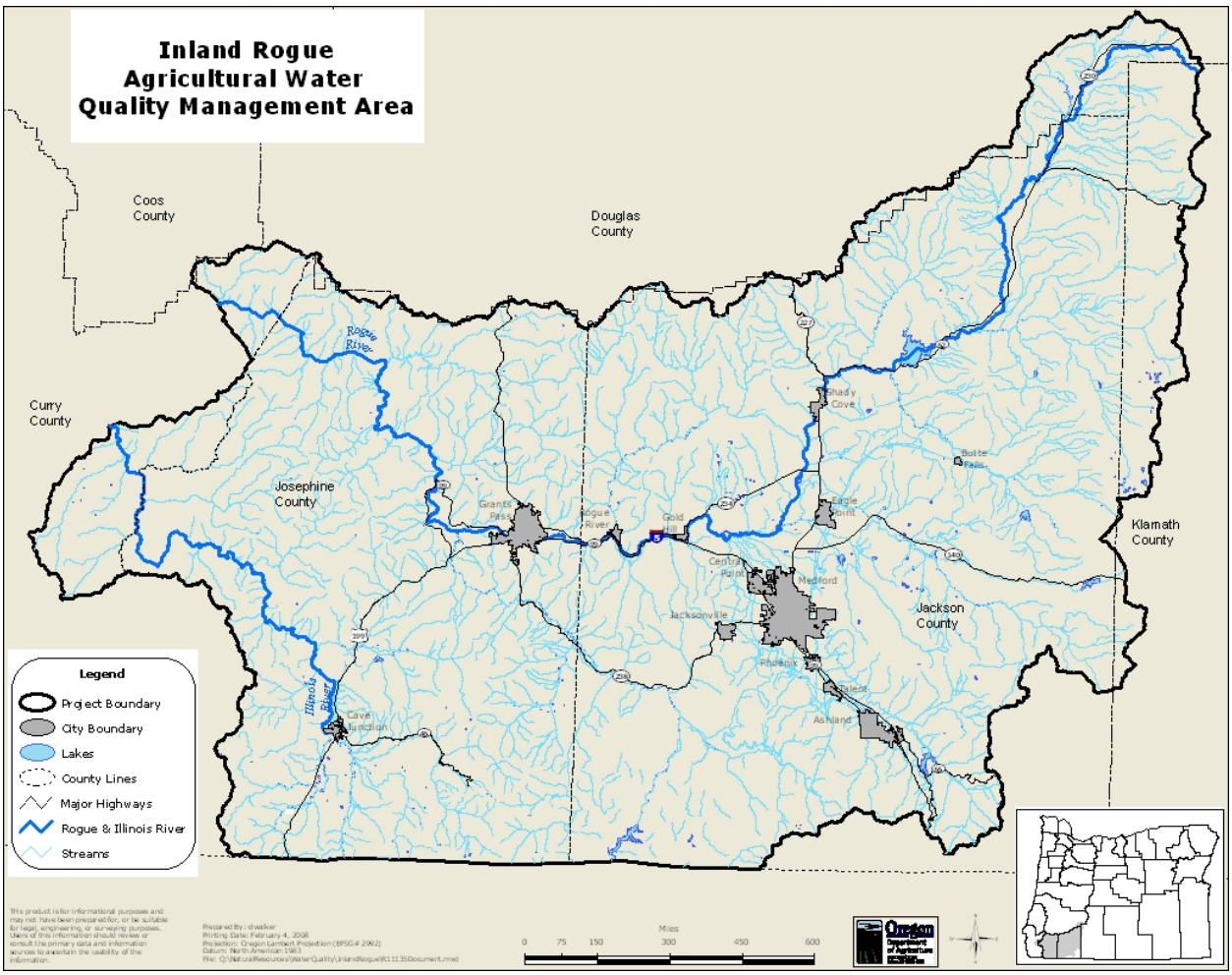
Riparian Setback — The purposefully designated or protected area away from the stream's normal flow mark back to a point where riparian functions for that site will not be adversely affected by land management practices.

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

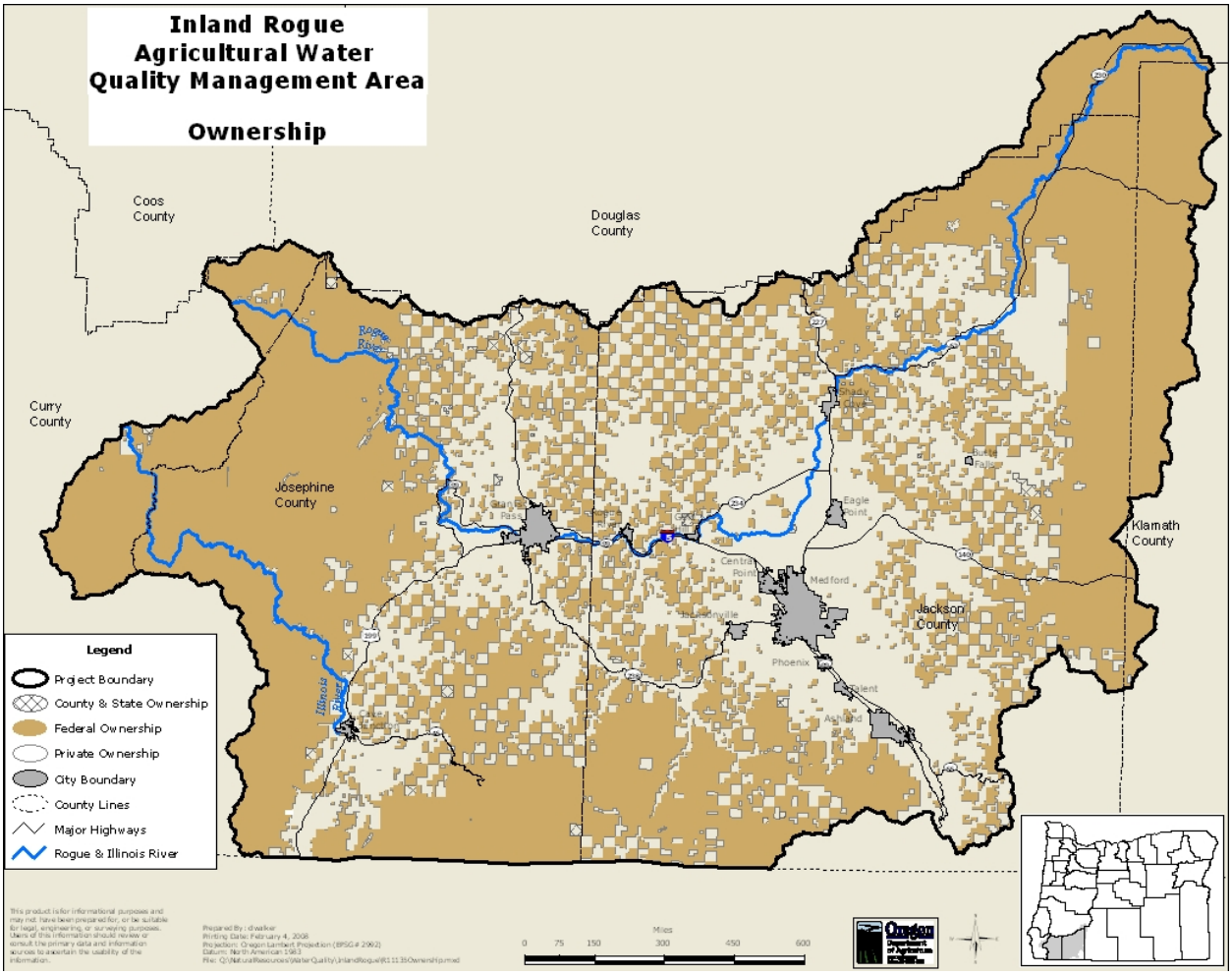
Streambank — Means the boundary of protected waters and wetlands, or the land abutting a channel at an elevation delineating the highest water level which has been maintained for a sufficient period of time to leave evidence upon the landscape; commonly that point where the natural vegetation changes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

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

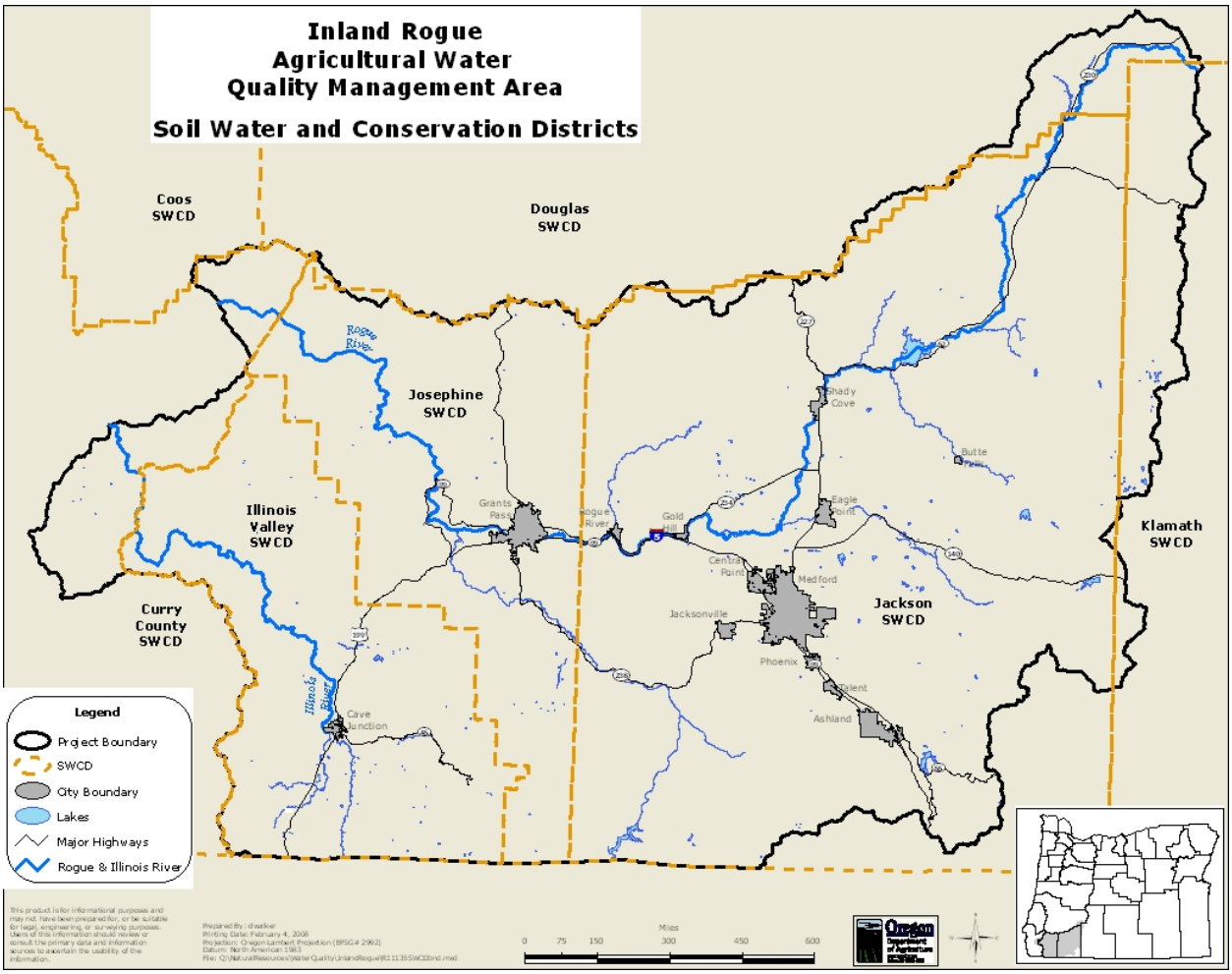
Appendix B - Inland Rogue AgWQM Area



Appendix C - Inland Rogue AgWQM Area Ownership



Appendix D - Inland Rogue AgWQM Area Soil and Water Conservation District Boundaries



Appendix E - Fish Use Designations

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

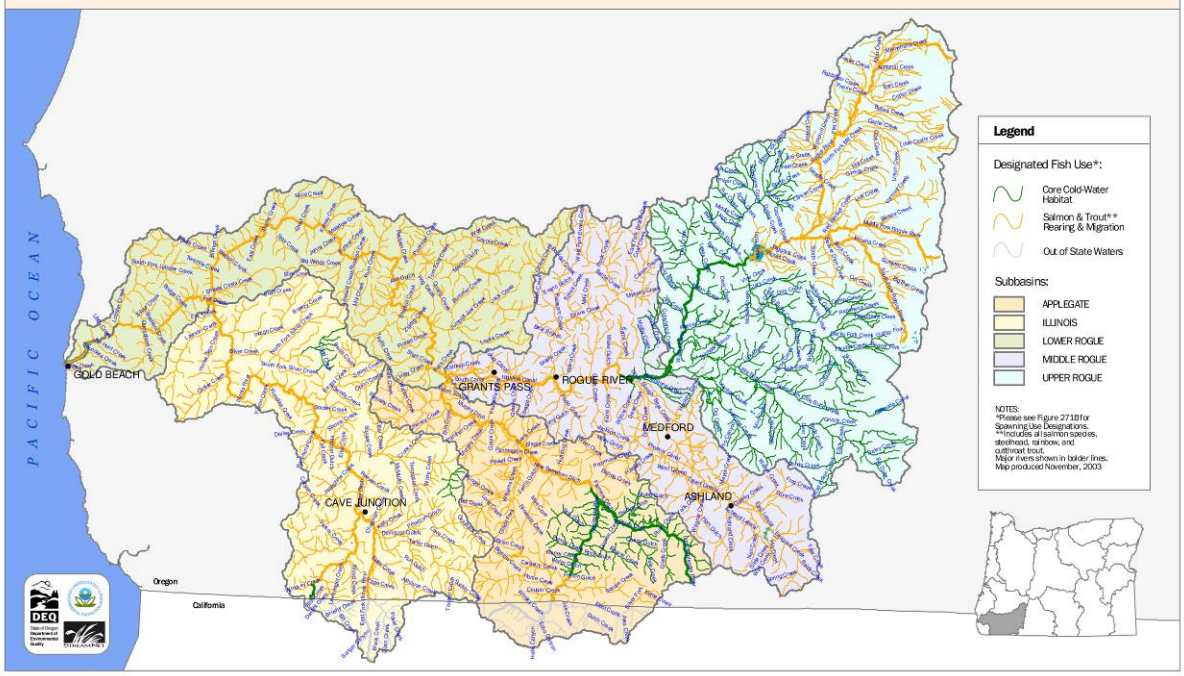
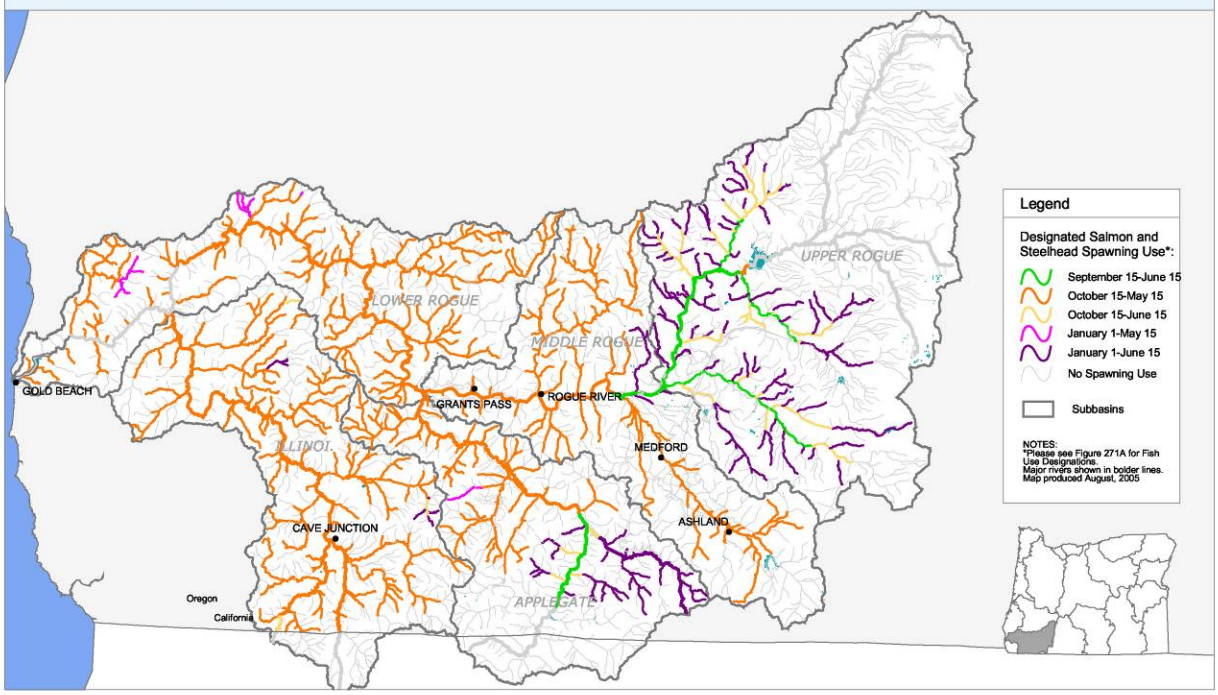


*Figure 271B: Salmon and Steelhead Spawning Use Designations**
Rogue Basin, Oregon



Appendix F - Watershed Council, SWCD, and Financial Assistance Contact Information

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

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

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

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

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

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

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

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

Available Technical and Financial Assistance

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

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

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

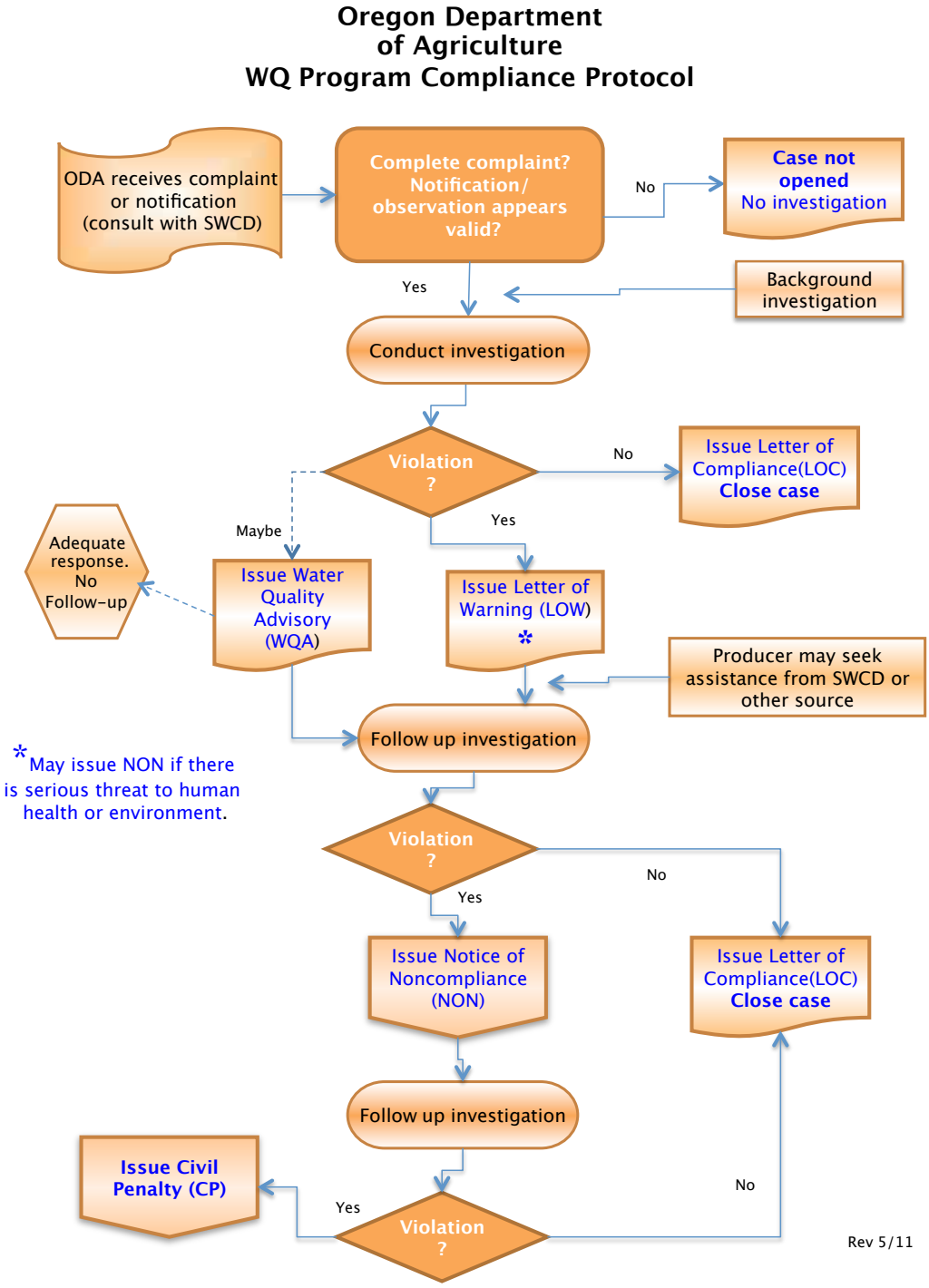
- **EPA 319** - Environmental Protection Agency administers the 1972 Clean Water Act section 319 grants through DEQ (541-776-6010) to help meet its water quality mandates. The projects EPA likes to fund are those with directly measurable benefits for water quality and endangered species. Check out EPA's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

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

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

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

Appendix G - Compliance Procedures Flow Chart



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

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

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

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

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

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

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

Appendix H - Coastal Zone Management Act Measures

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

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

Sedimentation

- Apply the erosion component of a Resource Management System as defined in the Field Office Technical Guide of the U.S. Department of Agriculture, Natural Resources Conservation Service to minimize the delivery of sediment to surface waters.
- 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.

Nutrients

- 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.

Pesticides

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

Riparian Areas

- Exclude livestock from riparian areas that are susceptible to overgrazing and when there is no other practical way to protect the riparian area when grazing uplands.
- Provide stream crossings and hardened access areas for watering.
- Provide alternative drinking water locations.
- Locate salt and shade away from sensitive riparian locations.

- Include riparian areas in separate pastures with separate management objectives and strategies.
- Fence, or where appropriate, herd livestock out of areas for as long as necessary to allow vegetation and streambanks to recover.
- Control the timing of grazing to: (1) keep livestock off streambanks where they are most vulnerable to damage, and (2) coincide with the physiological needs of target plant species.

Irrigation

- Operate the irrigation system so that the timing and amount of water match crop water needs. This will require, at a minimum: (a) the accurate measure of soil water depletion and the volume of irrigation applied, and (b) uniform application of water.
- When chemigation is used, include anti-backflow devices for wells, minimize the harmful amounts of chemigated waters from the field, and control deep percolation.
- In cases where chemigation is performed with furrow irrigation systems, a tailwater management system may be needed.
- In some locations, irrigation return flows are subject to other water rights or are required to maintain stream flow(s). In these special cases, on-site use could be precluded and would not be considered part of the management measures for such locations.
- 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.
- Where leakage from delivery systems or return flows support 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.
- In some locations, sprinkler irrigation is used for frost or freeze protection, or for crop cooling. In these special cases, applications should be limited to the amount necessary for crop protection, and applied water should remain on site.

Appendix I - Common Agricultural Water Quality Parameters of Concern

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

Parameters

Template Language

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

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

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

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

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

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

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

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

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

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

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

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