Yamhill Agricultural Water Quality Management Area Plan

Developed by the:

The Oregon Department of Agriculture

With support from the:

Yamhill Local Advisory Committee

and

The Yamhill Soil and Water Conservation District
The Polk Soil and Water Conservation District

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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 2

1.1 Purpose of Ag WQ Program and Applicability of Area Plans 2
1.2 History of the Agricultural Water Quality Management Program 2
1.3 Roles and Responsibilities 3
1.3.1 Oregon Department of Agriculture (ODA) 3
1.3.2 Local Management Agency 6
1.3.3 Local Advisory Committee (LAC) 6
1.3.4 Agriculture's Role 6
1.3.5 Public Participation 7
1.4 Agricultural Water Quality 7
1.4.1 Point and Nonpoint Sources of Water Pollution 7
1.4.2 Beneficial Uses and Parameters of Concern 7
1.4.3 Impaired Water Bodies and Total Maximum Daily Loads (TMDLs) 8
1.4.4 Oregon Water Pollution Control Law – ORS 468B.025 and ORS 468B.050 8
1.4.5 Streamside Vegetation and Agricultural Water Quality 9
1.5 Other Water Quality Programs 10
1.5.1 Confined Animal Feeding Operations (CAFO) 10
1.5.2 Groundwater Management Areas 11
1.5.3 The Oregon Plan for Salmon and Watersheds 11
1.5.4 Pesticide Management and Stewardship 11
1.5.5 Drinking Water Source Protection 12
1.6 Partner Agencies and Organizations 12
1.6.1 Oregon Department of Environmental Quality 12
1.6.2 Other Partners 13
1.7 Measuring Progress 13
1.7.1 Measurable Objectives 13
1.7.2 Land Conditions and Water Quality 14
1.7.3 Focused Implementation in Small Geographic Areas 14
1.8 Monitoring, Evaluation, and Adaptive Management 15
1.8.1 Statewide Aerial Photo Monitoring of Streamside Vegetation 15
1.8.2 Agricultural Ambient Water Quality Monitoring 15
1.8.3 Biennial Reviews and Adaptive Management 16

Chapter 2: Local Background 17

2.1 Local Roles and Responsibilities 17
2.1.1 Local Advisory Committee 17
2.1.2 Local Management Agency 17
2.2 Area Plan and Area Rules: Development and History 18
2.3 Geographic and Physical Setting 18
2.3.1 Water Resources 21
2.3.2 Biological Resources 22

2.4 Water Quality in the Management Area **23**
2.4.1 303(d) Listed 23
2.4.2 TMDLs and Agricultural Load Allocations 23
2.4.3 Summary 27
2.5 Prevention and Control Measures **27**
2.5.1 Prevention and Control Measure #1 - Erosion and Sediment 29
2.5.2 Prevention and Control Measure #2 - Irrigation 31
2.5.3 Prevention and Control Measure #3 – Waste 32
2.5.4 Prevention and Control Measure #4 – Nutrients 33
2.5.5 Prevention and Control Measure #5 – Pesticides 35
2.5.6 Prevention and Control Measure #6 - Chemigated Irrigation Water 36
2.5.7 Prevention and Control Measure #7 – Roads, Staging Areas, and Farmsteads 37
2.5.8 Prevention and Control Measure #8 - Streamside Areas 38

Chapter 3: Strategic Plan to Achieve Area Plan Goals **41**
3.1 The Mission **41**
3.2 Focus Area **41**
3.3 Strategic Implementation Areas **42**
3.4 Measurable Objectives **44**
3.5 Strategies for Area Plan Implementation **44**
3.5.1 Education and Outreach 45
3.5.2 Conservation Planning and Conservation Practices 46
3.5.3 Funding 48
3.5.4 Monitoring and Evaluation 49
3.6 Targets **51**
3.6.1 Management Area Targets 51

Chapter 4: Implementation, Monitoring, and Adaptive Management **53**
4.1 Implementation and Accomplishments **53**
4.2 Water Quality Monitoring—Status and Trends **57**
4.3 DEQ, Oregon Water Quality Index (OWQI) Yamhill Basin Summary **58**
4.4 Yamhill Pesticide Stewardship Partnership **61**
4.5 Aerial Photo Monitoring of Streamside Vegetation **62**
4.6 Results from Streamside Vegetation Assessment in the Focus Area **63**
4.7 Results from the Strategic Implementation Areas (SIA) **63**
4.8 Biennial Reviews and Adaptive Management **63**

References **65**

Appendices **67**
Appendix A: Waterbodies with approved TMDL/listed on the 303(d) list **69**
Appendix B: Yamhill Basin Ambient Water Quality Monitoring **73**
Appendix C: Common Agricultural Water Quality Parameters of Concern **81**
Appendix D: Educational and Technical Guidance Information for Natural Resource and Farm Management **83**
Appendix E: The Conservation Planning Process **89**
Appendix F: Instructions and Guidelines for a Voluntary Conservation Plan **91**
Appendix G: Conservation Practices **95**
Appendix H: Public Funding Sources for Landowner Assistance **101**

Acronyms and Terms Used in this Document

Ag Water Quality Program – Agricultural Water Quality Management Program
Area Plan – Agricultural Water Quality Management Area Plan
Area Rules – Agricultural Water Quality Management Area Rules
CAFO – Confined Animal Feeding Operation
CNPCP – Coastal Nonpoint Pollution Control Program
CWA – Clean Water Act
CZARA – Coastal Zone Act Reauthorization Amendments
DEQ – Oregon Department of Environmental Quality
GWMA – Groundwater Management Area
HUC – Hydrologic Unit Code
LAC – Local Advisory Committee
Management Area – Agricultural Water Quality Management Area
MOA – Memorandum of Agreement
NPDES – National Pollution Discharge Elimination System
NRCS – Natural Resources Conservation Service
OAR – Oregon Administrative Rules
ODA – Oregon Department of Agriculture
ODFW – Oregon Department of Fish and Wildlife
OHA – Oregon Health Authority
ORS – Oregon Revised Statute
OWEB – Oregon Watershed Enhancement Board
PMP – Pesticides Management Plan
PSP – Pesticides Stewardship Partnership
PSWCD – Polk Soil and Water Conservation District
RUSLE – Revised Universal Soil Loss Equation
SIA – Strategic Implementation Area
SVA – Streamside Vegetation Assessment
SWCD – Soil and Water Conservation District
T – Soil Loss Tolerance Factor
TMDL – Total Maximum Daily Load
U.S. EPA – United States Environmental Protection Agency
USDA – United States Department of Agriculture
WQPMT – Water Quality Pesticides Management Team
YSWCD – Yamhill Soil and Water Conservation District

Foreword

This Agricultural Water Quality Management Area Plan (Area Plan) provides guidance for addressing water quality due to agricultural activities 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 Agricultural Water Quality Management Area Rules (Area Rules), 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 Ag WQ Program and Applicability of Area Plans

As part of Oregon's Agricultural Water Quality Management Program (Ag Water Quality Program), the Area Plan guides landowners and partners such as Soil and Water Conservation Districts (SWCDs) in addressing water quality issues due to agricultural activities. The 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, education, conservation and management activities, compliance with Area Rules developed to implement the Area Plan, monitoring, evaluation, and adaptive management.

The provisions of the Area Plan do not establish legal requirements or prohibitions (ORS 568.912(1)). Each Area Plan is accompanied by Area Rules that describe local agricultural water quality regulatory requirements. ODA will exercise its regulatory authority for the prevention and control of water pollution from agricultural activities under the Ag Water Quality Program's general rules (OAR 603-090-0000 to 603-090-0120) and under the Area Rules for this Management Area (OAR 603-095-0500 - 0560). The Ag Water Quality Program's general rules guide the Ag Water Quality Program, and the Area Rules for the Management Area are the rules that landowners are required to follow.

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

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

1.2 History of the Agricultural Water Quality Management Program

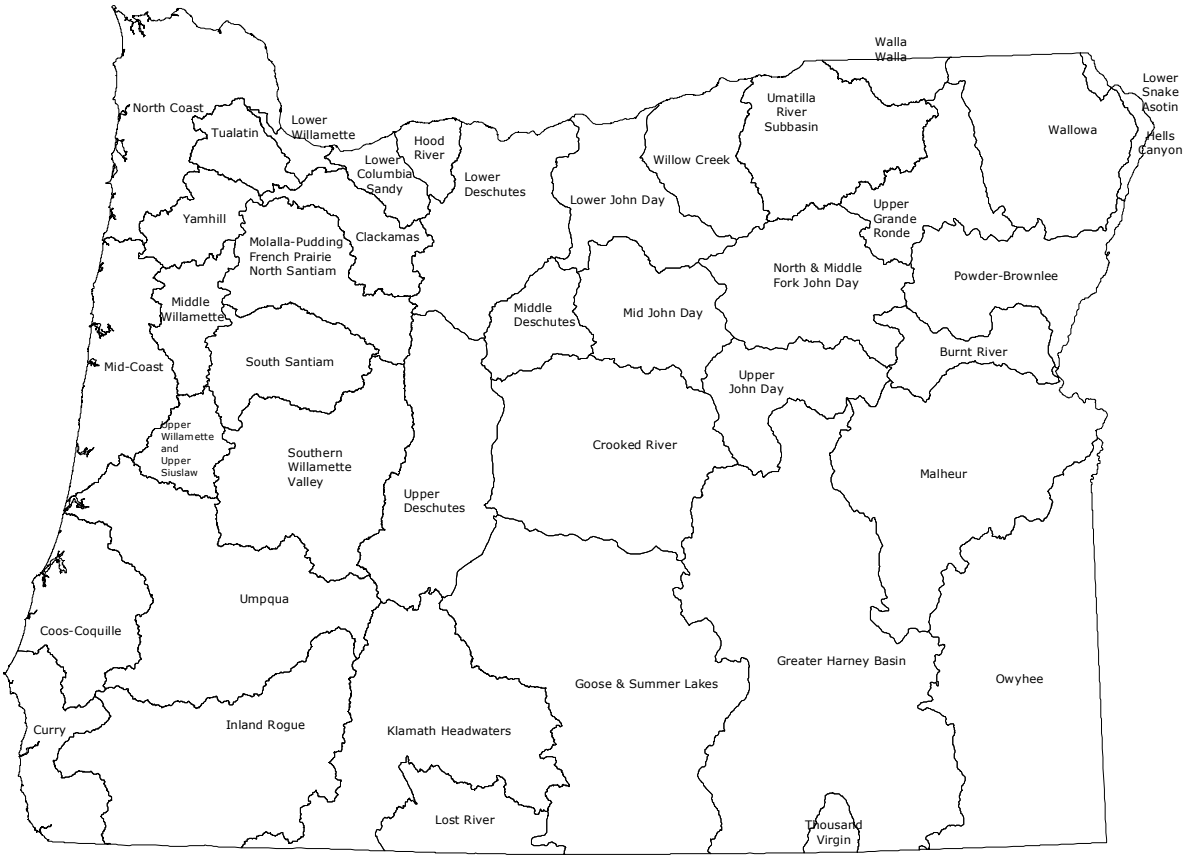
In 1993, the Oregon Legislature passed the Agricultural Water Quality Management Act (formerly known as "Senate Bill 1010") directing ODA to develop plans to prevent and control water pollution from agricultural activities, soil erosion, and to achieve water quality standards (ORS 568.900 through ORS 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 Area Rules were developed and subsequently revised pursuant to these statutes.

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

- Providing education, outreach, and technical assistance to landowners.

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

Figure 1: Map of 38 Agricultural Water Quality Management Areas



1.3 Roles and Responsibilities

1.3.1 Oregon Department of Agriculture (ODA)

The Oregon Department of Agriculture is the agency responsible for implementing the Ag Water Quality Program (ORS 568.900 to 568.933, ORS 561.191, OAR 603-090, and OAR 603-095). The Ag Water Quality Program was established to develop and carry out a water quality management plan for the prevention and control of water pollution from agricultural activities and soil erosion. State and federal laws that are drivers for establishing an Ag Water Quality Management Plan include:

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

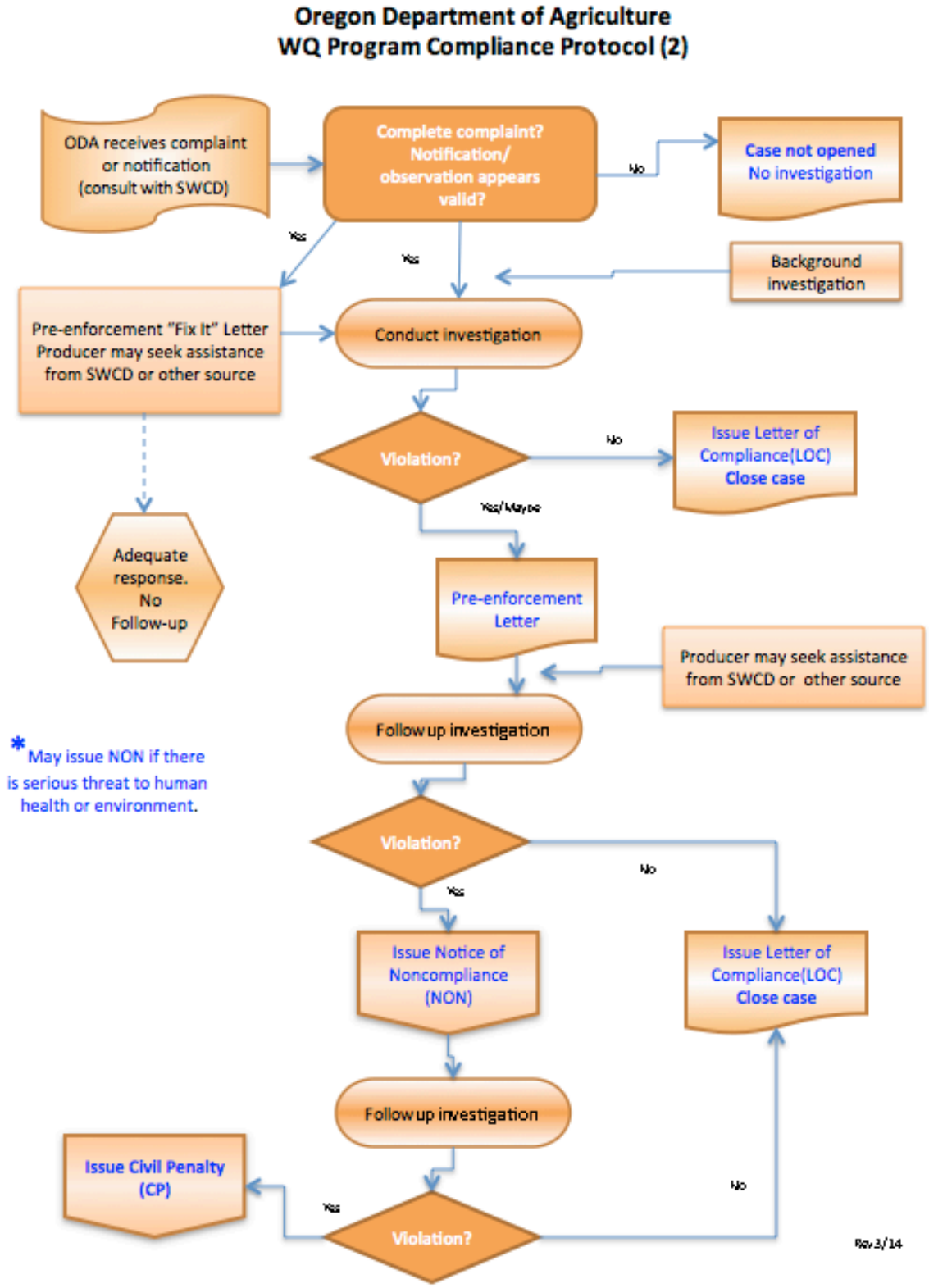
- Approved management measures for Coastal Zone Act Reauthorization Amendments (CZARA).
- Agricultural activities detailed in a Groundwater Management Area (GWMA) Action Plan (if a GWMA has been established and an Action Plan developed).

ODA has the legal authority to develop and implement Area Plans and associated Area Rules for the prevention and control of water pollution from agricultural activities and soil erosion, where such plans are required by state or federal law (ORS 568.909 and ORS 568.912). ODA bases Area Plans and Area Rules on scientific information (ORS 568.909). ODA works in partnership with SWCDs, LACs, DEQ, and other partners to implement, evaluate, and update the Area Plans and Area Rules. ODA has responsibility for any actions related to enforcement or determination of noncompliance with rules (OAR 603-090-0080 through OAR 603-090-0120). ORS 568.912(1) and ORS 568.912(2) give ODA the authority to adopt rules that require landowners to perform actions necessary to prevent and control pollution from agricultural activities and soil erosion.

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

ODA will use enforcement where appropriate and necessary to gain compliance with agricultural water quality rules. 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 rules. See the Compliance Flow Chart for a diagram of the compliance process. If and when other governmental policies, programs, or rules conflict with the Area Plan or associated Area Rules, ODA will consult with the appropriate agency to resolve the conflict in a reasonable manner.

Compliance Flow Chart



1.3.2 Local Management Agency

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

The day-to-day implementation of the Area Plan is accomplished through an intergovernmental agreement between ODA and each SWCD. Each SWCD implements the Area Plan by providing outreach and technical assistance to landowners. SWCDs also work with ODA and the LAC to establish implementation priorities, evaluate progress toward meeting Area Plan goals and objectives, and revise the Area Plan and associated Area Rules as needed.

1.3.3 Local Advisory Committee (LAC)

For each Management Area, the director of ODA appoints an LAC (OAR 603-090-0020) with as many as 12 members to assist with the development and subsequent biennial reviews of the local Area Plan and associated Area Rules. The LAC serves in an advisory role to the director of ODA and to the Board of Agriculture. LACs are composed primarily of agricultural landowners in the Management Area and must reflect a balance of affected persons.

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

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

1.3.4 Agriculture's Role

Each individual landowner or operator in the Management Area is required to comply with the Area Rules, which set minimum standards. However, the rules alone may not be enough in every Management Area. Landowners are also encouraged to engage in restoration activities to achieve the goals and objectives of the Area Plan. Each landowner and operator's actions will contribute toward achievement of the water quality standards.

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

Under the Area Plan and associated Area Rules, 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 Area Rules. In each Management Area, ODA and the LAC held public information meetings, a formal public comment period, and a formal public hearing. ODA and the LACs modified the Area Plans and Area Rules, as needed, to address comments received. The director of ODA adopted the Area Plans and Area Rules in consultation with the Board of Agriculture.

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

1.4 Agricultural Water Quality

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 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 from agricultural fields 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 water pollution sources include 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 can 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 specific to the pollutants that led to the placement of a waterbody on the on the 303(d) list.

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

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

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

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

To implement the intent of ORS 561.191, ODA incorporated ORS 468B into all of the Area Rules.

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 water pollution from agriculture activities and to prevent and control soil erosion. Streamside vegetation can provide three primary water quality functions: shade for cooler stream temperatures, streambank stability, and filtration of pollutants. Other water quality functions from streamside vegetation include: water storage for cooler and later season flows, sediment trapping that can build streambanks and floodplains, narrowing and deepening of channels, and biological uptake of sediment, organic material, nutrients, and pesticides.

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

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

Site-Capable Vegetation

The Ag Water Quality Program uses the concept of "site-capable vegetation" to describe the vegetation that agricultural streams can provide to protect water quality. Site-capable vegetation is the vegetation that can be expected to grow at a particular site, given natural site factors (e.g., elevation, soils, climate, hydrology, wildlife, fire, floods), and historical and current human influences (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 rules 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

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

1.5.1 Confined Animal Feeding Operations (CAFO)

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 State 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. Oregon Department of Agriculture 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 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 they have 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 Area Rules throughout Oregon.

1.5.4 Pesticide Management and Stewardship

The ODA Pesticides Program holds the primary responsibility for registering pesticides and regulating their use in Oregon under the Federal Insecticide Fungicide Rodenticide Act. ODA's Pesticide Program administers rules 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. Department of Environmental Quality and OHA encourage preventive management strategies to ensure that all public drinking water resources are kept safe from current and future contamination. For more information see: www.deq.state.or.us/wq/dwp/dwp.htm.

1.6 Partner Agencies and Organizations

1.6.1 Oregon Department of Environmental Quality

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

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

The MOA includes the following commitments:

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

- Whether existing strategies have been effective in achieving the goals and objectives of the Area Plans.
- Whether the rate of progress is adequate to achieve the goals of the Area Plans.

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

1.6.2 Other Partners

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

1.7 Measuring Progress

Agricultural landowners 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. 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 generally is used as a surrogate for water temperature, because shade blocks solar radiation from warming the stream. In addition, sediment can be used as a surrogate for pesticides and 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 before water quality improves or water quality impacts may be due to other sources.
- Reductions in water quality from agricultural activities are primarily through changes in land conditions and management activities.

Water quality monitoring data 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 water quality or concerns associated with agriculture. Through the Focus Area process, the SWCD delivers systematic, concentrated outreach and technical assistance in small geographic area. A key component of this approach is measuring land 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 Area Rules, and contacts landowners with the results and next steps. Landowners have the option of working with the SWCD or other partners to voluntarily address water quality concerns. ODA follows up, as needed, to enforce agricultural water quality Area Rules. Finally, ODA completes a post-assessment to document progress made in the watershed. Chapter 3 describes any SIAs that are underway in this Management Area.

1.8 Monitoring, Evaluation, and Adaptive Management

ODA, the LAC and the LMA will assess the effectiveness of the Area Plan and associated Area Rules 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 on agricultural lands across the entire Management Area and within the Focus Area. ODA will utilize other agencies' and organizations' local monitoring data when available. 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. Stream segments representing 10 to 15 percent of the agricultural lands in each Management Area were randomly selected for long-term aerial photo monitoring. Stream segments are generally 3-5 miles long. ODA evaluates streamside vegetation at specific points within 30, 60, and 90-foot bands along both sides of stream segments from the aerial photos and assigns each segment a score based on streamside vegetation. The score can range from 70 (all trees) to 0 (all bare ground). The same stream segments are re-photographed and re-scored every five years to evaluate changes in streamside vegetation conditions over time. Because site capable vegetation varies across the state, there is no single "correct" streamside vegetation index score. The purpose of this monitoring is to measure positive or negative change. 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 Area Plans around the state undergo biennial reviews by ODA and the LAC. As part of each biennial review, ODA, DEQ, SWCDs, and the LAC discuss and evaluate the progress on implementation of the Area Plan and Area Rules. This evaluation includes discussion of enforcement actions, land condition and water quality monitoring, and outreach efforts over the past biennium. ODA and partners evaluate progress toward achieving measurable objectives, and revise implementation strategies as needed. The LAC submits a report to the Board of Agriculture and the Director of ODA describing progress and impediments to implementation, and recommendations for modifications to the Area Plan or associated Area Plans necessary to achieve the goal of the Area Plan. ODA and partners will use the results of this evaluation to update the measurable objectives and implementation strategies in Chapter 3.

Chapter 2: Local Background

2.1 Local Roles and Responsibilities

2.1.1 Local Advisory Committee

This document was developed with the assistance of the Yamhill LAC. The LAC was formed in June of 1998 to identify water quality concerns in the Yamhill Basin and assist with the development of the Area Plan and Area Rules and with subsequent biennial reviews and plan adaptations overtime. Active members are involved in a wide-variety of operations. Members are:

Name	Area	Operation	Affiliations
Sam Sweeney Chair	Dayton	General farming, row crops	Country Heritage Farms, Yamhill SWCD, Palmer Irrigation District
Allan Elliott	Dayton	Nursery	Carlton Plants Oregon Association of Nurserymen
Lucien Gunderman	McMinnville	Livestock	Crown Hill Farms
Steve Jones	McMinnville	General farming	Select Seed Wheat League, Oregon Clover Growers
Ernie Strahm	Carlton	Livestock, small woodlot	City of McMinnville Water Reclamation Facility
Tom Thomson	Dallas	General farming, grass seed	Polk SWCD
Alan Holstein	Dundee	Vineyard	Past board member of LIVE
Rich Blaha	Yamhill	Livestock	ABR—Research Biologist
Matt Crawford	Amity	Grass and specialty seed	
Tim Pfeiffer	Yamhill	General farming	
Bruce Ruddenklau	Amity	General farming	
Rod Volbeda (Alternate)	West Salem	Dairy	Volbeda Farms Polk SWCD

2.1.2 Local Management Agency

The day-to-day implementation of this Area Plan is accomplished through Memoranda of Agreement between the Yamhill and Polk SWCDs. This Agreement defines the SWCDs as the Local Management Agencies for implementation of the Area Plan. Beginning in 1998, the Yamhill SWCD agreed to provide staffing to facilitate the activities and responsibilities of the LAC. The Yamhill SWCD was directly involved in development of the Area Plan and Area Rules.

2.2 Area Plan and Area Rules: Development and History

The Area Plan and associated Area Rules were developed over 25 LAC meetings, beginning in June of 1998 and concluding in April of 2000. The Area Plan and Area Rules were approved by the Director of ODA in July of 2000. During the development process, all LAC meetings were open to the public and public input was specifically sought at a public hearing in December 1999.

Since approval, the LAC met in 2003, 2007, 2009, 2011, 2013, and 2015 to review the Area Plan and Area Rules. Based on these assessments, the ODA, the SWCDs, the LAC, and the State Board of Agriculture consider making appropriate modifications to the Yamhill River Basin Area Plan and/or the associated Area Rules.

2.3 Geographic and Physical Setting

The Yamhill Basin is located in Yamhill County and the northern portion of Polk County, Oregon. It has an area of 769 square miles. The basin drains to the Yamhill River, which in turn drains to the Willamette River near Dayton. Although Chehalem Creek is not a tributary of the Yamhill River, its drainage resides within Yamhill County and is therefore included within the Yamhill Basin Area Plan boundary. The Chehalem Creek drainage basin has an area of 56 square miles and includes a few small streams that flow directly to the Willamette near Newberg and Dundee. The Chehalem Creek land area draining to the Willamette River within Yamhill County is clearly illustrated in the Yamhill Basin boundary map for purposes of this Plan (See map 1). Elevation in the Yamhill Basin ranges from 60 to 3,600 feet. The amount of rainfall ranges widely, from 40 inches at the valley bottom to 150 inches at the highest elevations in the basin.

Though the predominant land uses in the Yamhill Basin are forestry and agriculture (see Table 1), urban areas are growing rapidly. In 1900, the population of Yamhill County (which comprises 70 percent of the basin) was 13,000 (Otte et al, 1974). The current population of Yamhill County is approximately 99,000 (US Census Bureau, 2010), and by 2040 it is projected to be approximately 166,000 (Oregon Department of Administrative Services, 2007). Urban development is concentrated in the nine small cities in the county. Approximately 186,000 acres of Yamhill County are farmlands, down from 284,000 in 1900. There are approximately 1,800 farms in the county, with an average size of 103 acres (US Census of Agriculture, 1997). In 2007, this increased to approximately 2,115 farms in the county, with an average size of 86 acres (US Census of Agriculture, 2007). Please note that these numbers are for Yamhill County only, while the figures in Table 1 are for the whole basin.

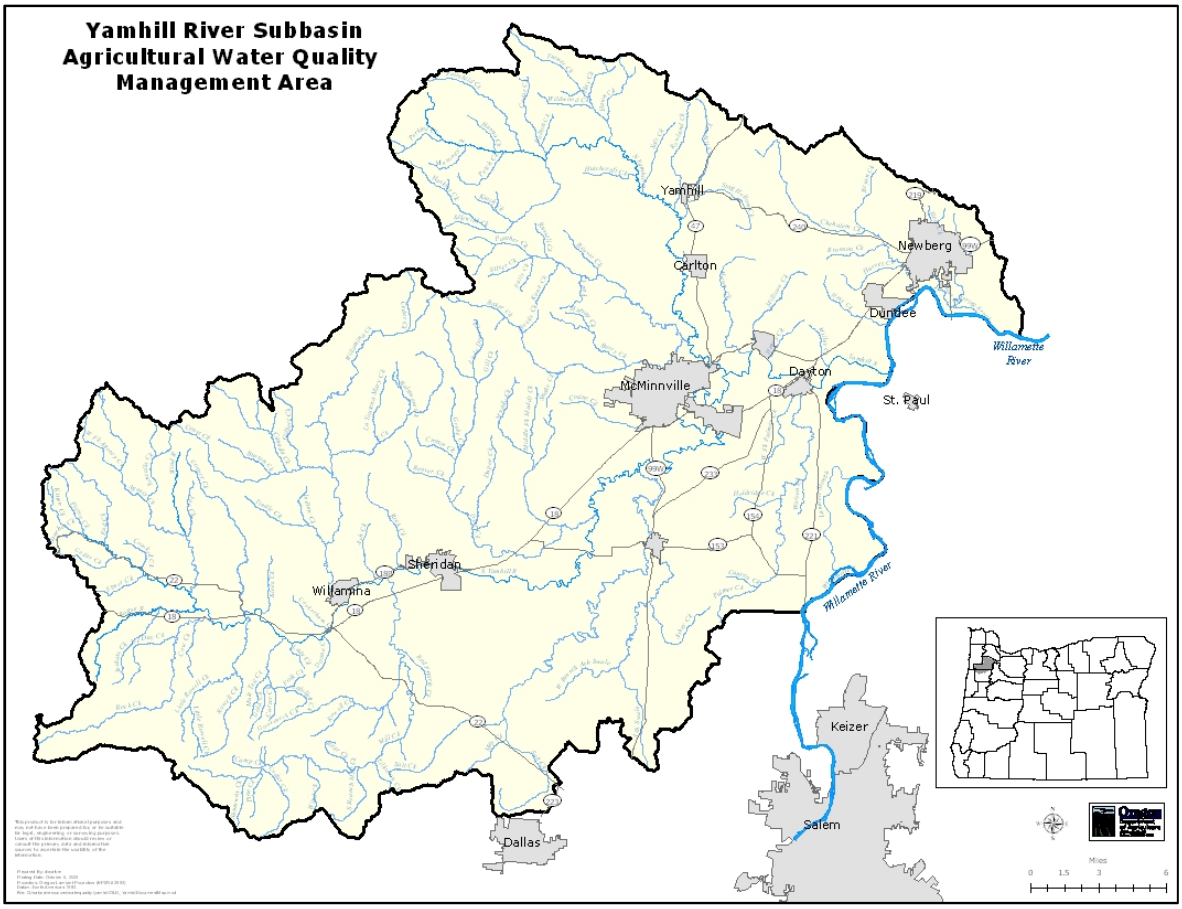
The Yamhill sub-basin has a land area of 491,916 acres. Land cover in the sub-basin is 34% agriculture, 40% forest, 16% grassland/shrub, and 7% urban (3% other). The USGS 2006 National Land Cover Database (NLCD) Land Cover GIS layer was used to determine land use.

Table 1. Ownership and Land Use Types in the Yamhill Basin.

Ownership	Acreage		Land Use	Acreage	
Federal	43,786	acres	Irrigated farmland	38,365	acres
State	2,459		Non-irrigated farmland	155,275	
Tribal	10,000		Range / Pasture	62,931	
Private	435,671		Forest	223,300	
			Urban	8,000	
Total Area	**491,916**	**acres**	Still Water	645	
			Other	3,400	
			Total	**491,916**	**acres**

The forested areas are generally in the western part of the watershed, in the foothills, and upper elevations of the Coast Range. Additional forestland occurs in isolated tracts in the Amity-Eola Hills, Red Hills of Dundee, and the Chehalem and Parrett Mountains. Commercial forest is under public and private ownership. Public lands include those of the Siuslaw National Forest and Bureau of Land Management. Private ownerships are industrial and non-industrial forests and smaller woodlots. The Confederated Tribes of Grand Ronde also own commercial forest in the western part of the watershed.

Figure 2. Yamhill Basin.



Much of the watershed is intensively farmed. Intensive agriculture includes highly productive cultivated land such as orchards, vineyards, nursery stock, grasses, legumes, row crops, dairy farms, irrigated hay and pasture, and dry-land farm crops (e.g., cereal grains). The diversity of agriculture is expressed in Table 2. The majority of the farmland in the basin is in the southern and eastern portions of Yamhill County and the northeastern portion of Polk County. Most of the major crops, such as cereal grains, orchards, and grasses are grown on the low foothills and the main valley terrace. Irrigated vegetable and specialty crops such as nursery products, vegetables for processing and fresh market, corn for silage, hay and alfalfa, are generally grown on the alluvial bottomlands (A large portion of the agricultural land is artificially drained. The slopes of most of the cultivated land range from zero to eighteen percent.

Table 2. Major crops in Yamhill County.

Crop	Acres planted in 2012	Livestock	Number of head
All wheat	11,900	Cattle and calves inventory	25,500
All hay	19,050	Cattle and calves sold	NA
Oats	1,933	Beef cows	5,800
Silage corn	2,500	Milk cows	5,000
Barley	300	Sheep, ewes, and lambs	13,000
Grass and legume seeds	44,102	Hogs and pigs	900
Hazelnut	7,410	Chickens	3,602,000
Tree Fruit	1,615	Horses, Mules, Burros and Donkeys	3,900
Wine grapes	5,800		
Christmas trees	3,600		
		Goats	700
		Llamas[2]	NA
Nursery / Greenhouse	Not in 2012 Report		
Berry crops (strawberries, black raspberries, blackberries, boysenberries, blueberries)	1,535		

Sources: Census of Agriculture (2012).
[2]Bob Wynea, President of the Willamette Valley Llama Association (1999).

The types of crops grown in the Yamhill Basin have shifted during this century and these changes have caused physical impacts in the basin. Most of the basin's farmland was planted in dryland crops such as oats and barley until the early 1940's. Since then, agricultural production in the basin has diversified to include irrigated specialty crops and a greater variety of dryland crops. The growth in specialty crops has been accompanied by increased

withdrawals from streams in the basin. The potential for soil erosion is dependent on the cropping system. Typically, annual cropping systems have greater potential for soil erosion than perennial cropping systems.

Farming practices in the Yamhill Basin have also undergone changes. Cover cropping in certain perennial crops is becoming an accepted method of reducing soil erosion. Flailing in orchard crops for vegetation control has become a routine practice. Farmers have also begun practicing residue management on highly erodible land. Confined Animal Feeding Operations (CAFOs), especially dairy farms, have worked to better contain wastes with manure storage systems and apply them based on crop nutrient needs.

Because there is no snowpack in the Yamhill Basin in an average year, rainfall provides most of the area's water. As is typical in a rainfall watershed, the impact of water entering into streams is more immediate and of shorter duration than in a watershed supplied with snowmelt. Additionally, the water contributed to streams through rainfall is generally at a higher temperature than is snowmelt. About 85 percent of the total annual rainfall in the area usually falls during the period September through April, and soils on the floodplains are subject to occasional to frequent flooding during the winter (Knezevich, 1982).

2.3.1 Water Resources

Appropriated water in the Yamhill Basin is diverted for agricultural, municipal, industrial, and commercial use. The primary use for which water rights are issued in the Yamhill Basin is irrigation. The amount of water appropriated in the basin is 8,300 annual acre feet (one acre foot covers one acre of land with a foot of water), with 6,423 acre feet of this allocated for irrigation (Oregon Water Resources Department, 1998). There are 24,907 acres of irrigated land in Yamhill County (Census of Agriculture, 2002). The water used for irrigation comes from several sources in the Yamhill Basin. These sources include impoundments, groundwater, out-of-basin transfers, and streams throughout the basin. Additionally, the Palmer Creek Water District Improvement Company diverts water from the Willamette River and excess water is returned to the Yamhill. Presently, there are no further appropriations of surface water allowed in the South Yamhill River, and most other basins are fully appropriated in the summer. With all appropriated water, the date of water right determines seniority. Junior water rights have lower priority and the user may be forced to cease irrigation under extreme conditions.

Stream flow in the Yamhill Basin varies throughout the year and the high and low flows have different impacts on the landscape and resources. Stream flows vary widely between summer and winter largely due to the amount of rainfall. The greater amount of water diverted for irrigation during the summer also contributes to the fluctuations in flow. The South Fork of the Yamhill River, for example, has an average flow of 30 ft^3/sec during the summer low flow condition and 6,000 ft^3/sec during the winter high flow condition. During the winter high stream flows, a prominent resource concern is soil erosion. Also, leached nutrients and pesticides can negatively affect water quality and can serve as an economic loss for producers. During periods of low stream flow, nutrients, heat load, and pesticides can more easily impact water quality because lower stream flows provide less dilution of contaminants. Additionally,

the higher stream temperatures associated with low flow in the summertime are a major factor affecting aquatic life.

2.3.2 Biological Resources

The diversity and acreage of natural wildlife habitats in the basin has been reduced as land has been converted from natural forest and grasslands to managed forests, pasture, cropland, homesteads, and urban areas. Studies estimate that around 40 percent of the original wetlands in the Willamette Valley have been lost (Gabriel, 1993). As a result, some of the ecological functions of wetlands and riparian areas have been impaired. These areas filter contaminants, trap sediment, and provide wildlife habitat. Wetland and riparian vegetation also minimizes hydrologic fluctuations by retaining water during high flows. This water may then replenish groundwater or provide shallow subsurface flow to streams. Both of these flow mechanisms are important for water quality with groundwater providing most of the in-stream water during summertime periods of low precipitation.

The Yamhill Basin hosts a number of vertebrate species that depend on aquatic habitats. Native, non-game fish include red-side shiner (*Richardsonius balteatus*), northern pike minnow (*Ptychocheilus oregonensis*), largescale (*Catostumus columbianus*) and bridgelip (*Catostumus macrocheilus*) sucker, Pacific lamprey (*Lampetra tridentata*), brook lamprey (*Lampetra richardsoni*), and several species of sculpin (*Cottus spp*.). Also native are winter steelhead (*Oncorhynchus mykiss*) and perhaps the basin's most widely distributed fish, cutthroat trout (*Oncorhynchus clarki*). Although adult Willamette spring Chinook salmon do not spawn in the Yamhill Basin, juvenile spring Chinook salmon (*Oncorhynchus tshawytscha)* have been found to use streams in the lower portion of the basin during the winter months for seasonal rearing (Galovich, 1999). Other aquatic vertebrates in the basin include several amphibians such as the Pacific giant salamander (*Dicamptodon ensatus*), tailed frog (*Ascaphus trueii*), red-legged frog (*Rana aurora*), and Columbia seep salamander (*Rhyacotriton kezeri*). Several mammalian species also depend on the waters of the Yamhill Basin. Beavers (*Castor canadensis*), muskrats *(Ondatra zibethica*), and river otters *(Lutris canadensis*) are common throughout the region. American dippers, green herons, belted kingfishers, and several other bird species also live and feed in the basin's aquatic habitats.

Several of the Yamhill Basin's fish and aquatic vertebrate populations are currently in decline. The Upper Willamette steelhead is listed under the Endangered Species Act. Pacific lamprey (another anadromous, cold water species) is currently listed as vulnerable on the Oregon Sensitive Species List and is of special concern to tribal communities due to its cultural importance. The Columbia seep salamander and the Western pond turtle are currently listed as critical on the state Sensitive Species List, while the status of the tailed frog and red-legged frog is vulnerable.

Ongoing conservation efforts in the Yamhill Basin are benefiting wildlife habitat. Conservation practices such as wetland restoration, upland habitat planting, tree and shrub planting, and riparian restoration create new habitat. Many producers are working with the SWCDs in the Yamhill Basin to implement these types of measures that will benefit wildlife in the future.

2.4 Water Quality in the Management Area

The LAC consulted many sources when determining water quality issues in the Yamhill Basin. These sources are listed in Table 5. While this is not a complete list of available data, water quality trends for the area are established utilizing the data.

2.4.1 303(d) Listed

As indicated above, several stream segments within the Yamhill River Basin Area Plan, (including Chehalem Creek in the Middle Willamette Basin near) have been declared "water quality limited or impaired" and have been placed on the Oregon DEQ 303(d) List or have established TMDLs Appendix A identifies the stream segments that are "303(d) Listed" or have established TMDLs for bacteria (fecal coliform), temperature, chlorophyll a, Chloropyrifos, dissolved oxygen, iron, nutrients, and manganese. The 303 (d) Listed streams are shaded in the table. These parameters are assessed by DEQ for water quality and are described in Appendix C. Also, the Appendix A & C information can be found at http://www.deq.state.or.us/wq/assessment/rpt0406.htm.

DEQ submitted Oregon's 2012 Integrated Report and 303(d) list to EPA in November 2014. EPA will review and either approve or disapprove the 2012 303(d) list as submitted. After EPA has taken final action, the 2012 303(d) list will become effective for Clean Water Act purposes.

2.4.2 TMDLs and Agricultural Load Allocations

A study conducted by the DEQ during the summer of 1988 determined that sections of the South Fork, North Fork and the mainstem Yamhill River exceeded water quality standards for pH. Analysis of the data determined that phosphorus levels in the river were causing an increase in algae populations and in turn pH. The data also indicated the wastewater treatment plants located in the communities of McMinnville, Carlton, Lafayette, and Yamhill were significant sources of phosphorus.

In response to this study, the Oregon Environmental Quality Commission, in June of 1989, established more stringent standards to improve water quality on the Yamhill River. These standards included a TMDL for phosphorus in 1992 for the streams listed in Appendix A.

The cities of McMinnville, Carlton, Lafayette, and Yamhill took steps to meet the new TMDL for phosphorus. The summer low flow conditions in the river were found to be a critical time for phosphorus concentrations, while winter stream conditions were not affected by phosphorus. As a result, both Yamhill and Carlton wastewater treatment plants no longer discharge to the Yamhill River during summer months, and the cities of Lafayette and McMinnville utilize chemical treatment to reduce the phosphorus discharged. The TMDL process also established an allocation for the load of phosphorus entering streams through agricultural activities. Efforts to reduce phosphorous have been ongoing under this plan. Strategies (Appendix G and chapter 3 goals) documented in this Area Plan support phosphorous reduction and affiliated parameter improvements.

Oregon has developed TMDLs for portions of the Willamette basin at different times. Table 3 summarizes TMDL development. Willamette Basin TMDLs for temperature, bacteria, and mercury were adopted in 2006. Stream specific TMDLs were issued for Dissolved Oxygen in the Upper Willamette. The Willamette Basin TMDL only covered 9 of the 12 (excluded Molalla-Pudding, Tualatin, and Yamhill) basins. Mercury is not identified on the Appendix A list because it applies to The Willamette River as a whole. Erosion control efforts under this plan work towards mercury reductions in the Chehalem area where the TMDL for mercury has been established. This Area Plan is a tool for implementing the nonpoint source controls required by a TMDL for phosphorus, bacteria, mercury, and temperature. The same BMPs are used in Yamhill and therefore work for the mercury TMDL and for when other TMDLs in the Yamhill are completed for the 303(d) listings applicable to the Yamhill Basin.

Table 3. 2006 Willamette Basin and Yamhill TMDL dates by basins.

Subbasin	**Bacteria**	**Dissolved Oxygen**	**Mercury**	**Phosphorous**	**Temperature**	**Legacy Pesticides Nitrates**
Willamette TMDL 9 of 12 Subbasins, includes Chehalem Creek	2006	2006 stream specific in Upper Willamette	2006	NA	2006	N/A
Yamhill	303(d) no TMDL	303(d) no TMDL	When TMDLs are completed for other parameters. Current efforts to reduce erosion support mercury reductions.	1998	303(d) no TMDL	303(d) no TMDL

TMDL Load Allocations under the 2006 Willamette TMDL for Chehalem Creek and the Yamhill Basin Phosphorous TMDLs s are outlined in Table 4 below.

Table 4. 2006 Nonpoint Source Agricultural TMDL Load Allocations/Reductions

TMDL	Basin	Allocations
Bacteria	Middle Willamette – Chehalem Creek	95% reduction applies to the Middle Willamette overall
Mercury	Middle Willamette – Chehalem Creek	27% Willamette Basinwide
Temperature	Middle Willamette – Chehalem Creek	Middle Willamette - Attainment and preservation of effective shade levels on smaller tributaries associated with system potential vegetation will eliminate most anthropogenic nonpoint source heat loads. 91% thermal pollution is from nonpoint sources. Surrogate measure is effective shade targets and a heat load equivalent of 0.05 ºC of the Human Use Allowance.
Phosphorous	Yamhill	Waters of the state must be of sufficient quality to support aquatic species without detrimental changes in the resident biological communities. Aquatic weeds or algae growth can decrease oxygen levels and increase pH, both of which can be harmful to fish. Excessive growth of these organisms can clog navigable waters and interfere with swimming, boating, and drinking water supply. Aquatic weeds and algae out-compete native submerged aquatic vegetation. The following standards support water quality under the phosphous TMDL: PH 6.5-8.5 Many biological processes, such as everyday metabolism and reproduction, are hampered in acidic (pH too low) or alkaline Chlorophyll a 0.015 mg/l Elevated chlorophyll a levels indicate excessive inputs of nutrients

Surface water quality in the Yamhill Basin varies seasonally. During the summer low flow periods, sections of the middle and lower reaches of the Yamhill River have poor water quality for several parameters. Some seasonal variation in water quality in the Yamhill Basin probably occurred prior to European settlement due to the natural characteristics of the stream. Diversion of water and hydrologic changes (created by activities such as tiling or impoundments) has exaggerated seasonal variations. This reduction in flow and some loss of shading by riparian vegetation have probably contributed to some increases in water temperature. Also, point and nonpoint source wastewater discharges have adversely affected water quality.

There are several potential sources of water pollution in the Yamhill Basin. Point source pollution emanates from clearly identifiable discharge points such as wastewater plants and industrial operations. Non-point source pollution originates from the general landscape and is difficult to trace to a single point. Non-point sources of pollution in the Yamhill Basin include erosion from agricultural, rural, and forestlands and stream banks, roadsides, and development in urban areas; contaminated runoff from livestock and other agricultural operations; and contaminated runoff from established urban areas, septic systems, and natural sources.

Pollutants from non-point sources are carried to the surface water or groundwater through the action of rainfall, irrigation runoff, seepage, and illicit discharges. The purpose of this Area Plan is to address strategies in preventing and controlling non-point pollution from agricultural activities from entering into waters of the state on agricultural land.

Table 5. Water quality data for the Yamhill Basin

Data Source	Parameter	Sample Site	Date	Author	Value of Study
Water Quality Assessment – Oregon's 2004/2006 Integrated Report and Database http://www.deq.state.or.us/wq/assessment/rpt0406.htm	All	Sites throughout Oregon	1998 2002 2004	Oregon DEQ	Water quality status for water bodies in Oregon
Oregon Department of Environmental Quality – Water Quality Monitoring Program	All	3 monitoring station sites: Yamhill River at Dayton (10363), North Yamhill River at Poverty Bend Road (10929), South Yamhill River Hwy 99W (10948)	Ongoing	Oregon DEQ	Statistical monitoring data
Distribution of Dissolved Pesticides and Other Water Quality Constituents in Small Streams, and their Relation to Land Use, in the Willamette River Basin, OR, 1996	Pesticides, nutrients, conventional parameters	3 sites: tributary to Ash Swale, tributary to S. Yamhill, West Fork Palmer Creek	1996	Chauncey Anderson et al., USGS	Provided baseline data on pesticides and nutrients in the Yamhill Basin
Phosphorus Loading in Baker Creek, Oregon	Phosphorus	18 sites along Baker Creek	1992	Scott Stewart, Dept of Soil Science, OSU	Interpretation needed
1998 Temperature Monitoring Report	Temperature	Mill and Turner Creek Basins; sites on Cosper and Rowell Creek and South Yamhill River	1999	Yamhill Basin Council	Documented temperatures from mouth to headwaters; verified accuracy of 303(d) listings
Endangered Species List	Steelhead		1999	National Marine Fisheries Service, US Fish and Wildlife	Aquatic species of concern (habitat requirements)

The Greater Yamhill Watershed Council (YBC) was key in monitoring efforts in the area from 1998 to 2009. In 1998, YBC monitored stream temperature at a number of sites throughout the region to collect baseline data on stream temperatures. Beginning in 2003, the YBC monitored

additional parameters (temperature, dissolved oxygen, pH, conductivity, turbidity, *E. coli*, and aquatic insects) at 25 sites in the watershed. In 2004, monitoring continued at a subset of the 2003 sites. In 2005 and 2006, the YBC completed baseline monitoring 17 sites on the North Yamhill River and tributaries. In 2008 and 2009, the YBC completed monitoring on the Lower South Yamhill. For additional information or results of the monitoring, contact the YBC.

2.4.3 Summary

Good water quality is a benefit to many different uses. Beneficial uses of water in the Yamhill Basin include fishing; swimming; boating; habitat for aquatic organisms and wildlife; native species enhancement; agricultural, domestic, municipal, and industrial water supplies; and aesthetics. While there may not be severe impacts on water quality from a single source or activity, the combined effects from all sources contribute to the impairment of beneficial uses of the Yamhill River Basin water. Most of the impacts on beneficial uses are recognized during summer, low flow periods. Water impairments are often the result of activities that occur, however, in the fall and winter months.

During the development of this Area Plan, the Yamhill SWCD recognized that not only could this planning process meet the requirements of the AgWQM Act, it could also address the issues associated with the federal CWA and Endangered Species Act. The SWCD encourages landowners to begin an individual conservation planning process that will improve the quality of their resources while meeting the intent of these state and federal rules.

2.5 Prevention and Control Measures

The focus of the Agricultural Water Quality Management Program is on voluntary and cooperative efforts by landowners, SWCDs, ODA, and others to protect water quality. However, the Agricultural Water Quality Management Act also provides for a regulatory backstop to ensure prevention and control of water pollution from agricultural sources in cases where landowners or operators refuse to correct problem conditions. Area Rules serve as this backstop while allowing landowners flexibility in how they protect water quality. Rules are goal-oriented and describe characteristics that should be achieved on agricultural lands, rather than practices that must be implemented.

In its advisory role to the ODA, the LAC developed rules to protect water quality and prevent and control water pollution from agriculture. The LAC recognizes that every farm and situation is different, and recommends each situation be considered carefully when the Area Rules are enforced.

In addition to the Area Rules, available management practices that may help landowners achieve compliance and meet the goals and objectives of the Area Plan are included for reference. The available management practices are intended as suggestions for landowners as options on how to meet the goals and objectives the Area Plan and generally maintain and enhance natural resources on their property. Landowners are neither required to cease a specific practice nor implement a particular practice by the Area Plan or associated Area Rules.

The available management practices that may help landowners achieve compliance are probably not enough for someone who wants to know exactly how to implement an available management practice on their property for a specific purpose. For more information, please consult one of the agencies or organizations listed in Appendix D, sources of information and technical assistance, or one of the publications listed in the references section.

There are cost-share and other forms of funding available for many of the available management practices that can significantly offset the costs to the producer. Some of the practices that funding is available for include fencing, off-stream water, hardened crossings, supplemental planting of riparian vegetation, and control of invasive vegetation. For a list of funding programs, see Appendix H.

Each prevention and control measure relates directly to 303(d) listings, TMDLs, and water quality concerns identified in the management area. The concerns addressed in these prevention and control measures are:

- Bacteria (E. coli and fecal coliform)
- Temperature
- Nutrients (surrogate for Phosphorus, Chlorophyll, pH)
- Turbidity
- Dissolved oxygen
- Chlorophyll a
- pH
- Biological criteria
- Iron
- Manganese
- Mercury

This Area Plan serves as a guidance document and as stated in the foreword, does not establish provisions for enforcement. The Area Rules developed with the LAC, OAR 603-095-0540(1) through 603-095-0540(7), are included in this document only as a reference for landowners. Each Area Rule has a border around it and appears in italics. The following, OAR 603-095-0540 gives some provisions that apply to the Area Rules that were developed with the LAC.

OAR 603-095-0540
All landowners or occupiers conducting activities on lands in agricultural use shall be in compliance with the following criteria. A landowner or occupier shall be responsible for only those violations of the following prevention and control measures caused by activities conducted on land managed by the landowner or occupier. Criteria do not apply to conditions resulting from unusual weather events or other exceptional circumstances which could not have been reasonably anticipated.

2.5.1 Prevention and Control Measure #1 - Erosion and Sediment

Issue

The goal of this prevention and control measure (PCM) is to prevent erosion on agricultural and rural lands. Erosion occurs when soil particles detach and move due to the impacts of wind and water. Eroded soil particles can carry contaminants along with them. These particles, either with or without attached contaminants, can move to waterways and create water quality problems. Soil erosion reduces the long-term productivity of farmland.

Part c) of this PCM is intended to prevent existing drainages and channels from being damaged, destabilized or otherwise eroded with excessive volumes of flow and/or high energy discharges. Ditches, culverts, and other drainage structures are designed to handle a maximum flow volume, and should not be relied upon to carry volumes of water beyond this maximum. Designed drainages also have a limit to the power (or energy) of flow they can handle without being damaged by scour or other erosion processes. Natural channels have formed in response to certain flow volumes and energies, and also cannot handle flows beyond these maximums without eroding and/or becoming unstable.

OAR 603-095-0540
(1) Erosion prevention and sediment control:
(a) Landowners or occupiers shall prevent sheet and rill erosion in excess of four times the tolerable soil loss (T) leaving the property or being transported to streams.
(b) By January 1, 2005, landowners or occupiers shall prevent sheet and rill erosion in excess of two times the tolerable soil loss (T) leaving the property or being transported to streams.
(c) Sediment from sheet and rill, gully, or drainage way erosion shall not reach waters of the state.
(d) Indicators of non-compliance for (a) through (c) above are:
(A) visible soil deposition that could enter natural stream areas;
(B) visible sloughing from drainage ways as a result of livestock grazing, tillage, or human destruction of riparian vegetation; or
(C) underground drainage tile outlets either improperly installed or maintained allowing soil or bank erosion to actively occur.

Potentially impacted parameters
Sedimentation, nutrients, toxics.

Indicators of non-compliance

Clear non-compliance

- Visible soil deposition that enters natural stream areas.
- Visible sloughing from drainage ways as a result of livestock grazing, tillage, or the destruction of riparian vegetation by the landowner or occupier.
- Underground drainage tile outlets either improperly installed or maintained allowing soil or bank erosion to actively occur.

Likely non-compliance, requires further investigation

- Sheet and rill erosion greater than “T”.
- Eroding road ditches, drainage ways, and field borders.
- A drainage way that is growing deeper or wider in response to increased flows.
- Field swales with high water flow and without crop residues, grass cover, or sediment control structures.
- Steep slopes with minimal cover.
- Sediment deposits left from flowing water that are visible away from the ditch or channel.
- Lack of vegetation in and around drainage ditch.

Definitions

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).

Erosion, rill - An erosion process in which numerous small channels only several inches deep are formed and which occurs mainly on recently disturbed soils. The small channels formed by rill erosion would be obliterated by normal smoothing or tillage operations. OAR 603-095-0010(14).

Erosion, sheet - The removal of a fairly uniform layer of soil from the land surface by runoff water. OAR 603-095-0010(15).

Erosion rate, sheet, and rill - The annualized amount of soil material lost from a field or parcel of land due to sheet and rill erosion, expressed in tons of soil eroded per acre per year, and calculated according to the Universal Soil Loss Equation (USLE) or the Revised Universal Soil Loss Equation (RUSLE). OAR 603-095-0010(13).

Soil loss tolerance factor or "T" - The maximum average annual amount of soil loss from erosion, as estimated by the USLE or the 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. OAR 603-095-0010(44).

Filter strip - A strip or area of vegetation for removing sediment, organic matter, and other pollutants from runoff and wastewater (USDA - Natural Resources Conservation Service, 1997).

Example Conservation Practices

For erosion control, practices include switching from conventional tillage to no till, planting a cover crop, tiling (subsurface drainage) a field to improve water infiltration, or any practice that reduces the detachment and movement of soil.

For sediment control, practices include strip cropping, catch basins, grassed lined waterways, vegetative filter strips, and straw bales.

2.5.2 Prevention and Control Measure #2 - Irrigation

Issue

The goal of this PCM is to prevent the mobilization of potential contaminants. This PCM deals with irrigation water management. Irrigation water management is comprised of two distinct components that are equally important. The first component is the irrigation system itself: the physical means of moving water from the supply source into the crop's root zone. The type of irrigation system chosen must be appropriate for factors such as field slope, soil infiltration rates, water supply, type of crop, etc.

The second component of irrigation water management considers how the system is managed. This includes how long and how often the water is applied and how often wearable components (such as sprinkler nozzles, gaskets, hoses, etc.) are replaced or serviced. Costly or complex irrigation systems are not a guarantee of success, particularly if they are managed or maintained incorrectly.

Irrigation scheduling decisions need to be based on numerous factors, such as soil water holding capacity, soil tilth conditions, crop type, stage of growth, weather conditions, recent applications of fertilizers or other chemicals, projected harvesting dates, etc. Irrigation system capabilities (performance, uniformity, efficiency, and application rate) also need to be taken into consideration.

Irrigation monitoring to determine uniform application rates should be considered. There are numerous irrigation scheduling tools available, ranging from the very inexpensive (soil moisture by feel using a soil probe, evaporation pans), to the very expensive (neutron probes, infrared guns, satellite imagery). Naturally, some scheduling tools work better with some crops than with others.

OAR 603-095-0540
(2 Landowners or occupiers shall not apply irrigation water in a manner that results in irrigation water discharge entering the waters of the state.
(a) Indicator of non-compliance is irrigation water discharge entering waters of the state.

Potentially impacted parameters
Nutrients, toxics, sedimentation.

Indicators of non-compliance:

Clear non-compliance

- Irrigation water discharge entering waters of the state.

Likely non-compliance, requires further investigation

- Irrigation application that creates surface runoff.
- Irrigation water applied at a rate that creates surface water turbidity.
- Irrigation water applied at a rate that results in "ponding."
- Irrigation water exiting underground tile outlets.

Example Conservation Practices

Planting and irrigating crops on a contour, planting sloping field edges to grasses, installing sediment basins at field edges in swales, using irrigation soil moisture monitoring, and using drip irrigation.

2.5.3 Prevention and Control Measure #3 – Waste

Issue

The goal of this PCM is to ensure that potentially concentrated nutrients and pathogens associated with higher livestock density areas are not readily transported to waters of the state. Producers should be aware that in addition to this PCM, other laws regulate the management of animal waste. Many livestock operations are required to have a CAFO permit. Also, ORS 468B.025 prohibits activity that causes pollution of any waters of the state or places or causes to be placed any wastes in a location where such wastes are likely to escape or be carried into waters of the state by any means.

OAR 603-095-0540
(3) Placement, Delivery, or Sloughing of Wastes
(a) Effective upon adoption of these rules;
(A) Except as provided in ORS 468B.050, no person conducting agricultural land management or land disturbing practices shall:
(i) cause pollution of any waters of the state or place or caused to be placed any wastes in a location where such wastes are likely to be carried into waters of the state.
(ii) Discharge any wastes into any waters of the state if the discharge reduces the quality of such waters below the water quality standards established by rule for such waters by the Environmental Quality Commission.
(B) No person shall violate the conditions of any waste discharge permit issued pursuant to ORS 468B.050 or ORS 568.
(b) Indicators of non-compliance are:
(A) runoff flowing through areas of high livestock usage and entering waters of the state; or
(B) livestock waste located in drainage ditches or areas of flooding.

Potentially impacted parameters

Bacteria, nutrients, dissolved oxygen, aquatic weeds or algae, chlorophyll a, pH.

Indicators of non-compliance:

Clear non-compliance

- Runoff flowing through areas of high livestock usage and entering waters of the state.
- Livestock waste located in drainage ditches or areas of flooding.

Likely non-compliance, needs further investigation

- Animal confinement areas or waste accumulation located where there is a chance of pollutant transport to waters of the state.

Definitions

Livestock - the animals described or listed in ORS 596.010 and 596.020 and includes, but is not limited to, horses, mules, jennies, jack-asses, cattle, sheep, dogs, hogs, goats, domesticated fowl, psittacines, ratites, domesticated fur-bearing animals, bison, cats, poultry, and any other vertebrate in captivity. Fish are not livestock. OAR 603-011-0250(4).

Waters of the state – As defined in ORS 468B.005(8).

Example Conservation Practices

- Waste management – clean water diversions; waste collection, storage, and utilization; facilities operation and maintenance.
- Pasture management/prescribed grazing.
- Vegetative buffer strips.
- Apply manure to cropland at rates that do not exceed agronomic needs for nitrogen and phosphorus based on soil and/or tissue tests for the crop to be grown.
- Schedule timing and amounts based on expected rainfall to avoid runoff.
- Manage livestock access to streams, wetlands, and riparian areas using off-stream watering facilities, exclusion (temporary or permanent), and seasonal grazing.

2.5.4 Prevention and Control Measure #4 – Nutrients

Issue

The goal of this PCM is to limit over application of nutrients to field, vegetable, and berry crops; nurseries; vineyards; and orchards. Over application of nutrients may result in nutrient runoff and leaching into waters of the state. This may cause nuisance algal growth, high pH, bacterial growth, and a decrease in dissolved oxygen. This PCM encourages growers to adopt sound agronomic practices to guide their crop nutrient applications.

Crop nutrients are elements taken in by a plant that are essential to its growth, and which are used by the plant in the production of its food and tissue. These elements include: nitrogen,

phosphorus, potassium, calcium, magnesium, sulfur, zinc, iron, manganese, copper, boron, molybdenum, and chlorine. The two nutrients of prime concern for water quality in the Yamhill Basin are nitrogen and phosphorus. Sources of crop nutrients include irrigation water, chemical fertilizers, animal manure, compost, bio-solids, and leguminous and non-leguminous crop residues.

OAR 603-095-0540
(4) Effective upon rule adoption, landowners or occupiers shall prevent crop nutrient applications that result in adverse impacts to waters of the state.
(a) Indicators of non-compliance are:
(A) nutrients applied to open water; or
(B) visible trail of compost, ash, or bio-solids to waters of the state.

Potentially impacted parameters
Bacteria, dissolved oxygen, aquatic weeds and algae, nutrients, pH, chlorophyll a

Indicators of non-compliance:

Clear non-compliance
- Nutrients applied to open water.
- Visible trail of compost, ash, or bio-solids to waters of the state.

Likely non-compliance, requires further investigation
- Total nutrient applications that exceed currently accepted fertilizer guidelines, such as Certified Crop Advisor or OSU recommendations.

Definitions

Waters of the state - As defined in ORS 468B.005(8).

Fertilizer - Any substance, or any combination or mixture of substances, designed for use principally as a source of plant food, in inducing increased crop yields or plant growth, or producing any physical or chemical change in the soil and shall contain five percent or more of available nitrogen, phosphorus pentoxide (phosphoric acid) or potassium oxide (potash), singly, collectively or in combination, except hays, straws, peat and leaf mold, and unfortified animal manure. ORS 633.310(5)

Example Conservation Practices

Use of currently accepted fertilizer guidelines; setting realistic yield goals; regular calibration of fertilizer application equipment; appropriate application timing; periodic soil testing and plant tissue analysis; periodic nutrient analysis of manure and/or compost products that are applied; managing irrigation to prevent nutrient loss through leaching and/or surface runoff; carefully managing nutrient applications; and accounting for “non-fertilizer” sources of nutrients such as manure, compost, bio-solids, and leguminous and non-leguminous crop residues.

2.5.5 Prevention and Control Measure #5 – Pesticides

Issue

The goal of this PCM is to minimize off-site transport and maximize on-site retention of pesticide materials. Over application of pesticides can lead to runoff into waters of the state and leaching, which may result in an increase in toxics and a decrease in biological organisms in water bodies and groundwater.

Read the label. As required by ORS 634.372(2) and (4), follow label recommendations for both restricted and non-restricted use pesticides. Pesticides can have a wide range of application methods and rates depending on soil type, crop type, season, and geographic location of the crop. Rain/irrigation affects different materials different ways. For example, some pesticides require a rain/irrigation event to be activated, while others can be washed off and rendered useless during the same event. Following label guidelines (which can change over time) is not only required by federal and state of Oregon laws, but will help to insure optimum results as well.

ORS 634.372 No Person Shall:
(2) As a pesticide applicator or operator, intentionally or willfully apply or use a worthless pesticide or any pesticide inconsistent with its labeling, or as a pesticide consultant or dealer, recommend or distribute such pesticides.
(4) Perform pesticide application activities in a faulty, careless, or negligent manner.

Potentially impacted parameters
Toxics, biological criteria

Indicators of non-compliance:

Clear non-compliance

- Pesticide product applied to open water unless labeled for such use.
- No air gap or other back-siphon prevention device in use on water source used to fill spray equipment. OAR 690-215-0017.
- Improper disposal of rinse/wash water or excess spray mix.

Likely non-compliance, requires further investigation

- Equipment not properly calibrated.

Definitions

Pesticide - Any substance or mixture of substances intended to be used for defoliating plants or for preventing, destroying, repelling or mitigating all insects, plant fungi, weeds, rodents, predatory animals or any other form of plant or animal life which is, or which ODA may declare to be a pest, which may infest or be detrimental to vegetation, humans, animals, or be present in any environment thereof. ORS 634.006(8)(h).

Example Conservation Practices

- Calibrate, maintain, and correctly operate application equipment. Spray rigs need to be calibrated each time application rates or materials change. Verify that a particular rpm range/gear/tire combination provides the intended ground speed. Nozzles need to be replaced often, particularly if abrasive pesticide formulations (such as wettable powders) are used. Sprayers need to be operated in the correct pressure range (dictated by the material and nozzle combination used), to prevent excess drift to non-target areas (i.e., waters of the state).
- Limit sediment movement off of the property. Once applied, many pesticide materials attach to soil particles. If soil is moving off of the property, pesticides will accompany it.
- Adopt integrated pest management (IPM) practices. IPM promotes a diverse, multi-faceted approach to pest control. This includes variety selection, field/orchard sanitation and cultural practices, field scouting, the establishment of an economic threshold for control actions, beneficial insect release, the use of biological pesticides, and the use of chemical pesticides. While IPM does not exclude the use of chemical pesticides, it does seek to reduce their use. A reduction in chemical pesticide use reduces the chance that these materials will make contact with waters of the state.
- Establish appropriate vegetative buffer strips. Buffer strips will help to retain soil (which may have absorbed pesticides) and prevent surface runoff (which may have dissolved pesticides) from making contact with waters of the state.
- Store and handle pesticide materials correctly. Storage and handling facilities should be secure and include a leak-proof pad with curbing for mixing and loading. An alternative to a permanent, concrete pad is to always mix pesticides in the field, frequently moving sites to prevent chemical buildup. Wash/rinse water should be directly applied to the appropriate crop. Empty liquid pesticide containers should be triple rinsed, then punctured and disposed of in an approved manner. Dry chemical bags should be emptied completely. Bundle and store paper bags until they can be disposed of in an approved manner.

2.5.6 Prevention and Control Measure #6 - Chemigated Irrigation Water

Issue

This PCM addresses the rate and concentration of chemically-treated irrigation water applications to farm or ranchland. Chemicals such as pesticides and fertilizers, as dissolved product or in suspension, should be carefully applied so that they do not move off the property to other bodies of water. This could occur via surface and subsurface transport. Irrigation systems used to chemigate must have appropriate backflow prevention devices installed and properly maintained.

OAR 603-095-0540
(5) ***Effective upon rule adoption, landowners or occupiers shall prevent the application of chemicals in combination with irrigation water that results in transport into waters of the state.***
(a) Indicator of non-compliance is chemigated water flowing into waters of the state.

Potentially impacted parameters
Nutrients, toxics, aquatic weeds or algae, dissolved oxygen, pH

Indicators of non-compliance:

Clear indicator of non-compliance

- Chemigated waters flowing into waters of the state.
- Functioning back-siphon prevention device not used while chemigating. OAR 690-215-0017.

Likely indicator of non-compliance, requires further investigation

- Chemigated waters flowing into or ponding around wells, well pits, cisterns, or other direct conduits to groundwater.
- In areas of known or suspected shallow groundwater, chemigated water ponding and standing for extended periods of time.

Definitions

Chemigation - The method of applying nutrients, pesticides, or both in irrigation water (National Association of Wheat Growers Foundation, 1994).
Waters of the state - As defined in ORS 468B.005(8).

Example Conservation Practices
Irrigation water management, vegetative buffer strips, nutrient management, tailwater management, integrated pest management.

2.5.7 Prevention and Control Measure #7 – Roads, Staging Areas, and Farmsteads

Issue

This PCM is intended to address non-cropped areas that may be sources of sediment or contaminant input to streams. These include roads, staging areas, barn lots, stream crossings, and heavy use areas. Many management methods are available for constructing and maintaining roads to increase their stability and reduce erosion. A single poorly maintained road can comprise the vast majority of one farm's sediment output.

OAR 603-095-0540
(6) Roadways, staging areas, farmsteads, and heavy use areas shall be constructed and maintained to prevent sediment or runoff contaminants from reaching waters of the state. All roads on agricultural lands not subject to the Oregon Forest Practices Act (OFPA) are subject to this regulation. Public roads are excluded from this prevention and control measure.
(a) Indicators of non-compliance are:
(A) surface runoff from farmsteads, roads, and staging areas that pick up contaminants and flow to waters of the state; or
(B) visible gully erosion in roads or staging areas.

Potentially impacted parameters
Sediment, turbidity, nutrients, toxics, dissolved oxygen

Indicators of non-compliance:

Clear non-compliance
- Surface runoff from farmsteads, roads, and staging areas that pick up contaminants and flow to waters of the state.
- Visible gully erosion in roads or staging areas.

Likely non-compliance
- Inadequate culverts and water bars to keep runoff in natural channel.
- Pesticide and oil containers stored in the open (exposed to precipitation).

Definitions

Waters of the state - As defined in ORS 468B.005(8).

Oregon Forest Practices Act - As defined in ORS 527.610 - 527.992.

Example Conservation Practices
- Appropriate culvert construction and design, plant and maintain grass cover where appropriate, water bars, grading roads.

2.5.8 Prevention and Control Measure #8 - Streamside Areas

Issue

It is anticipated that this PCM will allow landowners to develop a flexible streamside area management strategy while providing:
- Shade to reduce solar radiation reaching the water;
- A buffer to filter sediment, organic material, nutrients, and pesticides in surface runoff;
- Native species and wildlife habitat; and
- Stable streambanks.

It is also anticipated that this PCM will minimize the impact of livestock on riparian vegetation and maintain stable streambanks while ensuring livestock access to water.

A healthy streamside area provides adequate vegetation to trap sediment, prevents flood debris from depositing on fields, and protects pasture and cropland from bank erosion. Protecting vegetation along smaller streams helps reduce solar radiation reaching the water and provides wildlife habitat.

Landowners can determine the appropriate width of a streamside area through one of several methods. Some examples of how to determine the appropriate width include:

- An area extending 25 feet horizontally from the top of a streambank on each side of the stream, OR
- An area two times the height from the summer low flow level to the bank full level, plus ten feet (2h + 10') on each side of the stream, OR
- The width specified in the Conservation Practice Standards for Riparian Forest Buffer or Filter Strip, listed in the NRCS - Field Office Technical Guide (FOTG).

Although native vegetation affords benefits over exotic species, it is not necessarily recommended that exotic, non-invasive species be removed in order to replant an area with native plants. Native species may be more resistant to diseases and pests. Still, non-native species in the near stream area may also provide valuable shade, stabilize the streambank, and provide cover for wildlife.

OAR 603-095-0540
(7) Landowners or occupiers shall manage streamside areas to allow the establishment, growth, and/or maintenance of vegetation appropriate to the site. Vegetation must be sufficient to provide shade and to protect the streamside area such that it maintains its integrity during high stream flow events such as those events that are reasonably expected to occur as a result of a 25 year, 24-hour storm event.
(a) If any agricultural activity degrades riparian vegetation, the landowner or occupier shall replant or restore the disturbed area to an adequate cover as soon as practical.
(b) Indicator of non-compliance is active streambank sloughing or erosion as a result of tillage, grazing, or destruction of vegetation by the landowner or occupier.

Potentially impacted parameters

Aquatic weeds or algae, bacteria, biological criteria, dissolved oxygen, flow modification, habitat modification, nutrients, sediment, temperature, total dissolved gas, toxics, and turbidity.

Indicators of non-compliance:

Clear non-compliance
- Active streambank sloughing / erosion as a result of tillage, grazing, or destruction of vegetation by the landowner or occupier.

Likely non-compliance, requires further investigation
- Stream not protected by appropriate vegetation.

Example Conservation Practices

To protect and/or restore ecological functions in riparian and wetland areas to improve watershed health:
- Control undesirable vegetation.
- Plant native trees and shrubs.
- Allow snags (dead trees) to remain standing unless safety factors indicate otherwise.

- Allow fallen trees to remain on the ground or in the stream unless removal is essential for traffic, navigation, or serious flooding reasons.
- Allow marginally productive lands in floodplains/poorly drained riparian areas to revert to riparian/wetland status.

To reduce erosion and sedimentation:

- Establish buffer zones and filter strips.
- Establish grassed waterways.
- Protect streambanks.

Chapter 3: Strategic Plan to Achieve Area Plan Goals

3.1 The Mission

The mission of the Yamhill Agricultural Water Quality Management Area Plan is to promote sound agricultural conservation within a framework of economic profitability and agricultural viability. The Area Plan is designed to achieve applicable chemical, physical, and biological water quality standards. This goal of this Area Plan is to prevent and control water pollution from agricultural activities and soil erosion and to achieve applicable water quality standards.

The Yamhill LAC used the following guiding principles in the development of this Area Plan:

- Control pollution as close to its source as possible.
- Base actions on scientifically based conservation planning.
- Promote a variety of conservation practices in order to address individual situations.
- Recognize the need for landowners, operators or occupiers to maintain agricultural profitability.
- Protect beneficial uses of water in the Yamhill Basin.

The Yamhill and Polk SWCDs work with landowners, operators, agribusiness, commodity and volunteer organizations, and other agencies to implement this Area Plan. The focus of this Area Plan is on encouraging good stewardship of natural resources. The success of the Area Plan depends upon a large percentage of landowners voluntarily using conservation measures that reduce pollution from agricultural lands.

3.2 Focus Area

The current focus area for this Management Area is located in Puddy Gulch and Hutchcroft Creek, which are sub-watersheds of the Middle North Fork of the North Yamhill River. The sub-watershed Focus Area is located southwest of the city of Yamhill and contains 241.69 acres of assessed streamside vegetation through the Streamside Vegetation Assessment method.

The main agricultural uses vary between conventional row crops, livestock (mostly cows, horses and sheep), nurseries and orchard crops. An Action Plan, with a timeline, has been developed and approved by ODA, outlining the procedure for assessing the focus area and providing landowner assistance. Key components of the focusing work in a small area are:

- Conduct a pre-assessment of land conditions
- Identify areas of concern
- Conduct education and outreach to landowners
- Offer technical assistance to landowners and financial assistance, if needed
- Conduct post assessment at two year intervals
- Report to ODA and the Yamhill LAC

The sub-Focus Area of the Middle North Fork of the Yamhill watershed is predominantly in agricultural production and also has watershed level concerns for temperature and *E.coli* that

can be improved. The District also has working relationships with landowners in the area that are willing to implement conservation practices that will improve water quality in the watershed. The North Yamhill is 303d listed for temperature and bacteria from the mouth of the North Yamhill to Turner Creek. Also, according to the North Yamhill Watershed Assessment, The North Yamhill from mouth to headwaters is listed as a water body of concern for sedimentation. The Yamhill Basin Council did follow up monitoring on areas of the North Yamhill in 2003 and their results indicate that the North Yamhill and associated tributaries still do not meet DEQ standards (6 of 7 sites did not meet standards for temperature, 4 of 4 sites did not meet standards for *E.coli*, 5 of 7 did not meet standards for turbidity).

The North Yamhill and many of its associated tributaries are listed as a fish bearing streams or as historically essential fish habitat, which makes lowering stream temperature and sedimentation into streams an obvious priority in this area for improving conditions for native migratory fish. The high levels of *E.coli* presents human health risks which also makes lowering levels of *E.coli* a priority.

The current Focus Area is a reduction of the previous Focus Area from the 2013-2015 biennium. The district is narrowing its focus to better target ODA funds and leverage existing relationships in the area in order to more effectively deliver information about conservation programs and technical assistance that the Yamhill SWCD can provide.

We also intend to:

1. Gather information through existing relationships or neighbor referrals about needs/barriers to implementing conservation practices such as riparian buffers.
2. Compile this information to create fact based proposal to present to funders about needs and gaps for districts that only have federal farm bill programs and OWEB as funding tools to implement conservation practices in the watershed.
3. Work with neighboring districts to share our successes/challenges in order to support them in implementing a similar strategy to gather information to support our proposal.

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

3.3 Strategic Implementation Areas

Purpose and Methods:

Oregon Department of Agriculture (ODA) has worked over the last two years to develop the Strategic Implementation Area approach. The Strategic Implementation approach will concentrate technical and financial resources into specific geographic areas to address water quality concerns. The Strategic Implementation approach includes a pre-evaluation; outreach, technical assistance, on the ground projects, and enforcement if necessary; and a post-evaluation. This approach will allow ODA and partners to be able to 'tell the story' of how Agriculture is taking action to protect water quality and also correct problems that may exist.

ODA will complete a process to identify agricultural properties that may be polluting waters of the state and violating local area Agricultural Water Quality Rules using remote and field evaluation. The remote and field evaluations will document concern levels and then respond to

landowners according to concern level. Aerial photos, topographic maps, stream and drainage locations, property boundaries, soils, and well logs are evaluated for the remote evaluation. The presence of agricultural activity (livestock or cropping), slope, proximity to the waterbody, size of the waterbody, and type (ephemeral, seasonal, or perennial) of waterbody are considered for potential surface water impacts. After the remote evaluation, a field evaluation is completed to verify the concerns from the remote evaluation and also any additional observed concerns.

Implementation Process and Timeframe:

1. Coordination and Planning Meetings: (July 2015 to July 2016)
Throughout the SIA process, ODA meets with the local Soil and Water Conservation District(s) and other key partners (Watershed Councils, Natural Resources Conservation Service (NRCS), etc.).

2. Compliance Pre-Evaluation: (ODA completes; July 2015 to September 2015)
Riparian vegetation, bare ground, and manure piles are visually evaluated for each parcel using aerial photographs and field verification from public viewpoints to identify potential for agricultural activities impacting surface or ground water.

3. Outreach and Compliance:

- ODA sends the owners of all evaluated properties introductory letters, SIA outreach materials, and invites them to an open house. (September 2015)
- ODA plans and hosts an open house. (October 2015 to January 2016)
- ODA conducts escalating outreach and on-site visits dependent on concern level. (January 2016, April 2016, and July 2016)
- If a compliance investigation is opened, ODA's normal compliance process is followed. (Ongoing after January 2016)
- SWCD responds to landowners that contact them during the outreach and compliance phase. (Ongoing after January 2016)

4. Compliance Post-Evaluation:
The post-evaluation re-categorizes the concern level after the producer works with the local Soil and Water Conservation District, ODA, or other partner(s) to address any potential water quality issues. (Ongoing after January 2016)

Strategic Implementation Area Descriptions:

- Lower North Yamhill River is a small watershed (approximately 10,000 total acres) in Yamhill County north of the city of McMinnville and south of the city of Yamhill. The North Yamhill River flows into the Yamhill River just northeast of McMinnville. Agricultural areas of the watershed consist mostly of grass seed, nurseries, and hazelnuts. In addition, the watershed includes a portion of McMinnville and the industrial area near a steel mill. Water quality concerns in the watershed include bacteria, nutrients, and temperature.

- The Lower Salt Creek watershed (approximately 19,000 total acres) begins just north of Highway 22 near Cross Creek Golf Course in Polk County and extends to just north of Whiteson, a small community in Yamhill County. Salt Creek originates in Polk County and flows into the Yamhill River just north of Whiteson. Agricultural areas of the watershed consist mostly of grass seed, nurseries, and hazelnuts. Water quality concerns in the watershed are limited to nutrients but is limited to the data available.

3.4 Measurable Objectives

Measureable Objective for the Focus Area

- By June of 2017, reduce the acreage of Grass-ag and Bare-ag from 59.15 acres to 55 acres in the Focus Area measured using the Streamside Vegetation Assessment (SVA) tool. Results from the SVA can be found in Chapter 4, Section 4.6.

The Streamside Vegetation Assessment (SVA) is a tool utilized by ODA and partners to analyze streamside vegetation from aerial photographs using a Geographic Information System (GIS) software program. The year of the aerial photos analyzed are typically prior to implementation to create the baseline condition. When projects are completed, then the categories of streamside vegetation are changed to represent current conditions. For example, when the Yamhill SWCD completes a planting project in an area that was previously categorized as "Bare-Ag", the Yamhill SWCD can now change that category to a "Shrub" or "Tree" and thus eliminate that acreage of bare ground. The SVA is a tool created to show positive change in the watershed as projects are completed. Results will be updated when the post-assessment is complete in 2017 and beyond.

3.5 Strategies for Area Plan Implementation

To maintain 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 following strategies will be employed at the local level by the SWCDs and other partners in cooperation 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.
- Allow streamside vegetation along streams on agricultural properties to establish and grow, to provide streambank stability, filtration of overland flow, and moderation of solar heating.

3.5.1 Education and Outreach

As resources allow, the SWCDs, in partnership with other agencies and local organizations, will develop educational programs to improve the awareness and understanding of water quality and quantity 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 SWCDs Annual Work Plan and Long- Range Plan. The focus of the educational effort will be on:

- Water quality improvement
- Conservation planning
- Prevention of agricultural water pollution
- Watershed restoration and enhancement
- Water quality conditions
- Available programs and project funds
- Conservation success stories
- Rules related to water quality

Strategies: Create a high level of awareness and understanding of water quality issues in the agribusiness community, rural landowners, and the public.

Conduct education programs to promote public awareness of water quality issues:

- Hold workshops on water quality issues and the conservation practices that will help improve water quality.
- Develop demonstration projects to showcase successful conservation practices and systems.
- Organize tours of demonstration projects for agricultural managers, and producers.
- Produce and distribute brochures about water quality issues.
- Include updates on the status of the Yamhill River Basin Area Plan and water quality data in the Yamhill SWCD newsletters.
- Provide information about ways in which impoundments may benefit water quality.

Conduct a media program to inform Yamhill Basin agricultural operators, rural landowners, and the public of conservation issues and events:

- Submit news articles and public service announcements to area newspapers, radio stations, and newsletters.
- Invite media to conservation tours and workshops.

Involve the agricultural community in conservation education:

- Create and maintain a list of experienced agricultural operators willing to share their conservation practices with other interested people by speaking, leading tours, and providing tour sites.

Build partnerships with agribusiness to promote conservation:

- Co-sponsor workshops and tours between the SWCDs and agribusinesses.
- Share education materials with agribusiness field representatives.

- Develop educational materials in conjunction with agribusinesses and commodity and volunteer organizations.

For a list of agencies and organizations to contact for more information about resource management, please refer to Appendix D: Educational and Technical Guidance Information for Natural Resource and Farm Management.

3.5.2 Conservation Planning and Conservation Practices

Conservation Planning—Landowners, operators, and occupiers have flexibility in choosing management approaches and practices to address water quality issues on their lands. They may implement conservation systems on their own—without an approved plan—or may submit a written conservation plan to the LMA for approval.

Voluntary conservation plans describe the management systems and schedule of conservation practices 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, or occupiers, consultants, or technicians available through a SWCD or the NRCS, may develop voluntary conservation plans. An individual conservation plan should outline specific measures necessary to address the "Prevention and Control Measures" outlined in this AgWQM Area Plan. Plans are developed through a planning process that involves nine steps that are described in Appendix E. For an individual conservation plan to be approved by the LMA, it must meet the minimum requirements outlined in the Instructions and Guidelines in Appendix F. An approved voluntary conservation plan provides landowners, operators, or occupiers with limited protection against immediate enforcement actions by ODA, if violations of the prevention and control measures are found to occur on their lands. Please refer to the Enforcement section of this Plan for details on limited protection.

Conservation Practices—Effective water quality management practices for water pollution control are those management practices and structural measures that are determined to be the most effective, practical means of controlling and preventing pollution from agricultural activities.

Appropriate management practices for individual farms may vary with the specific cropping, topographical, environmental, and economic conditions existing at a given site. Due to these variables, it is difficult to recommend any uniform set of management practices to improve water quality relative to agricultural practices.

Management practices and land management changes are most effective when selected and installed as integral parts of a comprehensive resource management plan based on natural resource inventories and assessment of management practices. The result is a system using the management practices and land management changes that are designed to be complementary, and when used in combination is more technically sound than each practice separately.

A detailed listing of a number of specific practices and management measures that can be employed to control or reduce the risk of agricultural pollution are contained in other

documents such as the Field Office Technical Guide, available for reference at the local NRCS office. Landowners and operators have flexibility in choosing management approaches and practices to address water quality issues on their lands. They may implement conservation systems on their own—without an approved plan—or may submit a written conservation plan to the LMA for approval.

Strategies: Increase the adoption of conservation practices to improve water quality.

Encourage agricultural producers to develop conservation plans and implement conservation practices:

- Promote the benefits of having an individual farm conservation plan that incorporates conservation practices.
- Provide assistance in planning and implementation from the SWCDs, NRCS, and partner organizations.
- Showcase positive and effective conservation practices through workshops and tours of demonstration projects.

Identify conservation practices that will protect and improve water quality in the Yamhill Basin:

- Develop and distribute a list of conservation practices.
- Access ongoing research into effective conservation practices.
- Obtain practical knowledge from agricultural producers.
- Encourage a review of the current governmental policies regarding streambank protection and promote a cooperative approach to restoration work.
- Develop cooperative projects between landowners and county or state road departments to implement roadside management practices.
- Coordinate roadside seeding projects.
- Facilitate shallow water development projects that divert water from roads.

A voluntary conservation plan outlines the conservation practices that fulfill these resource quality objectives:

Livestock

- Ensure proper animal waste storage and utilization or disposal.
- Manage livestock access to streams, wetlands, and riparian areas.

Field and Vegetable Crop Production

- Reduce erosion and sediment delivery from agricultural and rural land.
- Limit movement of nutrients and pesticides from agricultural lands to streams.
- Manage and conserve irrigation water.

Nurseries

- Reduce erosion and sediment delivery from nurseries.
- Manage and conserve irrigation water.
- Limit movement of nutrients and pesticides from nurseries to streams.

Vineyards, Berries, Orchards

- Reduce erosion and sediment delivery.
- Limit movement of nutrients and pesticides to streams.
- Manage and conserve irrigation water.

Streamside Areas

- Protect and/or restore ecological functions in riparian and wetland areas to improve watershed health.
- Reduce erosion and sedimentation and provide filtering and buffering characteristics.
- Allows marginally productive or poorly drained lands in floodplains to revert to riparian or wetland status.

Other Management Areas – Roads, Staging Areas, and Farmsteads

- Minimize soil erosion from access roads.
- Manage runoff and contaminants in the farmstead area.

For a list of example **conservation practices** that may be used to meet these objectives, please refer to Appendix G.

The Yamhill and Polk SWCDs will offer technical assistance for conservation planning and will provide guidance to producers who wish to develop their own conservation plans. The USDA and other organizations offer financial assistance for implementing conservation practices outlined in voluntary conservation plans.

For more information on voluntary conservation plans, please consult the following appendices:

E: The Conservation Planning Process
F: Voluntary Conservation Plans in the Yamhill Basin: Instructions and Guidelines
G: Conservation Practices

3.5.3 Funding

Financial Assistance—It is not the intent of the Area Plan to impose a financial hardship on any individual. It is the responsibility of the landowner or operator to request technical and/or financial assistance and to develop a reasonable timeframe for addressing potential water quality problems.
As resources allow, the SWCD, NRCS, and other natural resource agency staff are available to assist landowners in evaluating effective practices for reducing runoff and soil erosion on their farms, and incorporating these practices into voluntary individual water quality plans. Personnel in these offices can also design and assist with implementation of practices, and assist in identifying sources of cost-sharing or grant funds for the construction and use of some of these practices.

Technical and financial assistance for installation of certain management practices may be available through current USDA conservation programs such as the Environmental Quality Incentives Program (EQIP), Conservation Reserve Program (CRP), Conservation Reserve

Enhancement Program (CREP), Continuous CRP (CCRP), Environmental Protection Agency's (EPA) non-point source implementation grants, or state programs such as the Oregon Watershed Enhancement Board (OWEB) grant program, the Riparian Tax Incentive Program, and the Wildlife Habitat Conservation and Management Program.

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

Education – to fund education programs such as workshops, tours, and development of published materials.

Technical assistance – to hire staff to work with producers through the conservation planning process.

Financial assistance – to provide cost-share dollars to assist producers in implementing the conservation practices outlined in their voluntary conservation plans.

Monitoring – to monitor and evaluate the effectiveness of the Area Plan and to evaluate how agricultural activities are impacting streams in the Management Area.

Strategies: Secure adequate funding for administration and implementation of the program to achieve this Area Plan's mission, goal, objectives, and strategies.

Obtain financial assistance for implementing conservation practices; and funding for conservation planning assistance, conservation education, and water quality monitoring: Submit grants to ODA, OWEB, USDA, US EPA, DEQ, and other agencies and private organizations.

- Submit ongoing reports of successes to granting agencies.
- Form partnerships with the agribusiness sector for additional funding.
- Promote USDA incentive based cost share programs to assist producers with conservation plan implementation.
- Pursue the feasibility of Pollution Tax Abatement Program relative to water quality.
- Coordinate the Area Plan with existing programs to minimize costs and conflicts.

Ensure adequate administration of the Yamhill River Basin AgWQM Area Plan:

- Include implementation of the Area Plan in the Yamhill and Polk SWCDs annual and long-range work plans.

For sources of financial assistance, see Appendix H: Public Funding Sources for Landowner Assistance.

3.5.4 Monitoring and Evaluation

ODA conducts monitoring at a statewide level and analyzes other agencies' and organizations' monitoring data to answer several monitoring questions related to agriculture and water quality:

- What are current water quality and landscape conditions in agricultural areas in Oregon?
- What are water quality trends?
- How well does the existing monitoring network assess agricultural water quality trends and streamside conditions in Oregon?
- What are riparian vegetation trends along agricultural lands in Oregon?
- How do riparian conditions compare with site capabilities?
- How do riparian vegetation conditions change in aerial photos of selected stream reaches?
- How do changes in riparian vegetation condition compare with trends in water quality in monitored watersheds?

Strategies: Monitor and evaluate the effectiveness of the Plan.

Work with ODA, SWCD, DEQ, the Yamhill Basin Council, and others to establish ways to measure Area Plan success.

Inventory and assess baseline watershed conditions and potential sources of pollution in the Yamhill Basin.

Establish a plan for monitoring streams and surface water areas that will accurately reflect current water quality conditions:

- Use the present water quality condition of the Yamhill Basin as a baseline.
- Work with local colleges to develop a monitoring program.
- Access and evaluate surveys conducted by the Yamhill Basin Council or other agencies.
- Make monitoring results available to landowners and other public.

Document the number of individual conservation plans written, the number and percentage of acres planned in the basin, and the number of practices implemented.
Track increases in awareness of water quality issues:

- Document the number of attendees of conservation workshops and tours.
- Document the number of agribusiness partnerships produced.

Monitor violations of Area Rules in the Yamhill Basin:

- Document the number of complaints.
- Inventory the watershed for violations of the Area Rules.
- Document ODA's actions.

Monitor the availability of cost-share funds to implement conservation practices outlined in individual conservation plans.

Review and update the Area Plan if necessary:

- Use a technical advisory committee to assist in evaluating Area Plan success.

- Prepare information for biennial reviews of the Yamhill River Basin AgWQM Area Plan.
- Prepare an Area Plan status report for and provide Area Plan revisions (if necessary) to the State Board of Agriculture.

3.6 Targets

3.6.1 Management Area Targets

The following targets were developed based on the work of the Yamhill and Polk SWCDs. ODA and the SWCDs work together on tasks related to implementation of the Area Plan. The targets are for the time period from July 2015 to July 2017 and are only for the SWCDs. Watershed councils and other groups may make additional efforts that fit within the mission and goal of the Area Plan. The SWCDs are not obligated to these targets; they only serve as direction from the LAC as activities that they would like to see accomplished to help gauge progress.

1) Education and outreach

- Host two workshops on specific topics such as mud and manure management or small acreage land stewardship. Give ten presentations at events hosted by other organizations on water quality issues.
- Develop a demonstration project highlighting successful conservation practices.
- Hold at least two tours per year addressing key issues in priority areas.
- Staff informational booths at a minimum of four events.
- Publish eight news articles and/or blog posts highlighting water quality issues in local newspapers and mail out a quarterly newsletter by the Yamhill and Polk SWCDs.

2) Conservation Planning and Conservation Practices

- Conduct information interviews to assess barriers to involvement to cost-share and other conservation programs focused on agricultural water quality.
- Provide one-on-one information about the Area Plan to at least 200 landowners, regarding best management practices for prevention of control of nutrients, fine sediment, and bacteria entering the waters of the state. This will be through fact sheets or one-on-one technical assistance.
- Conduct 20 site assessments to evaluate if water quality concerns are present.
- Provide water quality planning of best management practices, practice design and/or project layout on six sites.

3) Funding

- Apply for funding and implement 10 water quality best management practices to improve agricultural water quality.
- Provide information to at least 100 landowners on federal and local cost-share programs.

4) Effectiveness

- Document baseline water quality conditions in the management area.
- Work with partners to develop a monitoring plan.
- Provide a summary of violations of Rules to the LAC at the biennial review of the Area Plan.
- Conduct monitoring to determine agricultural sources of pollution and identify trends in water quality in agricultural stream reaches.
- Evaluate Light Detection and Ranging (LiDAR) information to understand vegetative conditions along streams in agricultural areas.

Chapter 4: Implementation, Monitoring, and Adaptive Management

4.1 Implementation and Accomplishments

Implementation monitoring tracks the conservation practices that have been implemented to benefit water quality. The local SWCDs and NRCS track practices that have been implemented through quarterly reports to ODA and through an NRCS database. In addition, projects that have received funding from OWEB are tracked in OWEB's restoration database. Partner agencies can submit reports of projects and practices installed in the management area that impact water quality.

Implementation Summary (2013-2015)

Education and Outreach

Yamhill SWCD

- 1,668 landowners were contacted through direct mailings, site visits, and one-on-one visits.
- Six mailings of "Conservation Notes" were mailed (mailing list 3,500 each mailing).
- 39,218 pounds of unlabeled restricted use or banned agricultural pesticides collected in District and Council event.
- 11 workshops were held with 223 people in attendance.
- 478 Fact Sheets distributed.
- Six conservation film nights with a total of 90 attendees.
- Eight presentations with 242 people in attendance.
- Eight Informational Booths were developed and displayed at McMinnville's Farmers Market.
- A woodland management educational event for 5th graders had 1145 students in attendance.
- 34 school groups received natural resources education at Miller Woods.

Polk SWCD

- Polk SWCD held 12 workshops/presentations on topics including land management planning, riparian vegetation management, ditch and stream regulations, upland habitat restoration, with 100 attendees.
- Eight editions of "The Conservation Voice" newsletter were delivered (~115 each mailing).
- 13 information booth displays were developed and exhibited at the Polk County Fair and other venues on Conservation Reserve Enhancement Program (CREP), Agricultural Water Quality, Salmon life cycle, and other agricultural projects and programs, reaching ~950 residents.
- Eight new fact sheets were developed including ODA agricultural water quality rules, CREP, 1,570 Fact Sheets distributed.

- An additional 86 Landowners were contacted with targeted outreach materials.
- Ten news articles were published related to Polk SWCD programs.
- Taught about water quality and salmon lifecycle through Claudia Chinook (more than 20 times).
- 12 macroinvertebrates and water quality classes were taught, reaching approximately 385 elementary and high school students.

Land Stewardship and Water Quality Projects

Yamhill SWCD

- 105 site visits made by staff to landowners.
- 246 Landowners provided with technical assistance.
- 19 conservation practices implemented using funds from EQIP, OWEB and USFWS.
- Three conservation plans written for landowners.
- 24 landowners are implementing CREP funded riparian projects.
- 20 informal and formal natural resources complaints were made and followed up on by staff.

Polk SWCD

- 28 site visits were conducted for landowners by technical staff addressing invasive species, pasture management, riparian issues, oak habitat restoration, forest health, general farm planning assistance and much more.
- An additional 146 landowners received technical assistance via drop-in visits, email, phone or mail correspondence.
- Removed noxious plant species from four locations totaling over 60 acres treated.
- Four water quality projects implemented improving native vegetative cover for filtration of surface flow and stability as well as wildlife habitat.
- Two Wildlife Habitat Conservation Management Plans were developed in assistance to Oregon Department of Fish and Wildlife.

Funding and Administration

Yamhill SWCD

- USDA-CIG was completed and final report was submitted to NRCS. Results shared with the industry in the OWRI tech newsletter.
- Four projects funded by OWEB small grant funds ($27,325).
- ODA/DEQ PSP funding received to purchase recycling tunnel sprayer for demonstrations and pesticide pick up event.
- NRCS Regional Conservation Partnership Program funding application awarded for upland oak and prairie habitat conservation practices ($2.1 million over 5 years).

Polk SWCD

- Submitted and managed 3 OWEB Small Grants addressing water quality issues through vegetation enhancement with $18,033 in obligated funds.
- Submitted and managed 1 OWEB Restoration Grant with $134,303 in obligated funds.

- In collaboration with Yamhill SWCD, was awarded Regional Conservation Partnership Program funding from NRCS, for oak habitat restoration, two million dollars in obligated funds over the next 5 years.
- Submitted Marion-Yamhill-Polk Riparian Partnership grant application for Conservation Reserve Enhancement Program funding for $149,335 over the next two years.
- Opted to give partner input in selection of ODA's Strategic Implementation Area (SIA) program for Lower Salt Creek, with plan to provide technical assistance to willing landowners in the upcoming biennium.

Focus Area Activities

Yamhill SWCD

- 172 landowners provided with technical assistance.
- 21 site visits made by staff to landowners.
- Six workshops offered in the focus area on topics related to water quality with 116 people participating.
- Three tours offered in the focus area on topics related to water quality with 44 participants.
- Three grants submitted and awarded for funding for water quality related practices.
- 406 factsheets distributed.
- Four water quality projects and 8 practices implemented.
- One conservation plan written for landowner.

Implementation Summary (2011 – 2013)

Education and Outreach

Yamhill SWCD

- 2,416 landowners were contacted through direct mailings, site visits, and one-on-one visits.
- Six mailings of "Conservation Notes" were mailed (mailing list 3500 each mailing).
- Workshops were held with 51 people in attendance.
- 127 Fact Sheets distributed.
- Six conservation film nights with a total of 90 attendees.
- Eight presentations with 242 people in attendance.
- Three demonstrations with 75 people in attendance.
- Eight Informational Booths were developed and displayed at McMinnville's Farmers Market.
- Three tours organized with a total of 108 people attendees.
- A woodland management educational event for 5th graders had 1,145 students in attendance.
- 34 school groups received natural resources education at Miller Woods.
- 107 news articles were published related to SWCD program.

Polk SWCD

- Five editions of "The Conservation Voice" newsletter were mailed (155 each mailing).
- Taught about water quality and salmon lifecycle through Claudia Chinook (more than 40 times).
- Displays were developed and displayed at the Polk County Fair reaching ~675 residents.
- ~65 Fact Sheets distributed (Three new fact sheets developed).
- Ten news articles were published related to Polk SWCD programs.
- 30 workshops/presentations hosted with ~154 attendees.
- Outdoor School and numerous one-day outdoor lessons were hosted reaching ~412 elementary and high school students.

Land Stewardship and Water Quality Projects

Yamhill SWCD

- 128 site visits were made by staff to landowners.
- 24 landowners are implementing CREP funded riparian projects.
- 49 conservation practices applied using funds from EQIP, OWEB and USFWS.
- 16 of 20 known knotweed infestations and 12 sites of spurge laurel were treated the last two years.
- 24 informal and formal natural resources complaints were made and followed up on by staff.

Polk SWCD

- 13 site visits were conducted for landowners by technical staff.
- ~136 landowners received technical assistance via drop-in visits, email, phone or mail correspondence.
- Removed invasive weed species from 1 location totaling over 31 acres effected.
- water quality projects implemented.
- Staff followed up on 1 formal agricultural water quality complaint, and numerous informal complaints were taken and addressed by staff.
- Participated in the Technical Advisory Committee for Greater Yamhill Watershed Council as part of the 2013 Watershed Restoration Action Plan.

Funding and Administration

Yamhill SWCD

- USDA-CIG proposal was funded ($75,000) and begun for cost sharing new vineyard spraying technology to Yamhill County.
- Six projects funded by OWEB small grant funds ($54,729).
- One erosion/fish passage barrier removed using multiple funding sources (OWEB $36,173, ODFW $4,000 and Northwest Association of Steelheaders $6,000).
- SWG grant for upland restoration partnering with ODFW and USFWS ($27,673).
- Oregon Weed Board Grant received for Spurge Laurel project ($26,013).

Polk SWCD

- OWEB Small Grants (OWEB) addressing water quality issues through vegetation enhancement and manure management were funded ($14,575).
- One WHIP plans was funded ($6,100).
- Outdoor School received funding from the Grey Family Foundation ($15,000).
- Nutria Control Program through Western IPM was awarded ($25,000).

4.2 Water Quality Monitoring—Status and Trends

A total of 16 water quality-monitoring stations meet ODA criteria. However, ten do not have data beyond 1988, and all but two do not have continuous data past 2001. The South Yamhill at Hwy 99 and North Yamhill at Poverty Bend Road are the only stations listed with continuous data useful for trend monitoring.

Other stations with relevant data are on the North Yamhill, Mill Creek, Deer Creek, Salt Creek, the mainstem Yamhill River, and Willamina Creek. In addition to the ambient water quality monitoring data, the Yamhill Basin Watershed Council (YBC) monitored 18 streams in 2003 and 2004 for many of the water quality parameters of interest to ODA (except nitrogen and phosphorus). Considering all these data sets, there is a very complete baseline survey of the entire basin. Thirteen of all the monitoring stations showed excessive concentrations of *E. coli* and/or fecal coliform. Thirteen streams did not meet DO standards. Fifteen did not meet turbidity standards. Salt Creek at Whiteson has had elevated N concentrations, though two upstream monitoring stations have not had elevated N. Other streams with multiple sampling locations also show differences in water quality over distinct reaches.

As of May 2007, the water quality data for the South Yamhill River at Highway 99 site shows a slightly increasing trend in nitrate concentrations (for the time period 1996 through 2006). Data over this period shows a maximum N as nitrate concentration of 1.47 mg/l. The mean concentration was 0.40 mg/l. Though this concentration does not exceed drinking water standards, it is still too high for natural water. As of September 2009, water quality data for the South Yamhill River site no longer showed an increasing trend in nitrate. As of April 2013, the South Yamhill again had two high nitrate concentrations (up to 1.13 mg/l), and some elevated turbidity readings (to 40 NTUs).

As of October 2007, the North Yamhill at Poverty Bend Road showed sporadic problems with *E. coli* and turbidity, though no trends were apparent. No other analytes assessed has excessive concentrations, except turbidity. One high turbidity value of 79 was reported on December 29, 2008. This was most likely the result of a large storm event or rain-on-snow event, because it also produced elevated turbidity at the North Yamhill River monitoring site. This site had a turbidity of 66 on that date, along with elevated nitrate (2.26 mg/l) and total phosphorus (0.18 mg/l) concentrations. High nitrate and TP concentrations were also reported at this site on February 24, 2009. Four high *E. coli* counts were also reported on the North Yamhill River after October 2007. The North Yamhill site had one high *E. coli* count of 649 in April 2010 and some elevated turbidity up to 58 NTU. No other agricultural water quality issues were apparent for these sites.

As of April 2013, the South Yamhill again had two high nitrate concentrations (up to 1.13 mg/l) and some elevated turbidity readings (to 40 NTUs). The North Yamhill site had one high E. coli count of 649 in April 2010 and some elevated turbidity up to 58 NTU. No other agricultural water qualtiy issues were apparent for these sites. No new monitoring sites in agricultural lands were included in LASAR since the last review of the data.

4.3 DEQ, Oregon Water Quality Index (OWQI) Yamhill Basin Summary

The Oregon Water Quality Index (OWQI) analyzes a defined set of water quality variables and produces a score describing general water quality. The water quality variables included in the OWQI are temperature, dissolved oxygen (percent saturation and concentration), biochemical oxygen demand, pH, total solids, ammonia and nitrate nitrogen, total phosphorus, and bacteria (*E. coli*). There are three sites in the Yamhill Basin with sufficient data for water quality trending analysis, based on OWQI scores. The locations are:

1) North Yamhill River at Poverty Bend Road,
2) South Yamhill River at Highway 99, and
3) Yamhill River at Dayton.

DEQ analyzes data for trends over ten-year periods.

The OWQI results for the Yamhill sub-basin show sites to be ranging from good to poor condition with no significant trend in either direction for the analysis of the data collected during the water years 2003 through 2012. The poor condition of the Yamhill River at Dayton (10363) seems to be driven by the total solids, nitrogen and phosphorus sub-indexes. Encouragingly, we are seeing increasing (improving) trends in the nitrogen and bacteria sub-index at this site. The North Yamhill at Poverty Bend Rd. is in fair condition, which also seems driven by total solids and nutrients (nitrogen and phosphorus). This site has an increasing trend in the dissolved oxygen sub-index and a decreasing (declining) trend in the biochemical oxygen demand (BOD) sub-index. The South Yamhill River at HWY 99E (10948) is in good condition and shows increasing trends in the dissolved oxygen, nitrogen and bacteria sub-indexes.

Analysis of the data from the three Yamhill Basin sites shows a significantly increasing trend in water quality at the Yamhill River at Dayton site between 1986 and 1995 and at all three sites between 1992 and 2001. An increasing trend in water quality continued at the North Yamhill site between 1994 and 2003 followed by a decreasing trend between 1998 and 2007. Analyses of 10-year periods ending after 2001 do not show increasing or decreasing water quality trends at the South Yamhill or Yamhill River sites. A summary of 2013-2014 is outlined in the Table 1 below.

Table 1 – Summary of 2013-2014 DEQ OWQI

No Trend Sites 2013 to 2014										
Basin	**13-14 trend change**	**Station**	**Site**	**Land Use**	**OWQI score 2013**	**OWQI condition 2013**	**OWQI trend 2013**	**OWQI score 2014**	**OWQI condition 2014**	**OWQI trend 2014**
Willamette - Middle	No Change	10363	Yamhill R. @ Dayton	Agriculture	79	Poor	NT	78.867	Poor	None
Willamette - Middle	No Change	10929	N. Yamhill R. @ Poverty Bend Rd.	Agriculture	81	Fair	NT	80.403	Fair	None

Figure 3 - Oregon Water Quality Index for Yamhill Basin Sites.

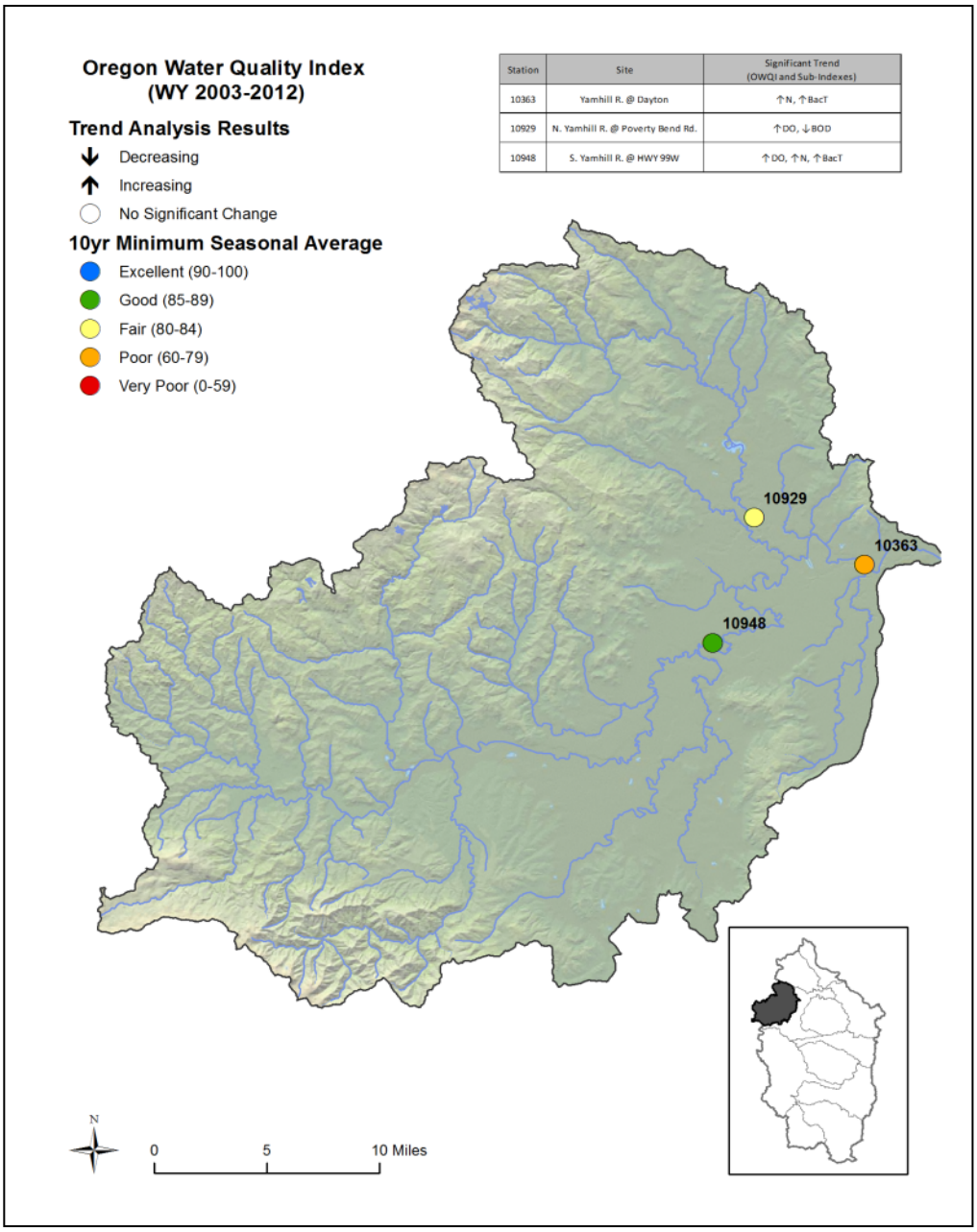
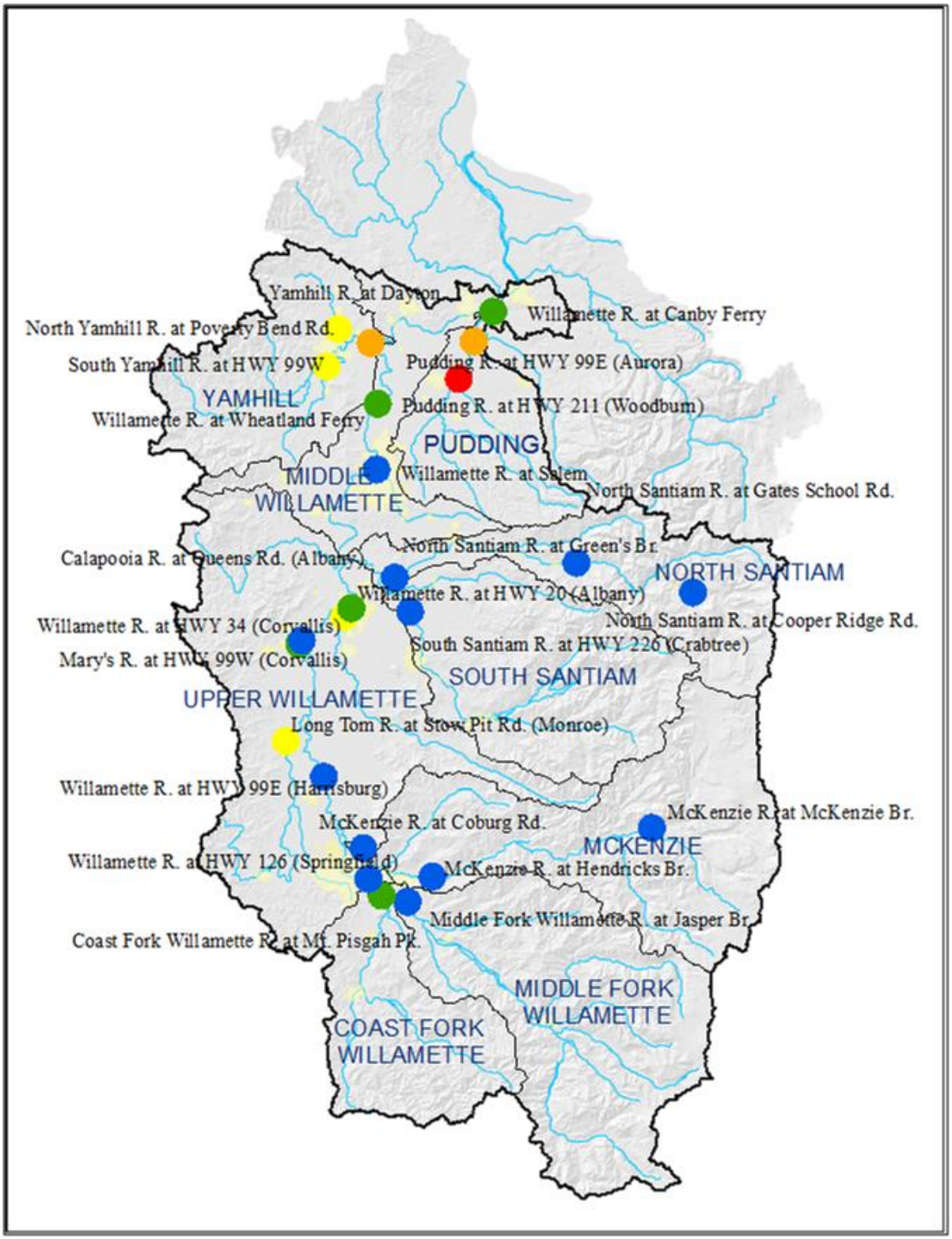


Figure 4 - Oregon Water Quality Index for Willamette Valley



4.4 Yamhill Pesticide Stewardship Partnership

(2015 Update provided by Julia Crown and Kevin Masterson from DEQ)

The PSP Program uses water quality monitoring data to inform and focus voluntary, collaborative actions to reduce pesticides in Oregon waters. There are currently PSP projects in seven watersheds in Oregon, including the Yamhill Sub-Basin. The Yamhill project was initiated in 2007, with DEQ, Greater Yamhill Watershed Council, Yamhill SWCD, OSU Extension and ODA as the principal partners. The original monitoring network for the Yamhill PSP included eight sites throughout the sub-basin, including Salt Creek, North Yamhill River, Yamhill Creek, East Fork Palmer Creek, West Fork Palmer Creek, and Yamhill River at Lafayette Locks, and two sites on Cozine Creek in McMinnville. The six monitoring sites outside of McMinnville are in primarily agricultural areas. Due to funding constraints, PSP monitoring was scaled back to three locations (two sites on Cozine Creek and West Fork Palmer Creek at the mouth) between 2011 and 2013. With the 2013 PSP legislative funding package, Yamhill PSP monitoring was restored in 2014. A decision was made to focus additional monitoring resources on West Fork Palmer Creek because of the high number of pesticide detections and the multiple exceedences of aquatic life benchmarks. As a result, two new sites were added to West Fork Palmer Creek, upstream of the mouth to better characterize stream segments and more effectively focus voluntary outreach and assistance efforts. A separate PSP project was initiated in late 2010 in the South Yamhill Watershed, with three monitoring locations downstream of industrial forestlands. DEQ, the Confederated Tribes of the Grand Ronde, and Oregon Department of Forestry are the principal partners on this project. The land uses upstream of the monitoring locations are primarily private managed forest lands, rather than agricultural lands.

The Yamhill PSP monitoring data shows a wide range of pesticides detected in streams. However, most of these detections are below EPA (non-regulatory) benchmarks. Forty-two pesticides were detected in 2014, often at very low concentrations. Diuron (Karmex, Direx) has been commonly detected in Cozine and West Fork Palmer Creeks since it was added as an analyte in 2009, and it was found in every sample in 2014. In 2014, Diuron was detected in WF Palmer at Webfoot Road at the unusually high concentration of 88.8 ug/L. Atrazine, simazine (Princep) and their degradates, were commonly found at low levels in all five of the Yamhill basin sites from 2009-14. During 2011-2014, as many as 19 pesticides were detected in single samples taken from WF Palmer Creek. Many of these included one or more triazine herbicides (e.g., atrazine, simazine) or degradate and the organophospate insecticide chlorpyrifos. Synergistic effects on aquatic life have been demonstrated for such mixtures. Methomyl, a carbamate insecticide, was detected seven times in 2013, once over the benchmark, but was not detected in other years. Dichlobenil and its degradate 2,6-dichlorobenzamide, metolachlor, and metribuzin were found in all 5 Yamhill basin sites in over 50% of the samples taken in 2014, all at levels less than 10% of the relevant benchmark. Some pesticides are detected frequently at some locations, and often occur as mixtures with several other pesticides. These chronic detections and mixtures are of potential concern for aquatic life, although these concerns cannot yet be quantified.

The Yamhill PSP monitoring data don't show any definitive trends in concentrations of frequently detected pesticides, or pesticides that regularly exceed benchmarks, since the outset of the Yamhill PSP project. As an example, West Fork Palmer Creek was listed as impaired

(on DEQ's 303d list) for the insecticide chlorpyrifos (Lorsban) in the early 2000s, and continues to be detected through 2014 at levels above the chronic water quality criterion. Chlorpyrifos was also detected five times in West Fork Palmer Creek at the mouth in spring 2014, with three of those detections exceeding the chronic criteria.

In 2013 and 2014, the Greater Yamhill Watershed Council and Yamhill SWCD hosted annual Town Hall meetings in Dayton to discuss the PSP data results with the West Fork Palmer community. The three monitoring stations there help us focus and intensify our monitoring and outreach efforts.

In 2014 and 2015, the PSP program funded and organized agricultural and commercial pesticide waste collection events around the state. By far, the largest event was in McMinnville on December 6, 2014, in the Yamhill Basin. There were 39,218 lbs. of waste collected from 54 participants. These are old "legacy" pesticides and unusable current use chemicals that will no longer pose risks to surface and groundwater in the Yamhill Sub-Basin. Additionally, approximately 1000 pounds of empty, triple-rinsed pesticide containers were collected for recycling. The Greater Yamhill Watershed Council, Yamhill SWCD, and OSU Extension in Yamhill County were instrumental in publicizing and organizing this event.

In 2014, the PSP program funded the purchase of a demonstration "Tunnel Sprayer," which was loaned to the Yamhill SWCD for training purposes. The tunnel sprayer is a retrofit to a standard air blast sprayer designed to reduce off-target movement of pesticides on small or trellised crops. Vineyard testing shows that it can reduce pesticide drift by up to 99% and reduce chemical usage (and purchases) by up to 35%. The PSP program has also provided grant funds for pesticide user technical assistance in the monitoring areas. PSP technical assistance grant funds were awarded to Salmon Safe to work in multiple PSP watersheds, including the Yamhill to engage agricultural landowners in identifying and implementing solutions that reduce priority pesticides in local waters. The project also will engage urban pesticide users in areas such as McMinnville (near Cozine Creek) to advance environmentally innovative storm water management, fish-friendly landscaping, and other stewardship activities.

4.5 Aerial Photo Monitoring of Streamside Vegetation

Currently, ODA is focusing land condition monitoring efforts on riparian areas because these areas have such an influence over water quality. Riparian land conditions are evaluated every five years by analyzing aerial photographs of about five percent of the riparian agricultural land. The ODA staff examine riparian ground cover at specific points in 90-foot bands along the stream from the aerial photos and assign each sample stream reach a score based on ground cover. The score can theoretically range from 70 (all trees) to 0 (all bare ground). Staff will then compare that score with the score when photos are taken again in five years to track changes in riparian conditions over time. Because site conditions vary across the state, there is no one correct riparian index score.

Six streams were monitored in this basin in 2003 and 2008. Results of the 2008 landscape monitoring showed there was little difference from the initial 2003 monitoring. The six Yamhill streams analyzed for this report all showed tree and shrub densities of at least 65

percent within thirty feet of the stream, with most streams (except Berry Creek) having tree and shrub densities in excess of 80 percent. Springbrook Creek had the largest change in riparian index score and this was probably because of urban development encroaching on the stream corridor. Urban development led to a loss of tree cover and an increase in grass cover. The other streams did not have significant changes in land cover elements.

4.6 Results from Streamside Vegetation Assessment in the Focus Area

Map Category	Acres in 2013	Acres in 2017
Ag Infrastructure	0.60	TBD
Bare Ground	5.16	TBD
Bare Ag	17.17	TBD
Grass	17.26	TBD
Grass Ag	41.98	TBD
Not Ag	150.76	TBD
Shrub	27.85	TBD
Shrub Ag	2.17	TBD
Tree	110.41	TBD
Tree Ag	2.19	TBD

4.7 Results from the Strategic Implementation Areas (SIA)

Results from both SIAs will be added to this section once ODA has results on the number of site visits and resulting actions. Scheduled to be completed in 2016.

4.8 Biennial Reviews and Adaptive Management

The 2015 biennial review of the Yamhill Agricultural Water Quality Management Area Plan was completed on December 2, 2015 at the City of McMinnville wastewater treatment facility. LAC members in attendance included:

Sam Sweeney	Lucien Gunderman	Tim Pfeiffer
Matt Crawford	Steve Jones	Ernie Strahm
Allan Elliott	Alan Holstein	Tom Thomson

In addition to the listed LAC members, representatives from the Yamhill and Polk SWCDs, Greater Yamhill Watershed Council, ODA, and DEQ were also present. The meeting began with an overview of the topics to be covered during the biennial review, and then Liz Beeles (Polk SWCD) and Marie Vicksta (Yamhill SWCD) gave a brief overview of the projects completed by the SWCDs over the last biennium. R. Beyer (ODA) then provided an overview of the ODA water quality program, recent compliance cases, and updates to the Yamhill Agricultural Water Quality Management Area Plan. The meeting concluded with the advisory committee discussing impediments to agriculture achieving water quality standards and recommendations for modifications for the Department of Agriculture. The meeting concluded at approximately 9:00 pm and it was determined that R. Beyer, from ODA, will make final edits to the Area Plan and send it out to the advisory committee for final review.

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.

Economics and Statistics Administration and Bureau of the Census. 1993. Census of Agriculture 1992, Volume 1: Geographic Area Series, Part 37: Oregon (State and County Data). US Department of Commerce, Washington, D.C.

Gabriel, J. T. 1993. A modified synoptic analysis of the status of Oregon's Willamette Valley wetlands. Master's Degree Research Paper. Department of Geosciences, Oregon State University, Corvallis.

Galovich, Gary. 1999. Personal Communication. August 16, 1999. Oregon Department of Fish and Wildlife.

Knezevich, C. A. 1982. Soil Survey of Polk County, Oregon. United States Department of Agriculture-Soil Conservation Service, Washington, D.C.

National Agricultural Statistics Service and Oregon Department of Agriculture. 1998. Oregon Agriculture & Fisheries Statistics 1997 – 1998. (V.G. Korn, ed.). USDA Oregon Agricultural Statistics Service, Salem.

National Association of Wheat Growers Foundation and Kansas State University Cooperative Extension. 1994. Best Management Practices for Wheat. (Steve Watson, ed.) National Association of Wheat Growers Foundation, Washington, D.C.

Oregon Department of Administrative Services, 2007. Oregon Department of Administrative Services, Office of Economic Analysis. Accessed on-line September 10, 2007 from the DAS OEA website at http://www.oregon.gov/DAS/OEA/demographic.shtml

Oregon State University Extension. 1998. Yamhill County Estimate of Agricultural Commodity Sales. Oregon State University Extension Service, McMinnville, Oregon.

Oregon Water Resources Department. 1998. Water Rights Information System.

Otte, G. E., D. K. Setness, W. A. Anderson, F. J. Herbert, Jr., and C. A. Knezevich. 1974. Soil Survey of Yamhill Area, Oregon. United States Department of Agriculture-Soil Conservation Service, Washington, D.C.

US Census Bureau, 2007. Accessed on-line September 10, 2007 from the US Census Bureau website at http://factfinder.census.gov/servlet/SAFFPopulation?_event=Search&_name=Yamhill+County&_state=04000US41&_county=Yamhill+County&_cityTown=Yamhill+County&_zip=&_sse=on&_lang=en&pctxt=fph

USDA – National Agricultural Statistics Service, 1997. "1997 Census of Agriculture: Oregon, State and County Data" Volume 1, Geographic Area Series Part 37.
USDA - Natural Resources Conservation Service. 1997. Field Office Technical Guide Section IV - Practice Standards and Specifications. Natural Resources Conservation Service, Oregon.

Wynea, Bob. 1999. Personal Communication. April 27, 1999. Willamette Valley Llama Association.

Appendices

A. **Waterbodies with an approved TMDL and waterbodies on the 2010 303(d) list**

B. **Yamhill Basin Ambient Water Quality Monitoring**

C. **Common Agricultural Water Quality Parameters of Concern**

D. **Educational and Technical Guidance Information for Natural Resource and Farm Management**

E. **The Conservation Planning Process**

F. **Instructions and Guidelines for a Voluntary Conservation Plan**

G. **Conservation Practices**

H. **Public Funding Sources for Landowner Assistance**

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Appendix A: Waterbodies with approved TMDL/listed on the 303(d) list

Waterbodies with an approved TMDL and waterbodies listed on the 303(d) list

Waterbody TMDL	River Mile Approved	Parameter	Season	Status	Date
Deer Creek	0 to 20.4	Phosphorus	May 1 – Oct 31	Water Quality Limited, TMDL Approved	1998
Mill Creek	0 to 22.2	Phosphorus	May 1 – Oct 31	Water Quality Limited	1998
N. Yamhill River	0 to 20.1	Phosphorus	May 1 – Oct 31	Water Quality Limited	1998
Salt Creek	0 to 32.8	Phosphorus	May 1 – Oct 31	Water Quality Limited	1998
S. Yamhill River	0 to 61.7	Phosphorus	May 1 – Oct 31	Water Quality Limited	1998
Willamina Creek	0 to 20.8	Phosphorus	May 1 – Oct 31	Water Quality Limited	1998
Yamhill River	0 to 11.2	Chlorophyll a	Year round	Water Quality Limited	2004
Yamhill River	0 to 11.2	Phosphorus	May 1 – Oct 31	Water Quality Limited	1998
Yamhill River	0 to 11.2	pH	May 1 – Oct 31	Water Quality Limited	1998
Middle Willamette -Chehalem Creek	0 to 13.8	Temperature	Year round non-spawning	Water Quality Limited	2010
Middle Willamette - Chehalem Crk Trib	0 to 4.3	Temperature	Year round non-spawning	Water Quality Limited	2010
303 (d)	**List**				
Baker Creek	0 to 14.2	Biological Criteria	Year-round	Water Quality Limited 303 (d) list	2012
Baker Creek	8.9 to 14.3	Dissolved Oxygen	Year-round	Water Quality Limited 303 (d) list	2012
Baker Creek	0 to 8.1	E. Coli	Summer	Water Quality Limited 303 (d) list	2012
Baker Creek	0 to 14.2	Temperature	Summer	Water Quality Limited 303 (d) list	2002
Cedar Creek	0 to 2.3	Iron	Year-round	Water Quality Limited 303 (d) list	2002
Middle Willamette – Chehalem Creek	0 to 13.8	Dissolved Oxygen	Year round	Water Quality Limited 303 (d) list	2010
Coast Creek	0 to 8.6	Temperature (Spawning)	Oct 15 – May 15	Water Quality Limited 303 (d) list	2012
Waterbody	**River Mile**	**Parameter**	**Season**	**Status**	**Date**
Coast Creek	0 to 8.6	Temperature (Rearing)	Year-round	Water Quality Limited 303 (d) list	2012
Cosper Creek	0 to 9.1	E. Coli	Summer	Water Quality Limited 303 (d) list	2012
Cosper Creek	0 to 9.1	Temperature	Year-round	Water Quality Limited 303 (d) list	2012
Cozine Creek	0 to 6.8	Dissolved Oxygen (Spawning)	Jan 1 – May 15	Water Quality Limited 303 (d) list	2012
Cozine Creek	0 to 5	Dissolved Oxygen	Year-round	Water Quality Limited 303 (d) list	2012
Cozine Creek	0 to 6.8	E. coli	Summer	Water Quality Limited 303 (d) list	2012
Cozine Creek	0 to 6.8	Temperature	Year-round	Water Quality Limited 303 (d) list	2012
Deer Creek	0 to 20.4	Biological Criteria	Year-round	Water Quality Limited 303 (d) list	2012

Waterbody	River Mile	Parameter	Season	Status	Date
Deer Creek	0 to 20.4	E. coli	Year-round	Water Quality Limited 303 (d) list	2012
Deer Creek	0 to 12	Temperature	Summer (Spawning)	Water Quality Limited 303 (d) list	1998
Deer Creek	0 to 20.5	Temperature	Year-round (Rearing)	Water Quality Limited 303 (d) list	2012
Deer Creek	0 to 20.4	Fecal Coliform	Year-round	Water Quality Limited 303 (d) list	1998
Dupee Creek	5.2 to 16.4	Biological Criteria	Year-round	Water Quality Limited 303 (d) list	2012
Gooseneck Creek	0 to 8.8	Biological Criteria	Year-round	Water Quality Limited 303 (d) list	2012
Gooseneck Creek	0 to 8.8	Dissolved Oxygen	Year-round	Water Quality Limited 303 (d) list	2012
Gooseneck Creek	0 to 6.1	Temperature (Spawning)	Oct 15 – May 15	Water Quality Limited 303 (d) list	2012
Gooseneck Creek	0 to 8.8	Temperature (Rearing)	Year-round	Water Quality Limited 303 (d) list	2012
Hay Creek	0 to 2.2	Dissolved Oxygen	Year-round	Water Quality Limited 303 (d) list	2012
Hay Creek	0 to 2.2	Temperature (Rearing)	Year-round	Water Quality Limited 303 (d) list	2012
Mill Creek	0 to 16.7	Biological Criteria	Year-round	Water Quality Limited 303 (d) list	2012
Mill Creek	0 to 22.2	Fecal Coliform	Summer	Water Quality Limited 303 (d) list	1998
Mill Creek	0 to 12.1	Temperature	Oct 15 – May 15 (Spawning)	Water Quality Limited 303 (d) list	2012
Mill Creek	0 to 22.2	Temperature	Year-round (Rearing)	Water Quality Limited 303 (d) list	2012
Muddy Creek	2.4 to 8.9	Dissolved Oxygen	Year-round	Water Quality Limited 303 (d) list	2012
Muddy Creek	0 to 8.9	Temperature	Year-round	Water Quality Limited 303 (d) list	2012
N. Yamhill River	0 to 32.4	Biological Criteria	Year-round	Water Quality Limited 303 (d) list	2012
N. Yamhill River	0 to 20.1 20.1 to 32.4	Temperature	Summer	Water Quality Limited 303(d) list	1998
N. Yamhill River	0 to 20.1	Fecal Coliform	Fall/Winter/ Spring	Water Quality Limited 303 (d) list	1998
N. Yamhill River	0 to 20.1	Dissolved Oxygen	Jan 1 to May 15	Water Quality Limited 303 (d) list	2004
N. Yamhill River	0 to 32.5	Iron Manganese	Year-round	Water Quality Limited 303 (d) list	2004
N. Yamhill River	0 to 20.1	E. coli	Fall/Winter/ Spring	Water Quality Limited 303 (d) list	2004
N. Yamhill River	12.3 to 32.4	E. coli	Summer	Water Quality Limited 303 (d) list	2012
Palmer Creek	0 to 17	Dissolved Oxygen	Jan 1 – May 15 (Spawning)	Water Quality Limited 303 (d) list	2012
Palmer Creek	0 to 14.5	Dissolved Oxygen	Year-round	Water Quality Limited 303 (d) list	2012

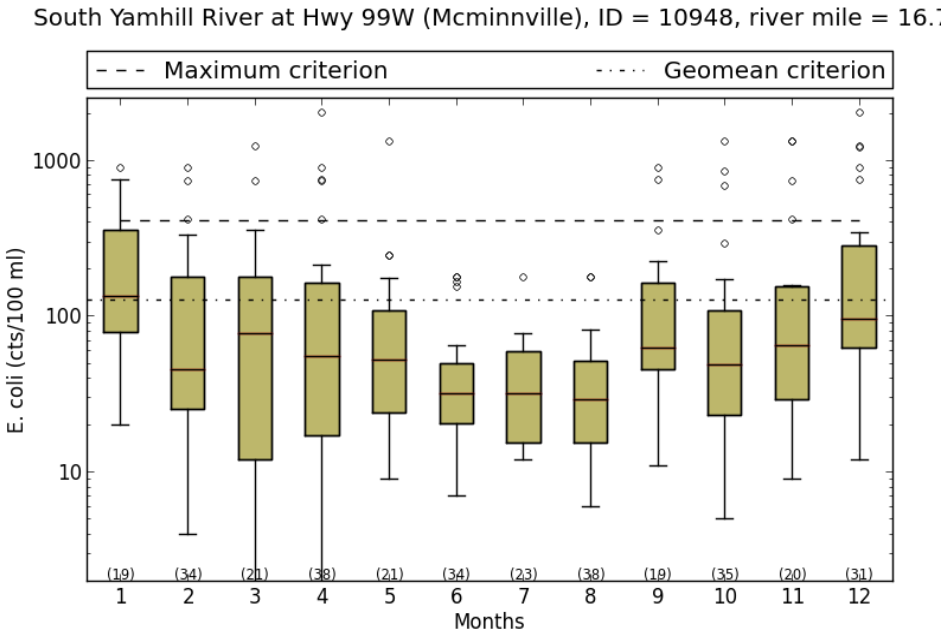
Waterbody	River Mile	Parameter	Season	Status	Date
Panther Creek	0 to 14	Biological Criteria	Year-round	Water Quality Limited 303 (d) list	2012
Panther Creek	8.9 to 15.8	Dissolved Oxygen	Year-round	Water Quality Limited 303 (d) list	2012
Panther Creek	0 to 14	E. Coli	Summer	Water Quality Limited 303 (d) list	2012
Panther Creek	0 to 14	Temperature	Year-round	Water Quality Limited 303 (d) list	2002
Panther Creek	12.2 to 14	Turbidity	Undefined (Drinking Water)	Water Quality Limited 303 (d) list	2004
Salt Creek	0 to 32.8	Dissolved Oxygen	Jan 1 – May 15 (Spawning)	Water Quality Limited 303 (d) list	2012
Salt Creek	0 to 32.8	Dissolved Oxygen	May 1 – Oct 31 (Rearing)	Water Quality Limited 303 (d) list	2012
Salt Creek	0 to 32.8	Manganese	Year-round	Water Quality Limited 303 (d) list	2002
Salt Creek	0 to 32.8	Temperature	Summer	Water Quality Limited 303 (d) list	1998
Salt Creek	0 to 32.8	Fecal Coliform	Fall/Winter/ Spring	Water Quality Limited 303 (d) list	1998
Salt Creek	0 to 32.8	Dissolved Oxygen	Spring/ Summer/Fall	Water Quality Limited 303 (d) list	1998
Salt Creek	0 to 32.8	Chlorophyll a	Summer	Water Quality Limited 303 (d) list	1998
S. Yamhill River	42.6 to 61.7	Fecal Coliform	Summer	Water Quality Limited 303 (d) list	1998
S. Yamhill River	18.1 to 42.6	Temperature	Summer	Water Quality Limited 303 (d) list	1998
S. Yamhill River	18.1 to 42.6	Fecal Coliform	Year-round	Water Quality Limited 303 (d) list	1998
S. Yamhill River	0 to 18.1	Temperature	Summer	Water Quality Limited 303 (d) list	1998
S. Yamhill River	0 to 18.1	Iron	Year-round	Water Quality Limited 303 (d) list	2002
S. Yamhill River	0 to 40.1	Dissolved Oxygen	Jan 1 – May 15 (Spawning)	Water Quality Limited 303 (d) list	2004
Turner Creek	0 to 7.3	E. coli	Summer	Water Quality Limited 303 (d) list	2012
Turner Creek	0 to 2.5	Temperature	Summer	Water Quality Limited 303 (d) list	1998
Turner Creek	4 to 7.3	Turbidity	Undefined - Drinking Water	Water Quality Limited 303 (d) list	
W. Fork Palmer Cr	0 to 5.2	Chlorpyrifos	Year-round	Water Quality Limited 303 (d) list	1998
W. Fork Palmer Cr	0 to 5.2	Dissolved Oxygen	Jan 15 – May 15 (Spawning)	Water Quality Limited 303 (d) list	2012
W. Fork Palmer Cr	0 to 5.2	Dissolved Oxygen	Year-round	Water Quality Limited 303 (d) list	2012
W. Fork Palmer Cr	0 to 5.3	Temperature	Year-round	Water Quality Limited 303 (d) list	2012
W. Fork Salt Creek	0 to 6.4	Temperature	Year-round	Water Quality Limited 303 (d) list	2012

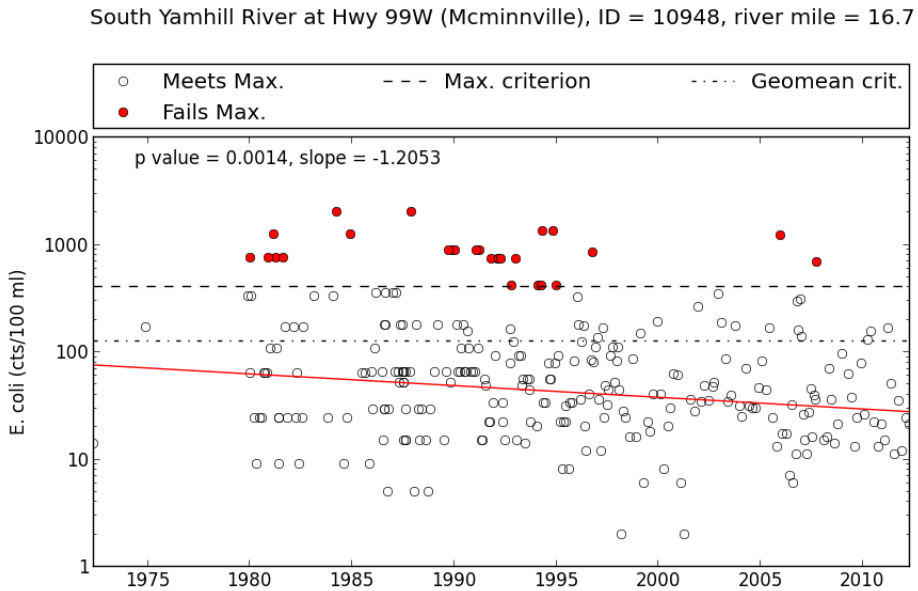
Waterbody	River Mile	Parameter	Season	Status	Date
Wildwood Creek	0 to 2.3	Temperature	Year-round	Water Quality Limited 303 (d) list	2012
Willamina Creek	0 to 20.8	Biological Criteria	Year-round	Water Quality Limited 303 (d) list	2012
Willamina Creek	0 to 20.8	E. Coli	Year-round	Water Quality Limited 303 (d) list	2012
Willamina Creek	0 to 9.9	Fecal Coliform	Fall/Winter/ Spring	Water Quality Limited 303 (d) list	1998
Willamina Creek	0 to 8.5	Temperature	Oct 15 – May 15 (Spawning)	Water Quality Limited 303 (d) list	2012
Willamina Creek	0 to 20.8	Temperature	Year-round (Rearing)	Water Quality Limited 303 (d) list	2012
Yamhill Creek	0 to 6.9	Dissolved Oxygen	Jan 1 – May 15 (Spawning)	Water Quality Limited 303 (d) list	2012
Yamhill Creek	0 to 4.6	Dissolved Oxygen	Year-round	Water Quality Limited 303 (d) list	2012
Yamhill Creek	0 to 6.9	E. coli	Summer	Water Quality Limited 303 (d) list	2012
Yamhill Creek	0 to 6.9	Temperature	Year-round	Water Quality Limited 303 (d) list	2012
Yamhill River	0 to 11.2	Dissolved Oxygen	Jan 1 to May 15	Water Quality Limited 303 (d) list	2004
Yamhill River	0 to 11.2	E coli	Fall/Winter/ Spring	Water Quality Limited 303 (d) list	2004
Yamhill River	0 to 11.2	Fecal Coliform	Fall/Winter/ Spring	Water Quality Limited 303 (d) list	1998
Yamhill River	0 to 11.2	Iron	Year-round	Water Quality Limited 303 (d) list	2002
Yamhill River	0 to 11.2	Manganese	Year-round	Water Quality Limited 303 (d) list	2002
Yamhill River	0 to 11.2	Temperature	Summer	Water Quality Limited 303 (d) list	2004

Appendix B: Yamhill Basin Ambient Water Quality Monitoring

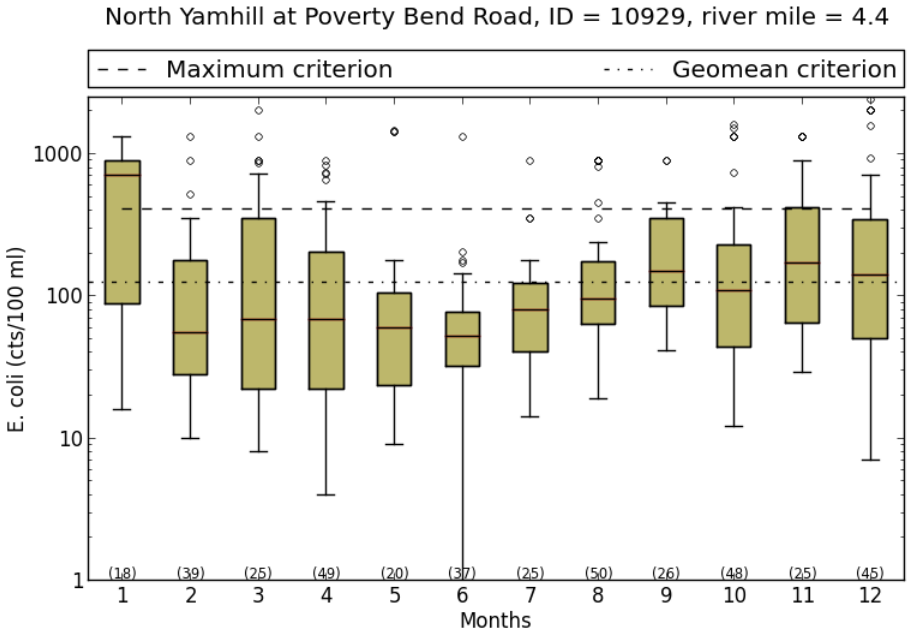
Figures provided by Oregon DEQ

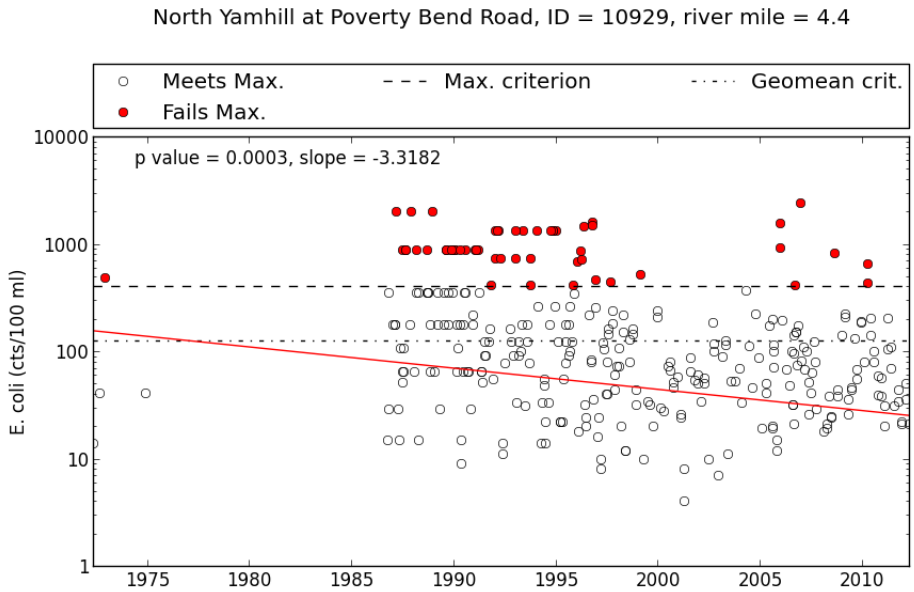
***E. coli* trend data South Yamhill River at McMinnville**



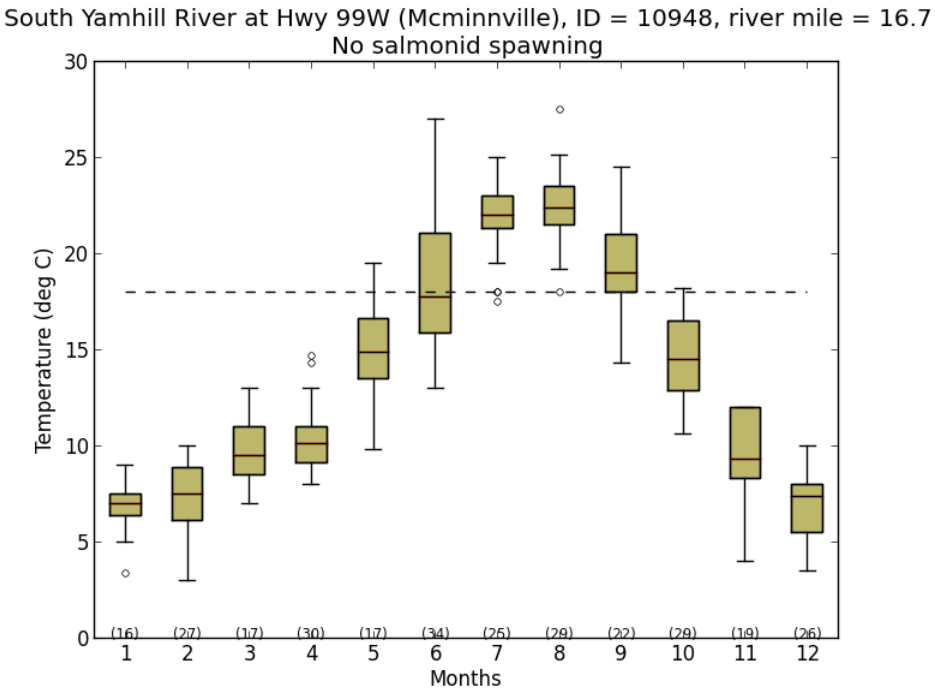


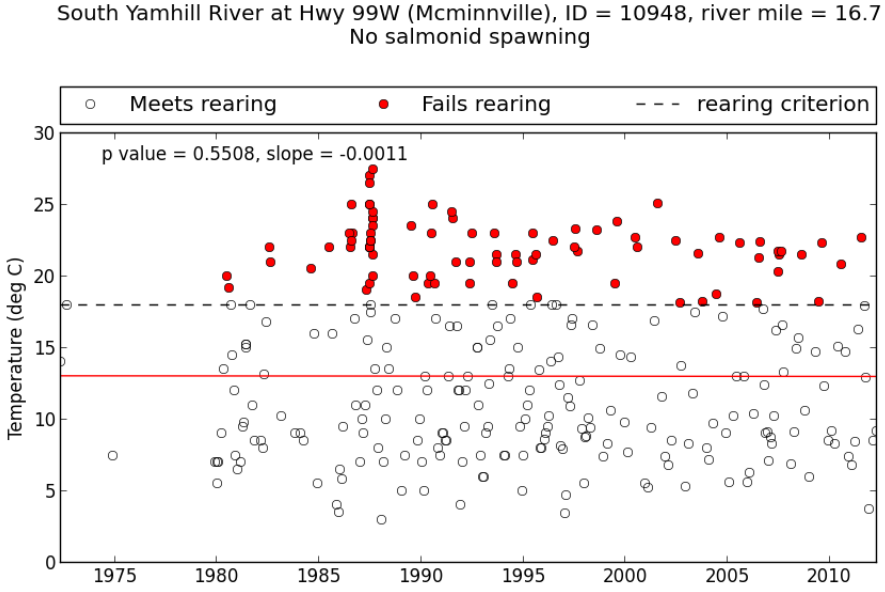
***E. coli* trend data North Yamhill at Poverty Bend Road**



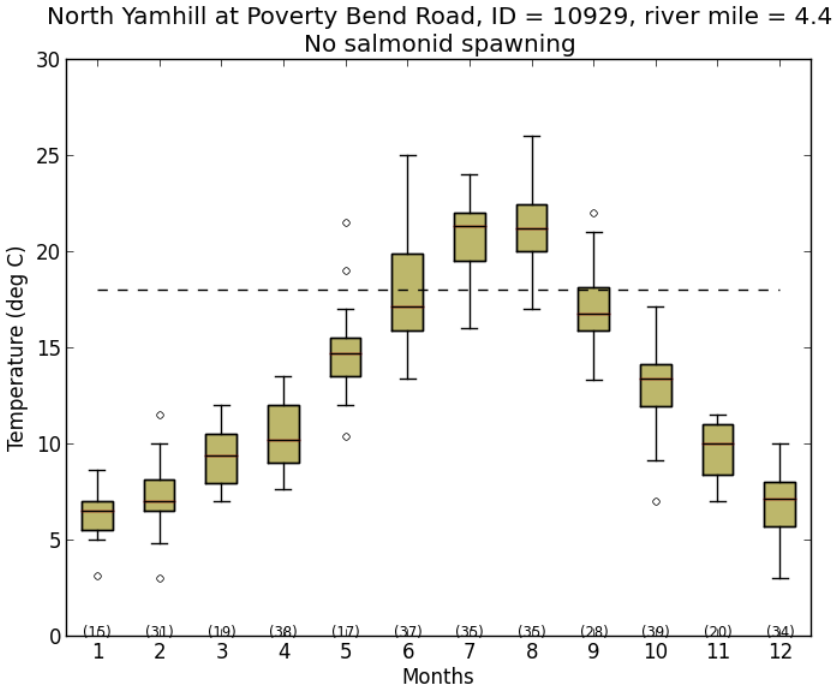


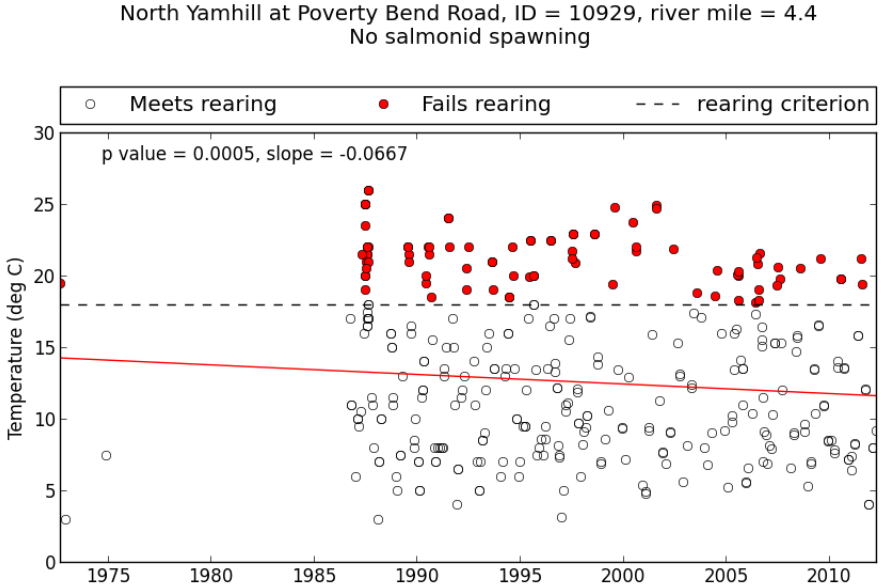
Temperature trend data South Yamhill at McMinnville (Salmon Rearing and Migration)



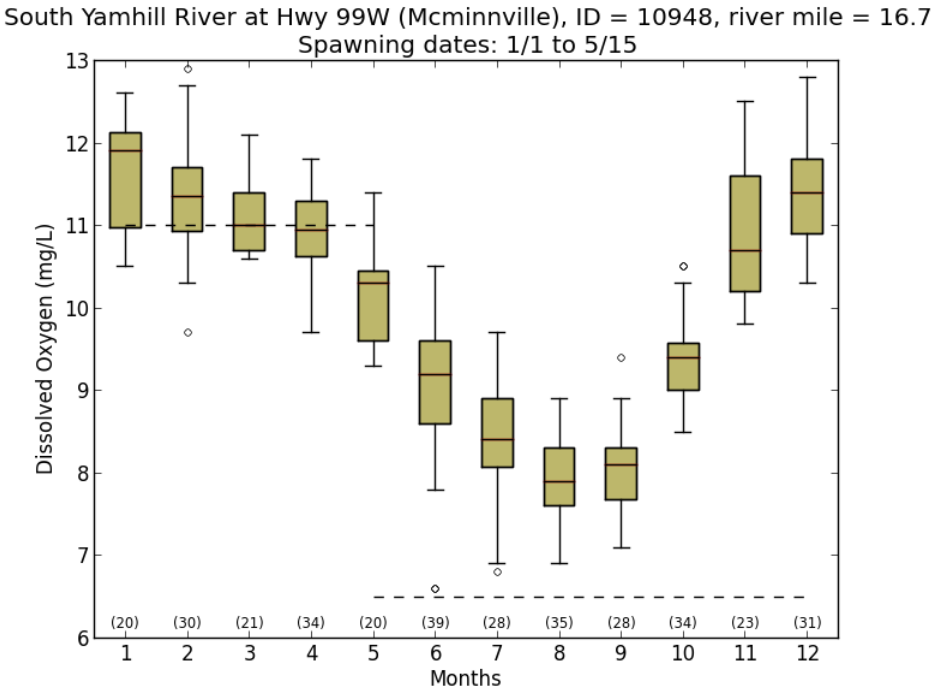


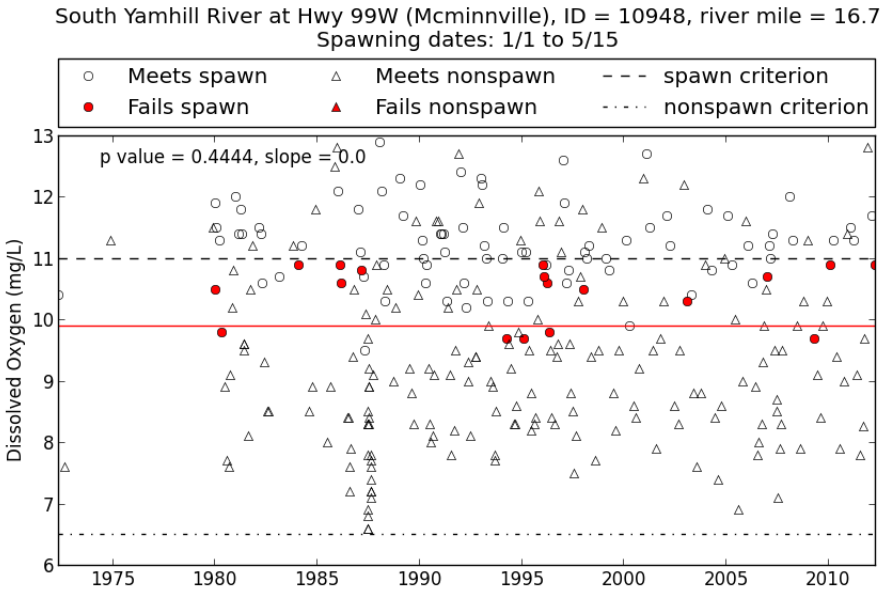
Temperature trend data North Yamhill at Poverty Bend Road (Salmon Rearing and Migration)



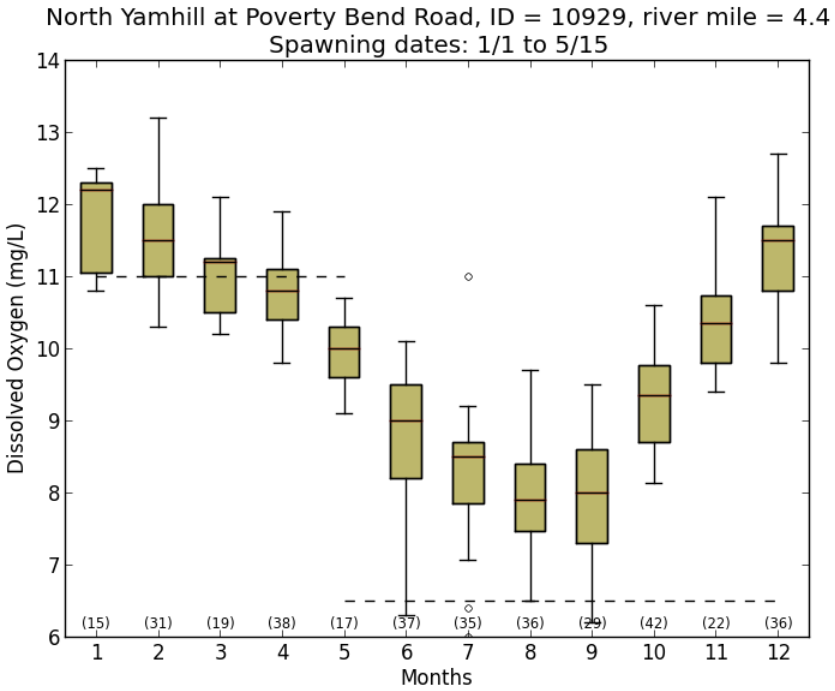


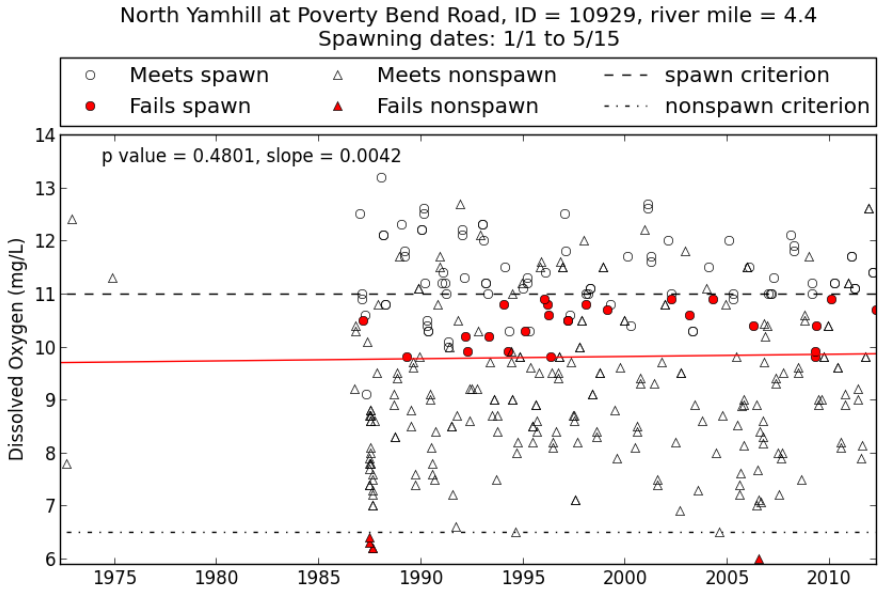
Dissolved oxygen trend data South Yamhill at Hwy 99 West (Resident Trout)



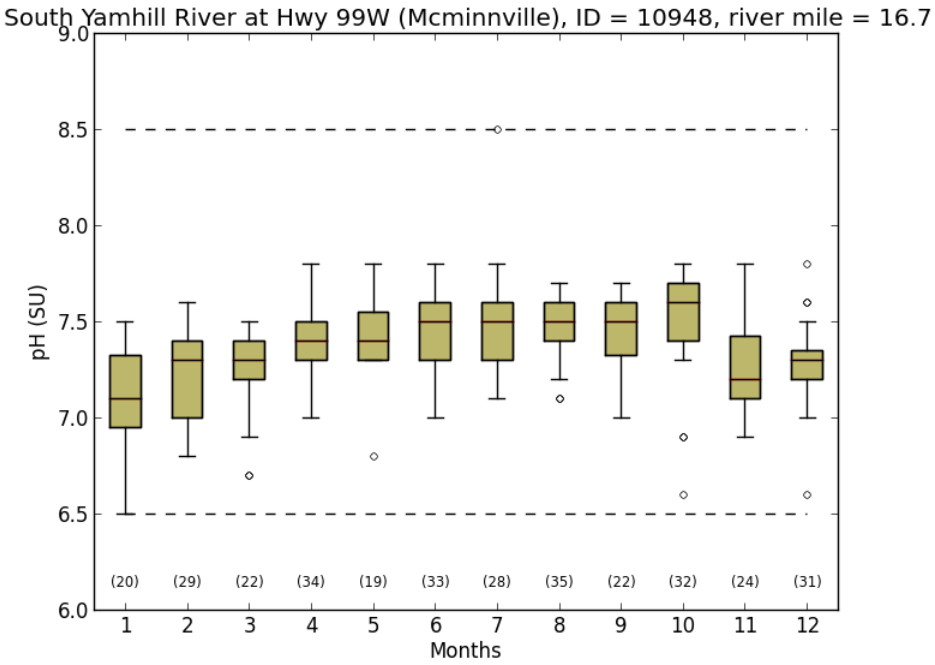


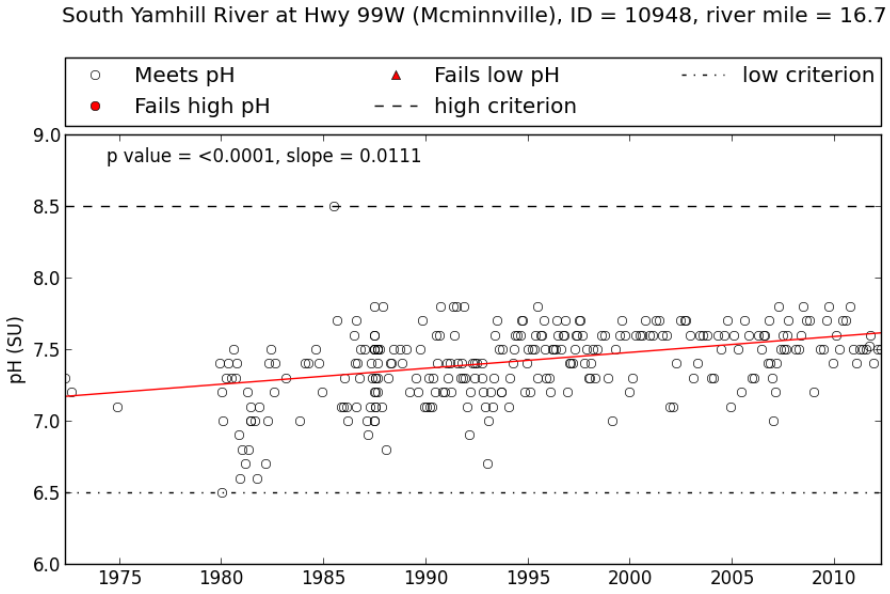
Dissolved oxygen trend data North Yamhill at Poverty Bend Road (Resident Trout)



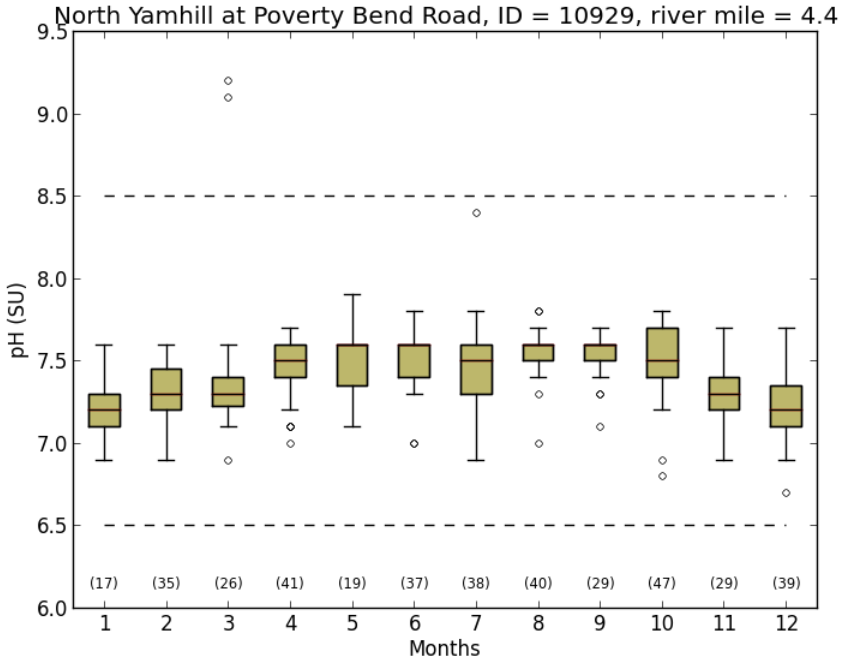


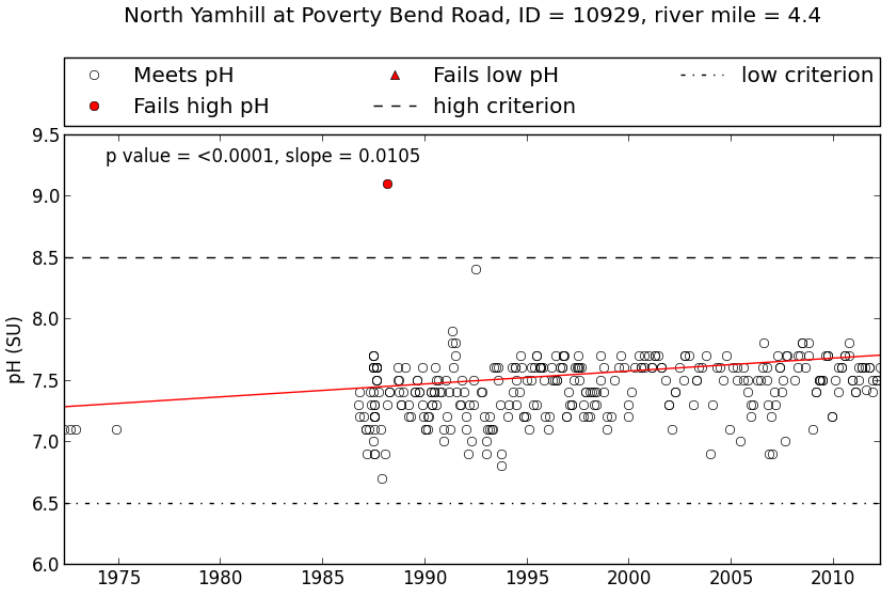
pH trend data South Yamhill at McMinnville





pH trend data North Yamhill at Poverty Bend Road





Appendix C: 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: http://www.deq.state.or.us/wq/assessment/assessment.htm or by calling (503) 229-6099.

Parameters

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 depend on a waterbody's designation 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 waterbody 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.

Nitrates: While nitrates occur naturally, the use of synthetic and natural fertilizers can increase nitrates in drinking water (ground and surface water). Applied nitrates that are not taken up by plants are 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 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 at: http://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.

Appendix D: Educational and Technical Guidance Information for Natural Resource and Farm Management

Soil and Water Conservation Districts (SWCDs)
Prepares management plans and helps implement them by coordinating with other technical experts in natural resources.

Yamhill SWCD
2200 SW 2nd Street
McMinnville, OR 97128
Phone: (503) 472-1474
Fax: (503) 472-2459
www.yamhillswcd.org

Polk SWCD
580 Main Street, Suite A
Dallas, OR 97338
Phone: (503) 623- 9680 ext. 101
Fax: (503) 623-3489
www.polkswcd.org

USDA – Natural Resources Conservation Service (NRCS)
Provides information on soil types, soils mapping, and interpretation of the Field Office Technical Guide. Administers and provides assistance in developing plans for Conservation Reserve Program (CRP), Environmental Quality Incentive Program (EQIP), Wetlands Reserve Program (WRP), and other cost share programs. Makes technical determinations on wetlands and highly erodible land.

NRCS Main Office
1201 NE Lloyd Blvd, Suite 900
Portland, OR 97232
Phone: (503) 414-3200
Fax (503) 414-3103
www.or.nrcs.usda.gov/

NRCS Yamhill Office
2200 SW 2nd Street
McMinnville, OR 97128
Phone: (503) 472-1474 ext. 3

NRCS Polk Office
580 Main Street, Suite A
Dallas, OR 97338-1911
Phone: (503) 623-9680

Oregon State University Extension Service
Offers educational programs, seminars, classes, tours, and publications to guide landowners in managing their resources.

OSU Extension Yamhill County Office
2050 NE Lafayette Street
McMinnville, OR 97128
Phone: (503) 434-7517
www.extension.oregonstate.edu/yamhill/

OSU Extension Polk County Office
289 E Ellendale, Suite 301
PO Box 640
Dallas, OR 97338
Phone: (503) 623-8395
www.extension.oregonstate.edu/polk/

Oregon Department of Agriculture (ODA)
Oversees the Agricultural Water Quality program, issues permits and helps producers comply with confined animal feeding water management programs, provides support to Soil and Water Conservation Districts.

ODA Main Office
635 Capitol St. NE
Salem, OR 97301-2532
Phone: (503) 986-4550
www.oregon.gov/ODA

Pesticides Program
Phone: (503) 986-4635 Fax: (503) 986-4735
www.oregon.gov/ODA/PEST

Natural Resources Program
Phone: (503) 986-4700 Fax: (503) 986-4730
www.oregon.gov/ODA/NRD

Plant Program (pests, weeds, etc.)
Nursery & Christmas Trees Program, Phone: (503) 986-4644
Plant Pest & Disease Programs, Phone: (503) 986-4636
Noxious Weed Control Program, Phone: (503) 986-4621
Invasive Species Hotline, Phone: 1-866-INVADER
www.oregon.gov/ODA/PLANT

Department of Environmental Quality (DEQ)
Responsible for protecting and enhancing Oregon's water and air quality, cleaning up spills and releases of hazardous materials, and managing the proper disposal of solid and hazardous wastes. Maintains a list of water quality limited streams, sets TMDL allocations.

DEQ Main Office
811 SW Sixth Avenue
Portland, OR 97204-1390
Phone: (503) 229-5696 or (800) 452-4011
TTY: (503) 229-6993 Fax: (503) 229-6124
E-mail: deq.info@deq.state.or.us
www.deq.state.or.us/

USDA – Farm Service Agency (FSA)
Maintains agricultural program records and administers various cost share programs. Their offices also provide up-to-date aerial photography of farm and forestland.

Yamhill County Office
2200 SW 2nd Street
McMinnville, OR 97128
Phone: (503) 472-1474 ext. 2

Polk County Office
580 Main Street, Suite D
Dallas, OR 97338
Phone: (503) 623-2396 ext. 2

Department of State Lands (DSL)
Administers state removal/fill law and provides technical assistance.

DSL Main Office
775 Summer St. N.E., Suite 100
Salem, OR 97301-1279
Phone: (503) 986-5200 Fax: (503) 378-4844
www.oregon.gov/DSL

Oregon Water Resources Department (WRD)
Provides technical and educational assistance and water rights permits and information.

WRD Main Office
725 Summer St. NE, Suite A
Salem, OR 97301
Phone: (503) 986-0900 Fax: (503) 986-0904
www.oregon.gov/OWRD

Yamhill Basin Council
Brings diverse interests together to work towards solutions on local natural resource issues. Collects environmental data about the watershed and conducts education and volunteer programs.

> **Greater Yamhill Watershed Council**
> 237 NE Ford Street, Suite 9
> PO Box 1517
> McMinnville, OR 97128
> Phone: (503) 474-1047 Fax: (503) 472-2459
> www.yamhillwatershedcouncil.org/

Yamhill Basin Local Advisory Committee (LAC)
Voluntary committee composed of twelve agricultural producers in the Yamhill Basin. Charged with developing the agricultural water quality management area plan in accordance with the AgWQM Act.

> **Yamhill SWCD District Manager**
> 2200 SW 2nd Street
> McMinnville, OR 97128
> Phone: (503) 472-1474 ext. 3 Fax: (503) 472-2459
> www.yamhillswcd.org

Oregon Department of Fish and Wildlife (ODFW)
Works with landowners to balance protection of fish and wildlife with economic, social, and recreational needs. Advises on habitat protection. Offers technical and educational assistance for habitat and restoration projects. Provides plan review for special property tax assessment for wildlife habitat projects.

> **ODFW Main Office**
> 3406 Cherry Ave NE
> Salem, OR 97303
> Phone: (503) 947-6000
> wwworegon.gov/ODFW
>
> **ODFW North Willamette Watershed District**
> Phone: (503) 657-2000

Oregon Department of Forestry (ODF)
Technical assistance with State and Federal cost sharing, Oregon property tax programs, Forest Resource Trust, forestry practices, and forest management plans.

> **ODF Main Office**
> 2600 State Street
> Salem, OR 97310
> Phone: (503) 945-7200 Fax: (503) 945-7212
> TTY: 800-437-4490
> www.oregon.gov/ODF

ODF Dallas Office
Phone: (503) 623-8146

ODF Forest Grove Office
Phone: (503) 357-2191

Yamhill County Government
Provides information on county zoning and restrictions.

Department of Planning and Development (zoning)
5265 NE 4th Street
McMinnville, OR 97128
Phone: (503) 434-7516 Fax: (503) 434-7544
E-mail: planning@co.yamhill.or.us
www.co.yamhill.or.us/plan

Public Works (roads, bridges, culverts, etc.)
2060 Lafayette Avenue
McMinnville, OR 97128
Phone: (503) 434-7515 Fax: (503) 472-4068
E-mail: phelanj@co.yamhill.or.us

Appendix E: The Conservation Planning Process

The USDA - Natural Resources Conservation Service and the Soil and Water Conservation Districts use the following nine-step process to develop a voluntary conservation plan.

1 Identify Problems—Identify resource problems, opportunities, and concerns in the planning area.

2 Determine Objectives—Identify, agree on, and document the client's objectives.

3 Inventory Resources—Inventory the natural resources and their condition, and the economic and social considerations. This includes on-site and related off-site conditions.

4 Analyze Resource Data—Analyze the resource information gathered in planning step 3 to clearly define the natural resource conditions, along with economic and social issues. This includes problems and opportunities.

5 Formulate Alternatives—Formulate alternatives that will achieve the client's objectives, solve natural resource problems, and take advantage of opportunities to improve or protect resource conditions.

6 Evaluate Alternatives—Evaluate the alternatives to determine their effects in addressing the client's objectives and the natural resource problems and opportunities. Evaluate the projected effects on social, economic, and ecological concerns. Special attention must be given to those ecological values protected by law or Executive Order.

7 Make Decisions—The client selects the alternative(s) and works with the planner to schedule conservation system and practice implementation. The planner prepares the necessary documentation.

8 Implement the Plan—Implement the selected alternative(s). The planner provides encouragement to the client for continued implementation.

9 Evaluate Plan—Evaluate the effectiveness of the plan as it is implemented and make adjustments as needed.

Appendix F: Instructions and Guidelines for a Voluntary Conservation Plan

To comply with the Agricultural Water Quality Management Act, a landowner or occupier needs to ensure that no violations of the "prevention and control measures" outlined in the administrative rules OAR 603-095-0500 through 603-095-0560 occur on their property. A landowner or occupier is NOT required to have a voluntary conservation plan. The Yamhill and Polk SWCDs do; however, promote the conservation planning process as the best method for landowners to use to improve the health of their resources and ensure that they are addressing all pertinent prevention and control measures.

A landowner who develops a voluntary conservation plan may choose to get it approved by the LMA. If the plan is approved by the LMA and is being followed according to its schedule, it affords the landowner or occupier with limited protection from immediate enforcement action from ODA should a prevention and control measure be violated on their land. These guidelines and instructions define the elements that must be included in a voluntary conservation plan in order for it to be approved by the LMA.

The plan needs to address all of the prevention and control measures written in the Yamhill River Basin AgWQM Area Plan and provide an action strategy for the improvement of those resources that are a part of the landowner's management objectives. The signature page (included) must be signed by the landowner, resource professional preparing the plan, and the LMA.

Landowners with a voluntary conservation plan that was approved prior to the development of this AgWQM Area Plan are encouraged to have it reviewed to ensure that it meets the prevention and control measures.

Management Plan Instructions:

1. Cover Page
   List the landowner's name and address, location of the property described in the plan; the name, address, title and phone number of the person completing the plan; and the date the plan is completed.

2. Table of contents

3. Landowner objectives

4. Physical site description

5. Map
   - A map or maps at 8" = 1 mile or larger scale showing:
   - Legend
   - Property boundary
   - Soil types
   - Field divisions and numbers

- Streams / ponds
- 303(d) Listed stream segments highlighted

6. Field Inventory Data
   - Soil types
   - Acres
   - Erosion estimates
   - Crops / land use / rotations
   - Livestock enterprises
   - Forage inventories
   - Fertilizer / pesticide information

7. Conservation Practices
   Provide a narrative that describes how each prevention and control measure (PCM) is being addressed on the property. List the conservation practices that are currently being implemented or will be in the future to address the PCMs. For the plan to be approved, practices must meet the NRCS technical guidelines. Include practice specifications (if applicable) and operation and maintenance requirements.

8. Schedule
   Schedule for the implementation of the conservation practices outlined in the plan.

9. Other information
   Photos, soil tests, alternatives, or supporting data.

10. Signature Page (Included)

For additional guidance in developing a voluntary conservation plan, an example template and plan is available from the Yamhill Soil and Water Conservation District.

Yamhill Basin Voluntary Conservation Plan Signature Page

This voluntary conservation plan describes the existing soil, water, animal, plant, and air resources on the property. It addresses the opportunities for the protection of all natural resources while assisting the landowner with meeting his/her objectives for the management of the property. It addresses all of the prevention and control measures written in the Yamhill River Basin Agricultural Water Quality Management Area Plan, which are in the categories of:

- Erosion Prevention and Sediment Control
- Irrigation Management
- Animal Waste
- Nutrients
- Pesticides
- Chemigated Irrigation Water
- Roads, Staging Areas, and Farmsteads
- Streamside Area Management

Prepared for:

_____

_____

Landowner's Signature Date

_____

_____

Landowner's Name (Please print)

Prepared by:

Resource Professional's Signature Date

Resource Professional's Name (Please print)

Approved by:

_____

Chair, Yamhill Basin Local Management Agency Date

Appendix G: Conservation Practices

The following is a list of example agricultural conservation practices according to type of operation.

Field and Vegetable Crop Production

Reduce erosion and sediment delivery from agricultural and rural land.

Example conservation practices:

- Residue management
- Grassed waterways
- Cover cropping
- Crop rotations
- Conservation tillage
- Vegetative buffer strips
- Straw mulch
- Jute erosion matting
- Irrigation scheduling using soil moisture instrumentation
- Sub-surface drainage - surface inlets and diversions

Limit movement of nutrients and pesticides from agricultural lands to streams.

Example conservation practices:

- Vegetative buffer strips
- Irrigation water management
- Equipment calibration and maintenance
- Tailwater management
- Integrated pest management
- Proper storage of pesticides, fertilizer, and fuel

Manage and conserve irrigation water.

Example conservation practices:

- Irrigation scheduling based on site specific factors that influence crop growth, such as:
    - Evapotranspirational demands (crop type, stage of growth, percent ground shade, weather conditions)
    - Soil conditions (percolation rate, water holding capacity)
    - Irrigation system performance (uniformity, efficiency, and application rate)
    - Recent applications of crop nutrients or farm chemicals
- Irrigation scheduling using:
    - Soil probes
    - Evaporation pans
    - Neutron probes
    - Infrared guns
    - Tensiometers
    - Other soil water monitoring devices
- Contour cropping

Livestock

Ensure proper animal waste storage and utilization or disposal.

Example conservation practices:

- Vegetative buffer strips
- Cover manure piles with a tarp
- Manure storage and composting structures
- Waste management—clean water diversions; waste collection, storage, and utilization; facilities operation and maintenance
- Apply manure to cropland at rates that do not exceed agronomic needs for nitrogen and phosphorus based on soil and/or tissue tests for the crop to be grown
- Pasture management/prescribed grazing

Manage livestock access to streams, wetlands, and riparian areas.

Example conservation practices:

- Off-stream watering
- Seasonal grazing
- Exclusion—temporary or permanent

Nurseries

Reduce erosion and sediment delivery from nurseries.

Example conservation practices:

- Use ground cloth and/or gravel in container nurseries as a surface covering
- Gravel or sod road surfaces and staging areas
- Designed drainage systems to handle runoff from greenhouse and building roofs
- Grass ditches, waterways, and buffer strips adjacent to streams and ponds
- Land leveling
- Limit irrigation runoff from fields
- Manage cultivation timing and methods

Manage and conserve irrigation water.

Example conservation practices:

- Recycling of irrigation tail water in container nurseries
- Moisture monitoring to determine field moisture to balance irrigation applications with crop needs
- Monitor and record water use
- Regular maintenance of irrigation delivery systems for maximum efficiency
- Utilize cultivation to conserve soil moisture in field operations

Limit movement of nutrients and pesticides from nurseries to streams.

Example conservation practices:

- Apply fertilizer based on competent advice and nutrient levels determined by soil and tissue analysis
- Time fertilizer applications to promote optimum plant utilization and limit leaching

- Protect water sources from contamination through use of backflow prevention devices where fertigation is practiced
- Restrict irrigation water from leaving the property though irrigation management and water recycling
- Make banded fertilizer application when feasible
- Calibrate application machinery prior to use
- Monitor and record application rates
- Use timed release fertilizers
- Maintain organic content of soil mixes and fields to hold nutrients for plant utilization
- Utilize Integrated Pest Management (IPM) practices
- Scout crops to determine presence of insects and disease
- Trap to quantify pest populations
- Establish economic thresholds for various crops
- Use traps, pheromone disrupters, and beneficial insects as alternatives to chemicals.
- Rotate chemicals used in applications
- Make application as per label instructions
- Have trained applicators apply, or supervise the application of, pesticides
- Calibrate equipment and use equipment suited for specific types of applications (i.e., ground, foliar, drench, etc.).

Other nursery management issues.

Example conservation practices:

- Recycle nursery wastes and byproducts to restrict their impact on the environment:
    - Empty chemical containers
    - Plant tissue and residues (through composting)
    - Paper products
    - Plastic products—poly, pots, and flats
    - Metal, glass, wood tires, and oils
- Cover cropping to reduce erosion, build organic matter, provide habitat for beneficial insects and wildlife, and control weeds
- Fish screening at pump intakes to protect small fish and other aquatic life
- Control of noxious weeds to prevent degradation of protective native vegetation near riparian areas
- Set aside less productive land for conservation and wildlife habitat enhancement

<u>Streamside Areas</u>

Protect and/or restore ecological functions in riparian and wetland areas to improve watershed health.

Example conservation practices:

- Control of undesirable vegetation
- Planting native trees and shrubs
- Allowing snags (dead trees) to remain standing unless safety factors indicate otherwise

- Allowing fallen trees to remain on the ground or in the stream unless removal is essential for traffic, navigation, or serious flooding reasons

Reduce erosion and sedimentation and provide filtering and buffering characteristics.

Example conservation practices:

- Manage buffer zones
- Grassed waterways
- Stream bank protection

Allow marginally productive or poorly drained lands in floodplains to revert to riparian or wetland status.

<u>Vineyards, Berries, Orchards</u>

Reduce erosion and sediment delivery.

Example conservation practices:

- Annual and perennial cover crops
- Conservation tillage
- Strip cropping
- High density tree cropping
- Straw mulch
- Catch basins
- Grassed waterways
- Vegetative filter strips
- Straw bales

Limit over application of pesticides and nutrients.

Example conservation practices:

- Mechanical weed control
- Apply herbicide under the vine row or spot treat weeds
- Adopt methods to monitor disease and pest pressure
- Apply insecticides only at label recommended rates
- Rotate pest control methods to reduce development of resistance
- Encourage an open canopy – reduces disease pressure, improves spray penetration and fruit quality
- Encourage use of new, low impact products
- Apply nutrients when there is a maximum uptake by the crop
- Use organic nutrient sources
- Apply fertilizer based on competent advice and nutrient levels determined by soil and tissue tests
- Recycle all organic matter

Manage and conserve irrigation water.

Example conservation practices:

- Limit irrigation to young vineyards, shallow soils, or drought conditions.
- Use water sensing devices or physiological indicators to help schedule water applications.

Encourage botanical diversity within and around the borders of the vineyard to provide favorable habitat for beneficial insects.

Example conservation practices:

- Alternate mowing (the oldest inter-row is mowed when the youngest inter-row begins flowering)
- Botanical diversity in cover

<u>Other Management Areas – Roads, Staging Areas, and Farmsteads</u>

There are other land uses associated with agriculture that do not fall under a specific type of operation, such as access roads and staging areas. Several conservation practices may be applicable to these areas.

Minimize soil erosion from access roads.

Example conservation practices:

- Encourage landowners to cooperate with county or state roads departments to implement roadside management practices
- Plant and maintain grass cover where appropriate
- Appropriate culvert construction and design
- Water bars
- Grading roads

Manage runoff and contaminants in the farmstead area.

Appendix H: Public Funding Sources for Landowner Assistance

The following is a list of some conservation funding programs available to landowners and organizations in Oregon. For more information, please refer to the contact agencies for each program. Additional programs may become available after the publication of this document. For more current information, please contact one of the organizations listed below.

Program	General Description	Contact
Conservation Planning and Implementation Grants	Provides grants to SWCDs and to landowners for on-the-ground conservation projects.	SWCDs, ODA
Conservation Reserve Enhancement Program (CREP)	Provides annual rent to landowners who enroll agricultural lands along fish-bearing streams. Also cost-shares conservation practices such as riparian tree planting, livestock watering facilities, and riparian fencing.	NRCS, SWCDs, Oregon Department of Forestry
Conservation Reserve Program (CRP)	Competitive CRP provides annual rent to landowners who enroll highly erodible lands. Continuous CRP provides annual rent to landowners who enroll agricultural lands along seasonal or perennial streams. Also cost-shares conservation practices such as riparian plantings.	NRCS, SWCDs
Emergency Watershed Protection Program (EWP)	Available through the USDA-Natural Resources Conservation Service. Provides federal funds for emergency protection measures to safeguard lives and property from floods and the products of erosion created by natural disasters that cause a sudden impairment to a watershed.	NRCS, SWCDs
Environmental Protection Agency Section 319 Grants	Fund projects that improve watershed functions and protect the quality of surface and groundwater, including restoration and education projects.	DEQ, SWCDs, Watershed Councils
Environmental Quality Incentives Program (EQIP).	Cost-shares water quality and wildlife habitat improvement activities, including conservation tillage, nutrient and manure management, fish habitat improvements, and riparian plantings.	NRCS, SWCDs
Federal Reforestation Tax Credit	Provides federal tax credit as incentive to plant trees.	Internal Revenue Service
Forest Land Enhancement Program (FLEP)	Provides educational, technical, and cost-share assistance for several forest stand improvement practices.	NRCS, SWCDs, Oregon Department of Forestry
Forest Resource Trust	State assistance up to 100 percent of the costs to convert non-stocked forestland to timber stands. Available to non-industrial private landowners.	Oregon Department of Forestry
Oregon Watershed Enhancement Board (OWEB).	Provides grants for a variety of restoration, assessment, monitoring, and education projects, as well as watershed council staff support. 25% local match requirement on all grants.	SWCDs, Watershed Councils, Oregon Watershed Enhancement Board

Program	General Description	Contact
Oregon Watershed Enhancement Board Small Grant Program.	Provides grants up to $10,000 for priority watershed enhancement projects identified by local focus group.	SWCDs, Watershed Councils, Oregon Watershed Enhancement Board
Partners for Wildlife Program.	Provides financial and technical assistance to private and non-federal landowners to restore and improve wetlands, riparian areas, and upland habitats in partnership with the U.S. Fish and Wildlife Service and other cooperating groups.	U.S. Fish and Wildlife Service,, NRCS, SWCDs
Public Law 566 Watershed Program	Program available to state agencies and other eligible organizations for planning and implementing watershed improvement and management projects. Projects should reduce erosion, siltation, and flooding; provide for agricultural water management; or improve fish and wildlife resources.	NRCS, SWCDs
Resource Conservation & Development (RC & D) Grants	Provides assistance to organizations within RC & D areas in accessing and managing grants.	Resource Conservation and Development
State Forestation Tax Credit	Provides for reforestation of under-productive forestland not covered under the Oregon Forest Practices Act. Situations include brush and pasture conversions, fire damage areas, and insect and disease areas.	Oregon Department of Forestry
State Tax Credit for Fish Habitat Improvements	Provides tax credit for part of the costs of voluntary fish habitat improvements and required fish screening devices.	Oregon Department of Fish and Wildlife
Stewardship Incentive Program (SIP).	Cost-sharing program for landowners to protect and enhance forest resources. Eligible practices include tree planting, site preparation, pre-commercial thinning, and wildlife habitat improvements.	NRCS, SWCDs, Oregon Department of Forestry
Wetlands Reserve Program (WRP)	Provides cost-sharing to landowners who restore wetlands on agricultural lands.	NRCS, SWCDs
Wildlife Habitat Tax Deferral Program	Maintains farm or forestry deferral for landowners who develop a wildlife management plan with the approval of the Oregon Department of Fish and Wildlife.	Oregon Department of Fish and Wildlife, NRCS, SWCDs