

# **Lower Willamette Agricultural Water Quality Management Area Plan**

**Developed by**

**The Lower Willamette Local Advisory Committee**

**with assistance from**

**The Oregon Department of Agriculture**

**and**

**The East Multnomah Soil and Water Conservation District**

**April 30, 2009**

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This document was developed with the assistance of the Lower Willamette Local Advisory Committee (LAC) for agricultural water quality management. The committee was formed in December of 2001 and reconvened in October 2006 and in February 2007 to identify water quality issues in the Lower Willamette and assist with the development of the Agricultural Water Quality management area Plan and Rules under the provisions of the Agricultural Water Quality Management Act. The members represent a wide variety of interests. Members of the committee are:

<b>Name</b>	<b>Area</b>	<b>Operation</b>	<b>Affiliations</b>
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Greg Elwell, Vice Chair	Boring	Manager, J. Frank Schmidt Nursery	Farm Bureau, OAN
Dean Apostol	Gresham	Hay, organic fruits, willow stakes, vegetables, and ducks, Landscape Architect	Johnson Creek Watershed Council, Society for Ecological Restoration, Boring CPO
Michael Dillard	Gresham	Nursery stock	Farm Bureau, OAN, Future Farmers of America, Clackamas County Soil and Water Conservation District (SWCD)
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# ACRONYMS

<b>AgWQMA</b>	<b>Agricultural Water Quality Management Act</b>
<b>BMPs</b>	<b>Best Management Practices</b>
<b>CWA</b>	<b>Clean Water Act</b>
<b>DEQ</b>	<b>Department of Environmental Quality</b>
<b>DO</b>	<b>Dissolved Oxygen</b>
<b>LAC</b>	<b>Local Advisory Committee</b>
<b>LMA</b>	<b>Local Management Agency</b>
<b>Metro</b>	<b>Portland Metro</b>
<b>OAR</b>	<b>Oregon Administrative Rule</b>
<b>ODA</b>	<b>Oregon Department of Agriculture</b>
<b>SWCD</b>	<b>Soil and Water Conservation District</b>
<b>TMDL</b>	<b>Total Maximum Daily Load</b>
<b>USDA NRCS</b>	<b>United States Department of Agriculture Natural Resources Conservation Service</b>

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## **FOREWORD**

This Agricultural Water Quality Management Area Plan (area plan) provides guidance for addressing agricultural water quality issues in the Lower Willamette Agricultural Water Quality Management Area. The purpose of this plan is to identify strategies to reduce water pollution from agricultural lands through a combination of prevention, educational programs, suggested land treatments, management activities, and monitoring. The provisions of this plan do not establish legal requirements or prohibitions.

The administrative rules for the Lower Willamette Management Area (OAR 603-095-3700 through 603-095-3760) set forth the requirements and/or prohibitions that will be used by the Oregon Department of Agriculture (ODA) in exercising its enforcement authority for the prevention and control of water pollution from agricultural activities. In addition, OAR 603-090-0060 through 603-090-0120 describes the enforcement actions that may be triggered upon the finding of a violation by the ODA.



# INTRODUCTION

## Background

### Geographical and Physical Setting

The Lower Willamette Agricultural Water Quality Management Area (Management Area) is located in northwest Oregon surrounding the greater Portland Metropolitan area. See Figure 1. The Management Area is bordered on the north by the Columbia River, Multnomah Channel, and the Columbia County line. The western border follows the Tualatin Mountains then heads east past the north side of the Lake Oswego (incorporated) city limits, to the Willamette River just north of the Forest Creek confluence. The boundary follows the Willamette River south to a point due east of Bolton then continues to the headwaters of Johnson Creek. From here, the eastern border follows a line east of the cities of Pleasant Home and Orient, skirts east and north of the city limits of Gresham, and then heads north between Wood Village and Troutdale to the Columbia River.

The Management Area is almost entirely within Multnomah County and the northwest corner of Clackamas County with a small portion in Washington County. In total, the Management Area covers 234.49 sq. miles (129.97 square miles of which are within the city limits of Portland).

In early geologic history, the area we now know as the Willamette Valley had a tropical climate and was covered by an inland sea. Once the marine waters receded and the coastal range was uplifted by activity in the subduction zone of the Juan de Fuca plate, the Willamette Valley became a separate physiographic feature. Various forms of mineral deposits from Boring Lava to silty sediment have blanketed this area.

In more recent geologic history the area was impacted by the spectacular Missoula Floods, a series of massive floods released from ruptured ice dams in the western Montana region. Water from these floods stripped off gravel and picked up debris, steepening the walls of the Columbia Gorge. At several spots in the path of the flood, water was temporarily retained. One such location was near Rainier, Oregon, and resulted in water backing up into the Willamette Valley. The Portland area was inundated up to a depth of 400 feet. As the water receded coarse sediment was left behind in the Portland vicinity. These multiple floods had lasting impacts on the Columbia River channel and the Willamette Valley. (Orr, Elizabeth L., Orr, William N., and Baldwin Ewart M. *Geology of Oregon*. Kendall/Hunt Publishing Company, Dubuque, IA. 1992.)

Floodwater backing into the Willamette Valley from the Columbia River disrupted the normal northward flow of the Willamette River for weeks. Coarse sand and gravel quickly dropped out of the floodwaters once they backed up into the Willamette Valley. Willamette Silt carried into the impoundment by the Willamette River was also deposited in distinct layers marking numerous impounding events. (Orr, Elizabeth L., Orr, William N., and Baldwin Ewart M. *Geology of Oregon*. Kendall/Hunt Publishing Company, Dubuque, IA. 1992.)

Currently, we are experiencing a less eventful period in geologic activity. However, there has been extensive human activity in the collection of information about the area soils and their

characteristics. The U.S. ODA of Agriculture Natural Resources Conservation Service (USDA NRCS) has assembled this information into a series of soil surveys for each county. According to the Soil Surveys of Multnomah and Clackamas counties, there are four soil groupings that dominate the agricultural portions of the Lower Willamette Agricultural Water Quality Management Area. Descriptions of the four soil types are listed below.

**Sauvie-Rafton-Pilchuck (along the Columbia River)** These soils are characterized as deep silt loam over sandy loam or silt loam. They are located in bottomlands and have good potential for agriculture in areas protected from flooding.

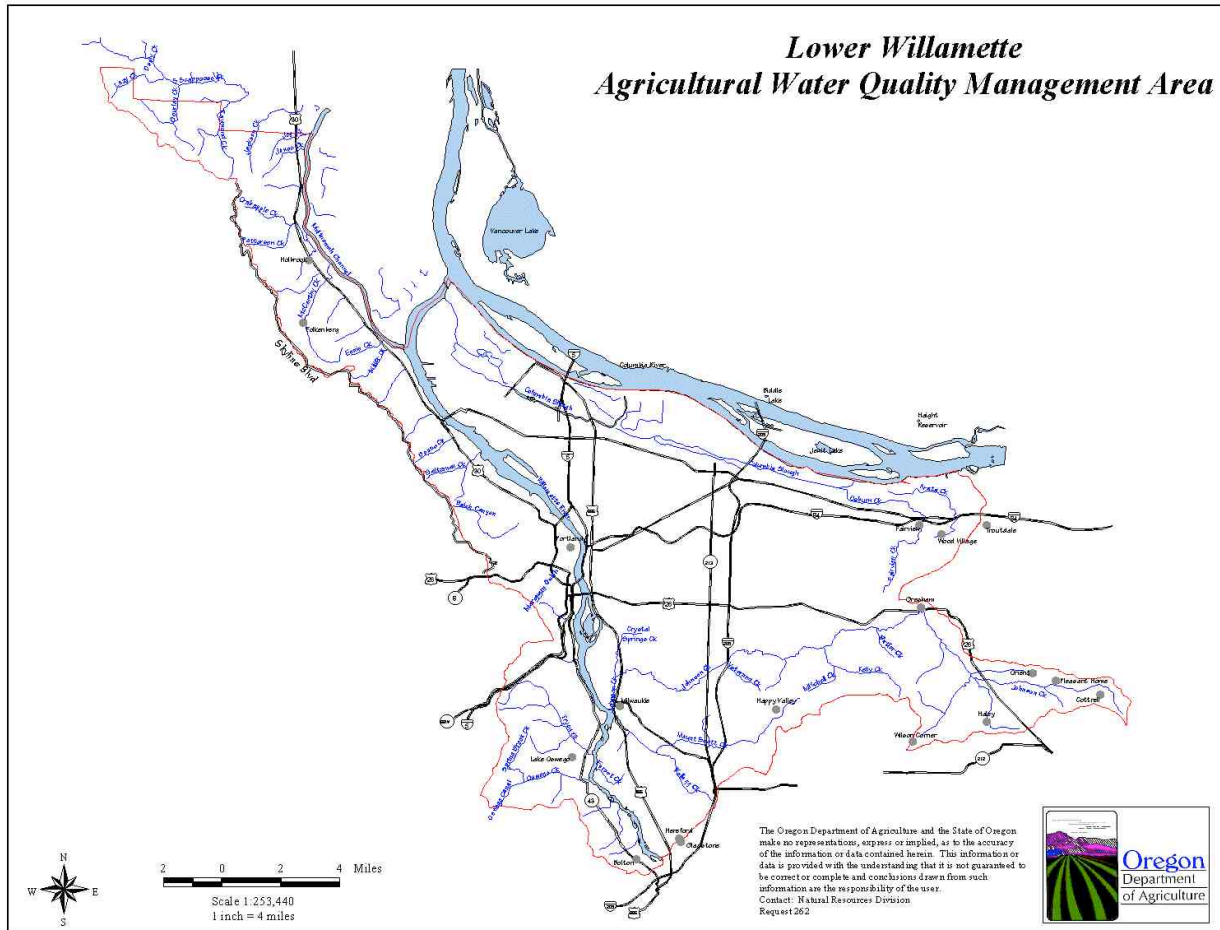
**Multnomah-Latourell-Urban (Gresham/Fairview area)** These soils are characterized as loam and silt loam over gravelly silt loam or sandy loam. Soils in this map unit are used for urban development, farming, and wildlife habitat. The potential is good for most uses of these soils except in areas with steeper than 15 percent slopes.

**Cascade-Urban land-Cornelius (Johnson Creek region)** These soils are characterized as silt loam over a thick fragipan. The potential for farming is good in areas with less than 8 percent slope.

**Cascade-Powell (Clackamas County portion of this Management Area)** These soils are characterized as silt loam underlain by a cemented layer. This region of the Management Area has rolling hills and high terraces. The soils are appropriate for cultivation with the limitation of a seasonal high water table and restricted rooting depth.

Weather conditions in the Management Area are typically mild with cool, wet winters and warm, dry summers. Temperatures are mild throughout the year, ranging from 34°F-80°F. The predominant winter precipitation is in the form of rain. The mean annual precipitation in the Management Area ranges from 37-50 inches and increases with elevation.

**Figure 1. Map of the Lower Willamette Agricultural Water Quality Management Area**



## **Land Use**

Portions of three counties are included within the boundary of this planning area; therefore, statistics are difficult to compile. Information can, however, be collected based on the relative size of each county's portion of the plan area.

The Lower Willamette Management Area is a combination of:

- Multnomah County—approximately 79 percent (186.33 square miles)
- Clackamas County—approximately 18 percent (41.88 square miles)
- Washington County—approximately 3 percent (6.28 square miles)

The predominant land use in the Lower Willamette Management Area, according to Metro, is urban. The annual rate of population growth in the urban area is two percent. The remaining land is predominantly zoned as forestland. Farmland accounts for approximately five percent of the total land area within the Lower Willamette Management Area boundary.

Certain information regarding agricultural activities in this Management Area can be obtained from the 2007 Census of Agriculture. The vast majority of farms in both Multnomah and Clackamas counties are less than 50 acres in size, distributed fairly equally between two categories: 1-9 acres and 10-49 acres. Dominant agricultural land uses include commercial nursery operations, berries, vegetable, livestock, orchards, and equestrian facilities. Also included are small acreage non-commercial farms.

In both counties, crops including nursery and greenhouse plants are produced in far greater amounts than livestock. The majority of farm owners in Multnomah and Clackamas counties describe farming as their secondary occupation. These landowners work at least 200 days per year at an occupation other than farming.

The first farm in Multnomah County is believed to have been a nursery of young fruit trees on the east bank of the Willamette River just north of Milwaukie. In the mid 1800s, this nursery supplied a great deal of the orchard stock to early pioneers in Oregon. (USDA/Soil Conservation Service. *Soil Survey of Multnomah County*. 1976.)

## **Federal Clean Water Act**

The original federal law addressing water quality problems was the Federal Water Pollution Control Act of 1948. This law focused on decreasing the pollution of interstate waters and tributaries and improving the sanitary condition of surface and groundwater. After many amendments over the years, the Clean Water Act of 1972 (CWA) was enacted in order to restore and maintain the chemical, physical, and biological integrity of the nation's water and generate a system of water quality standards, discharge limitations, and permits.

As required by the CWA, states must establish water quality standards for all bodies of water in the state. Additionally through section 303(d) of the CWA, each state is required to maintain a list of impaired water bodies that do not meet these water quality standards. In Oregon, the Department of Environmental Quality (DEQ) is responsible for this task.

Water quality standards are designed to protect the most sensitive beneficial use within a water body. For any water body that exceeds these standards, DEQ is required to establish total

maximum daily loads (TMDLs). This process involves calculating the amount of pollutants that can enter a water body and still meet water quality standards, and therefore support beneficial uses. Separate TMDLs are developed for each water quality parameter that violates a standard. Once the TMDL has been established, it is divided into allocations for each of the designated management agencies (i.e. Oregon Departments of Agriculture and Forestry, federal agencies, counties, and cities) that in turn must develop plans to meet the allocation. This responsibility is met for agricultural allocations, through the Agricultural Water Quality Management Act (AgWQMA), formally known as Senate Bill 1010. The AgWQMA was passed in 1993 and authorizes the ODA to develop and carry out plans for prevention and control of water pollution from agricultural activities and soil erosion.

### **Beneficial Uses**

When a water quality standard is established, the first step is to identify the beneficial uses sensitive to the parameter. Then a numeric or narrative criterion is established based on the levels needed to protect the sensitive uses. For example, the uses typically most sensitive to dissolved oxygen are fish and aquatic life. Fish and other aquatic organisms need an adequate supply of oxygen in the water to be healthy and productive. The dissolved oxygen criteria identify the minimum amount of dissolved oxygen needed in the water to protect fish. For other pollutants, such as many of the toxic pollutants or bacteria, criteria identify the maximum amount that may be in the water without risk to the aquatic biota or to human health.

(From <http://www.deq.state.or.us/wq/standards/uses.htm> as appeared on 3/7/07)

## **WATER QUALITY PARAMETERS OF CONCERN FOR THE LOWER WILLAMETTE**

Water bodies that do not meet one or more water quality standards are included in Oregon's 303(d) list. The Management Area water quality parameters that are not meeting state and federal standards are listed in Table 1. Also included in this table are the beneficial uses that are being detrimentally impacted.

The DEQ is the state agency responsible for developing the federal CWA TMDLs for the parameters on the 303(d) list. Currently, the TMDLs that have been developed in the Lower Willamette Management Area address chlorophyll *a*, dissolved oxygen, pH, phosphorus, bacteria, DDE/DDT, PCBs, lead, mercury, temperature, Dieldrin and 2,3,7,8 TCDD

**Table 1.** Water Quality Standards that are not being met and either have been or will be addressed by TMDLs

<b>Water Quality Parameter</b>	<b>Impacted Beneficial Uses</b>
Ammonia	❖ Aquatic Life
Bacteria, <i>Escherichia coli</i> ( <i>E. coli</i> )	❖ Water Contact Recreation
Chlorophyll <i>a</i>	❖ Water Contact Recreation ❖ Aesthetics ❖ Fishing ❖ Water Supply ❖ Livestock Watering
Dissolved Oxygen	❖ Fish and Aquatic Life ❖ Salmonid Spawning and Rearing
Iron	❖ Aquatic Life ❖ Drinking Water ❖ Fishing ❖ Human Health
Manganese	❖ Human Health ❖ Drinking Water ❖ Fishing
Nutrients, phosphorus	❖ Aesthetics
pH	❖ Fish and Aquatic Life ❖ Water Contact Recreation ❖ Anadromous Fish Passage ❖ Salmonid Fish Spawning and Rearing
Temperature	❖ Fish and Aquatic Life ❖ Salmonid Spawning and Rearing
Toxics, DDE	❖ Fish and Aquatic Life ❖ Drinking Water ❖ Human Health
Toxics, DDT	❖ Fish and Aquatic Life ❖ Drinking Water ❖ Human Health ❖ Anadromous Fish Passage
Toxics, Dieldrin	❖ Aquatic Life ❖ Drinking Water ❖ Fishing ❖ Human Health
Toxics, Lead (not attributed to agricultural sources)	❖ Fish and Aquatic Life ❖ Drinking Water ❖ Human Health
Toxics, PCB	❖ Aquatic Life ❖ Drinking Water ❖ Fishing ❖ Human Health

Oregon's 2004/2006 303(d) List of Water Quality Limited Waterbodies, 2006. Oregon Department of Environmental Quality

Beneficial uses that have been adversely affected in streams within the Management Area are water contact recreation, fish and aquatic life, which include spawning through fry emergence and rearing, drinking water and aesthetics.

The following criteria correspond to the water quality parameters in Table 1.

## **Bacteria**

Criteria: *E. coli* levels may not exceed a 30-day log mean of 126 *E. coli* organisms/100 mL, based on a minimum of 5 samples. No single sample may exceed 406 *E. coli* organisms/100 mL.

## **Temperature**

Criteria: For all temperature 303(d) listed waterbodies in the Lower Willamette Subbasin, Oregon's temperature standard specifies that sources of anthropogenic heating may result in no more than a 0.3° C increase in stream temperature. Since stream temperature results from cumulative interactions between upstream and local sources, the Lower Willamette Temperature TMDL considers all surface waters that affect the temperatures of 303(d) listed waterbodies. For example, only the mainstem of Johnson Creek is 303(d) listed for temperature, but to address this listing the TMDL will assign allocations for all surface tributaries in the watershed. This concept applies throughout the Subbasin.

## **Nutrients and pH**

Criteria: Chlorophyll *a* action level is 15 µg/L based on a 3 month average with a minimum of 3 samples. The Total Phosphorus interim target for the TMDLs in Columbia Slough and Fairview Creek is 0.1 mg/L, ortho-phosphate interim target is 0.02 mg/L based on EPA guidelines and DEQ best professional judgment. Measurements for pH must fall between 6.5 and 8.5.

## **Toxics**

Criteria: Toxic substances shall not be introduced above natural background levels in the waters of the state:

- in amounts, concentrations, or combinations which may be harmful
- that may chemically change to harmful forms in the environment
- that may accumulate in sediments or bio-accumulate in aquatic life or wildlife to levels that adversely affect public health, safety, or welfare; aquatic life; wildlife; or other designated beneficial uses.

Criteria and lethal concentrations for 303(d) organics:

- DDT criterion of 0.024 ng/L from Table 20
- DDE criterion of 0.000022 ug/L from Table 33B
- Dieldrin criterion 0.071 ng/L from Table 20

## **Dissolved Oxygen (DO)**

Beneficial Uses Affected: Fish and Aquatic Life, Salmonid Spawning & Rearing

Criteria: Dissolved oxygen must not be less than 6.5 mg/L except during spawning. During spawning, DO must not be less than 11 mg/L unless conditions of barometric pressure, altitude, and temperature preclude attainment of the 11 mg/L. In such cases, DO levels shall not be less than 95 percent of saturation.

For streams providing for cold-water aquatic life, DO must not be less than 8 mg/L, unless conditions of barometric pressure, altitude, and temperature preclude attainment of the 8 mg/L. In such cases, DO shall not be less than 90 percent of saturation.

For streams providing for cool-water aquatic life, DO shall not be less than 6.5 mg/L as an absolute minimum.

## **MISSIONS, GOALS, AND OBJECTIVES**

### **Mission**

The mission of the Lower Willamette Local Advisory Committee (LAC) is to promote agricultural management conditions that protect and improve water quality in the Lower Willamette Agricultural Water Quality Management Area, while maintaining agricultural viability.

### **Goal**

The specific goal is to prevent and control runoff, water pollution, and soil erosion from agricultural activities for the purpose of improving water quality.

To reach this goal, the LAC and ODA developed Prevention and Control Measures. The area rules were developed based on these measures. The Prevention and Control Measures focus on the following issues:

- Controlling nutrients from manure pile leachate, from overland runoff, and by using appropriate fertilizer application rates.
- Preventing conditions already prohibited under ORS 468B.025 and 468B.050 (Water Pollution Control).
- Controlling erosion so that there is no visible evidence of erosion resulting from agricultural activities contributing, or having the likelihood of contributing, sediment to waters of the state.
- Promoting natural or managed development of riparian vegetation appropriate to site capability that provides riparian function over time.

Consult the Prevention and Control Measures section, especially the boxed text, for more detailed information on the above strategies.

## PREVENTION AND CONTROL MEASURES

The focus of the Agricultural Water Quality Management Program is on voluntary and cooperative efforts by landowners, Soil and Water Conservation Districts (SWCDs), ODA, and others to protect water quality. However, the AgWQMA authorizes ODA, in cooperation with a local advisory committee, to develop Agricultural Water Quality Management Area Rules (Area Rules) that can be enforced to ensure prevention and control of water pollution from agricultural sources. Area Rules are goal-oriented and describe conditions that should be achieved or avoided on agricultural lands, rather than practices that must be implemented.

In this section there are four Prevention and Control Measures that appear with a border around the text. These measures are the enforceable Area Rules for the Lower Willamette.

The Prevention and Control Measures relate directly to water quality issues identified on the 303(d) list in the Management Area. The issues addressed are:

- Temperature
- Bacteria
- Dissolved Oxygen
- Nutrients
- Toxics

**Agricultural landowners (commercial and noncommercial) should review the Area Rules--cited in the boxes--and evaluate their operations to determine if they are in compliance.** Indicators of non-compliance are included to describe landscape conditions that should be avoided on agricultural land. A review of the information provided in this document may provide ideas on how to improve water quality through management activities.

Based upon this self-evaluation, landowners should develop or seek assistance to develop their own site-specific adaptive management strategy to meet required conditions. The Prevention and Control Measures are intended to be flexible enough for landowners to develop feasible and affordable approaches to meet water quality standards. Landowners are encouraged to seek technical assistance and management plans from their local SWCD, USDA NRCS or cooperative extension service. (see Appendix A for contact information)

## Prevention and Control Measure – Waste Management

**603-095-3740(2)**

### **Waste Management**

Effective upon rule adoption, no person subject to these rules shall violate any provision of ORS 468B.025 or ORS468B.050.

**ORS 468B.025 Prohibited activities.** (1) Except as provided in ORS 468B.050 or 468B.053, no person shall:

(a) Cause pollution of any waters of the state or place or cause to be placed any wastes in a location where such wastes are likely to escape or be carried into the waters of the state by any means.

(b) Discharge any wastes into the waters of the state if the discharge reduces the quality of such waters below the water quality standards established by rule for such waters by the Environmental Quality Commission.

(2) No person shall violate the conditions of any waste discharge permit issued under ORS 468B.050.

(3) Violation of subsection (1) or (2) of this section is a public nuisance. [Formerly 449.079 and then 468.720; 1997 c.286§5].

**ORS 468B.050 When permit required.** (1) Except as provided in ORS 468B.053 or 468B.215, without first obtaining a permit from the Director of the Department of Environmental Quality or the Oregon Department of Agriculture, which permit shall specify applicable effluent limitations, no person shall:

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

(b) Construct, install, modify or operate any disposal system or part thereof or any extension or addition thereto.

(c) Increase in volume or strength any wastes in excess of the permissive discharges specified under an existing permit.

(d) Construct, install, operate or conduct any industrial, commercial, confined animal feeding operation or other establishment or activity or any extension or modification thereof or addition thereto, the operation or conduct of which would cause an increase in the discharge of wastes into the waters of the state or which would otherwise alter the physical, chemical or biological properties of any waters of the state in any manner not already lawfully authorized.

(e) Construct or use any new outlet for the discharge of any wastes into the waters of the state.

(2) As used in this section, "confined animal feeding operation" has the meaning given that term in rules adopted by the Oregon Department of Agriculture or the Department of Environmental Quality. [Formerly 449.083 and then 468.740; 1997 c.286 §6; 2001 c.248 §4]

### **Definitions**

"**Wastes**" means sewage, industrial wastes, and all other liquid, gaseous, solid, radioactive or other substances that will or may cause pollution or tend to cause pollution of any waters of the state.

**"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 Waters of the State"**: ORS 468B.005(8). "Water" or "the waters of the state" includes 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.

### **Intent**

The LAC understands that not all situations resulting in impacts to the state waters are possible to foresee. Therefore, this Prevention and Control Measure was included to address circumstances that result in threats to the quality of waters of the state and are not categorized by other Prevention and Control Measures.

### **Potentially impacted 303(d) list parameters:**

Water quality parameters on the 303(d) list for this Management Area that may be positively impacted by this rule include bacteria, nutrients, dissolved oxygen, and toxics.

### **Other water quality parameters that may be impacted:**

Additional water quality parameters that may be positively impacted by this rule include chlorophyll *a*, pH, aquatic weeds and algae, and turbidity.

## Prevention and Control Measure – Nutrient Management

### 603-095-3740(3)

#### Nutrient Management

Effective upon rule adoption (a) Landowners and operators shall prevent the runoff or leaching of contaminated water from feed and manure storage piles into waters of the state, including but not limited to groundwater.

(b) Landowners or operators shall store, use, and apply crop nutrients in a manner that prevents transport into the waters of the state.

#### Intent

The judicious application of crop nutrients is a necessary and beneficial cultural practice. The misapplication of crop nutrients is often financially costly to the grower and can be costly to the environment as well. The nutrient Prevention and Control Measure encourages growers to adopt sound agronomic practices to guide their crop nutrient applications, rather than relying on arbitrary methods (apply what the neighbors apply, do what was done last year, etc.) that can limit potential crop yields and maximize the potential for offsite movement of nutrients.

Sound agronomic practices related to nutrient management include:

- balancing yield with correct fertilization rates (more is not always better)
- regular calibration of fertilizer application equipment
- timely soil testing and/or plant tissue analysis
- periodic nutrient analysis of manure and/or compost products that will be applied
- managing irrigation to prevent nutrient loss through leaching and/or surface runoff
- carefully managing nutrient applications in periods of potentially high rainfall
- accounting for “non-commercial” sources of nutrients such as manure, compost, sewage sludge and leguminous and non-leguminous crop residues

#### Indicators of non-compliance

The following indicators will assist landowners in evaluating their property and agricultural operation to determine if they are meeting the above Prevention and Control Measure.

Clear non-compliance:

- Fertilizer product applied to, or remaining in surface water
- Visible trail of manure, soil, or compost to surface water
- Fall soil tests show excess of 30 ppm Nitrate ( $\text{NO}_3^-$ ) in the first 12” of soil\*
- Runoff water flowing through accumulated waste or areas of high animal usage

Likely non-compliance, requires further investigation:

- Excess depth of manure or compost applied to fields.
- Manure piles stored on permeable surfaces.
- Animal confinement areas located in close proximity to waterbodies.

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\* Marx, E.S., J. Hart and R.G. Stevens. 1998. Soil Test Interpretation Guide. Oregon State University Extension Service Bulletin EC 1478

- Indicators that runoff from confinement areas could easily flow into waters of the state.
- Waste (manure) accumulations that are not covered.

**Potentially impacted 303(d) list parameters:**

Water quality parameters on the 303(d) list for this Management Area that may be positively impacted by this rule include bacteria, dissolved oxygen, and nutrients.

**Other water quality parameters that may be impacted:**

Additional water quality parameters that may be positively impacted by this rule include chlorophyll *a*, pH, aquatic weeds and algae, and sedimentation.

## Prevention and Control Measure – Erosion Management

### 603-095-3740(4)

#### Erosion Management

Effective upon rule adoption, there shall be no visible evidence of erosion resulting from agricultural activities in a location where erosion contributes, or may contribute, sediment to waters of the state.

- (a) Visible evidence of erosion consists of one or more of the following features:
  - (A) Sheet wash, noted by visible pedestalling, surface undulations, and/or flute marks on bare or sparsely-vegetated ground; or
  - (B) Visibly active gullies, as defined by OAR 603-095-0010 (1); or
  - (C) Multiple rills, which have the form of gullies, but are smaller in cross sectional area than one square foot; or
  - (D) Visible soil deposition that could enter natural stream areas; or
  - (E) Streambanks breaking down, eroding, tension-cracking, shearing or slumping beyond the level that would be anticipated from natural disturbances given natural hydrologic characteristics; or
  - (F) Underground drainage tile outlets either improperly installed or maintained allowing soil or bank erosion to actively occur.
- (b) Private roads used for agricultural activities shall be constructed and maintained such that road surfaces, fill, ditch lines, and associated structures are designed and maintained to prevent and control contributing sediment to waters of the state. All private roads not subject to the Oregon Forest Practices Act are subject to this regulation.
- (c) Drainage and irrigation ditch construction and maintenance must be done such that:
  - (A) Ditch slope and ditch cross section are designed for the local soils and minimize erosion;
  - (B) Placement of disposed soils is done in a manner that prevents reintroduction to waters of the state; and
  - (C) Other appropriate best management practices are employed when necessary so that sediment delivery is consistent with water quality standards.

#### Intent

Tillage is a cultural practice that can be very crop and farm specific. A particular combination of tillage operations that works well for one grower may not work for a neighbor down the road who is growing the same crop. Therefore, it is not the intent of this Prevention and Control Measure to dictate to growers what tillage practices they may or may not employ. This Prevention and Control Measure does however, require growers to look at their entire cropping operation in terms of erosion prevention and sediment control.

This Prevention and Control Measure is also 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 bridge abutments. 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.

Practices that may be used to prevent sediment input to streams from roads and staging areas include:

- water bars
- surface crowning
- filter strips
- water and sediment control basins
- road maintenance (maintaining gravel or grass cover)
- rolling dips
- outsloping road bench

Many pesticides that are no longer permitted for application may remain adsorbed to soil particles. If soil is moving off the property, pesticides may be going along for the ride. Limiting erosion removes this transportation mode of pesticides and will help address the DDT and Dieldrin TMDL allocation.

Many practices that prevent or control erosion also slow the rate of water flowing across the land surface. The process of slowing and infiltrating water also slows the rate at which the water eventually reaches a stream during and immediately after a rainstorm. If water reaches a stream too quickly it may cause streams to become "flashy" or rise quickly. This may cause two problems associated with pesticides:

- re-suspension of sediment in the stream that may contain pesticides
- greater erosive action on streambanks bringing more sediment that may contain pesticides into the stream

**Erosion Prevention** - Erosion prevention starts at the "top" of the hill. This process focuses on ways to prevent soil particles from detaching and moving with water or wind. Erosion prevention is NOT placing straw bales at the bottom of a swale to catch sediment - the erosion has already occurred.

**Examples of erosion prevention include:**

- switching from conventional tillage to no-till
- planting a cover crop
- contour cropping
- deep ripping a field to improve water infiltration
- any practice that reduces the detachment and movement of soil.

**Sediment Control** - Sediment control deals with what happens at the "bottom" of the hill. This process focuses on the techniques used to prevent already detached soil from entering waters of the state. While soil erosion is a natural process, poorly managed tillage operations have the potential to accelerate erosion rates to phenomenal levels.

**Examples of sediment control measures include:**

- strip cropping

- catch basins
- grass lined waterways
- vegetative filter strips
- straw bales (temporary measure)
- sediment fence (temporary measure)

The above Best Management Practices (BMPs) can be very effective in retaining sediment, IF they are properly designed and maintained. Grass lined waterways and vegetative filter strips can be incorporated into many management practices, creating an integrated system to protect waters of the state.

### **Indicators of non-compliance for soil erosion:**

#### Clear non-compliance

- Visible soil deposition in natural stream areas
- Visible sloughing from drainage ways, road ditches, and field borders 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
- Visible sheet and rill erosion leading to waters of the state
- Streambanks breaking down, eroding, tension-cracking, shearing or slumping beyond the level that would be anticipated from natural disturbances given natural hydrologic characteristics

#### Likely non-compliance, requires further investigation

- 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 ditches

### **Indicators of non-compliance for erosion on private roads used for agricultural activities:**

#### Clear non-compliance

- Surface runoff of water 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

### **Potentially impacted 303(d) list parameters**

Water quality parameters on the 303(d) list for this Management Area that may be positively impacted by this rule include sediment, turbidity, nutrients, toxics, and dissolved oxygen.

## Prevention and Control Measure – Riparian Management

Riparian areas consist of predominantly trees and/or shrubs located adjacent to and up-gradient from watercourses or water bodies.

### 603-095-3740(5)

**Riparian Management.** Effective upon rule adoption.

(a) Agricultural activities in Riparian Management Areas will allow for the development of riparian vegetation along streams to provide:

- (A) shade for minimizing solar heating of the stream;
- (B) streambank stability from flows at or below those expected to occur during or following a 25-year, 24-hour storm event;
- (C) filtration, settlement, and biological uptake of sediment, organic material, nutrients, and pesticides in surface runoff by intercepting or slowing overland flow;
- (D) improvement to water storage capacity of the riparian zone; and
- (E) protection of streams from flashy flows by infiltrating runoff and overland flow.

(b) The Riparian Management Area is defined by that area needed to achieve OAR 603-095-3740(5)(a)(A to E).

(c) Streams as used in OAR 603-095-3740(5)(a) are those that are identified in the 2001 Metro stream map Regional Land Information System (RLIS) lite stm\_line.shp and stm\_fill.shp.

(d) Riparian vegetation in OAR 603-095-3740(5) includes grasses, sedges, shrubs, and trees that are consistent with site capability.

(e) Riparian area development can be through allowing natural processes to occur or through active management to accelerate achieving OAR 603-095-3740(5)(a)(A to E).

(f) Sufficient Riparian Management Area width will be site specific, and may vary by soil type, hydrology, climate, geology, man-made limitations, and other factors.

(g) Within the entire Riparian Management Area the technical criteria to determine compliance with OAR 603-095-3740(5)(a) are:

- (A) Ongoing renewal or establishment of riparian vegetation, especially native.
- (B) Where sufficient functions required in OAR 603-095-3740(5)(a) have not been met, at least 50% of each year's new growth of woody vegetation, both trees and shrubs, is maintained.

(h) Management activities within the Riparian Management Area are allowed provided they do not compromise achieving the conditions described in 603-095-3740(4) and 603-095-3740(5)(a).

(i) Drainage and irrigation ditches are not subject to the riparian management provisions cited above but are subject to OAR 603-095-3740(4).

### Intent

This Prevention and Control Measure is anticipated to allow landowners to develop a flexible riparian area management strategy while providing adequate vegetation to trap sediment, prevent flood debris from depositing on fields, and protect pasture and cropland from bank erosion. Vegetation along smaller streams provides wildlife habitat and helps reduce solar radiation reaching the water which impacts water temperature. This Prevention and Control Measure is

also anticipated to minimize the impact of livestock on riparian vegetation. Streams that are regulated by this riparian rule are defined as those shown on the map that was created using the RLIS lite stm\_line.shp and stm\_fill.shp 2001 created by Metro. (See Figure 2 or for an enlarged view see Appendix H) During the biennial review of the plan and rules, the LAC will consider Metro's updates to their stream data for inclusion into our stream map.

### **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.
- Streambank sloughing/erosion caused by drain tile outlets.

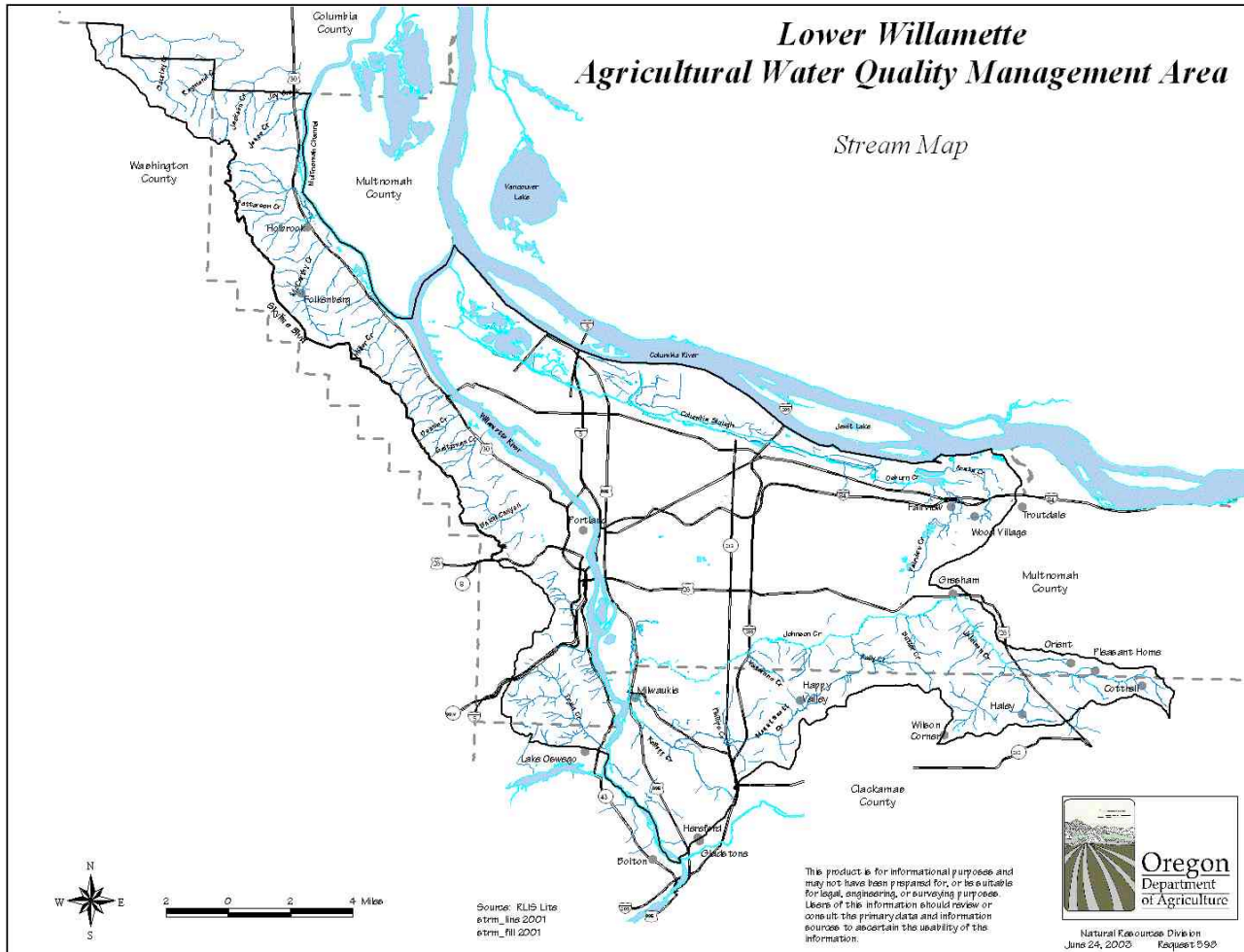
#### Likely non-compliance, requires further investigation

- Stream not protected by appropriate vegetation.

### **Potentially impacted 303(d) list parameters**

Water quality parameters on the 303(d) list for this Management Area that may be positively impacted by this rule include aquatic weeds or algae, bacteria, biological criteria, dissolved oxygen, nutrients, sediment, temperature, total dissolved gas, toxics, and turbidity.

**Figure 2. Map of Streams Requiring a Riparian Management Area**



## Functioning Riparian Areas

Healthy riparian areas provide several important ecological functions. These include:

- Slowing stream flow when water spreads over riparian areas – allowing the sediment in the water to fall out and be deposited on land rather than being carried downstream
- Retaining floodwater and recharging groundwater
- Stabilizing streambanks through plant root mass
- Developing diverse channel characteristics providing pool depth, cover, and variations in water velocity necessary for fish habitat
- Supporting a diversity of species
- Shading for minimization of heating from sunlight
- Providing a source of large woody debris for aquatic habitat
- Providing a source of fine and coarse organic matter for the stream
- Buffering to filter sediment, organic material, nutrients, and pesticides in surface water runoff before it enters the stream
- Providing an area for overbank flows and flood storage during high flow events

Factors used to evaluate improvement of the riparian area condition could include:

- Increase in the numbers of desirable riparian plant species including grasses, sedges, rushes, trees and shrubs
- Reduction in the amount of bare ground
- Increase in the amount of fallen debris including leaves and wood
- Maintenance of established beneficial vegetation
- Maintenance or establishment of woody vegetation -- both trees and shrubs
- Establishment of streambank integrity capable of withstanding 25-year, 24-hour rain events
- Composition of the plant community reflecting decreases in noxious plant species
- Shade provided that is consistent with site capability to reduce solar radiation (sunlight) reaching the water
- Increased stubble height of herbaceous species and continued growth of shrubs and trees

Stream temperature is an important measurement of the quality of water present in our streams. Cool water holds more dissolved oxygen and benefits aquatic life forms that are native to the Pacific Northwest.

One way of ensuring cool water is to promote water infiltration into the soil before it reaches the stream. As water moves through the soil, it cools to ground temperature so when it seeps back into streams during low flow conditions it helps moderate stream temperatures.

A second method to control water temperatures is to prevent solar heating by providing shade along waterbodies. The fewer opportunities there are to heat water the easier it will be to satisfy the temperature requirements established by the temperature TMDL.

A third method to prevent increased water temperature is to minimize expansion of stream surface area through artificial impoundments that cause water to slow or stand still. In the case

of in-stream ponds, water is slowed by a small dam in the stream. This detention allows solar radiation to heat the water before it is released downstream. The water is usually not deep enough to establish temperature stratification. If there is no layer of cold water at the bottom of the pond it is not possible to mitigate the temperature increases by releasing water from the bottom of the pond. The Lower Willamette LAC discourages the construction of new dams on streams in the Management Area and encourages landowners who have ponds, and wish to assist in improving water quality, to contact their local natural resource agencies for technical advice on the best way to remove or improve dams. Modifying an existing pond to allow stream flow to pass around the pond rather than through it can provide substantial benefits to water quality, especially water temperature.

## **OUTREACH AND IMPLEMENTATION STRATEGY**

To develop the outreach and implementation strategy for the Lower Willamette Area Plan, the LAC decided to take action to:

1. Determine the target audience for outreach
2. Determine the beliefs and actions of the target group concerning water quality
3. Determine the desired behavior changes from each group
4. Determine the key messages
5. Determine the tools to deliver the key messages
6. Determine how to evaluate success

Adaptation is necessary throughout the process and it is important to make sure the messages are pertinent and delivered in a manner that reaches the intended audience.

The LAC determined that their priority for outreach is streamside landowners engaging in agricultural activities on their property. Further prioritization narrowed these activities down to:

### **Large Acreage (>20 acres)**

- Nurseries
- Row Crops

### **Small Acreage (<20 acres)**

- Nurseries
- Livestock

The goal of outreach activities offered to these groups is to encourage agricultural practices that protect water quality. This may require changes in particular behaviors or ways of thinking and acting. These changes should be reflected in improvements on the landscape or in management of the operation, and those in turn would translate into a reduction of negative impacts on water quality in the Lower Willamette.

For both the large acreage nurseries and row crops the focus is closely aligned. The following five necessary results are sought from both groups.

1. **Increased riparian cover** – Benefits from this change include improved streambank stability, increased shade for streams and other waterbodies, improved filtration of soil and other contaminants in overland water flow, and increased opportunity for water to infiltrate into the soil.

2. **Reduction in the amount of bare soil** – This recommendation is especially important during the rainy season. The benefit of reducing areas of bare soil is to lessen erosion and the possibility of losing valuable topsoil to ditches or streams. From both a production and long-term sustainability standpoint, any practices that keep soil in place will save landowners money in soil amendments and fertilizers. The erosion potential of fields should be considered when determining the timing of initial and final plantings. This strategy should result in the most erosion prone fields having the highest amount of protection.
3. **Improved road construction and maintenance** – The benefit of this recommendation is reduced sediment run off from roads or road embankments. Roads are often a major source of sediment to ditches and streams, so proper construction and maintenance is an important part of good operation management and would benefit water quality.
4. **Slowing the rate of overland water flow** – Slowing overland water flow may occur as a result of many of the best management practices implemented to accomplish other goals in an agricultural producer's operation. Any improvement to soil infiltration or increased vegetation on a property would slow down the rate of run-off reducing the ability to carry soil and contaminants. Allowing water to soak into the ground and recharge the groundwater system reduces the amount of erosion of streambanks from high flows.
5. **Improved fertilizer and pesticide use and storage** – The LAC is promoting an improved awareness of proper storage and application of agricultural chemicals and nutrients. Avoiding an opportunity for these compounds to be carried into surface water either by washing off a crop or transport attached to soil particles will reduce toxics and nutrient input. Best Management Practices may be employed to determine appropriate application rates for nutrients and other standards for constructing proper storage facilities.

An additional method that helps to reduce sheet and rill erosion and reduce transport of sediment and other contaminants to surface water is contour farming. This method is highly effective, but may have limited application in this Management Area. For additional recommended practices see Appendix C.

The outreach focus for small acreage landowners will concentrate on nurseries and livestock owners. The behavior changes that are desired from small acreage nursery growers are the same as those from the large acreage nursery growers, but also include **improved water conservation practices and awareness of water rights**.

There is a different focus for the outreach efforts directed at the small acreage livestock owners. For this group the LAC wants to emphasize the following six objectives.

1. **Improved manure management** – Storage and disposal of animal waste may be a serious issue for landowners with limited land on which to spread manure as a soil amendment and fertilizer. The LAC encourages the use of environmentally friendly, practical options to be presented to landowners in an attempt to help them solve these problems.

2. **Increased riparian cover** – Benefits from this change include improved streambank stability, increased shade for streams and other waterbodies, improved filtration of soil and other contaminants in overland water flow and increased opportunity for water infiltration into the soil.
3. **Improved pasture management** – This recommendation includes proper grazing practices and improving or maintaining the health and vigor of pasture plant communities. Benefits of this recommendation are numerous, including reduced soil erosion, improved soil condition, increased forage production and improved animal health.
4. **Installation of off-stream livestock watering troughs** – Benefits of this practice include cleaner water for livestock consumption, reduced input of animal waste to streams, and protection of streambanks and riparian vegetation.
5. **Installation of sacrifice areas** – This practice provides an area for animals to spend the winter, protecting pastures from damage during the rainy season. Removing animals from pastures in the winter reduces compaction of the soils when they are wet and protects the health of pasture grasses. These benefits translate to reduced soil erosion and runoff of sediment-laden water.
6. **Appropriate stocking rates** – Appropriate animal numbers per acre is beneficial for animal health as well as improved forage production thus reducing the cost of animal feed. In cases where too many animals are kept on too few acres, animal waste storage and disposal can become a “mountainous” problem. The LAC recommends that small acreage landowners carefully consider the capacity of their property for sustaining healthy livestock conditions before animals are brought onto the land.

## **Key Messages**

The main message that must be delivered to the agricultural community is that the Lower Willamette Water Quality Management Plan and Rules have been adopted and the Rules must be followed. Other messages recommended by the LAC include:

- Agricultural producers take pride in land stewardship.
- Are you affected by the new Lower Willamette Agricultural Plan and Rules? Are you in compliance? Make the effort to find out! It's the right thing to do!
- Ten reasons why it's "good business" to follow the agricultural rules.
  1. Retain top soil – it's where your money grows
  2. Protect your livestock health
  3. Preserve the land for your grandchildren and beyond
  4. You may qualify for potential tax breaks and financial assistance
  5. Protect your groundwater (often a drinking water source) from contamination
  6. Get the bull's-eye off your farm
  7. Reduce supplemental feed costs through good pasture management
  8. It's cheaper to install best management practices than to pay mitigation costs
  9. Prevent more water quality standards from being violated
  10. Lower water temperatures are healthy for fish – and improve your fishing success!
- Be a good neighbor to downstreamers! Everyone is downstream to someone...tomorrow could be your turn. Help prevent flooding, erosion, movement of toxics, and bacteria!
- Help is out there! Technical assistance and cost share money is available to help you comply with the agricultural rules!

## **Outreach Tools**

The LAC identified several categories of outreach tools that they would like to have employed in the implementation phase of this agricultural plan. The Local Management Area (LMA) will coordinate with their conservation partners to use as many of these tools as possible to deliver the key messages and promote the implementation of BMPs on agricultural land. Details of outreach tools are found in Appendix B.

## **Evaluation of Outreach**

Evaluation and adjustment is crucial to good outreach. The LAC has recommended the following types of assessment be used by the LMA to determine which outreach tools are effective and make adjustments.

- Develop a survey to be used during workshops to determine effectiveness of the presentation
- Track attendance at outreach events

- Determine if stream stewardship is increasing in the rural community by tracking the following:
  - Requests for assistance
  - Number of voluntary conservation plans developed
  - Implementation of projects and management changes
  - Number of complaints

Outreach also depends on available funding to provide staff and materials needed to implement an effective outreach program. The LMA will work with conservation partners including ODA, USDA NRCS, neighboring SWCDs, Oregon State University (OSU) Extension Service, watershed councils, etc. to seek grants and share resources to implement the Area Plan.

### **Example Conservation Practices for Prevention and Control Measures**

Many practices that landowners may implement will address several resource issues. For instance, vegetation along a stream will reduce streambank erosion as well as enhance a riparian area. This strip of vegetation will also capture sediment from overland water flow before it reaches a waterbody. In doing so, pollutants associated with soil such as phosphorus and pesticides (eg. Dieldrin) are kept from contaminating the stream.

In Appendix C, you will find tables listing Best Management Plans (BMPs) for riparian areas and streams, nutrient and manure management, and erosion and sediment control. These BMPs are intended as suggestions for landowners who want ideas on how to meet area rules and generally maintain and enhance natural resources on their property. The tables provide some idea of the water quality benefits of each practice as well as potential costs and benefits to landowners. The tables are organized by resource, such as riparian areas, or erosion control.

### **Voluntary Conservation Plan**

Landowners have flexibility in choosing management approaches and practices to address water quality issues on their lands. Suggested BMPs are included in Appendix C. Landowners may choose to develop management systems to address problems on their own, or they may choose to work with specialists (see Appendix D) to develop a voluntary conservation plan. A conservation plan is a comprehensive management plan that addresses site-specific concerns through the selection of individual management practices or systems of practices. Conservation plans should outline specific measures to protect water quality and limit soil erosion from agricultural activities.

### **Technical Assistance**

Landowners who want more information on any of the practices mentioned in Appendix A, or who are looking for other ideas for water quality improvement and conservation on their lands, may contact several agencies and organizations that provide technical assistance, including the East Multnomah SWCD, the West Multnomah SWCD, the Clackamas County SWCD, the USDA NRCS, and the OSU Extension Service. A list of contact information may be found in Appendix A. Also, please consult Appendix D for a list of publications describing water quality improvement practices for agricultural landowners.

## **Funding Sources**

Financial assistance is available to individual landowners for implementing practices necessary to be in compliance with the Lower Willamette Area Plan. In Appendix E is a list of opportunities available at the time of Area Plan approval. This is not a comprehensive list. The reader is cautioned to inquire about the programs **prior** to implementing practices if interested in obtaining financial assistance, as many of the programs are not retroactive.

## **RESOLUTION OF COMPLAINTS**

The ODA will investigate complaints against landowners or occupiers who are alleged to be out of compliance with OAR 603-95-3740(1) through 603-095-3740(5). The complaint must relate to a specific site and contain a thorough description of the problem. The complaint must be filed with the ODA in writing and be signed by the complainant.

The ODA will determine if a violation of a Prevention and Control Measure exists using both professional judgment and the "indicators regarding compliance" outlined for each Prevention and Control Measure in this plan or the rules. Based on this determination, appropriate action will be taken by the ODA to assure that the condition is remedied.

## **ENFORCEMENT ACTION**

The ODA will use enforcement mechanisms where appropriate and necessary to gain compliance with the Area Rules. Any enforcement action will be pursued only when reasonable attempts at voluntary solutions have failed.

A land occupier shall be responsible for only those conditions caused by activities conducted on land managed by the landowner or occupier. Area Rules do not apply to conditions resulting from unusual weather events or other exceptional circumstances that could not have been reasonably anticipated, such as fire, natural disaster, or extreme weather conditions. The ODA recognizes that every farm and situation is different and will take into account each individual situation when enforcing the Rules.

Voluntary conservation plans can afford landowners or occupiers limited protection against immediate enforcement actions from the ODA. If violations of the area rules are found to occur, these plans may serve as documentation for the landowner to demonstrate that they are trying to address the issues. The landowner or occupier must be implementing their voluntary conservation plan according to the schedule outlined in the plan. Refer to Appendices F and G for more information on developing an approved voluntary conservation plan. Landowners or occupiers with a voluntary conservation plan that was developed prior to the development of the Lower Willamette Area Plan are encouraged to review it to ensure that it is consistent with the Area Rules.

If a voluntary conservation plan which addresses the Area Rules (Prevention and Control Measures) listed in this document exists for a site determined to have a violation, AND the plan is being implemented on schedule, the landowner will be given an opportunity to modify the plan

or to develop an updated implementation schedule to remedy the situation with a time frame specified by the department.

Where violations exist, the occupier and/or landowner may be issued a Notice of Noncompliance (NON) by the Department. Under a (NON), the occupier and/or landowner will be directed by the ODA to remedy the condition under the provisions of the enforcement procedures outlined in OAR 603-090-060 through 603-090-120. Authority for any enforcement action pertaining to OAR 603-095-3740(1) through 603-095-3740(5) rests solely with the ODA. If and where other governmental policies, programs, or regulations conflict with this Plan or its Rules, ODA will consult with the agency(ies) and attempt to resolve the conflict in a reasonable manner.

Implementation of this Plan began upon adoption of the Administrative Rules. The effective date of the Prevention and Control Measure was upon adoption.

## **PLAN EFFECTIVENESS MONITORING**

Monitoring is an essential component of an area plan. When effectively used, monitoring activities can provide valuable information on how much effect a plan is having, how extensively it is being implemented, and where more efforts are needed in a basin.

Currently, several agencies and organizations are monitoring water quality in the Management Area including the cities of Gresham and Portland, Clackamas and Multnomah counties and DEQ. To avoid duplication of effort and provide area plan information, the LAC has recommended that a monitoring committee be formed to work toward implementing monitoring projects that will answer questions developed by the LAC. This committee will include, but is not limited to, local SWCDs, watershed councils, interested LAC members, and ODA.

During development of the Area Plan, the LAC identified five questions they feel are critical in evaluating the effectiveness of the Area Plan and Rules. To most effectively utilize funding, the LAC has prioritized the following questions.

1. Are improvements being made in riparian condition?
2. Is there a reduction in amounts of sediment from agricultural sources reaching streams?
3. Is water quality improving?
4. Are Management Area stream channels functioning properly?
5. Are streams in the Management Area supporting sustainable fish communities?

The LAC recommends that ODA, in cooperation with the monitoring committee mentioned above, should put special effort toward obtaining funding to answer the above questions.

## **PLAN EVALUATION AND MODIFICATION**

Two years following approval of the Area Plan and adoption of the Area Rules, the LAC will reconvene to review and update the Area Plan and Rules. The review and update will be conducted in consultation with the Oregon DEQ to ensure the Area Plan and Rules are consistent with TMDLs for the Management Area. Based on the results of the effectiveness evaluation of the Area Plan and Rules and any additional water quality issues identified in the Management

Area, the LAC, ODA, the East Multnomah SWCD, and the state Board of Agriculture will consider making appropriate modifications to the Area Plan and Rules.

# APPENDICES

## Appendix A: Technical Assistance Contact Information

Sources of information and technical assistance are available from many sources. This list is a good representation of local assistance available, but is not all-inclusive.

### Soil and Water Conservation Districts (SWCDs)

Prepares management plans and helps implement them by coordinating with other technical experts in natural resources.

East Multnomah SWCD:	503-222-7645
West Multnomah SWCD:	503-238-4775
Clackamas County SWCD:	503-655-3144

### USDA – Natural Resources Conservation Service (NRCS)

Provides information on soil types, soils mapping, and interpretation. Administers and provides assistance in developing plans for CRP, EQIP, WRP, and other cost share programs. Makes technical determinations on wetlands and highly erodible land.

Multnomah County:	503-326-3941
Clackamas County:	503-655-3144

### Oregon State University Extension Service

Offers educational programs, seminars, classes, tours, and publications to guide landowners in managing their resources.

Clackamas County:	503-655-8631
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### Oregon Department of Agriculture (ODA)

Oversees the AgWQM program, issues permits and helps producers comply with confined animal feeding water management programs, provides support to Soil and Water Conservation Districts.

Natural Resources Division (Salem):	503-986-4700
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### 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 total maximum daily load (TMDL) allocations.

Portland:	800-452-4011
Northwest Region Office, Portland:	503-229-5696

### 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.

Multnomah County:	503-655-3144
Clackamas County:	503-655-3144

**Division of State Lands (DSL)**

Administers state removal/fill law and provides technical assistance.

Salem: 503-378-3805 x221  
Multnomah County: 503-378-3805 x320  
Clackamas County: 503-378-3805 x255

**Oregon Water Resources Department (WRD)**

Provides technical and educational assistance and water rights permits and information.

Salem: 503-986-0900

**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.

North Willamette Watershed District: 503-947-6000 or 800-720-6339

**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.

Salem: 503-945-7200

**Oregon Watershed Councils**

Johnson Creek Watershed Council 503-652-7477  
Columbia Slough Watershed Council 503-281-1132  
Tryon Creek Watershed Council 503-636-4398 x121

## **Appendix B: Outreach Tools**

Possible media types that the LAC considered effective include:

- Newspaper
- Public radio
- Local newsletters from watershed councils, OSU Extension Service, and Farm Bureau
- Trade journals (i.e. Digger)
- Direct mailings
- Public access television

Some local events that may provide opportunities for landowner interaction include:

- County fairs
- Horse symposium

Other outlets for distribution of information include agribusinesses such as:

- Feed stores
- Agricultural vendors- wholesale and retail
- Farm implement dealers
- Large animal veterinarians
- Retail garden centers
- Horse stables

Agricultural groups that may hold meetings or events that would be good conduits for presenting information include:

- Oregon Equestrian Trails
- School students/associations (i.e. 4-H, Future Farmers of America)
- Oregon Recreation and Parks Association
- Oregon Association of Nurserymen
- Granges
- Farm Bureau

Activities and techniques that may be used to educate landowners and promote BMP implementation may include:

- Demonstration projects
- Example photos before and after conservation practices have been implemented
- Workshops with a varied topic that would include information on the Lower Willamette area plan and rules (i.e. weed control, wells/septic systems, livestock health)
- Marketing techniques to draw landowners to workshops such as contests, drawings, children's activities
- Tax incentive or other assistance programs (i.e. conservation easements, cost share)
- Focus groups to target the best vehicle to deliver pertinent information
- Conservation curriculum development or promotion to schools
- Tours to environmentally progressive operations or demonstration sites

Promotion of BMPs by agricultural producers to other producers

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## Appendix C: Best Management Practices

### Riparian Areas and Streams

<b>Practice</b>	<b>Resource Concerns Addressed</b>	<b>Potential Benefits of Practice to Producer</b>	<b>Potential Costs of Practice to Producer</b>
a. Rotational grazing in riparian area; timed when growth is palatable to animals and when riparian areas are not saturated.	Helps establish desirable riparian vegetation, promotes streambank integrity; helps filter nutrients and sediment from runoff; promotes channel narrowing.	May lessen streambank erosion and loss of pastures; allows limited use of riparian area for grazing when grass is most nutritious, controls weeds and improves wildlife habitat.	May require time and financial investment for livestock control and off-stream watering facilities.
b. Livestock exclusion from riparian area Establishing off-stream watering facilities.	Helps promote desirable riparian vegetation; promotes streambank integrity; helps filter nutrients and sediment from runoff; may help narrow channel and reduce erosion in channel.	May lessen streambank erosion and loss of pastures; less time involved in managing livestock grazing in riparian area, improves wildlife habitat.	May require higher weed control costs than seasonal riparian grazing. May require financial investment for livestock control and off-stream watering facilities.
c. Planting perennial vegetation in riparian area.	Helps establish perennial riparian vegetation rapidly; promotes streambank integrity; may help narrow channel and reduce erosion in channel.	May lessen streambank erosion and loss of pastures. If livestock are excluded from riparian area, area may be eligible for federal cost-share programs. Some alternative perennial agricultural products may be harvested from riparian areas.	Costs of vegetation and weed control. May require financial investment for riparian fencing and off-stream watering facilities while vegetation establishes.

### Nutrient and Manure Management

<b>Practice</b>	<b>Resource Concerns Addressed</b>	<b>Benefits to Producer</b>	<b>Costs to Producer</b>
a. Apply nutrients according to soil test results.	Helps prevent nutrient runoff into waters of the state.	May help reduce fertilizer costs; ensures that plants receive needed nutrients for growth; makes plants more competitive against weeds.	Costs of soil testing; time associated with taking soil samples.
b. Establish sacrifice areas. Sacrifice areas are small pastures where animals are confined during the winter to protect other pastures from trampling and compaction. Limit livestock access to pastures when soils are saturated; cover sacrifice areas with rock, hog fuel, and/or geotextile.	Helps prevent sediment, nutrient, and bacteria runoff into waters of the state. Helps protect streamside areas.	Protects pastures from compaction during the winter, improving growth. May improve animal health by covering sacrifice areas with material so animals are not wading in mud.	Cost of fencing sacrifice area; cost of feeding hay during the winter; cost of materials for protecting sacrifice area.
c. Site barns and sacrifice areas away from streams.	Helps prevent sediment, nutrient, and bacteria runoff into waters of the state. Helps protect streamside areas.	Helps prevent flooding in barns and sacrifice areas.	Need either off-stream watering facility or other source of water for livestock.
d. Prevent silage leaching and/or store and manage leachate from silage and other vegetative materials.	Helps prevent nutrient runoff into waters of the state.	Preventing leaching maintains higher nutrient content of ensiled feed material.	May require cost of facility development and purchase of moisture-absorbing materials.
e. Installing gutters and downspouts in areas with high livestock use.	Helps prevent sediment, nutrient, and bacteria runoff into waters of the state. Helps protect streamside areas.	May improve animal health by lessening mud during the winter, so animals are not wading in mud.	Cost of installation and maintenance of gutters and downspouts.

<b>Practice</b>	<b>Resource Concerns Addressed</b>	<b>Benefits to Producer</b>	<b>Costs to Producer</b>
f. Cover manure storage piles.	Helps prevent sediment, nutrient, and bacteria runoff into waters of the state.	Do not lose the nutrients in manure that can be spread on pastures or crops.	Cost of installation and maintenance of cover.

### **Erosion and Sediment Control**

<b>Practice</b>	<b>Resource Concerns Addressed</b>	<b>Benefits to Producer</b>	<b>Costs to Producer</b>
a. Grazing management: graze pasture plants to appropriate heights, rotate animals between several pastures; provide access to water in each pasture.	Helps prevent sediment, nutrient, and bacteria runoff into waters of the state. Helps protect streamside areas.	May improve pasture production; easy access to water may increase livestock production as well. May improve composition of pasture plants and help prevent weed problems.	Cost of installing fencing, watering facilities for rotational grazing system; time involved in moving animals through pastures.
b. Farm road construction: construct fords appropriately, install water bars to divert runoff to roadside ditches and catch-basins	Helps prevent sediment runoff to waters of the state.	May help prevent water damage on farm roads.	Cost of installation and maintenance.
c. Plant appropriate vegetation along drainage ditches; seed ditches following construction.	Helps prevent sediment runoff into waters of the state.	May help prevent ditch bank erosion and slumping.	Costs of establishing vegetation.
d. Plant cover crops on erosion-sensitive areas.	Helps prevent sediment runoff into waters of the state; helps filter nutrients and slow runoff.	May reduce weed problems; prevents loss of applied nutrients.	Costs of establishing cover crops; cover crops may compromise primary crop.

<b>Practice</b>	<b>Resource Concerns Addressed</b>	<b>Benefits to Producer</b>	<b>Costs to Producer</b>
e. Irrigate pasture or crops according to soil moisture and plant water needs.	Helps prevent irrigation return flow and associated nutrients and sediment to waters of the state.	May reduce costs of irrigation; may help crop or pasture production.	Installation/maintenance cost. Monitoring time.
f. Install/maintain diversions or French drains to prevent unwanted drainage into barnyards and sacrifice areas.	Helps prevent nutrient runoff into waters of the state.	Decreases muddiness and shortens saturation period in protected areas.	Cost of installation.
g. Implement contour farming.	Farming sloping land in such a way that preparing land, planting, and cultivating are done on the contour.	Reduced runoff and erosion. Increased infiltration to soil profile. Reduced sediment transport.	Cost of a new cropping system.

## **Appendix D: Water quality references for agricultural landowners**

Oregon Small Acreage Fact Sheets—includes publications on erosion, buffers, pasture management, stock water, fencing, mud and manure management, nutrients, irrigation, forestry, wildlife, ponds, wells, septic, and permits. Available from your local Soil & Water Conservation District or online at <http://www.oacd.org/fs00safs.htm>

### **Nursery**

Water Quality Handbook for Nurseries Oklahoma State University, E-951. Available online at [http://www.okstate.edu/OSU\\_Ag/agedcm4h/pearl/e951/](http://www.okstate.edu/OSU_Ag/agedcm4h/pearl/e951/)

Oregon State University Extension and Experiment Station Communications publish the following documents. These and many other publications are available online at <http://eesc.orst.edu/agcomwebfile/edmat/default.html> or from your county extension office.

### **Nutrients, cover crops, and irrigation**

EM 8646 Nutrient Management for Dairy Production: Assessing Your Manure Management for Water Quality Risk

EM 8649 Manure Management in Small Farm Livestock Operations: Protecting Surface and Groundwater (html)

FS 281 Manure Management Practices to Reduce Water Pollution (html)

EM 8825 Composting: An Alternative for Livestock Manure Management and Disposal of Dead Animals

EC 1492 Gardening and Water Quality Protection: Understanding Nitrogen Fertilizers

EC 1493 Gardening and Water Quality Protection: Using Nitrogen Fertilizers Wisely

EM 8704 Using Cover Crops in Oregon (pdf)

M 8716 Simple Irrigation Scheduling Using the ‘Look and Feel’ Method (includes soil appearance cards in English and Spanish)

### **Horses**

C 1558 Managing Small-acreage Horse Farms for Green Pastures, Clean Water, and Healthy Horses (Available only online)

### **Streams**

EM 8636 The Water Quality Limited Stream Segments List--What does it mean? (Available only online. Cannot be ordered)

EM 8761 Stream\*A\*Syst: A Tool To Help You Examine Stream Conditions on Your Property

PNW 552 Taking Care of Streams in Western Washington, Western Oregon, and Coastal Alaska: A Homeowner's Guide to Riparian Areas

### **Groundwater**

EC 1374 Rural Domestic Water Supply (html)

EM 8559 How Soil Properties Affect Groundwater Vulnerability to Pesticide Contamination

EM 8560 Site Assessment for Groundwater Vulnerability to Pesticide Contamination

EM 8561 Understanding Pesticide Persistence and Mobility for Groundwater and Surface Water Protection

EM 8596 Assessing the Risk of Groundwater Contamination from Livestock Manure Management Worksheet

EM 8597 Reducing the Risk of Groundwater Contamination from Livestock Manure Management

## **Appendix E: Funding Sources**

### **Conservation Reserve Enhancement Program (CREP)**

This program, administered by Farm Service Agency (FSA), focuses on anadromous fish bearing streams and provides cost share money for the implementation of riparian fencing and planting on a specified buffer. A rental payment on the riparian buffer, based on the USDA soil rental rate, is dispersed annually for 10-15 years.

Contact the Washington County Soil and Water Conservation District or Natural Resources Conservation Service for information.

### **Conservation Reserve Program (CRP)**

This program, administered by the USDA NRCS and Farm Service Agency, includes streams whether or not they are habitat for anadromous fish. This program also provides cost share to landowners willing to establish an appropriate riparian buffer. A rental payment is also dispersed annually over a 10-15 year period.

Contact the Natural Resources Conservation Service for information.

### **Environmental Quality Incentives Program (EQIP)**

This program, administered by the USDA NRCS, provides assistance to farmers and ranchers in complying with federal, state, and tribal environmental laws, and encourages environmental enhancement. Through this program a conservation plan that includes structural, vegetative, and land management practices on eligible land is implemented. Cost-share payments may be made to implement eligible structural or vegetative practices. Five- to ten-year contracts are made with eligible producers.

Contact the Natural Resources Conservation Service for information.

### **Wildlife Habitat Incentives Program (WHIP)**

This program, administered by the USDA NRCS, provides financial incentives to develop habitat for fish and wildlife on private lands.

Contact the Natural Resources Conservation Service for information.

### **Oregon Watershed Enhancement Board Small Grant Program**

The local Soil and Water Conservation District and the Watershed Councils administer this program jointly. Funds are available for specific practices. Landowners may be responsible for a certain percentage of the total cost.

Contact Clackamas County SWCD, East Multnomah SWCD, or West Multnomah SWCD for details.

### **Oregon Riparian Tax Incentive Program**

This program, administered by the Oregon Department of Fish and Wildlife (ODFW), offers a property tax incentive to property owners for improving or maintaining qualifying riparian lands. Under this program, property owners receive complete property tax exemption for their riparian property. This can include land up to 100 feet from a stream. For riparian land to qualify for this program, it must be planned and zoned as forest or agricultural lands (including rangeland), or must have met these criteria as of July 1, 1997. If a riparian area is already in good shape it may also qualify for the program.

Contact your local ODFW office for more information or visit their website (<http://www.dfw.state.or.us/ODFWhtml/InfoCntrHbt.html>).

### **Oregon Wildlife Habitat Conservation and Management Program**

This program, administered by ODFW, is specifically for property zoned exclusive farm use, mixed farm and forest use, or land designated as forestland that are managed for wildlife habitat. The landowner who qualifies and successfully completes the required steps will receive a tax benefit.

Contact your local ODFW office for more information or visit their website (<http://www.dfw.state.or.us/ODFWhtml/InfoCntrHbt.html>).

### **Nonpoint Source Pollution Control Facilities Tax Credit**

This program, administered by the Oregon Department of Environmental Quality (DEQ), is intended to cover expenditures for “on-the-ground” management practices and improvements. Possible eligible practices must be consistent with the implementation of any of a number of state approved plans including the local agricultural water quality Management Area plan and the TMDL implementation plan.

Contact the Portland DEQ office for more information or visit their website (<http://www.deq.state.or.us>).

## **Appendix F: The Conservation Planning Process**

The USDA - Natural Resources Conservation Service has developed, and the Local Management Agency may choose to use the following nine-step process to develop a voluntary 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 issues. 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.

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## **Appendix G: Guidelines for a Voluntary Conservation Plan**

To comply with the Ag WQMA, a landowner/operator needs to ensure that no violations of the prevention and control measures outlined in the administrative rules OAR 603-095-3740(1) through 603-095-3740(5) occur on their property.

A landowner or operator is NOT required to have a Voluntary Conservation Plan. The LMA does, 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 area rules (seen in the area plan as Prevention and Control Measures).

The plan should address all of the area rules adopted for the Lower Willamette and provide an action strategy for the improvement or maintenance of those resources that are a part of the landowner's management objectives.

Landowners with a Voluntary Conservation Plan that was approved prior to the development of the Lower Willamette area plan are encouraged to review and modify it as necessary to ensure that it is consistent with the area rules.

### **Format for a Voluntary Conservation Plan:**

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

Landowner objectives

Physical site description

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

Field inventory data:

- Soil types
- Acres
- Erosion estimates
- Crops/land use/rotations
- Livestock enterprises

- Forage inventories
- Fertilizer/pesticide information
- Results of analysis and alternative development

#### Best Management Practices

Provide a narrative that describes how each Prevention and Control Measure is being addressed on the property. List the Conservation Practices that are currently being implemented or will be in the future to address the Prevention and Control Measures. For the plan to be approved, practices must meet the Natural Resources Conservation Service technical guidelines. Include practice specifications (if applicable) and operation and maintenance requirements.

#### Schedule

Schedule for the implementation of the Conservation Practices outlined in the plan.

#### Other information

Photos, soil tests, alternatives, or supporting data.

#### Signature Page (Included)

**For additional guidance in developing a Voluntary Conservation Plan, contact the East Multnomah, West Multnomah or Clackamas County Soil and Water Conservation District.**

# Appendix H: Enlarged Maps of Streams Requiring a Riparian Management Area

