# Umatilla Agricultural
# Water Quality Management Area Plan

**December 6, 2018**

**Developed by the**

**Oregon Department of Agriculture**

**Umatilla Local Advisory Committee**

With support from the

**Umatilla County Soil and Water Conservation District**

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# Acronyms and Terms Used in this Document

**Ag Water Quality Program** – Agricultural Water Quality Management Program
**Area Plan** – Agricultural Water Quality Management Area Plan
**Area Rules** – Agricultural Water Quality Management Area Rules
**BMP –**Best Management Practices
**CAFO** – Confined Animal Feeding Operation
**CCRP –** Continuous Conservation Reserve Program
**cfs** – cubic feet per second
**CNPCP** – Coastal Nonpoint Pollution Control Program
**CREP –** Conservation Reserve Enhancement Program
**CRP –** Conservation Reserve Program
**CTUIR –** Confederated Tribes of the Umatilla Indian Reservation
**CWA** – Clean Water Act
**CZARA -** Coastal Zone Act Reauthorization Amendments
**DEQ** – Oregon Department of Environmental Quality
**DMA** – Designated Management Agency
**EQIP –** Environmental Quality Incentive Program
**ESA –** Endanger Species Act
**FA** – Focus Area
**FAAP –** Focus Area Action Plan
**FOTG –** Field Office Technical Guide
**GWMA** – Groundwater Management Area
**GWMAC** - Groundwater Management Area Committee
**HABs** – Harmful Algal Blooms
**HUC** – Hydrologic Unit Code
**LAC** – Local Advisory Committee
**LMA** – Local Management Agency
**LUB GWMA** – Lower Umatilla Basin Groundwater Management Area
**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
**OACD –** Oregon Association of Conservation Districts
**OCA –** Oregon Cattleman's Association
**ODA** – Oregon Department of Agriculture
**ODF** – Oregon Department of Forestry
**ODFW** – Oregon Department of Fish and Wildlife
**OHA** – Oregon Health Authority
**ORS** – Oregon Revised Statute
**OWEB** – Oregon Watershed Enhancement Board
**OWRD** – Oregon Water Resources Department
**PMP** – Pesticides Management Plan
**PSP** – Pesticides Stewardship Partnership
**RCA** – Required Corrective Action
**RM –** River Mile
**RUSLE** – Revised Universal Soil Loss Equation
**SIA** – Strategic Implementation Area
**SWCD** – Soil and Water Conservation District
**T** – Soil Loss Tolerance Factor

**TMDL** – Total Maximum Daily Load
**UBWC –** Umatilla Basin Watershed Council
**USDA** – United States Department of Agriculture
**US EPA** – United States Environmental Protection Agency
**VWQFP –** Voluntary Water Quality Farm Plans
**WPCF** – Water Pollution Control Facility
**WQPMT** – Water Quality Pesticides Management Team

# Foreword

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

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

# Required Elements of Area Plans

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

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

# Plan Content

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

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

Chapter 3: Implementation Strategies, Present goals(s), Measurable objectives, timelines, and strategies to achieve these goal(s) and objectives.

Chapter 4: Local Implementation, Monitoring, and Adaptive Management. ODA and the Local Advisory Committee (LAC) will work with knowledgeable sources to summarize land condition and water quality status and trends to assess progress toward the goals and objectives in Chapter 3.

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

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

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

The provisions of the Area Plan do not establish legal requirements or prohibitions (ORS 568.912(1)). Each Area Plan is accompanied by Area Rules that describe local agricultural water quality regulatory requirements. ODA will exercise its regulatory authority for the prevention and control of water pollution from agricultural activities under the Ag Water Quality Program's general regulations (OAR 603-090-0000 to 603-090-0120) and under the Area Rules for this Management Area (OAR 603-095-3200). The Ag Water Quality Program's general rules guide the Ag Water Quality Program, and the Area Rules for the Management Area are the regulations that landowners are required to follow. Landowners will be encouraged through outreach and education to implement conservation management activities.

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

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

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

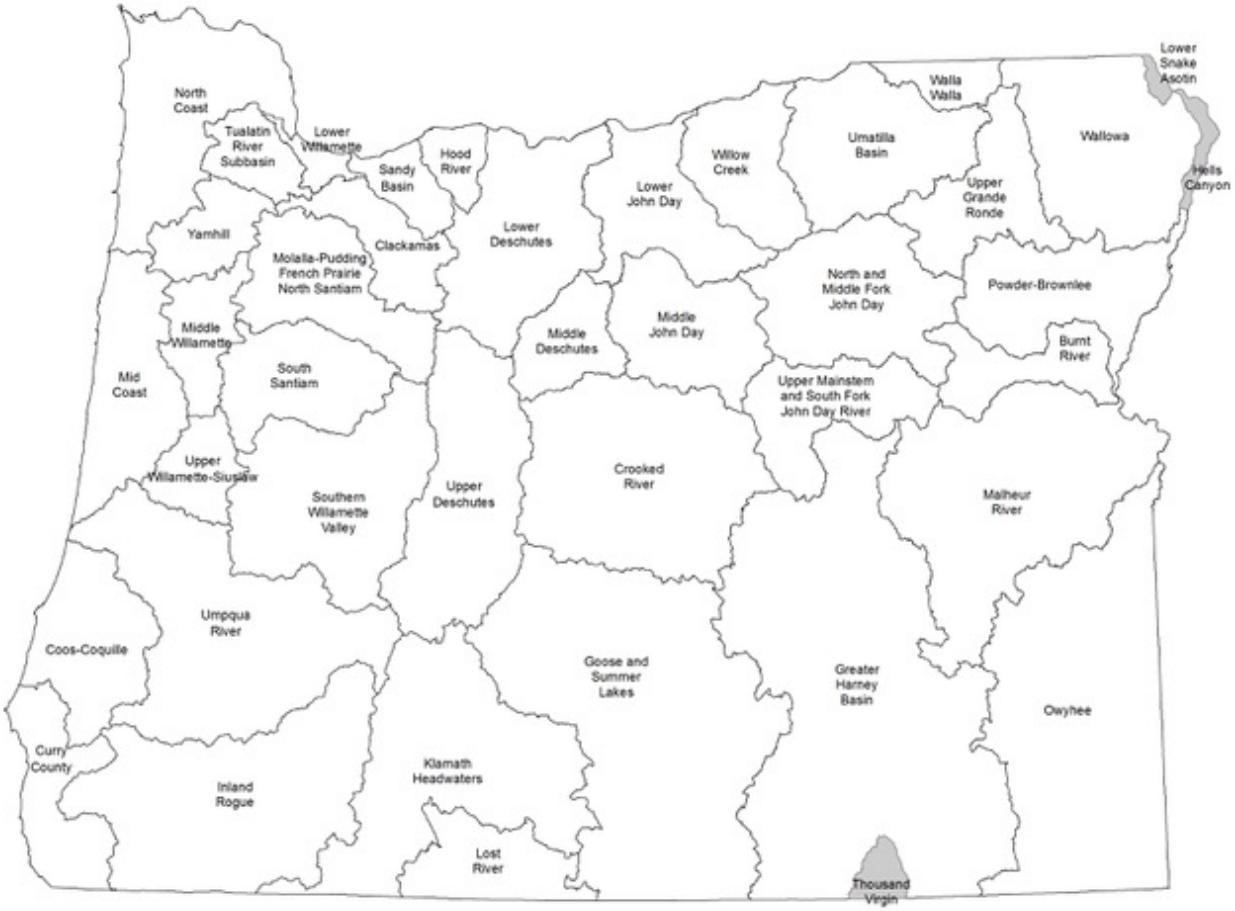
## 1.2 History of the Ag Water Quality Program

In 1993, the Oregon Legislature passed the Agricultural Water Quality Management Act directing ODA to develop plans to prevent and control water pollution from agricultural activities and soil erosion, to achieve water quality standards, and to adopt rules as necessary (ORS 568.900 through ORS 568.933). The Oregon Legislature passed additional legislation in 1995 to clarify that ODA is the lead agency for regulating agriculture with respect to water quality (ORS 561.191). The Area Plan and Area Rules were developed and subsequently revised pursuant to these statutes.

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

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

**Figure 1: Map of 38 Agricultural Water Quality Management Areas**
Grey areas are not incorporated into Ag Water Quality Management Areas




## 1.3 Roles and Responsibilities

### 1.3.1 Oregon Department of Agriculture

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

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

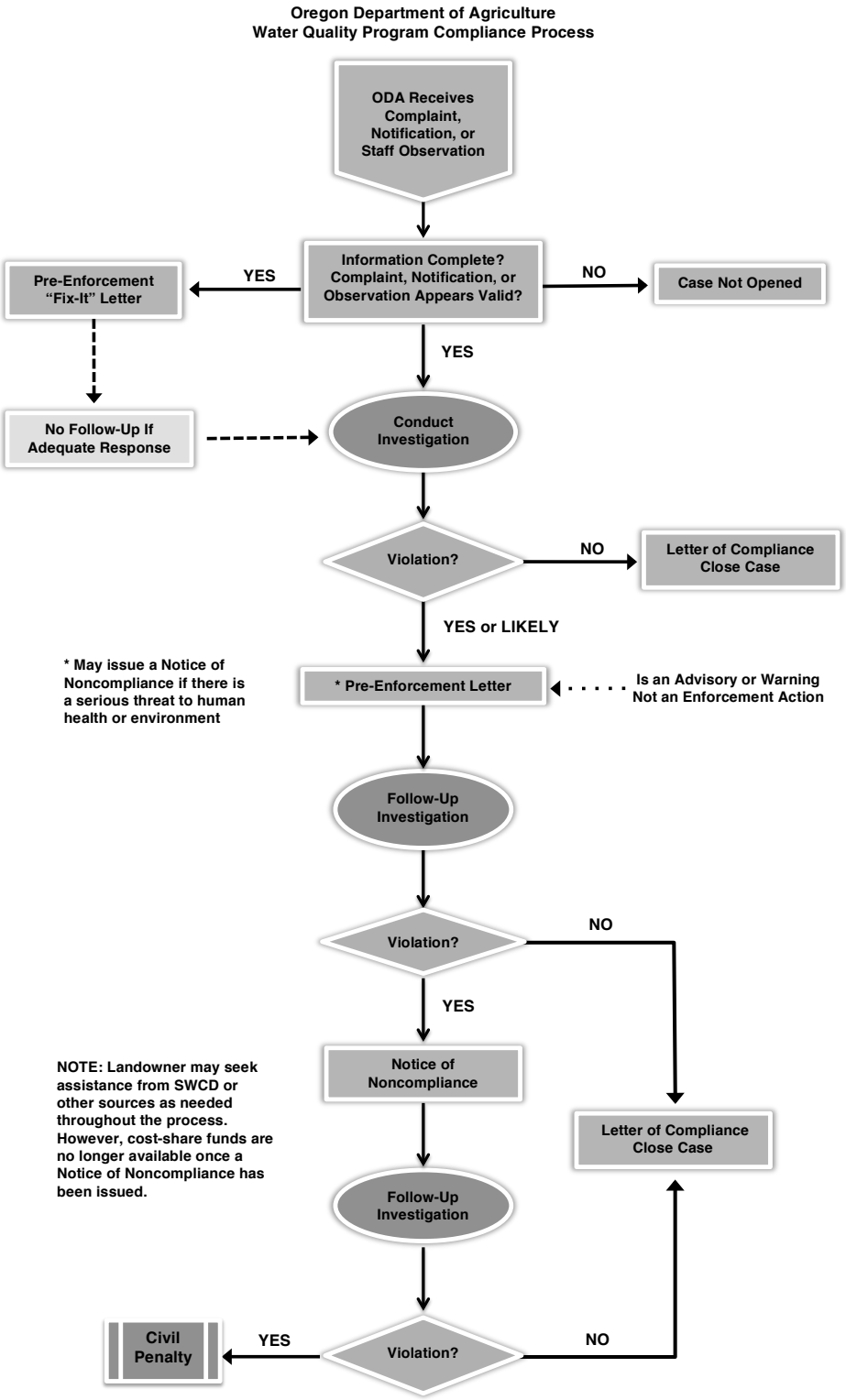
- Approved management measures for Coastal Zone Act Reauthorization Amendments (CZARA).
- Agricultural activities detailed in a Groundwater Management Area (GWMA) Action Plan (if DEQ has established a GWMA and an Action Plan has been developed).

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

The Area Rules are a set of standards that landowners must meet on all agricultural or rural lands. ("Landowner" includes any landowner, land occupier or operator per OAR 603-95-0010(24)). All landowners must comply with the Area Rules. ODA will use enforcement where appropriate and necessary to gain compliance with Area Rules. Figure 2 outlines ODA's compliance process. ODA will pursue enforcement action only when reasonable attempts at voluntary solutions have failed (OAR 603-090-0000(5)(e)). If a violation is documented, ODA may issue a pre-enforcement notification or an enforcement Order such as a Notice of Noncompliance. If a Notice of Noncompliance is issued, ODA will direct the landowner to remedy the condition through required corrective actions (RCAs) under the provisions of the enforcement procedures outlined in OAR 603-090-060 through OAR 603-090-120. If a landowner does not implement the RCAs, ODA may assess civil penalties for continued violation of the Area Rules. If and when other governmental policies, programs, or rules conflict with the Area Plan or Area Rules, ODA will consult with the appropriate agencies to resolve the conflict in a reasonable manner.

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

**Figure 2: Compliance Flow Chart**



### 1.3.2 Local Management Agency

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

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

### 1.3.3 Local Advisory Committee

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

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

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

### 1.3.4 Agricultural Landowners

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

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

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

- Conditions resulting from unusual weather events.

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

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

### 1.3.5 Public Participation

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

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

## 1.4 Agricultural Water Quality

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

### 1.4.1 Point and Nonpoint Sources of Water Pollution

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

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

### 1.4.2 Beneficial Uses and Parameters of Concern

Beneficial uses related to water quality are defined by DEQ in OARs for each basin. They may include: public and private domestic water supply, industrial water supply, irrigation, livestock watering, fish and aquatic life, wildlife and hunting, fishing, boating, water contact recreation, aesthetic quality,

hydropower, and commercial navigation and transportation. The most sensitive beneficial uses usually are fish and aquatic life, water contact recreation, and public and private domestic water supply. These uses generally are the first to be impaired because they are affected at lower levels of pollution. While there may not be severe impacts on water quality from a single source or sector, the combined effects from all sources can contribute to the impairment of beneficial uses in the Management Area. Beneficial uses that have the potential to be impaired in this Management Area are summarized in Chapter 2.

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

### 1.4.3 Impaired Water Bodies and Total Maximum Daily Loads

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

A TMDL includes an assessment of water quality data and current conditions and describes a plan to achieve conditions so that water bodies will meet water quality standards. TMDLs specify the daily amount of pollution a waterbody can receive and still meet water quality standards. In the TMDL, point sources are allocated pollution limits as "waste load allocations" that are then incorporated in National Pollutant Discharge Elimination System (NPDES) waste discharge permits, while a "load allocation" is established for nonpoint sources (agriculture, forestry, and urban). The agricultural sector is responsible for helping achieve the pollution limit by achieving the load allocation assigned to agriculture specifically, or to nonpoint sources in general, depending on how the TMDL was written.

Total Maximum Daily Loads generally apply to an entire basin or Subbasin, not just to an individual waterbody on the 303(d) list. Water bodies will be listed as achieving water quality standards when data show the standards have been attained.

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

For more general and specific information about Oregon's TMDLs, see: www.oregon.gov/deq/wq/tmdls/Pages/default.aspx. The list of impaired water bodies (303(d) list), the TMDLs, and the agricultural load allocations for the TMDLs that apply to this Management Area are summarized in Chapter 2.

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

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

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

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

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

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

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

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

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

### 1.4.5 Streamside Vegetation and Agricultural Water Quality

Across Oregon, the Ag Water Quality Program emphasizes streamside vegetation protection and enhancement to prevent and control water pollution from agriculture activities and to prevent and control soil erosion. Streamside vegetation can provide three primary water quality functions: shade for cool stream temperatures, streambank stability, and filtration of pollutants. Other water quality functions from

streamside vegetation include: water storage in the soil for cooler and later season flows, sediment trapping that can build streambanks and floodplains, narrowing and deepening of channels, and biological uptake of sediment, organic material, nutrients, and pesticides.

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

- Streamside vegetation can improve water quality related to multiple pollutants, including: temperature (heat), sediment, bacteria, nutrients, and toxics (e.g., pesticides, heavy metals, etc.).
- Streamside vegetation provides fish and wildlife habitat.
- Landowners can improve streamside vegetation in ways that are compatible with their operation.
- Streamside vegetation condition is measurable and can be used to track progress in achieving desired site conditions.

Site-Capable Vegetation

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

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

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

In many cases, invasive, non-native plants, such as introduced varieties of blackberry and reed canarygrass, grow in streamside areas. This type of vegetation has established throughout much of Oregon due to historic and human influences and may provide some of the water quality functions of site-capable vegetation. ODA's statutory authority does not require the removal of invasive, non-native plants, however, ODA recognizes removal as a good conservation activity and encourages landowners to remove these plants. Voluntary programs through SWCDs and watershed councils provide technical assistance and financial incentives for weed control and restoration projects. In addition, the Oregon State Weed Board identifies invasive plants that can negatively impact watersheds. Public and private landowners are responsible for eliminating or intensively controlling noxious weeds as may be provided by state and local law enacted for that purpose. For further information, visit www.oregon.gov/ODA/programs/weeds.

## 1.5 Other Water Quality Programs

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

### 1.5.1 Confined Animal Feeding Operation Program

The Oregon Department of Agriculture is the lead state agency for the CAFO Program. The CAFO Program was developed to ensure that operators do not contaminate ground or surface water with animal manure or process wastewater. Since the early 1980s, CAFOs in Oregon have been registered to a general Water Pollution Control Facility (WPCF) permit designed to protect water quality. A properly maintained CAFO must implement a site-specific suite of structural and management practices to protect ground and surface water. To assure continued protection of ground and surface water, the 2001 Oregon State Legislature directed ODA to convert the CAFO Program from a WPCF permit program to a federal NPDES program. ODA and DEQ jointly issue the NPDES CAFO permit, which complies with all CWA requirements for CAFOs. In 2015, ODA and DEQ jointly issued a WPCF general CAFO permit as an alternative for CAFOs that are not subject to the federal NPDES CAFO permit requirements. Currently, ODA can register CAFOs to either the WPCF or NPDES CAFO permit.

Both of the Oregon CAFO permits require the registrant to operate according to a site-specific, ODA-approved, Animal Waste Management Plan that is incorporated into the CAFO permit by reference. For more information about the CAFO program, go to www.oregon.gov/ODA/programs/NaturalResources/Pages/CAFO.aspx.

### 1.5.2 Groundwater Management Areas

Groundwater Management Areas are designated by DEQ where groundwater has elevated contaminant concentrations resulting, at least in part, from nonpoint sources. After the GWMA is declared, a local groundwater management committee comprised of affected and interested parties is formed. The committee works with and advises the state agencies that are required to develop an action plan that will reduce groundwater contamination in the area.

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

### 1.5.3 The Oregon Plan for Salmon and Watersheds

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

### 1.5.4 Pesticide Management and Stewardship

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

In 2007, the interagency Water Quality Pesticide Management Team (WQPMT) was formed to expand efforts to improve water quality in Oregon related to pesticide use. The WQPMT includes representation from ODA, Oregon Department of Forestry (ODF), DEQ, and Oregon Health Authority (OHA). The

WQPMT facilitates and coordinates activities such as monitoring, analysis and interpretation of data, effective response measures, and management solutions. The WQPMT relies on monitoring data from the Pesticides Stewardship Partnership (PSP) program and other monitoring programs to assess the possible impact of pesticides on Oregon's water quality. Pesticide detections in Oregon's streams can be addressed through multiple programs and partners, including the PSP.

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

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

### 1.5.5 Drinking Water Source Protection

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

## 1.6 Partner Agencies and Organizations

### 1.6.1 Oregon Department of Environmental Quality

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

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

The MOA includes the following commitments:

- ODA will develop and implement a monitoring strategy, as resources allow, in consultation with DEQ.

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

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

### 1.6.2 Other Partners

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

## 1.7 Measuring Progress

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

### 1.7.1 Measurable Objectives

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

The AgWQ Program is working throughout Oregon with SWCDs and LACs toward establishing long-term measurable objectives to achieve desired conditions. ODA, the LAC, and the SWCD will establish measurable objectives and associated milestones for each Area Plan. Many of these measurable objectives relate to land conditions and primarily are implemented through focused work in small geographic areas (section 1.7.3), with a long-term goal of developing measurable objectives and monitoring methods at the Management Area scale.

The State of Oregon continues to improve its ability to use technology to measure current streamside vegetation conditions and compare it to the vegetation needed to meet stream shade targets to keep surface waters cooler. As the State's use of this technology moves forward, ODA will use the information

to help LACs and LMAs set measurable objectives for streamside vegetation. These measurable objectives will be achieved through implementing the Area Plan, with an emphasis on incentive programs.

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

The measurable objectives and associated milestones for the Area Plan are in Chapter 3 and progress toward achieving the measurable objectives and milestones is summarized in Chapter 4.

### 1.7.2 Land Conditions and Water Quality

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

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

- Landowners can see land conditions and have direct control over them.
- Improved land conditions can be documented immediately.
- Reductions in water quality from agricultural activities are primarily due to changes in land conditions and management activities.
- It can be difficult to separate agriculture's influence on water quality from other land uses.
- There is generally a lag time between changes on the landscape and the resulting improvements in water quality.
- Extensive monitoring of water quality would be needed to evaluate progress, which would be cost-prohibitive and could fail to demonstrate improvements in the short term.

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

### 1.7.3 Focused Implementation in Small Geographic Areas

Focus Areas

A Focus Area is a small watershed with water quality concerns associated with agriculture. The Focus Area process is SWCD-led, with ODA oversight. The SWCD delivers systematic, concentrated outreach and technical assistance in the Focus Area. A key component of this approach is measuring conditions before and after implementation to document the progress made with available resources. The Focus Area approach is consistent with other agencies' and organizations' efforts to work proactively in small watersheds and is supported by a large body of scientific research (e.g. Council for Agricultural Science and Technology, 2012. Assessing the Health of Streams in Agricultural Landscapes: The Impacts of Land Management Change on Water Quality. Special Publication No. 31. Ames, Iowa).

Systematic implementation in Focus Areas provides the following advantages:

- Measuring progress is easier in a small watershed than across an entire Management Area.

- Water quality improvement may be faster since small watersheds generally respond more rapidly.
- A proactive approach can address the most significant water quality concerns.
- Partners can coordinate and align technical and financial resources.
- Partners can coordinate and identify appropriate conservation practices and demonstrate their effectiveness.
- A higher density of projects allows neighbors to learn from neighbors.
- A higher density of projects leads to opportunities for increasing the connectivity of projects.
- Limited resources can be used more effectively and efficiently.
- Work in one Focus Area, followed by other Focus Areas; will eventually cover the entire Management Area.

Soil and Water Conservation Districts select a Focus Area in cooperation with ODA and other partners. The scale of the Focus Area matches the SWCD's capacity to deliver concentrated outreach, technical assistance, and to complete projects. The current Focus Area for this Management Area is described in Chapter 3. The SWCD will also continue to provide outreach and technical assistance to the entire Management Area.

Strategic Implementation Areas

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

## 1.8 Monitoring, Evaluation, and Adaptive Management

The Oregon Department of Agriculture, the LAC, and the LMA will assess the effectiveness of the Area Plan and Area Rules by evaluating the status and trends in agricultural land conditions and water quality (Chapter 4). This assessment will include an evaluation of progress toward measurable objectives. ODA will utilize other agencies' and organizations' local monitoring data when available. ODA, DEQ, SWCDs, and LACs will examine these results during the biennial review and will revise the goal(s), measurable objectives, and strategies in Chapter 3 as needed.

### 1.8.1 Agricultural Water Quality Monitoring

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

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

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

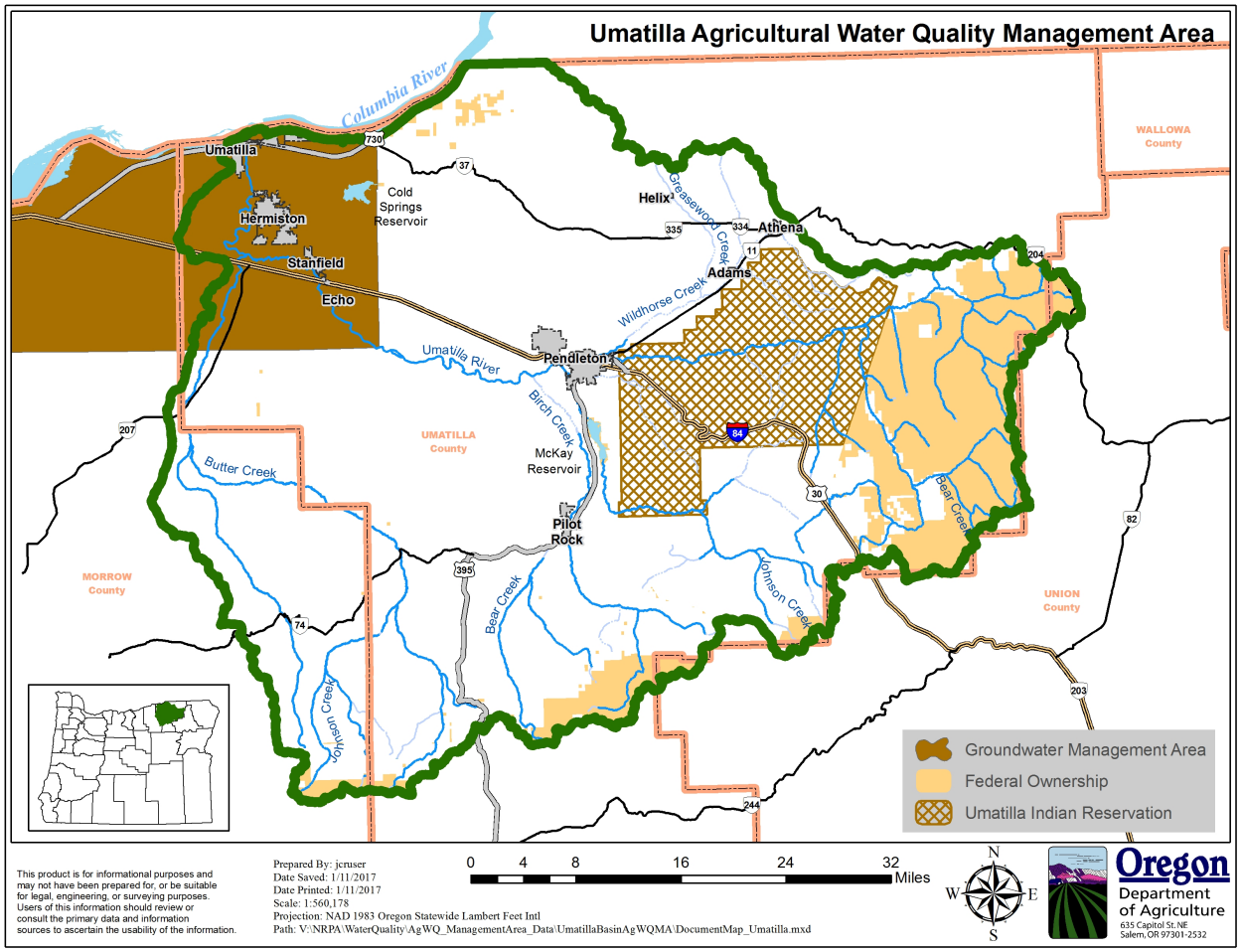
### 1.8.2 Biennial Reviews and Adaptive Management

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

# Chapter 2: Local Background

The Management Area consists of all the drainage area of the Umatilla River, from the headwaters to the confluence with the Columbia River. The operational boundaries of this Area Plan include all agricultural and rural lands in Oregon that contribute to the Umatilla River and its tributaries and that drain directly to the Columbia River between the Umatilla and Walla Walla rivers except federally managed land, lands within the Umatilla Indian Reservation, and activities subject to the Oregon Forest Practices Act (FPA).

**Figure 3: Umatilla Agricultural Water Quality Management Area**




## 2.1 Local Roles and Responsibilities

### 2.1.1 Local Advisory Committee

The Area Plan was developed with the assistance of the LAC. The LAC was formed in 1997 to assist with the development of the Area Plan and Area Rules and with subsequent biennial reviews.

Current LAC members are:

| Name | Location | Description |
|---|---|---|
| Jim Harris, chair | S. Cold Springs | Dryland crops, ODA Weed Board |
| Karl Jensen | Butter Creek | Cattle |
| Bob Lazinka | Pilot Rock | Retired cattleman |
| Jeff Newtson | Juniper | Dryland crops |
| Robin Harris | CTUIR | Water Quality Specialist |
| Gus Wahner | Stanfield | Organic/biological Irrigated Crops, SWCD |
| Dan Mills | Echo/Stanfield | Diversified Irrigated crops, SID |
| Clinton Reeder | Helix | Dryland crops |
| Chris Williams | Athena | Dryland and irrigated crops |
| Vic Thompson | Adams/Athena | Dryland crops |

### 2.1.2 Local Management Agency

The implementation of the Area Plan is accomplished through Intergovernmental Grant Agreements between ODA and the Umatilla County and Morrow County SWCDs. These Intergovernmental Grant Agreements define the SWCDs as the LMAs for implementation of the Area Plan. The SWCDs also helped develop the Area Plan and Area Rules.

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

## 2.2 Area Plan and Rules: Development and History

The director of ODA approved the Area Plan and Area Rules in 1999. Since approval, the LAC met in 2003, 2006, 2008, 2010, 2012, and 2014 to review the Area Plan and Area Rules. The biennial review process includes an assessment of progress toward achieving the goals and objectives in the Area Plan.

## 2.3 Geographical and Physical Setting

The Umatilla River Management Area is a 2,545 square mile area encompassing most of Umatilla County and portions of Morrow County in northeast Oregon. The Umatilla River originates in the Blue Mountains and flows generally westward across the Columbia Plateau approximately 100 miles and discharges into the Columbia River at the town of Umatilla. The basin has a continental climate with a winter precipitation pattern. Precipitation varies from 8-10 inches along the Columbia River to as high as 45 inches in the higher elevations of the Blue Mountains. Peak flows normally occur in the spring with high elevation snowmelt and diminish throughout the summer to their low points in August or September. Below Pendleton, summer flows are augmented with releases from McKay Reservoir for irrigation and fisheries. Elevations range from 270 feet at the Columbia River to above 6,000 feet at the highest peaks of the Blue Mountains. A thick sequence of lava flows, known as the Columbia River Basalt Group, underlies nearly all of the basin. Regional uplifting formed the Blue Mountains along the south and east borders of the basin. The basalt bedrock is covered with younger sedimentary deposits from glacial and river origins. Alluvium is common in the valleys and floodplains. A layer of loess, windblown silt, and fine sand, of various depths, covers the land surface of much of the management area.

### 2.3.1 Land Use, Water Use, Fish Resources

#### 2.3.1.1 Land Use

Agricultural land, both dryland and irrigated, comprises about 42 percent of the basin area, rangeland, and range-forest transition areas account for another 42 percent and the remaining portion of the basin is

approximately 13 percent forest and 3 percent urban and developed areas. Historically, early settlers arrived (1843-1880) to mountains covered with forests and native grasses covering the plateau lands. These early settlers pursued an agrarian lifestyle, primarily raising livestock with limited crop production. Heavy livestock grazing during the last half of the 1800s and early part of the 20th century, along with expanding cultivation, modified much of this native vegetation. Less desirable, drought-tolerant species moved in, converting thousands of acres of perennial native grasses to annual grasses. Intensive tillage began during the 1880s to 1910s, converting large amounts of native grassland to dry cropland.

Mechanization and government policy (WWII horse slaughter) reduced the number of horses and the need for large areas of pasture and hay production by the late 1940s or early 1950s. Irrigation water rights date to the 1860s for flood irrigating in creek valleys. Several US Bureau of Reclamation projects, beginning shortly after the turn of the century, developed arid areas in the lower basin. Since the advent of modern irrigation systems, thousands of acres of land in the lower basin have been developed for crop production.

Nearly 80 percent of the management area, mostly agricultural and rangeland, is in private ownership. The federal government owns about nine percent and the Umatilla Indian Reservation includes about 11 percent of the management area. The present population of Umatilla County is approximately 76,000 with about 60 percent in urban areas. Growth is expected to add 10,000 people in the next 10 years in the lower basin.

Records from 1900 indicate there were 223,000 sheep, 19,500 cattle, and 20,000 horses in the Umatilla Basin. The 1996 Oregon State University Extension Service (OSU Extension) statistics indicate there were 46,000 sheep, 32,000 cattle, and 3,800 horses in the Basin. The acreage used to grow grain has increased from 126,800 in 1890 to 279,160 in 2011. A total of 348,505 acres were used to produce crops in 2011.

Economically, the management area is regarded as one of the state's major agricultural centers. In 2012, Umatilla County ranked second in the state in agricultural commodity sales at $423 million. Wheat and other grains are the major commodities followed by cattle and potatoes. Hay and vegetables are also large contributors with vineyards, canola, and other alternative crops emerging as new commodities. Currently, 10 -15 percent of the cropland has been retired from crop production, enrolled in Conservation Reserve Program (CRP), and seeded to grass, shrubs, and trees. The timber industry has declined dramatically in recent years primarily due to harvest reductions on national forest lands. Food processing, mainly located in the lower basin, has continued to expand.

The first inhabitants of the basin were the Native Americans. The Tribes' homeland once encompassed 6.4 million acres in NE Oregon and SE Washington. As a result of the 1855 Treaty with the United States Government and subsequent federal legislation, the present day reservation of the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) consists of 172,000 acres, which lies mostly within the management area. The ownership of reservation land is: 20,200 acres of Tribal ownership, 68,350 acres in individual allotments, and 83,589 acres owned by non-natives. The CTUIR reserved their sovereign authority and reserved rights to harvest fish, wildlife, and other natural resources in their traditional homeland.

#### 2.3.1.2 Water Use

The average discharge of the Umatilla River at Yoakum (River Mile (RM) 37) is about 495,000 acre-feet (AF) per year. The gaged yield at Umatilla (RM 2) is about 336,000 AF per year. The difference is primarily due to withdrawals for irrigation and other purposes. The Umatilla River was adjudicated in 1916. The court decree defined rights for water use as: irrigation, municipal, domestic, stock, power, and industrial. The irrigation season was defined as March 1 to November 1. Above Pendleton (RM 55),

surface water rights for all purposes total about 17.6 cubic feet per second (cfs). The entire Umatilla River drainage has surface water rights totaling 1,954.8 cfs (out-of-stream uses equals 1,813.5 cfs).

Two major reservoirs store water in the Umatilla River Subbasin: McKay has a design capacity of 73,800 AF and Cold Springs is 38,000 AF. Both reservoirs are primarily for irrigation but provide wildlife, recreational, and flood control benefits as well. Many other sites have been studied for storage but none has been developed due to economic reasons.

Six major irrigation diversions, within the Federal Umatilla Reclamation project, are located in the lower 32 miles of the mainstem Umatilla River. Large quantities of water are diverted and at times dewater entire reaches of the mainstem during summer and fall months. Return flows to the river are an important factor in availability of water in the lower reaches. A cooperative program between the Bureau of Reclamation, irrigators, and the CTUIR provides releases from McKay Reservoir for critical fish passage.

The Umatilla Basin Project, which began construction in the late 1980s, is designed to deliver water from the Columbia River to the Umatilla Basin irrigation systems, permitting Umatilla River water, which was formerly diverted or stored for irrigation use, to remain in the Umatilla River to improve flows for salmon and steelhead production. In addition, the project improved fish passage facilities and provided protective screens to the major irrigation diversions.

Extensive development of the basalt groundwater resource, largely for irrigation, began in the mid 1960s. Estimates of annual groundwater use and annual groundwater recharge to the basalts indicates that the available groundwater supply was being significantly overdrawn. The Oregon Water Resources Department (OWRD) documented declines in many wells and interference between wells. Critical Groundwater Areas have been established in the Ordnance, Butter Creek, and Stage Gulch areas. These orders control the amount of water pumped from wells in those areas and limits the development of new wells.

The appropriation and use of ground water in the Umatilla Basin require a permit issued by OWRD, with the exception of statutorily exempt groundwater uses (see definition in OAR 690- 507-0010(6) e.g. stock watering, domestic wells, and watering lawns not over one-half acre in size). The OWRD "classifies" the type of beneficial uses that may file for a permit in a given Subbasin. For example, the groundwater resources of the Butter Creek, Stage Gulch, and Ordnance Critical Ground Water Areas and the Ella Butte Study Area are closed to issuance of new permits. However, the only classified uses allowed are statutorily exempt groundwater uses. Outside of these closed areas, the classifications allowed are broader. For example, in the Columbia-Umatilla Plateau Subbasin, the classified uses that could file for a permit are: statutorily exempt ground water uses, irrigation, municipal, industrial, power development, low temperature geothermal, mining, fish life, wildlife, recreation, pollution abatement, and artificial groundwater recharge. For cities that have an OWRD approved conservation plan and which have municipal wells in the basalt aquifer, the uses classified are: municipal, group domestic and statutorily exempt groundwater uses only. It's possible other uses may be permitted, on a case-by-case basis subject to certain criteria. To determine what uses are classified in a certain Subbasin; it is advisable to contact the local OWRD office in Pendleton.

#### 2.3.1.3 Fish Resources

The Umatilla River Subbasin supports a variety of anadromous and resident fish; both cold and warm water species. The historical abundance of the Basin's anadromous fish resources, including fall and spring Chinook, Coho and steelhead, has been greatly diminished. The bull trout and summer steelhead are listed as a threatened species under the federal Endangered Species Act (ESA). Recovery efforts have resulted in the restoration of Chinook and Coho salmon runs in the Basin.

The Umatilla River Subbasin is home to four indigenous species of fish that qualify as Sensitive, Threatened or Endangered under either the federal ESA or Oregon's Sensitive Species Rule (OAR 635, Division 100).

**Table 1: Umatilla River Subbasin Indigenous Fish Species**

| SPECIES | ESA STATUS | SENSITIVE SPECIES STATUS |
|---|---|---|
| Bull trout | Threatened | Critical |
| Summer steelhead | Threatened | Vulnerable |
| Redband trout | | Vulnerable |
| Margined sculpin | | Vulnerable |

## 2.4 Agricultural Water Quality

### 2.4.1 Water Quality Issues

#### 2.4.1.1 Beneficial Uses

Beneficial uses in the Management Area include public and private water supply, irrigation, industrial, livestock watering, salmonid fish rearing and spawning, resident fish and aquatic life, wildlife and hunting, boating, fishing, water contact recreation, and aesthetics *(OAR 340-41-642, Table 11*).

While there may not be severe impacts on water quality from a single source or activity, the combined effects from all sources contribute, along with impacts from other land uses and activities, to the impairment of beneficial uses of the Umatilla River water. Beneficial uses that are adversely affected include: public and private domestic water supplies, salmonid fish rearing and spawning, resident fish and aquatic life, water contact recreation, and aesthetic quality.

#### 2.4.1.2 WQ Parameters and 303(d) list

**Temperature**
Water temperature is primarily a summer concern, a season characterized by low flow and high air temperature, for rearing of salmonids including anadromous fish species, resident trout and bull trout. Water temperatures above 70°F can be immediately lethal to salmonids due to a breakdown in their respiration and circulation systems. Temperatures between the mid-60s°F to 70°F are stressful to salmonids and fish survival is reduced as the salmonids are more susceptible to a variety of other agents. The sub-lethal effects associated with higher than optimum temperatures are disease, reduced metabolic energy for feeding, and reduced growth or reproductive behavior due to avoidance of areas with high temperatures.

The temperature standard (*OAR 340-041-0028*) provides numeric and narrative temperature criteria. Maps and tables provided in *OAR 340-041-151* specify where and when the criteria apply. Biologically based numeric criteria, as measured using the seven-day average maximum stream temperature, include:

- 12.0° C (53.6° F) during times and at locations of bull trout spawning and juvenile rearing;
- 13.0° C (55.4° F) during times and at locations of salmon and steelhead spawning;
- 16.0° C (60.8° F) during times and at locations of core cold water habitat identification;
- 18.0° C (64.4° F) during times and at locations of salmon and trout rearing and migration.

Determining whether the stream temperature is above or below the temperature standard is based on the average of the maximum daily water temperatures for the stream's warmest, consecutive seven-day

period during the year. Water temperature measurements must be taken with continuous recording temperature sensors in well-mixed and representative stream locations.

A one-time measurement above the standard is not a violation of the standard. When stream flow is exceptionally low or air temperature is exceptionally high, the temperature criterion is waived (an example is when the flow is less than the expected ten-year low flow or the air temperature is above the 90th percentile of a seven-day average).

Approximately 40 river/stream segments in the Umatilla Basin have been declared "water quality limited" by the Department of Environmental Quality (DEQ) under Section 303 (d) of the CWA. Water quality standards violations occur for temperature, pH, bacteria, nutrients (ammonia and nitrate), turbidity, aquatic weeds/algae, sedimentation, dissolved oxygen, iron, and manganese. Of these, temperature, flow, ammonia, algae, and bacteria are primarily summer concerns. Data collected over the past few years indicate that temperature, sediment, pH, and nutrients are interrelated and together lead to conditions that impair beneficial use of the water. Temperature is the most common listing and one of the easiest to quantify as well as the most difficult to affect. Further monitoring and data evaluation will be done to support effective solutions and track progress and will be the basis for future refinement of this Area Plan.

The U.S. Environmental Protection Agency (EPA) approved TMDLs for the Umatilla Basin in May 2001. The water bodies with TMDLs are assigned to Category 4A (water quality limited, TMDL approved). Category 5 includes streams that are impaired and a TMDL is needed. In the future, when data show that water quality criteria have been met, water bodies will be assigned to Category 2 (attaining water quality standards).

**Sediment**

Sediment includes fine silt and organic particles suspended in the water column, settled particles, and larger gravel and boulders that move at high flows. Sediment movement and deposition is a natural occurrence 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 cause physical damage to fish and other aquatic life, modify behavior, and increase temperature by absorbing incoming sunlight. Sediment comes from erosion on range, forestland and croplands, erosion from streambanks and streambeds, and runoff from roads and developed areas. Nutrients, pesticides, and toxic substances can also be attached to sediment particles.

**pH and Dissolved Oxygen**

Extremes in water pH and low levels of dissolved oxygen can harm fish and other aquatic life. Both conditions can be caused by the availability of nutrients, warm temperatures, and light, all of which stimulate aquatic plant or algae growth. Excessive aquatic plant growth can increase water pH, which may harm fish. The death and subsequent decomposition of aquatic plants can deplete the water of dissolved oxygen resulting in the death of fish and other aquatic animals as well. These conditions are usually aggravated by low stream flow. For waters identified as providing cold-water aquatic life, the dissolved oxygen shall not fall below 8.0 mg/l unless environmental conditions (barometric pressure, altitude, and temperature) preclude attainment *(OAR 340-041-0016)*. The water quality standard for pH (hydrogen ion concentrations) values range from 6.5 to 9.0. *(OAR 340-041-0315)*.

**Bacteria**

Bacteria counts are used to determine the safety for human contact, recreation, and domestic water supplies. High levels of *E. coli* bacteria can cause severe gastric illness and even death. Potential sources of bacteria include animal manure and septic systems. Streams may be listed as violating this criterion during the summer period (the highest use period for water contact recreation), or for the fall-winter-spring period. The DEQ standard sets a maximum level allowable over a 90-day period, as well as a

single sample maximum of 406 *E. coli* organisms per 100 ml. *(OAR 340-041-0009)*.

**Nutrients**
Nutrients can occur naturally in streams and rivers but elevated concentrations are often the result of pollution due to human activities. Phosphorus and nitrates have been nationally identified as the most important nutrients to prevent from reaching surface water bodies.

Excess nutrients can promote the growth of algae, which can reduce beneficial uses of the stream. Biological processes (such as algal production) in surface waters are controlled by the availability of temperature, light, and nutrients. Abundant algae cause wide fluctuations in pH and dissolved oxygen, impacting aquatic life. Nuisance algae and plant growth impair aesthetics and can cause odor problems.

Nitrate is a parameter of concern in the shallow Umatilla Basin groundwater, especially in the lower portions of the management area in an area DEQ designated as the Lower Umatilla Basin Groundwater Management Area (LUB GWMA). Elevated nitrate concentrations present in the sand and gravel (i.e., alluvial aquifer) of the lower Umatilla Basin are due to five activities: irrigated agriculture, land application of food processing water, dairies and feedlots, domestic sewage where septic systems occur in high densities, and the U.S. Army Umatilla Chemical Depot's washout lagoon.

**GWMA Background, Sources of Impairment, Voluntary and Regulatory Measures**
In 1990, the DEQ declared the Lower Umatilla Basin (LUB) a Groundwater Management Area (GWMA) because nitrate-nitrogen concentrations exceeded 7 mg/l in many area groundwater samples. This level is 70 percent of the Oregon maximum measurable level of 10 mg/l (Federal Safe Drinking Water Standard) and is the trigger level for declaring a GWMA. Under the Oregon Groundwater Protection laws (*ORS 468B.180*), DEQ is required to declare a GWMA if area-wide groundwater contamination is present as a result of suspected non-point source activities.

DEQ and other state agencies conducted a four-year hydrogeologic investigation to determine the extent of the contamination and to identify the potential sources of that contamination. The technical investigation identified five area activities contributing to nitrate contamination of the groundwater:

- Irrigated agriculture;
- Land application of food processing water;
- (CAFOs);
- Domestic sewage where septic systems occur in high densities;
- U.S. Army Umatilla Chemical Depot's washout lagoons.

The LUB Groundwater Management Area Committee (GWMAC) is composed of local area residents and governments representing affected and interested parties. The committee is an official body appointed by DEQ under state law to assist the state in developing an action plan to address the groundwater contamination. The Morrow SWCDs is the lead agency in implementing the Action Plan with assistance from OSU Extension. DEQ and ODA have oversight responsibilities.

In 1997, the LUB GWMA Action Plan was approved by DEQ and ODA. ODA, DEQ, and the GWMAC agreed to promote a voluntary approach for addressing the groundwater contamination in the area, which complements the use of water quality permits, where required by law. This voluntary approach recognizes that individuals, businesses, organizations, and governments, given adequate information and encouragement, will take positive actions and adopt or modify practices and activities to reduce nitrate-nitrogen loading to groundwater.

The Action Plan is evaluated every four years. At each evaluation, the GWMAC, DEQ, and ODA determine whether or not the voluntary approach has been effective, and if mandatory requirements are

necessary.

A 2011 report completed by DEQ, ODA, and OSU Extension titled *Estimation of Nitrogen Sources, Nitrogen Applied, And Nitrogen Leached to Groundwater in the Lower Umatilla Basin Groundwater Management Area* concluded the sources of nitrate identified in the LUB GWMA Action Plan contribute significantly different amounts of nitrogen to groundwater, and can be classified into three tiers differing by approximately an order of magnitude:

- Tier One – Irrigated Agriculture (81.6%);
- Tier Two – Pastures (8.1%), food processors (4.6%), and on-site septic systems (3.9%);
- Tier Three - Lawns (0.9%), CAFO waste applied to dry land crops (0.7%), vegetable gardens (0.3%), and the Depot Washout Lagoon (0.09%).

For the purposes of this Area Plan, irrigated agriculture and (CAFOs) are the relevant sources of nitrate. The major sources of nitrate from agricultural activities are fertilizers and mineralization of organic matter. Nitrogen not utilized by plant growth remains in the soil and can be leached to groundwater if sufficient water is available to move it through the soil profile. Manure and wastewater are the nitrate sources at CAFOs that can be leached to groundwater.

Recommended Best Management Practices (BMPs) for irrigated agriculture include both irrigation and nutrient management. Recommended BMPs for CAFOs include: surface water management, wastewater effluent management, solid manure management, and management of feed yard surfaces. More information on BMPs that protect groundwater quality can be found in the Best Management Practices section of this document and in the LUB GWMA Action Plan available through the SWCDs.

#### 2.4.1.3 Sources of Impairment

Nonpoint sources of pollution in the Umatilla River watershed include: eroding agricultural, range and forest lands, eroding streambanks, runoff and erosion from roads and urban areas, runoff from livestock and other agricultural operations, and septic systems. Re-routing of runoff via road building, construction, and land surfacing such as parking areas can lead to excessive erosion or pollutant transport. Pollutants from nonpoint sources are carried to the surface water or groundwater through the action of rainfall, snowmelt, irrigation and urban runoff, and seepage. A major nonpoint source of water quality impairment is heat input, which has increased due to vegetation removal, seasonal flow reduction, changes in channel shape, and alteration to the floodplain. Channelization alters gradient, width/depth ratio, and sinuosity, causing sediment and temperature increases.

Within the past 200 years, many human activities and natural events have contributed to the watershed conditions that still may affect water quality. Historically, the first Europeans to come to this area were trappers in search of beaver pelts. Nearly complete elimination of beaver began a series of events that changed the natural hydrology of area watersheds. Following further settlement into the area, livestock numbers and grazing practices negatively impacted natural vegetation. As reported earlier, over a quarter million domestic animals grazed this area in the late 1800's. Extensive logging and road building has changed the natural water holding capacity of upper watersheds while extensive cultivation has impacted the lower areas. With development of cropland came diversion of water for irrigation. Federal and state agencies, while implementing what was then "best agricultural or watershed health science," encouraged fire suppression, stream channel straightening, wetland drainage, and other practices that have impacted watershed health and water quality. In addition to the human contributions, the cyclical nature of the climate has produced watershed altering droughts and floods.

There exists within the Basin an extensive network of public roads. Outside of urban areas, there are approximately 1,900 miles of county and state managed roadways that equates to nearly 10,000 acres of

impermeable surfaces. These roadways also may form blockages or constrictions to streams and waterways that influence erosion and/or sediment delivery and influence functionality of streams. Roads can serve as a conduit to channel runoff from the road onto adjacent land before entering the waterway.

### 2.4.2 Basin TMDLs and Agricultural Load Allocations

DEQ, the UBWC, and the CTUIR, formed a core partnership to lead the development of a TMDL for the Umatilla Basin. Numerous local, state, and federal natural resource agencies in the Umatilla Basin provided technical and financial assistance in the data collection and evaluation of data used in the TMDL. A citizen stakeholder committee provided balanced and diversified local input into the TMDL development process. TMDLs for the Umatilla Basin were approved by the EPA in May of 2001 and apply to various land uses: agriculture, transportation, urban and forestry.

The TMDL set maximum limits on the amount of pollutants allowed to enter in the Umatilla River Subbasin's waters. This "loading capacity" is calculated to achieve water quality standards.

The "Load Allocation" is the allocated portion of the allowable pollutant assigned to the various land uses in the management area. The DEQ has requested the appropriate DMA in the management area to develop pollution control plans and programs designed to achieve the load allocations. *OARs 340-041 and 340-042* require management plans and set the water quality standards.

**Table 2: Description of Load Allocations**

| Water Quality Limitation | Quantity | Geographic Areas | Season | Responsibility | |
|---|---|---|---|---|---|
| | | | | Land Use | DMA |
| Temperature | • Daily maximum radiant energy<br>• % Effective<br>• Channel width and shade<br>• Channel maximum width/depth | Perennial streams of the Umatilla Basin | July to August annual peak temperatures | • Agriculture<br>• Forest<br>• Urban<br>• Transportation | ODA<br>ODF<br>DEQ, City, County<br>ODOT, Coumty |
| Sediment | • % Upland erosion reductioun | All streams of the Umatilla Basin | Design storm (winter/spring) | • Agriculture<br>• Forest<br>• Urban<br>• Transportaion | ODA<br>ODF<br>DEQ, Cities, County<br>ODOT, County |
| Nitrate | Flow-based daily instream limits in lbs/day of nitrate | Wildhorse Creek watershed | Throughout the year | Agriculture | ODA |
| Bacteria | Number of *E. coli* organisms entering streams per design storm runoff | 8 major watersheds | Design storm McKay Creek (all year)<br>Others (April to October) | Agriculture<br>Urban | ODA<br>DEQ, Cities, County |

The TMDL identifies and describes numeric water quality goals applicable to this Area Plan. Oregon's TMDL process for agriculture involves goal development by DEQ and implementation guided by ODA and local management agencies through the AgWQM process.

The TMDLs and associated geographic areas of importance to agriculture are:

- **Temperature** (all Umatilla Basin perennial streams),
- **Sediment** (all Umatilla Basin perennial and intermittent streams),
- **Bacteria** (Butter Creek, canyons and gulches near Yoakum, Stage Gulch, Birch Creek, McKay

Creek, Tutuilla Creek, Wildhorse Creek and the Umatilla River from Pendleton to mouth),

- **Nitrate** (Wildhorse Creek watershed - Spring Hollow Creek and Sand Hollow Creek).

Elevated summertime stream **temperatures** attributed to agriculture sources in the Umatilla River Basin may result from riparian vegetation disturbances, summertime reduction of flow, and channel widening. This results in increased stream surface area exposed to solar radiation. The goal of the TMDL is to decrease solar heating through increased riparian vegetation that leads to increased shade, narrower and deeper stream channels, more stable streambanks, floodplain recharge, and increased flows. The TMDL goal is expressed as system potential vegetation, with a tree height and density that provides the effective shade needed to decrease solar radiation impact. Numeric load allocations of effective shade, channel and channel width/depth targets from the TMDL, **Attachment 2**, provide more insight on these factors and their effect on stream temperature. Specific management expectations for agricultural landowners for the promotion and protection of riparian vegetation are established in this Area Plan and associated Area Rules. In certain areas, trees or shrubs may not be appropriate due to the increased risk for damaging flooding and sediment transport. Site-specific determinations will be made by the DMA.

The **sediment** TMDL specifies an amount of suspended-pollutant load reduction calculated to achieve turbidity levels that are protective of beneficial uses and are expressed as percent reductions in both upland and streambank erosion. The improvements identified to reduce temperature will generally achieve the desired reduction of streambank erosion along perennial streams. The TMDL also provides erosion reduction goals for uplands and non-perennial streams.

The **bacteria** TMDLs are a maximum amount of bacteria in aggregate watershed runoff. In all cases the target is less than 406 counts *E. coli* per 100 milliliters, at the point at which runoff enters a water body. The TMDL objective is bacteria reduction until this goal is met and maintained.

The **nitrate** TMDL is flow dependent; as flow increases, loading capacity increases. The instream target for the TMDL is 10-mg/l nitrate (as N). The ground water nitrate concentration that triggers a groundwater management area is 7.0 mg/l. The goal is measured at the mouths of Spring Hollow Creek, Sand Hollow Creek, and Wildhorse Creek. (Need to check to see if this is still being monitored) The source of elevated nitrate includes ground water, which in turn is fed by crop fertilization and infiltration. Ground water nitrate has been measured at 16-17 mg/l (nitrate as N) in Athena Springs and a spring near Spring Hollow Creek. The TMDL objective is nitrate reduction until these concentrations are met and maintained.

*See Appendix A - 2012 303(d) Approved Water Quality Limited List*

## 2.5 Voluntary and Regulatory Measures

Voluntary efforts are the focus of the ODA, the Umatilla SWCD and the LAC. However, if a particular landowner refuses to correct a verified adverse condition on his or her property the ODA has regulatory authority to ensure pollution control. At the same time, ODA does not want to mandate or prohibit any specific agricultural activity. To maintain this flexibility, this Area Plan and its associated administrative rules describe Prohibited Conditions.

Readers should note that this Area Plan is only a guidance document; by itself it is not regulatory. However, it does refer to administrative rules that set requirements for landowners. To help distinguish between this Area Plan and its associated rules, all rule language is separated from the rest of the text by solid lines.

This Plan encourages farmers and ranchers to manage their land to control conditions that have been identified as contributing to undesirable water quality using adaptive management techniques.

### 2.5.1 Applicability

All landowners or operators conducting activities on lands in agricultural use must be in compliance with the Area Rules. A landowner is responsible for only those conditions caused by activities conducted on land managed by the landowner or occupier. Conditions resulting from unusual weather events or other circumstances not within the reasonable control of the landowner or operator are considered when making compliance decisions. An example of reasonable control of the landowner means that technically sound and economically feasible measures are available to address conditions described in Prevention and Control Measures. ODA may allow temporary exceptions when a specific integrated pest management plan is in place to deal with certain weed or pest problems. The Area Rules will be applied with consideration of agronomic and economic impacts.

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**Prevention and Control Measures**

**(1) All landowners or operators conducting activities on lands in agricultural use must be in compliance with the following rules. A landowner is responsible for only those conditions caused by activities conducted on land managed by the landowner or operator. Rules will be applied with consideration of agronomic and economic impacts.**

**(a) These rules do not apply to conditions resulting from unusual weather events or other exceptional circumstances.**

**(b) Temporary exceptions to the rules are allowed when a specific integrated pest management plan is in place to deal with certain weed, insect pest, or disease problems.**

**(c) Unless otherwise indicated, the rules below become effective on January 1, 2008.**

### 2.5.2 Waste Management

A landowner or operator's responsibility under this Area Plan is to prevent the introduction of waste materials into nearby bodies of water. There are existing statutes and rules that regulate water quality that remain in effect and are enforced by other designated management agencies.

*See Section 1.4.4 for statute and definitions.*

Wastes include livestock manure from situations like seasonal feeding and birthing areas, gathering pastures and corrals, rangelands and pasture, and any other situations not already covered by Oregon's CAFO laws.

Indicators of noncompliance include:

- Runoff flowing through areas of high livestock usage and carrying wastes into waters of the state,
- Livestock waste accumulated in drainage ditches or areas of flooding,
- Fecal coliform (*E. coli*) counts that exceed State water quality standards.

Livestock grazing is allowed to the extent it does not cause conditions that violate state water quality standards and complies with the Prevention and Control Measures in the Area Rules. Livestock facilities located near streams should employ an adequate runoff control system. Compliance with the riparian objectives will help keep wastes from running into waters of the state.

**OAR 603-095-0340**

**(2) Pollution and Waste Management**
**Effective on rule adoption, no person subject to these rules shall violate any provision of ORS 468B.025 or ORS 468B.050.**

### 2.5.3 Streamside Conditions

A landowner or operator's responsibility under this Area Plan is to implement measures that prevent and control water pollution from agricultural activities. Areas near waterbodies are especially important to water quality and sensitive to management activities.

The streamside area is defined as the area near the stream where management practices can most directly influence the conditions of the water. This area usually ranges from 10 feet to 100 feet from the water, depending on the slope, soil type, stream size, and morphology.

The riparian area, as defined in *OAR 141-110-0020(28),* is a zone of transition from an aquatic to a terrestrial system, dependent upon surface or subsurface water, that reveals through the zone's existing or potential soil-vegetation complex the influence of such surface or subsurface water. A riparian area may be located adjacent to a lake, reservoir, estuary, pothole, spring, bog, wet meadow, muskeg, slough, or ephemeral, intermittent or perennial stream.

Water is the distinguishing characteristic of riparian areas but soil, vegetation, and landform also exert strong influence on these systems. In a healthy riparian ecosystem, these four components interact to produce a wide variety of conditions.

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

- Dissipation of stream energy associated with high flows and thus influencing the transport of sediment,
- Capture of suspended sediment and bedload that builds streambanks and develops floodplain function,
- Retention of floodwater and recharging ground water,
- Stabilization of streambanks through plant root mass,
- Development of diverse channel characteristics providing pool depth, cover, and variations in water velocity necessary for fish production,
- Support of biodiversity,
- Shade for moderation of solar heat input,
- Recruitment of large woody debris for aquatic habitat.

Indicators to determine improvement of this condition include:

- Ongoing, natural recruitment of desirable riparian or upland plant species,
- Management activities maintain at least 50% of each year's growth of woody vegetation - both trees and shrubs,
- Management activities minimize the degradation of established native vegetation,
- Maintenance of established beneficial vegetation,
- Maintenance or recruitment of woody vegetation - both trees and shrubs,
- Streambank integrity capable of withstanding 25-year flood events.

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

- Expansion of riparian area as evidenced by development of riparian vegetation and plant vigor,

- Reduction in actively eroding streambank length beyond that expected of a dynamic stream system,
- Community composition changes reflecting an upward trend in riparian condition (increases in grass-sedge-rush, shrubs, and litter and decreases in bare ground),
- Plant community composition reflecting an upward trend as indicated by decreases in noxious plant species,
- Stream channel characteristics show upward trend consistent with landscape position (i.e. a decrease of width-to-depth ratio of the channel),
- Shade patterns consistent with site capability,
- Stubble height of herbaceous species and leader growth of shrubs and trees.

**OAR 603-095-0340**

**(4) Stream-side Area Management**
**(a) Agricultural land management activity must not cause streambank instability.**
**(b) Agricultural land management near streams must include establishment and maintenance of riparian vegetation, vegetative buffers, filter strips, sediment retention structures, or equally effective water pollution control practices, placed so as to prevent sediment, thermal and other pollution of waters of the state.**
**(c) When establishment or reestablishment of crops occurs near waters of the state during the growing season (March through October), cropping and management systems must be employed that prevent erosion. An adequate vegetative buffer or equally effective erosion control practice must be provided during the winter months (November through March).**

### 2.5.4 Soil Erosion and Sediment Control

A landowner or operator's responsibility under this Area Plan is to implement measures that prevent and control water pollution from upland agricultural activities and soil erosion. This includes agricultural, rural lands and road management that may not be in close proximity to waterbodies but have the potential to contribute to water quality degradation by runoff of sediment and wastes.

Upland areas are the rangelands, forests, and croplands upslope from the riparian areas. These areas extend to the ridge tops of watersheds. With a protective cover of crops and crop residue, grass (herbs), shrubs or trees, consistent with site capability, these areas will capture, store, and safely release precipitation thereby reducing the potential of excessive soil erosion or delivery of soil or pollutants to the receiving stream or other body of water. Vegetation is dependent on physical characteristics including soil, geology, landform, water, and other climate factors. Proper management of upland vegetation considers physical and biological conditions, controls soil erosion, and minimizes transport of soil and nutrients to the stream. Upland management also considers livestock production while, at the same time, should consider forest health and protection of fish and wildlife habitat. Healthy uplands maintain productivity over time and are resilient to stresses caused by variations in physical conditions such as climatic changes.

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

- Capture, storage, and safe release of precipitation,
- Provide for plant health and diversity that support habitat (cover and forage) for wildlife and livestock,
- Filtration of sediment,
- Filtration of polluted runoff,
- Provide for plant growth that increases root mass that utilizes nutrients and stabilizes soil against erosion. Indicators of these conditions include:

- Recruitment of beneficial plant species,
- Groundcover to limit runoff of nutrients and sediment,
- Cropland cover that is sufficient to limit movement of nutrients and sediment,
- Roads and related structures designed, constructed, and maintained to limit sediment delivery to streams.

Factors to evaluate upland area condition may include:

- Vegetation utilization through stubble height measurements,
- Plant species composition to measure plant health and diversity,
- Groundcover (live plants, standing plant litter, and ground litter) as a measure of potential erosion,
- Evidence of overland flow (pattern and quantity),
- Site productivity (domestic livestock and wildlife carrying capacity),
- Soil erosion potential through prediction models available through NRCS.

Noxious weeds present a challenge to establishing upland and streamside vegetation. These weeds can harm water quality in many ways. Some examples are:

- Reduced ground cover resulting in increased erosion,
- Reduced infiltration of precipitation into the soil,
- Crowding out of vegetation appropriate to each site.

Public roads and rights of way should be managed to reduce the impact of runoff onto agriculture lands and into waterways. This includes practices, similar to agricultural practices, such as: grass seeding of rights of way, rock placement in borrow ditches, sediment basins, proper culvert placement, sizing, management, and weed control. Similarly, agricultural lands must be managed to reduce the impacts of runoff onto public rights of way.

While the Revised Universal Soil Loss Equation (RUSLE2) is used as a means of assessing likely reductions in in-field soil erosion, because it has not been validated as a siltation prediction tool; it should not be used as a standard means of predicting siltation problems in adjoining waterways. It is presumed that if a landowner adopts practices that prevent and control soil erosion that a significant reduction in stream sedimentation from agricultural activities will result. A landowner may develop and adopt alternative means of reducing stream sedimentation, but the burden of demonstrating effectiveness of the alternative system rests on the landowner.

**OAR 603-095-0340**

**(3) Soil Erosion and Sediment Control**
**Landowners must control upland soil erosion using technically sound and economically feasible methods.**
**(a) Landowners must control active channel (gully) erosion to protect against sediment delivery to streams.**
**(b) On croplands, a landowner may demonstrate intent to comply with this rule by:**
**(A) Operating consistent with a Soil and Water Conservation District (SWCD)-approved conservation plan that meets Resource Management Systems (RMS) quality criteria for soil and water resources; or**
**(B) Operating in accordance with an SWCD-approved plan for Highly Erodible Lands (HEL) developed for the purpose of complying with the current US Department of Agriculture (USDA) farm program legislation and farming non-HEL cropland in a manner that meets the requirements of an approved USDA HEL compliance plan for similar cropland soils in the county; or**
**(C) Farming such that the predicted sheet and rill erosion rate does not exceed 5 tons/acre/year, as estimated by the Revised Universal Soil Loss Equation (RUSLE); or**
**(D) Constructing and maintaining terraces, sediment basins, or other structures sufficient to keep eroding soil out of streams.**
**(c) On rangelands, a landowner may demonstrate intent to comply with this rule by:**
**(A) Operating consistent with a Soil and Water Conservation District (SWCD)-approved conservation plan that meets Resource Management Systems (RMS) quality criteria for soil and water resources;**
**(B) Maintaining sufficient live vegetation cover and plant litter to capture precipitation, slow the movement of water, increase infiltration, and reduce excessive movement of soil off the site; or**
**(C) Minimizing visible signs of erosion, such as pedestal or rill formation and areas of sediment accumulation.**
**(D) Private roads that traverse rural lands or roads used for agricultural activities must be constructed and maintained such that road surfaces, fill and associated structures are designed and maintained to limit contributing sediment to waters of the state. All roads on agricultural lands not subject to the Oregon Forest Practices Act (OFPA) are subject to this regulation. Homesteads and other non-crop areas must be laid out and managed in a manner that controls soil erosion and prevents delivery of sediments to the stream. Stream crossings, with or without culverts or bridges, must be kept to a minimum, and must be installed and maintained to prevent sediment delivery to the stream. Agricultural lands must be managed to prevent runoff of sediment to public road drainage systems.**

### 2.5.5 Livestock and Waste Management

A landowner or operator's responsibility under this Area Plan is to implement measures that prevent and control water pollution from livestock operations. Careful management of areas used for grazing, feeding, and handling is critical to the success of livestock operations and have potential to affect water quality.

Livestock management (including handling facilities, pastures, rangeland, and confinement areas) should be done in a manner that limits soil erosion and minimizes the delivery of sediment and animal wastes to nearby streams or delivery of nutrients and bacteria to groundwater. A grazing management system should promote and maintain adequate vegetative cover, for protection of water quality, by consideration of intensity, frequency, duration and season of grazing.

Grazing near streams should be managed to prevent negative impacts to streambank stability, allow for recovery of plants, and leave adequate vegetative cover to ensure protection of riparian functions

including shade and habitat. Off-stream watering systems, upland water developments, feed, salt and mineral placement are examples of methods to be considered as ways to reduce impacts of livestock to streamside areas. Establishment and spread of noxious weeds should be prevented by appropriate weed control practices and grazing management.

Factors used to evaluate effectiveness of management may include:

- Safe diversion of runoff,
- Protection of clean water sources,
- Off stream watering systems,
- Lot maintenance; smoothing, mounding, seeding,
- Structural measures i.e.; filter strips, catch basins, berms,
- Waste collection, storage and application methods,
- Plant community is neither dominated by invasive annual plant species nor by overgrowth of native woody species,
- Plant cover (plants plus plant litter) is adequate to protect site,
- Distribution and amount of bare ground does not exceed what is expected for site,
- Livestock utilization patterns do not exhibit excessive sustained use in key areas,
- Plant vigor levels and regeneration are sufficient to protect long-term site integrity.

**OAR 603-095-0340**

**(5) Livestock Management**

**(a) Pastures and rangeland must be managed to prevent sediment, nutrient and bacterial contributions to waters of the state. Adequate vegetative buffers or filter strips must be installed and maintained, and vegetative cover must be maintained or restored after use as needed to control contaminated runoff or weed infestations. Where appropriate, waste management systems must be installed to collect, store and utilize animal wastes.**

**(b) Barnyards, feedlots, dry lots, confinement and non-pasture areas, and other livestock facilities located near waters of the state must employ an adequate runoff control system, or an equally effective pollution control practice. Where necessary to prevent waste delivery, waste management systems must be installed to collect, store and utilize animal wastes.**

**(c) Grazing must be done in a manner that does not degrade waters of the state or negatively impact the stability of streambanks. Grazing management systems must allow for recovery of plants and leaves adequate vegetative cover to ensure streambank stability, reduce sediments entering the stream, and provide stream-side shading consistent with site capability. The grazing management system must maintain or develop the desired vegetative cover.**

### 2.5.6 Irrigation Management

A landowner or operator's responsibility under this Area Plan is to implement measures that prevent and control water pollution from irrigation. Diversion of water for irrigation or other uses and the return of that water to the stream are activities that have potential for contributing to water quality problems.

Irrigated lands are lands either riparian, floodplain, or upland upon which water is applied for the purpose of growing crops. Diversion of water from a water body to be applied on land for the purpose of growing crops is a recognized beneficial use of water. Irrigation water use is regulated by the OWRD in the form of water rights, which specify the rate, duty, and season that water can be applied to a particular parcel of land. Refer to OWRD Rules *(OAR 690 and ORS 536 through 543)* for more details.

Irrigation in this basin is done by flooding, drip, or sprinkler application. Water usually is diverted from surface sources (stream or pond) and from groundwater sources. Water withdrawals have an effect on

stream flows and thus, indirectly affect water quality. Over-irrigation can leach agricultural chemicals (including nitrate) to groundwater, directly affecting water quality. Irrigation management in this basin recognizes there may be some positive benefits, in addition to crop growth, occurring from irrigation application - including flow augmentation as water returns back to the stream, cooling and filtering of water through underground percolation and the recharge of shallow wells and springs due to the connectivity of surface water to groundwater sources. Irrigation water may be used more than once as it returns to the stream and is available for instream uses or by other irrigators. Ultimately, stream flows will be enhanced by upland and riparian management practices promoting natural upstream storage and properly functioning floodplains that catch, store, and safely release precipitation for beneficial uses during summer months.

Subject to legal water rights, water withdrawals (dependent on surface water characteristics and method of diversion) should be made in a manner to minimize the adverse impacts on stream flows. The efficacy of irrigation water application is generally enhanced by assuring the quantity and timing of application based on the needs of the crop, as determined by soil moisture levels, crop water use budgets or other monitoring tools.

Characteristics of an irrigation system that has minimal effect on water quality include:

- Delivery of water efficiently to the land within legal water rights,
- Minimal overland return flows,
- Return flow routing that provides for settling, filtering, and infiltration,
- Minimal effect on stability of streambanks and minimal soil erosion,
- Scheduling of water application appropriate to the site including consideration of soil conditions, crop needs, climate, and topography,
- Installation and management of diversion structures that control erosion and sediment delivery and protect the stability of streambanks,
- Diversions that are adequately screened and which provide for fish passage. (Refer to *ORS 498.268* for screening requirements),
- Sediment is captured from irrigation runoff before it enters rivers and streams.

**OAR 603-095-0340**

**(6) Irrigation Management**
**(a) Irrigation systems must be designed and operated to prevent runoff of potential contaminants. Irrigation scheduling must consider such factors as soil conditions, crop, climate and topography.**
**(b) Overland return flows from irrigation must be managed to prevent the delivery of pollution including water temperature increases to waters of the state.**

### 2.5.7 Nutrient and Farm Chemical Management

Crop nutrient applications, including manure, sludge, commercial fertilizer, and other added nutrient inputs, should always be done at a time and in a manner that reduces the possibility of runoff into any nearby stream or waterway as well as leaching to groundwater. Fertilizers should be applied in accordance with nutrient budgets developed for each crop by the use of current yield estimates, water analysis, soil tests, tissue tests and/or other appropriate tests and information. Sources of information are found in the NRCS Field Office Technical Guide (FOTG) and OSU Extension informational fact sheets for most commercial crops.

Surface applied nutrients should not be applied to frozen soil, on snow, or when significant rainfall (more than one-inch) is predicted as imminent, (greater than a 67 percent probability within 24-hours of application) by the National Weather Service. Extra care shall be used when utilizing surface (rill or

flood) irrigation to minimize nutrient contamination of tail water. In no case, should chemigated or fertigated irrigation waters be applied in a manner such that a direct hydraulic connection occurs with waters of the state.

Concentrated Potential Contaminants (CPCs) are substances managed on a property that may or may not be toxic or dangerous but need special consideration when storage locations are chosen. Typical farm and ranch CPCs include, but are not limited to: manure; compost; fuel, lubricants and other motor vehicle chemicals; insecticides, herbicides, and other farm chemicals; fertilizer; used truck and tractor batteries; solvents; garbage; and cleaning products. Fertilizers, pesticides, and other chemicals that have been applied to the land are not considered concentrated after application.

Safe storage of all CPCs is encouraged, including consideration of major factors, which might make any site potentially threatening to surface and/or groundwater. Management practices for spill prevention and control must be implemented.

Pesticides must be used in accordance with label requirements. Pesticide handling and application practices should be adopted that limit off-target pesticide transport and maximize the amount of applied pesticide material retained on the property.

The ODA-Pesticides Division holds the primary responsibility for pesticide registration and use regulation within the state of Oregon under the Federal Insecticide Fungicide Rodenticide Act. As the US EPA designated the state as the lead agency for pesticides, ODA is responsible for overseeing the development and implementation of a Pesticide Management Plan (PMP) for the state of Oregon as stipulated in the annual EPA/ODA Consolidated Pesticide Cooperative Agreement. The PMP sets forth a process for preventing and responding to pesticide detections in Oregon's ground and surface water resources by managing the pesticides that are currently approved for use by US EPA in both the agricultural and non-agricultural settings. Pesticides that are no longer marketed, also called "legacy" pesticides, are regulated through a separate process under the Clean Water Act. The PMP 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.

**OAR 603-095-0340**

**(7) Nutrient and Farm Chemical Management**
**(a) Crop nutrient applications, including manure, sludge and commercial fertilizers, must be done at a time and in a manner that does not pollute waters of the state.**
**(b) Nutrients and farm chemicals must be stored in a location and condition that makes them unlikely to be carried into the waters of the state by any means.**

### 2.5.8 Channel and Drain Management

Ditches and water channels should be designed and maintained with a capacity to handle above normal flows with a minimum likelihood of bank erosion and negative erosion impacts on nearby land areas. Water storage, transfer, and recirculation facilities must be constructed and maintained so that the infiltration of agricultural chemicals and nutrients to groundwater is reasonably controlled.

Instream activities other than routine maintenance of diversion or other agricultural structures are regulated and permitted by the Division of State Lands.

**OAR 603-095-0340**

**(8) Channel and Drain Management Whenever major construction, reconstruction or maintenance occurs in ditches and water channels, exclusive of perennial and intermittent streams, they must be designed and maintained with a capacity to handle a greater than normal runoff event with a minimum likelihood of bank erosion or erosion impacts on nearby land areas**

# Chapter 3: Strategic Initiatives

**Goal**

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

**LAC Mission**

Seek to achieve water quality standards appropriate to the Umatilla Management Area through development and implementation of the Area Plan.

## 3.1 Measurable Objectives

To achieve the Area Plan mission and goal, the following long-term water quality related objectives are established:

- Prevent runoff of agricultural wastes,
- Control soil erosion on uplands to acceptable rates,
- Provide adequate riparian vegetation for stream bank stability and stream shading consistent with site capability.

Measurable objectives allow the Ag Water Quality Program to better evaluate progress toward meeting water quality standards and TMDL load allocations.

### 3.1.1 Milestones and Timelines

To achieve the long-term objectives, the following milestones and timelines guide the evaluation of the effectiveness of the strategies outlined in Section 3.4:

- **Prevent runoff of agricultural wastes**

By 2020, the SWCD through Scope of Work Funds, will identify livestock operations along streams for likelihood of pollution from bacteria and sediment. The method consists of: looking for likely sources (manure piles and heavy use areas) during the riparian vegetation survey (see below) and follow up with landowners to do a site visit and provide technical assistance if needed.

These results will help the LAC develop long-term targets at the 2020 Biennial Review. Likely targets include:

  - By June 30, 2028, the number of livestock operations that are likely to pollute surface water is reduced by 10%;
  - By June 30, 2038, fewer than 5% of livestock operations are likely to pollute surface water.

- **Control soil erosion on uplands to acceptable rates**

By 2020, the SWCD through Scope of Work Funds, will evaluate the uplands for erosion potential. The method consists of RUSLE2 evaluation, which is based on average slopes for conventional and direct seed management practices and typical crop rotations. Soil loss will be estimated for 2018 and previous years.

These results will help the LAC develop long-term targets at the 2020 Biennial Review. Likely targets include:

- By June 30, 2028, estimated soil erosion rates on cropland will be reduced by 10% from 2018 levels;
- By June 30, 2038, estimated soil erosion rates on all cropland will be reduced by 30% from 2018 levels.

- **Provide adequate riparian vegetation for stream bank stability and stream shading consistent with site capability**

By 2020, the SWCD through Scope of Work Funds, will evaluate perennial stream reaches for vegetative water quality function (shading, bank stability, and filtration of potential pollutants in overland flows). The method consists of a combination of aerial photo evaluation and local knowledge to determine how similar the ground cover and canopy cover/shade are compared to what could be provided by site capable vegetation.

These results will help the LAC develop long-term targets at the 2020 Biennial Review. Likely targets include:

- By June 30, 2028, 70% of perennial streams in agricultural areas will have streamside vegetation that likely provides the full suite of water quality functions the site is capable of (i.e., shade, bank stability, filtration of overland flow);
- By June 30, 2038, 90% of perennial streams in agricultural areas will have streamside vegetation that likely provides the full suite of water quality functions the site is capable of (i.e., shade, bank stability, filtration of overland flow).

### 3.1.2 Focus Area

The Umatilla SWCD Focus Area is the Spring Hollow watershed consisting of approximately 11,584 acres. Land use in the watershed is 99 percent agriculture and 1 percent residential. The main agricultural uses include wheat/pea/hay production. There is approximately 18 miles of perennial streams. Natural stream flows support this watershed. The Focus Area encompasses all of the Spring Hollow Creek 6th field HUC (170701030302). This HUC is directly south of the Gerking Creek Focus Area that was the Umatilla County SWCD Focus Area for the 2013-2015 period. This Focus Area is directly connected to the Wildhorse Creek a tributary to the Umatilla River. There is coordination with the CTUIR Range, Agriculture, and Forestry program for acres that fall within the CTUIR boundaries dealing with water quality issues.

The SWCD worked with ODA and the LAC to select this Focus Area and based on: agricultural use in the watershed, concerns about sedimentation in the stream, condition of streamside vegetation, high nitrates in the watershed, and existing contacts and relationships.

The LMA used ODAs Streamside Vegetation Assessment (SVA) to characterize the type of ground cover within 35 feet of the stream. The metric used is the percent of the different types of land cover (agricultural infrastructure, bare ground, bare due to agricultural activities, grass, agricultural grass, shrubs, trees, and water) viewed on aerial photographs.

#### 3.1.2.1 Focus Area Outcomes

The current Focus Area is still Spring Hollow. It was closed in the Fall of 2018 and the SWCD is currently evaluating the results to determine the changes from the 2016 measurements. Updated changes will be finalized in Summer of 2019.

The LAC discussed a new Focus Area and proposed the Cold Springs area north of Pendleton.

**Current Conditions (From Pre-Assessment)**

- In 2015: Bare-Ag=1.22 Acres or 0.84% will be reduced 50%.

**Focus Area Milestone for 2015-2019**

By June 30, 2019, eliminate Bare-Ag (less than 0.3%).

### 3.1.3 GWMA

The LUB Groundwater Management Area Committee (GWMAC) is composed of local area residents and governments representing affected and interested parties. The committee is an official body appointed by DEQ under state law to assist the state in developing an action plan to address the groundwater contamination. The Morrow SWCD is the lead agency in implementing the Action Plan with assistance from OSU Extension. DEQ, and ODA have oversight responsibilities.

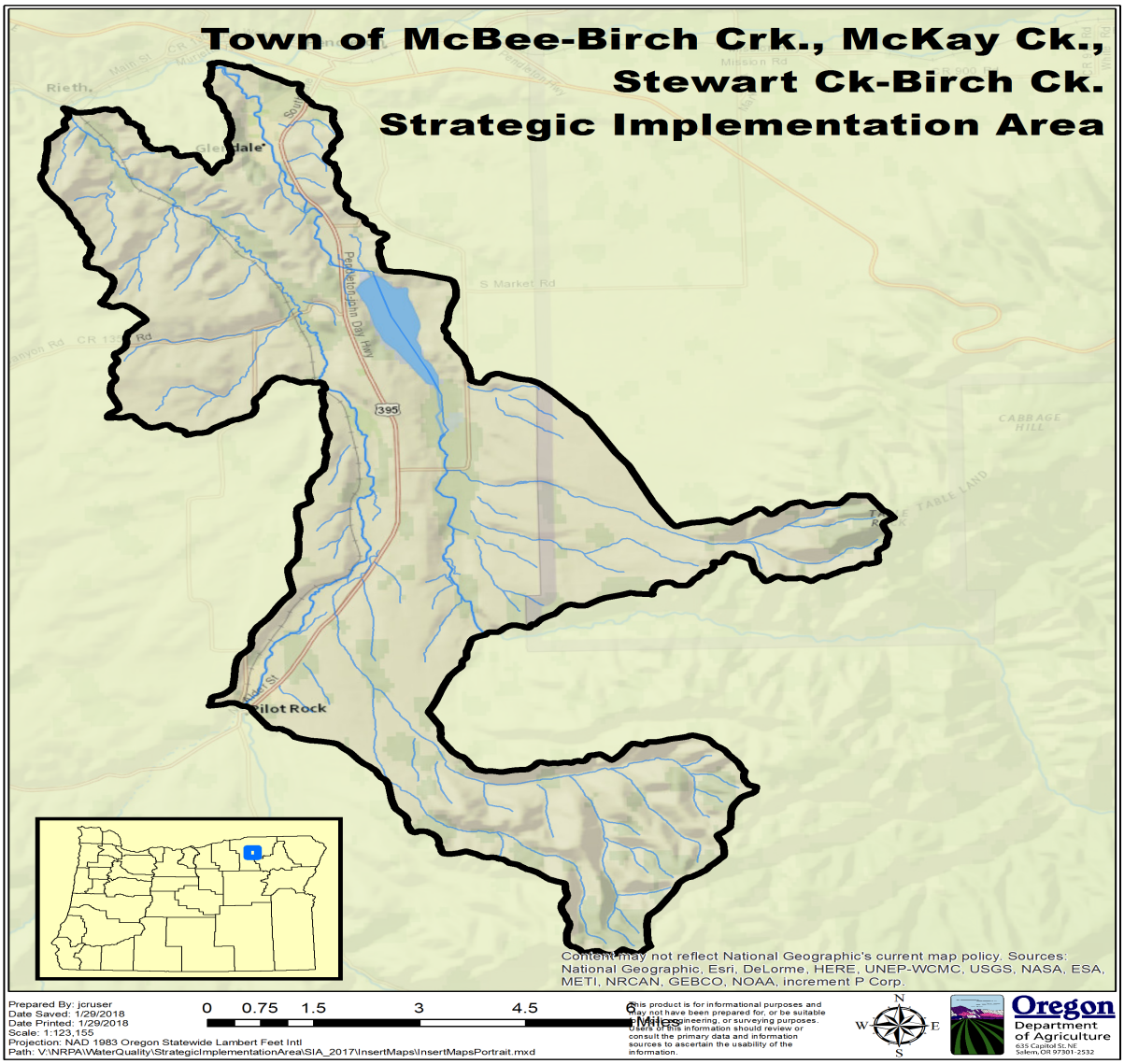
The Action Plan is evaluated every four years. At each evaluation, the GWMAC, DEQ, and ODA determine whether or not the voluntary approach has been effective and if mandatory requirements are necessary.

The current Action Plan: Second Lower Umatilla Basin Groundwater Management Area Local Action Plan is in the final review and will be put into effect starting in 2019.

### 3.1.4 Strategic Implementation Area

The Umatilla SIA includes the Lower Birch, McKay, and Steward creeks. All of these streams drain into the Umatilla River located in Umatilla County. These streams have a common problem, which is poor water quality; temperature, sediment, and pollutants are the major concerns present within each of the streams.

**Figure 4: Strategic Implementation Area**




## 3.2 Strategies and Activities

ODA and the SWCD intend to encourage participation in this water quality improvement program by:

- Providing **educational programs** to raise public awareness and understanding of water quality issues and solutions;
- Offering **technical and financial assistance** for the development and implementation of Voluntary Water Quality Farm Plans (VWQFPs) and BMPs for pollution control;
- Identifying and focusing outreach and technical assistance work in a small geographic area to help demonstrate the implementation of the Area Plan;
- Developing a **monitoring and evaluation** program to identify current and potential water quality problems;
- Biennially review and assessing the progress of implementation toward achievement of Area Plan goals and objectives;
- Following up on any **water quality complaints** and providing assistance in solving identified

problems.

### 3.2.1 Education and Outreach

As resources allow, the SWCD, DEQ, UBWC, NRCS, CTUIR, and OSU Extension, in partnership with other agencies and local organizations, will develop educational programs to improve the awareness and understanding of water quality and quantity issues. The objective of the educational programs is to promote the programs in a manner that reduces conflict and encourages cooperative efforts through education and technical assistance activities by:

- Incorporating implementation of the Area Plan as a priority element in the SWCD's Annual Work Plan and Long-Range Plan with support from partner organizations;
- Showcase successful practices and systems and conduct annual tours for landowners and media;
- Recognize successful projects and practices through appropriate media and newsletters;
- Promote cooperative on-the-ground projects to solve critical problems identified by landowners and in cooperation with partner organizations;
- Conduct educational outreach to promote public awareness of water quality issues;
- Collaborate and coordinate the review of information and education materials with agencies or organizations as appropriate.

### 3.2.2 Technical and Financial Assistance

As resources allow in the Management Area, the SWCD and NRCS staff are available to assist landowners in evaluating effective practices for reducing runoff and soil erosion on their farms and incorporating these practices into VWQFPs. Personnel in these offices can also design and assist with implementation of practices and assist in identifying any sources of cost-sharing funds for the construction and/or use of some of these practices. Technical and cost-sharing assistance for installation of certain management practices may be available through current USDA conservation programs such as Environmental Quality Incentives Program (EQIP) and Continuous Conservation Reserve Program (CCRP), EPA's nonpoint source implementation grants, or state programs such as the Oregon Watershed Enhancement Board (OWEB) and Conservation Reserve Enhancement Program (CREP).

Technical and cost-sharing assistance will assist landowners to improve the quality of water through planning and implementation of scientifically-based conservation practices. Emphasis will be to:

- Promote upland and streamside management practices to limit soil erosion and pollution caused by agricultural activities as close to the source as possible, through compliance with the soil erosion and sediment control prevention and control measures.
- Promote reduction in nitrate, ammonia, phosphorus, bacteria, and thermal contributions from agricultural and rural lands through compliance with the livestock management and nutrient and farm chemical management prevention and control measures.
- Promote streambank stabilization and the restoration and enhancement of wetlands and riparian habitat through implementation of appropriate management practices.
- Seek solutions to protect the area's groundwater as outlined in the Lower Umatilla Basin (LUB) Groundwater Management Area (GWMA) Action Plan. Recommended solutions should, within a reasonable time, bring the level of nitrate in the groundwater back below the 7-mg/l levels triggering the GWMA declaration.
- Seek solutions to protect the area's surface waters as outlined in the Umatilla Basin TMDL. Target goals have been established for temperature, sediment, nitrates, and bacteria.

#### 3.2.2.1 Voluntary Water Quality Farm Plans

Landowners are encouraged to develop and implement VWQFPs. These plans may be developed by landowners or operators, consultants, or technicians available through the SWCD, NRCS, or OSU Extension. Plans will outline specific measures to be implemented to limit soil erosion and pollution of

the waters of the state from activities on lands in agricultural use. The VWQFP is a comprehensive management plan that addresses site-specific problems through the selection of individual management systems or management practices to be implemented for the protection of natural resources.

Available Sources for Farm Planning Technical Assistance:

- NRCS - planning, design, implementation,
- SWCD - planning, design, implementation, grant writing,
- CTUIR invasive plants,
- Workbooks and publications.

#### 3.2.2.2 Best Management Practices

Agricultural Best Management Practices (BMPs) for 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. BMPs are actions taken by individual agricultural operations for the achievement of production and water quality goals.

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 BMPs to improve water quality relative to agricultural practices.

A detailed listing of a number of specific practices and management measures that can be used to control or reduce the risk of agricultural pollution are contained in other documents such as the FOTG available for reference at the local the NRCS office. While not exhaustive or all-inclusive, the following is a list of practices from the FOTG, which may typically be used in the Management Area for effective prevention and control of water pollution from agricultural activities.

**For soil erosion and sediment control**:

- Conservation tillage (crop residue management) - reduced tillage, minimum tillage, direct seeding, modified conventional tillage, reservoir tillage, sub-soiling or deep chiseling;
- Cover crops – perennial or annual;
- Contour farming practices -strip cropping, divided slopes, terraces (level and gradient), contour tillage;
- Crop rotations;
- Early or double seeding in critical areas;
- Vegetative buffer strips - filter strips, grassed waterways, field borders, contour buffer strips;
- Irrigation scheduling;
- Prescribed burning;
- Weed control;
- Grazing management plans;
- Range plantings;
- Livestock distribution practices;
- Road design and maintenance;
- Sediment retention basins and runoff control structures;
- Reforestation and tree thinning;
- Streambank protection.

**For prevention and control of impacts to streamside areas**:

- Critical Area Plantings,

- Vegetative buffer strips - CCRP, CREP, riparian buffers, riparian forest buffers,
- Livestock Management -Fencing - exclusion, temporary; seasonal grazing; water developments - off stream watering, water gaps, spring development,
- Conservation tillage practices,
- Weed control,
- Nutrient and chemical application scheduling,
- Road, culvert, bridge, and crossings maintenance,
- Wildlife management.

**For prevention and control of impacts from livestock**:

- Grazing management or scheduling based on intensity, duration, frequency, season of use; pasture rotations including resting and deferral; riparian pastures;
- Vegetation management - grass seeding, weed control, controlled burning;
- Fencing – including temporary, cross, exclosures;
- Watering facilities -spring development, off-stream water, water gaps;
- Livestock distribution - salt, mineral and feed placement;
- Waste management systems - clean water diversions; waste collection, storage, and utilization; facilities operation and maintenance;
- Safe diversion of runoff;
- Protection of clean water sources
- Lot maintenance - smoothing, mounding, seeding, filter strips, catch basins, berms.

**For prevention and control of impacts from irrigation**:

- Irrigation scheduling based on - crop needs, soil type, climate, topography, infiltration rates,
- Irrigation system efficiency and uniformity monitoring,
- Diversion maintenance - push-up dam management, head gates, screens,
- Return flow management,
- Flow measuring devices,
- Backflow devices,
- Cover crops.

**For nutrient and farm chemical application**:

- Nutrient budgeting based on soil testing, tissue testing, plant needs, water testing,
- Application methods,
- Application timing,
- Tail water management,
- Hydraulic connectivity,
- Label requirements,
- Irrigation scheduling,
- Integrated Pest Management.

**For channel and drain management**:

- Vegetation management -burning, chemical, clipping,
- Streambank stabilization -structural, bioengineered,
- Critical area planting,
- Channel management,
- Obstruction removal,
- Wetland development,

- Outfall protection,
- Off-stream or headwater storage.

**For groundwater protection**:

- Irrigation management - irrigation scheduling based on soil characteristics and crop needs; convert to more efficient systems; equipment maintenance;
- Nutrient management – nutrient scheduling based on weather conditions soil testing, tissue testing, water testing, and plant crop uptake requirement; practices that minimize leaching nutrients to groundwater also include deep soil testing, precision farming, managing inputs for lower value crops, and scheduling deep rooting crops in rotation;
- Grazing management – pasture maintenance, renovation, and rotation;
- Surface water management – divert clean surface water and runoff away from corrals and animal confinement areas;
- Wastewater effluent management – design, construction, and maintenance of lagoons or holding ponds; application at agronomic rates;
- Solid manure management – proper storage; manure analysis;
- Feed yard surface management – direct drainage to catch basins or lagoons; ensure and maintain surface seal.

BMPs 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 BMPs and land management changes which are designed to be complementary, and when used in combination, are more technically sound than each practice separately.

## 3.3 Monitoring and Evaluation

The progress and success of implementation efforts will be assessed through determination of changes in land management systems and the measurement of water quality improvement over time. Monitoring activities are integral components of the Area Plan. Water quality monitoring is being conducted by an interagency team consisting of: DEQ, ODA, OWRD, Oregon Department of Fish and Wildlife, UBWC, SWCD, USDA-NRCS, USDA-Forest Service, CTUIR, city of Pendleton, USDA-Agricultural Research Service, and others. Some agencies are conducting independent monitoring or surveys within the Basin.

The Umatilla Basin Watershed Council monitored water quality from 1996 through 2015. Their 2015 results were presented in the 2016 Area Plan.

DEQ monitors one site in the Management Area as part of their ambient monitoring network (Umatilla River at Hwy 11 bridge upstream of Pendleton).

DEQ retrieved data from DEQ, EPA, and USGS databases for January 1, 2000 to August 15, 2018 for the Management Area. DEQ determined status for stations with data from 2016 through 2018 and trends for stations with at least eight years of data. Their report is summarized in Chapter 4 and can be found at http://www.oregon.gov/deq/wq/programs/Pages/wqstatustrends.aspx. The report will be updated for future biennial reviews.

# Chapter 4: Implementation, Monitoring, and Adaptive Management

## 4.1 Progress Toward Measurable Objectives

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

The Focus Area has only had a pre-assessment. The final assessment will be done by the Summer of 2019. The SWCD will tabulate the results this winter and present them at the 2020 biennial review.

The objective of the SIA is 100 percent compliance. Results will be provided at the 2020 biennial review.

## 4.2 Activities and Accomplishment (2016-2018)

Many conservation activities and implementation monitoring tracks have been implmented to benefit water quality. The SWCD and NRCS track activites that have been implmented through quartely reports to ODA and through a NRCS database, respectively.

**Table 3: Activities and Accomplishments**

| ***Planning and Projects*** | ***Outreach and Education*** | ***Funding and Grants*** |
|---|---|---|
| Erosion control & sediment delivery<br>• 2 Upland water developments<br>• 1 Riparian fencing project<br>• 1 Irrigation Efficiency<br>• 1 Flow/Hydrology Study<br><br>Bank stabilization and riparian vegetation<br>• 30+ CREP projects assisted | • 2 Watershed Field Days (1,600 5th graders attended)<br>• Newsletter and newspaper articles (1,000 sent, 1 article)<br>• 2 Farm Fair displays/presentations, 2 County Fair displays/presentations | USDA Funding<br>• CSP - $217,634<br>• EQIP - $22,197<br><br>OWEB Rest. Projects - $20,954<br>• Hascall Spring Development Projects<br>• Sevenmile Spring Developments<br>• Bradley Irrigation Efficiency<br>ODA and CREP Funding-$514,276<br>• 2 CREP Grants<br>• 2 ODA Capacity Grants<br>OWEB TA Projects - $44,246<br>• Upper Greasewood Conservation Alternatives |
| | ***Monitoring*** | ***Partnerships*** |
| | • Annual Report<br>• Umatilla Basin WQ Technical Team (Long-Term Monitoring Plan)<br>• Spring Hollow Focus Area SVA Monitoring | • OSU – soil health and watershed health<br>• NRCS – practice certification, planning<br>• Local Working Groups<br>• Birch Creek Assessment<br>• CTUIR |

## 4.3 Monitoring—Status and Trends

For this biennial review, DEQ reviewed data from 58 monitoring stations, of which four had sufficient data for this status and trends analysis (*Umatilla Basin AgWQ Management Area: DEQ's Water Quality Status and Trends Analysis for the Oregon Department of Agriculture's Biennial Review of Agricultural Area Rules and Plan*. 60pp. 2018). Water quality at the McKay Creek site is driven primarily by McKay Reservoir six miles upstream.

The main agricultural water quality concerns are highlighted in grey and discussed below. See the DEQ report for all graphs (https://www.oregon.gov/deq/wq/programs/Pages/wqstatustrends.aspx).

**Table 4: Agricultural Water Quality Concerns**

| Site ID | Site Description | *E. coli* (mpn/100mL) | pH | Dissolved Oxygen (mg/L) | Total Phosphorus (mg/L) | Total Suspended Solids (mg/L) |
|---|---|---|---|---|---|---|
| | | # exceeding standard/N[1] | | | median[2]/N | # exceeding TMDL target[3]/N |
| **10404** | **Umatilla R @ Yoakum bridge (between 10406 and 11489)** | 1/110[4,6] | 27/113[5,6] | 3/113[4,6] | 0.08/111 | 416/2057[5,6] |
| **10406** | **Umatilla R abv Pendleton** | 2/109[4,6] | 23/111 | 16/111 | 0.03/109[6] | 3/108 |
| **11489** | **Umatilla R @ Hermiston** | 2/111 | 0/113[5,6] | 13/113[4,6] | 0.08/111 | 11/110[4,6] |
| **12005** | **McKay Ck @ Pendleton** | 3/109[4,6] | 22/111[5,6] | 0/110[5,6] | 0.07108 | 1/107[4,6] |

[1] N = total # of observations
[2] DEQ benchmark for potential water quality concerns = 0.05 mg/L ("*Methodology for Oregon's 2012 Water Quality Report and List of Water Quality Limited Waters*"); 0.07 mg/L in the adjacent Snake River TMDL
[3] TMDL target varies from 60-110 mg/L depending on the location.
[4] Statistically significant degrading trend
[5] Statistically significant improving trend
[6] Statistically significant seasonal patterns

*E. coli:* Values are generally low, however the trend line for Yoakum bridge has been noticeably rising from near zero mg/L in 2000 to about 40 in 2018.

pH: All stations on the river had exceedances; all but one exceedance at Yoakum predated 2014. Improving trends were obvious at all but the station above Pendleton.

Dissolved oxygen: Dissolved oxygen was the parameter of most widespread concern in this analysis. The dissolved oxygen standard is complex, and DEQ has several criteria that apply to this Management Area including 8 mg/L (cold water beneficial use) or 6.5 mg/L (cool water use) that apply year-round, except for 11 mg/L during the salmonid spawning seasons. Warm water holds less oxygen.

Dissolved oxygen has been noticeably declining in both Umatilla River sites below Pendleton.

Total phosphorus: levels are high in McKay Creek and in the Umatilla River from Pendleton to the mouth. Every station had at least two samples > 0.25 mg/L

TSS: Levels generally meet the TMDL location, except at Yoakum Bridge where values are about *100 times* those at the other locations, with eight values > 2500 mg/L. Higher levels appear to occur during spring runoff.

## 4.4 Biennial Reviews and Adaptive Management

The Biennial Review of the Umatilla Agricultural Water Quality Plan was held on December 6, 2018, at the USDA Ag Service Center in Pendleton. Five members of the LAC were present, along with two

members of the local Future Farmers of America chapter from Pendleton High School, as well as representatives of the Umatilla SWCD, DEQ, and ODA.

The SWCD presented a report of the implementation activities of the SWCD during the past two years. They presented current focus area results from the Spring Creek and Big Springs assessments including their landowner contacts. The current DEQ Status and Trends Report was presented to the LAC. Comments about how to look at the trends with winter runoff and low summertime flows was discussed. Further investigation into the timing of these events will occur to determine a possible correlation within these events.

Discussion was held regarding the proposed measurable objectives, timelines, and milestones. The new proposed measures will be incorporated into the SWCD's Scope of Work plans starting in the Summer of 2019. It was recommended that the proposed plan revisions be sent out to LAC members for comment, with comments due in one month. No additional comments were received.

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WESt Program Workbook, Oregon Cattleman's Association, 1998

# Appendix A: Approved 2012 303(d) Water Quality Limited List

| Category 4 – TMDL Approved | | | |
|---|---|---|---|
| **Stream** | **Parameter** | **Reach (river mile)** | **Season** |
| Athena Spring | Nitrates | 0 – 3.1 | Year Round |
| Beaver Creek | Sedimentation | 0 – 6.4 | Year Round |
| Birch Creek | pH | 0 – 15.6 | Summer |
| Birch Creek | Temperature | 0 – 15.6 | Summer |
| Boston Canyon | Sedimentation | 1.5 – 4.7 | Year Round |
| Butter Creek | pH | 0 – 65.7 | Summer |
| Darr Creek | Sedimentation | 0 – 3.4 | Undefined |
| East Birch Creek | Temperature | 0 – 10.3 | Summer |
| East Meacham Creek | Temperature | 0 – 5.4 | Summer |
| Hermiston Ditch | Ammonia | 0 – 2.7 | Summer |
| Hermiston Ditch | pH | 0 – 2.7 | Summer |
| Johnson Creek | Temperature | 0 – 11.7 | Year Round |
| Line Creek | Sedimentation | 0 – 3.9 | Undefined |
| Little Beaver Creek | Sedimentation | 0 – 3.8 | Undefined |
| Lost Pin Creek | Sedimentation | 0 – 1.3 | Year Round |
| McKay Creek | Temperature | 0 – 5.9 | Summer |
| McKay Creek | Fecal Coliform | 0 – 5.9 | Year Round |
| McKay Creek | pH | 0 – 5.9 | Fall/Winter/Spring |
| Meacham Creek | Sedimentation | 5 – 35.5 | Year Round |
| Meacham Creek | Temperature | 5 – 35.5 | Summer |
| Mill Creek | Sedimentation | 0 – 3 | Undefined |
| North Fork McKay Creek | Sedimentation | 1.5 – 7.8 | Year Round |
| North Fork McKay Creek | Temperature | 1.5 – 7.8 | Summer |
| North Fork Meacham Creek | Sedimentation | 0 – 11.8 | Undefined |
| North Fork Meacham Creek | Temperature | 0 – 11.8 | Summer |
| North Fork Umatilla River | Temperature | 0 – 10.3 | Summer |
| Rail Creek | Sedimentation | 0 – 4.7 | Undefined |
| Sheep Creek | Sedimentation | 0 – 4.7 | Undefined |
| Shimmiehorn Creek | Temperature | 0 – 6.5 | Summer |
| South Fork Umatilla River | Temperature | 0 – 10.8 | Summer |
| Spring Hollow | Nitrates | 0 – 9.3 | Year Round |
| Iskuulpa Creek | Temperature | 9.8 – 12.7 | Summer |
| Tutuilla Creek | pH | 0 - 10 | Fall/Winter/Spring |
| TwoMile Creek | Sedimentation | 0 – 3.6 | Undefined |
| Umatilla River | Ammonia | 0 – 32.1 | Year Round |
| Umatilla River | Aquatic Weeds/Algae | 32.1 – 88.1 | Spring/Summer/Fall |
| Umatilla River | Fecal Coliform | 0 – 32.1 | Summer |
| Umatilla River | p | 32.1 – 56 | Year Round |
| Umatilla River | Sedimentation | 54.2 – 88.1 | Year Round |
| Umatilla River | Temperature | 0 – 88.1 | Summer |
| Umatilla River | Turbidity | 0 – 32.1 | Spring/Summer |
| West Birch Creek | Sedimentation | 0 – 19.7 | Undefined |
| West Birch Creek | Temperature | 0 – 19.7 | Summer |
| Westgate Canyon | Temperature | 0 – 0 | Summer |
| Wildhorse Creek | Nitrates | 0 – 33.1 | Year Round |

| | | | |
|---|---|---|---|
| Wildhorse Creek | Temperature | 0 – 33.1 | Summer |

| **Category 5 – TMDL Needed** | | | |
|---|---|---|---|
| Birch Creek | Iron | 0 -15.6 | Year Round |
| Butter Creek | Iron | 0 – 18 | Year Round |
| Cold Spring Canyon/ Cold Spring Reservoir * | Mercury | 0 - 3 | Year Round |
| McKay Creek | Biological Criteria | 0 - .6 | Year Round |
| McKay Creek | Iron | 0 - 18 | Year Round |
| McKay Creek * | Lead | 0 - 15 | Year Round |
| Umatilla River * | Copper | 0 - 56 | Year Round |
| Umatilla River | Iron | 0 – 88.1 | Year Round |
| Umatilla River * | Lead | 0 - 56 | Year Round |
| ~~Umatilla River~~ | ~~Manganese~~ | Delisted ** | |
| Umatilla River/ Three Mile Falls Pool * | Mercury | 3.9 – 4.4 | Year Round |
| Wildhorse Creek * | Arsenic | 0 – 33.2 | Year Round |
| Wildhorse Creek | Iron | 0 – 33.1 | Year Round |
| ~~Wildhorse Creek~~ | ~~Manganese~~ | Delisted ** | |

* Added in 2012
** Delisted in 2012

# Appendix B: Summary of Umatilla River Basin TMDLs

*This summary is taken directly from the TMDL document with some modification for clarification purposes*. The entire Umatilla TMDL document can be viewed at: www.deq.state.or.us/wq/TMDLs/Umatilla.

A Total Maximum Daily Load (TMDL) is the total amount of a pollutant (from all sources) that can be present in a specific waterbody and still meet water quality standards. TMDLs are set at levels that are protective of streams and other waterbodies, designed to support beneficial uses of waters of the state. The most widespread concerns in the Umatilla River Basin are temperature, and excess soil erosion that leads to turbidity and impaired salmonid spawning areas. This TMDL is based on surface water protection and develops surface water goals. In certain instances, groundwater improvement will be essential to attaining stream water quality goals and should be accounted for in response to this TMDL. In areas with TMDLs, Oregon Administrative Rules require that management plans lay out all feasible steps towards meeting TMDLs and water quality standards.

The TMDL sets maximum limits on the amount of pollutants from both point and nonpoint sources allowed to enter into the Basin's waters. This *loading capacity* is calculated to achieve water quality standards. *Wasteload Allocations* are portions of the total allowable pollutant load that are allocated to point sources of pollution, such as wastewater treatment plants or industries. *Load Allocations* are portions of the total allowable pollutant load that are allocated to non-point sources, such as agriculture or forestry activities, and natural background sources.

| **Description of Load Allocations** | | | | |
|---|---|---|---|---|
| **Water Quality Limitation** | **Quantity** | **Geographic Areas** | **Season** | **Responsibility** |
| Temperature | • Daily max. radiant energy<br>• % effective shade<br>• Channel width and shade<br>• Channel max. width/depth | Perennial streams of the Umatilla Basin | July to August annual peak temperatures | Land uses:<br>• Agriculture<br>• Forestry<br>• Urban<br>• Transportation |
| Sediment | • % Upland erosion reduction<br>• % Streambank erosion reduction | All streams of the Umatilla Basin | Design storm (winter/spring) | Land uses:<br>• Agriculture<br>• Forestry<br>• Urban<br>• Transportation |
| Aquatic weeds and Algae | Addressed through temperature TMDL | | | |
| Nitrate | Flow-based daily instream limits in lbs/day of nitrate | Wildhorse Creek watershed | Throughout the year | Land use:<br>• Agriculture |
| Ammonia | Address through point source permits | | | |
| Bacteria | Number of *E.coli* organisms entering streams per design storm runoff | 8 Major Watersheds | Design storm:<br>McKay Ck (all year)<br>Others (April to October) | Land uses:<br>• Agriculture<br>• Urban |

**Temperature TMDL**

**Pollutant identification**
Human caused increases in solar radiation loading and warm water discharge to surface waters.

**Target identification**
Temperature Related to Aquatic Life: salmonids are sensitive to warm temperatures. Temperatures greater than 70°F are considered incipient lethal. Temperatures between 64°F and 74°F are sub-lethal but will impair salmonid reproduction and survival.
Sensitive Beneficial Use Identification: anadromous fish passage, salmonids fish spawning, salmonid fish rearing and resident fish and aquatic life.

**Existing Sources of Non-point Pollution**

- Near stream vegetation disturbance and removal increases solar radiation loading (decreases shade) and causes channel instability that leads to channel widening (decreases resistance to flow velocity).
- Channel widening has occurred in many Umatilla Basin stream segments. This widening is a result of channel and riparian disturbance. A wider channel compounds increased solar radiation loading (decreased shade) with an increased stream surface area exposed to solar radiation loading.
- Low summertime flows decrease the thermal assimilative capacity of streams. Pollutant (solar radiation) loading causes larger temperature increases in stream segments where flows are reduced.

Since the nonpoint source Loading Capacity is based on system potential, and use of this target is based on the water quality standard (i.e., no measurable temperature increases from anthropogenic source), the nonpoint source Loading Capacity is by definition 100% allocated to natural sources.[8] *System potential* is defined in the TMDL as the physical and biological conditions that are at maximum potential, taking into account local natural environmental constraints and conditions. The terms *system potential* and *site potential* are used interchangeably.

- [8]A TMDL allocates allowable pollution levels within the limits set by State water quality standards. Because the standard's trigger temperatures are probably close to, or at times less than, natural background, there is no capacity for additional thermal loading. This is logical from a biologic standpoint – salmon in Oregon are near the southern and warmest edge of their range, and hence are challenged by relatively slight increases. The TMDL modeling shows that there is much opportunity, from a hydrologic and physics standpoint, to substantially decrease temperatures; the summer 7-day average temperatures have been increased by human-related actions, typically by 3 to 15°F. A zero allocation by no means indicates that land usages should be eliminated, in fact, the current custodians are to whom we appropriately rely on for progress toward fishable, drinkable, swimmable water in the Umatilla Basin.

The TMDL incorporates measures other than "*daily loads*" to fulfill requirements of 303(d). Because a loading capacity for heat energy is expressed in terms of Langleys per day, it is of limited value in guiding management activities needed to solve identified water quality problems. In addition to heat energy loads, the TMDL allocates "*other appropriate measures*" (or surrogates measures) as provided under US EPA regulations that can be more directly interpreted by the land manager.

The following surrogates, as well as the load capacities, are largely dependent on determination of system potential vegetation. The Basin potential was assessed through the best professional judgment of a multi-agency local team during TMDL development. This team described the potential streamside shade-

producing vegetation broadly, as continuous tree-belts on each side of the river. The description applies to the mainstem and all perennial streams in the Basin – here just the non-coniferous areas will be discussed. Point bars (inside of meander bend) are subject to high levels of flood disturbance and typically support alders and small willows, just above the bank-full channel. Outside of this alder-willow zone and along the outside of meanders cottonwood trees are common, often forming continuous gallery forests. Cottonwoods can also be represented as occasional occurrences in mixed deciduous settings. Other trees occur naturally in these settings as well. Collectively, the following were identified as common indigenous trees that support reduced temperatures and contribute to bank stability and habitat formation:

| | |
|---|---|
| Small Willow – Coyote, Bebb | Black Cottonwood |
| Large Willow – Pacific Willow | Choke Cherry |
| Alder – Thinleaf, White | Red Osier Dogwood |

Vegetative buffers on perennial streams in the Basin should consist of trees and an understory of herbaceous vegetation that provide substantial root strength, shade, sediment filtering, and other riparian functions.

Surrogate Measure #1: Along the Umatilla River mainstem, attain the potential effective shade levels specified in Fig. 37 between the North and South Fork confluence and the Columbia pool.

Surrogate Measure #2: Along the tributaries, attain both the potential effective shade levels specified in Fig. 38 through 40 for the appropriate physiographic/political unit and Near Stream Disturbance Zone (NSDZ). (NSDZ is defined for purposes of the TMDL as the width between shade-producing near-stream vegetation.)

Surrogate Measure #3: Umatilla River NSDZ should be reduced to the levels presented in Fig. 3

Surrogate Measure #4: Width to depth ratios (W:D) throughout the Basin should be reduced to targets listed in Table 15 or less.

| **Width/Depth Targets by Stream Type** (mid-range measured width/depth of streams across the US, from Rosgen, 1996) | | | | |
|---|---|---|---|---|
| **Stream type** | **A** | **B** | **C** | **F** |
| **w/d Target** | 7 | 17 | 24 | 29 |

Surrogate Measure #5: Where feasible and attainable, instream flows should be maintained or increased during the critical season (at a minimum, June to September) by limiting water withdrawals, improved flow management, and/or flow augmentation.

**Sediment TMDL**
The sediment TMDL specifies an amount of suspended-pollutant load reduction calculated to achieve turbidity levels (< 30 NTU) that are protective of salmonids feeding and respiration.

The sediment-related water quality impairments were identified based on streambed surface area percent fines and greater than ten percent increases in mainstem turbidity caused by mid-basin tributaries.

**Target identification**:
Sediment Related to Aquatic Life: Turbidity and suspended solid effect fish by respiratory and feeding impairment, social disorganization, damage to spawning sites by limiting oxygen and removal of metabolic toxins.
Sensitive Beneficial Use identification: salmonid spawning

| Applicable Sedimentation, Turbidity and Biological Criteria Standards | |
|---|---|
| Sedimentation<br>OAR 340-041-0007(11) | The formation of appreciable bottom or sludge deposits or the formation of any organic or inorganic deposits deleterious to fish or other aquatic life or injurious to public health, recreation, or industry shall not be allowed |
| Turbidity<br>OAR 340-041-0036 | No more than ten percent cumulative increase in natural stream turbidities shall be allowed, as measured relative to a control point immediately upstream of the turbidity causing activity |
| Biological Criteria<br>OAR 340-041-0011 | Waters of the state shall be of sufficient quality to support aquatic species without deleterious changes in the resident biological communities |

Because the TMDL is best expressed as a mass load, total suspended solids is the constituent used as a surrogate for turbidity in this TMDL. In order to express the water column sediment TMDL in terms of mass load, regressions were calculated to evaluate the association between total suspended solid (TSS) and turbidity. The TSS correlative to 30 NTU turbidity was calculated as the TMDL target concentration for the 14 Umatilla Basin watersheds.

The sediment erosion load allocations for the Umatilla Basin are expressed as percent reductions for the individual watersheds. The load allocations are based on a storm of specified intensity, referred to as a design storm. The total percent reductions were calculated for a design storm that exceeded Umatilla River bankfull flow.

| Water Column Sediment TMDL Summary | | | | | |
|---|---|---|---|---|---|
| **Watershed** | **Modeled Event Mean TSS (mg/L)** | **TSS Loading Capacity (mg/L)** | **Design Storm Total Erosion % Reduction** | **Upland Component % of Total Reduction** | **Streambank component % of Total Reduction** |
| Upper Umatilla | 14 | 76 | None | None | None |
| Meacham | 34 | 60 | None | None | None |
| Squaw/Buckaroo | 652 | 99 | 85 | 33 | 52 |
| Pendleton | 279 | 80 | 72 | 39 | 33 |
| Wildhorse | 1,694 | 86 | 95 | 22 | 73 |
| Tutuilla | 1,599 | 70 | 96 | 38 | 58 |
| McKay | 251 | 72 | 72 | 33 | 39 |
| Birch | 376 | 110 | 71* | *30 | *41 |
| Butter | 1,186 | 110 | 91 | 9 | 82 |
| Gulches/Canyons | 2,560 | 80 | 97 | 10 | 87 |
| Stage Gulch | 656 | 80 | 88 | 23 | 65 |
| Sand Hollow | 1,115 | 80 | 93* | *10 | *83 |
| Cold Springs | 1,295 | 80 | 94 | 17 | 77 |
| Lower Umatilla | 36 | 77 | None | None | None |

*Estimated by averaging adjacent watershed reduction values

**Streambank Stability Goal**

A management planning goal of 25 percent eroding streambank…is expected to fulfill the streambank component of the sediment load allocations.

**Linking Sediment and Temperature Load Allocations**

Both the sediment TMDL allocation of reduced streambank erosion and the channel/stream width reduction surrogates of the temperature TMDL are outcomes that, through much of the basin, will be met by implementing the effective shade goals of the temperature TMDL (surrogates 1 & 2). It is important to recognize that implementation of these surrogates both requires and leads to width reduction. It is also important to recognize that similar work on intermittent streams is needed for implementation of the

sediment TMDL and the associated sedimentation reduction will support downstream morphology needed for achievement and maintenance of decreased temperature. The temperature and sediment TMDLs can be entirely achieved through increased riparian vegetation (including canopy vegetation), increased space for sinuosity/channel stability, floodplain reconnection where feasible; and increased upland groundcover.

**Aquatic Weeds, Algae, and pH TMDL**

**Target Identification**:
Aquatic Weeds and pH related to Aquatic Life: There is increasing periphyton (algae attached to the river substrate) growth during the summer in the Upper Umatilla River. Algae production is the principle cause of wide pH fluctuations. The pH standard is exceeded during the warmest part of the day. Excessive algae growth and increased pH can be stressful to fish, adversely affects aesthetic quality and can cause taste and odor problems.
Sensitive Beneficial Use Identification: water contact recreation, aesthetics, and fish-related uses.

| Applicable Aquatic Weeds or Algae and pH Standards | |
|---|---|
| Aquatic Weeds or Algae<br>OAR 340-041-007(9) | The development of fungi or other growths having a deleterious effect on stream bottoms, fish or other aquatic life, or which are injurious to health, recreation, or industry, shall not be allowed |
| pH<br>OAR 340-041-0021 and 340-041-0315(2)(d) | pH values shall not fall outside the ranges…6.5 to 9.0. |

It was determined by the pH modeling of the Upper Umatilla River that achieving the load allocations and wasteload allocations established for temperature will reduce periphyton growth and lead to the attainment of the water quality standards for pH and aquatic weeds and algae.

**Nitrate TMDL**

**Target identification**:
Nitrate related to Drinking Water: US EPA has set a maximum contaminate level of 10 mg/l for nitrate ($NO_3$ –N) in public water supplies. This standard has been devised to protect a select group of sensitive persons (infants, and pregnant and nursing women).
Sensitive Beneficial Use identification: drinking water

**Water quality standard**:
OAR 340-041-0033 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, may chemically change to harmful forms in the environment, or may accumulate in sediments or bioaccumulate in aquatic life or wildlife to levels that adversely affect public health, safety, or welfare; aquatic life; wildlife; or other designated beneficial uses.

Nitrate concentrations in the Wildhorse watershed are unusually high for the Umatilla Basin. Forestry, transportation, urban, and natural background are insignificant or unlikely sources of nitrates. Agriculture is 94% of the land area. Nitrate transport to streams, during seasons of high runoff, is expected to be lessened in part by sediment TMDL implementation (upland allocation measures control runoff). The load allocations for the Wildhorse Creek watershed are allocated to agriculture. The instream goal of the TMDL is 10 mg/L.

**Ammonia TMDL**

**Target Identification:**
Ammonia Related to Aquatic Life: Chronic ammonia toxicity during the summer months may have varying degrees of effect from reduced growth rate and morphological development to death on fish depending on the concentrations.
Sensitive Beneficial Uses: resident fish and aquatic life

**Water Quality Standard**:
OAR 340-041-0033(2) Levels of toxic substances shall not exceed a criteria …[that is pH and temperature related.]

No load allocations were established for this TMDL.

**Bacteria TMDL**

**Target Identification**:
Bacteria related to water contact recreation: High levels of bacteria limit the use of waterbodies for swimming.

**Water Quality Standard:**
OAR 340-041-0009 Prior to March 1996: A geometric mean of five fecal coliform samples should not exceed 200 colonies per 100 mls, and no more than ten percent should exceed 400 colonies per 100 mls. Bacteria (fecal coliform) concentrations exceeding the Oregon water quality standard has been measured in McKay Creek and the Lower Umatilla River.

Effective March 1998 through present: A 30-day log mean of 126 *E. coli* organisms per 100 ml, based on a minimum of five samples; and no single sample shall exceed 406 *E. coli* organisms per 100 ml. *E. coli* standard exceedances have been identified in Butter Creek, Birch Creek, Wildhorse Creek, and Tutuilla Creek.

As with the sediment TMDL, the load allocations for bacteria are based on a storm of specified intensity. The bacteria load goal was estimated by the product of upland runoff volume, the target concentration, and the percent living bacteria after die-off. Target loads for urban, agriculture and rangeland uses were computed to meet an *E. coli* concentration within the runoff volume equal to the water quality standard. The loads were calculated for the total land use area within the affected watersheds.

| **Watershed Bacteria Load Allocations** | | | | | |
|---|---|---|---|---|---|
| **Watershed** | **Season** | **Design Storm precipitation** | **Runoff (cfs)** | **Loading Capacity (counts/100 ml)** | **Agriculture/Range Load Allocations *(E. coli)*** |
| McKay | Summer | 1.13 | 212 | 406 | 7.4 billion |
| McKay | Winter | 1.45 | 519 | 406 | 17.4 billion |
| Canyons/Gulches | Summer | 1.13 | 762 | 406 | 26.8 billion |
| Stage Gulch | Summer | 1.13 | 167 | 406 | 5.7 billion |
| Lower Umatilla | Summer | 1.13 | 134 | 406 | 4.2 billion |
| Wildhorse | Summer | 1.13 | 312 | 406 | 10.8 billion |
| Tutuilla | Summer | 1.13 | 199 | 406 | 6.8 billion |
| Birch | Summer | 1.13 | 471 | 406 | 16.5 billion |
| Butter | Summer | 1.13 | 707 | 406 | 24 billion |