

# **Umatilla Agricultural Water Quality Management Area Plan**

**Developed by**

**The Umatilla ~~River Subbasin~~  
Local Advisory Committee**

**with assistance from**

**The Oregon Department of Agriculture  
and  
The Umatilla County  
Soil and Water Conservation District**

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## I. FOREWORD

This Agricultural Water Quality Management (AgWQM) Area Plan provides guidance for addressing agricultural water quality issues in the Umatilla AgWQM Area. The purpose of this Area Plan is to identify strategies to reduce water pollution from agricultural lands through a combination of educational programs, suggested land treatments, management activities, and monitoring. This Area Plan will be used by local management agencies for guiding implementation, outreach, and assistance efforts and by landowners to enhance their awareness and understanding of water quality issues.

The provisions of this Area Plan are not meant to establish legal requirements or prohibitions.

The Umatilla Agricultural Water Quality Management Area Rules (Area Rules), Oregon Administrative Rules (OAR) 603-095-0300 through 603-95-0380, were formally adopted, in 1999, to implement this Area Plan. Area Rules define the planning area, provide prevention, and control measures to protect water quality, provide exceptions to the prevention and control measures, and describe a complaint resolution process. Area Rules set forth the requirements and/or prohibitions that will be used by the Oregon Department of Agriculture (ODA) in exercising its enforcement authority for the prevention and control of water pollution from agricultural activities. In addition, statewide enforcement procedures provided in OAR 603-090-0000 through 603-090-0120 describe the enforcement actions that may be triggered upon the finding of a violation by ODA.

All landowners should immediately evaluate their operations and implement technically sound, economically feasible measures, where needed, to achieve measurable progress towards achieving the water quality goals of this plan and to assure compliance with Area Rules as they become effective.

**Area Rules are presented in this Area Plan, for information purposes, and indicated by bold type within a border.**

## II. INTRODUCTION

The 1993 Oregon Legislature, through passage of Senate Bill 1010 (ORS 568.900 - 568.933), designated the Oregon Department of Agriculture to be the lead state agency working with agriculture to address water pollution. Oregon adopted the law to give agriculture an effective way to meet the requirements of federal and state clean water regulation. Through SB 1010, ODA is authorized to develop and carry out a water quality management plan for agricultural or rural lands, whenever state or federal law requires a water quality management plan. In the 2001 legislative session, ORS 568.900 – 933 was amended to clarify that only the Area Rules associated with an Area Plan are enforceable, not the plan itself.

In 1995, the Oregon Legislature passed SB 502 (ORS 561.191) that stipulates that ODA shall develop and implement any program or rules that directly regulate farming practices that are for the purpose of protecting water quality and that are applicable to areas of the state designated as

exclusive farm use zones or other agricultural lands. The implications of the legislation are that in Oregon, ODA is the agency solely responsible for regulating agricultural activities that affect water quality.

Recent legislation has also clarified that ODA entry onto private property must be consistent with section 9, Article I of the Oregon Constitution, and the Fourth Amendment of the United States Constitution; that ODA may not impose a civil penalty on a landowner for a first violation of any water quality rules unless certain conditions are met; and that any new fees proposed by ODA are subject to legislative approval.

Oregon's agricultural water quality management program relies on Area Plans to help identify and control water pollution caused by activities on agricultural and rural lands. These plans recognize that the best way to prevent or control pollution from agricultural and rural land is to work to reduce the conditions on that land that cause pollution. The Area Plan and Rules adopted to implement the plan must be based on upon scientific information.

There is a great deal of information in the scientific literature and natural resources management agencies documents that describes the transport and fate of pollutants in an agricultural setting and the effectiveness of various land management practices that can be employed to limit the movement of potential pollutants into waterways.

ODA has developed a review of the literature that establishes the scientific basis for water quality protection based on landscape conditions. The document, *Relationship Between Agriculture Water Quality Management Area Plan Conditions and Water Quality Standards*, is available for review at the Umatilla County Soil and Water Conservation District (SWCD) office.

ODA is the "Designated Management Agency" for water pollution control activities on agricultural and rural lands in the Umatilla watershed. In turn, through Memorandum of Agreement, ODA has designated the Umatilla County SWCD as the Local Management Agency (LMA) for development and implementation of the AgWQM Area Plan and projects in the Umatilla AgWQM Area. Implementation priorities will be established on a periodic basis through annual work plans developed jointly by the SWCD and ODA.

The director of ODA, in consultation with the Board of Agriculture, appointed the Umatilla Local Agricultural Water Quality Advisory Committee (LAC) representing local agricultural producers, local landowners, the Indian tribes, local agencies, and the SWCD, for the purpose of assisting with the development of this plan and the associated Area Rules to implement core elements of the plan. The same LAC members were present for the biennial review and Area Plan modifications completed in 2003 and the biennial review and Area Rules modification in 2006.

The draft Area Plan and the associated proposed Area Rules, were presented in public information meetings and public hearings within the agricultural and rural portions of the Umatilla AgWQM Area. Testimony presented at public hearings, and during the public comment period, was reviewed by ODA and the LAC and recommended modifications were

presented to the Board of Agriculture and the director for their review. The final Area Rules resulting from that review were adopted through the Administrative Rules process by the director of ODA in September 1999. Revisions to the Area Rules were adopted through the Administrative Rules process by the director of ODA in 2006.

## **Geographic and Programmatic Scope**

The operational boundaries of this 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). This plan applies to agricultural lands in current use and those lying idle or on which management has been deferred. This plan applies to rural lands not in agricultural use, but which affect agricultural lands such as roadways and rural residences.

This document recognizes that planning for water quality is only part of a successful approach for overall management of agricultural and rural land, and that other personal and public objectives must also be considered in total farm or resource management planning.

## **III. GEOGRAPHIC AREA AND PHYSICAL SETTING**

The Umatilla River subbasin is a 2545 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, discharging into the Columbia River at the townsite 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, underlies nearly all 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 basin.

### **A. Land Use**

Agricultural land, both dryland and irrigated, comprise about 42% of the basin area. Rangeland and range-forest transition areas account for another 42%, and the remaining portion of the basin is approximately 13% forest and 3% 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 1800's and early part of this 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, causing large amounts of native grassland to be converted 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 1940's or early 1950's. Irrigation water rights date to the 1860s for flood irrigating in creek valleys. Several 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 85% of the Basin, mostly agricultural and rangeland, is in private ownership. The federal government owns about 9% and the Umatilla Indian Reservation includes about 6% of the basin. The present population of Umatilla County is approximately 68,000 with about 60% 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 statistics indicate there are 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 340,750 in 1996. A total of 575,000 acres is now used for crop production.

Economically, the Umatilla Basin is regarded as one of the state's major agricultural centers. In 2002, Umatilla County ranked fourth in the state in agricultural commodity sales at \$209 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% of the cropland has been retired from crop production, enrolled in Conservation Reserve Program 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 (CTUIR) consists of 172,000 acres, which lies entirely within the Umatilla River subbasin. 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.

## **B. Water Use**

The average discharge of the Umatilla River at Yoakum (River Mile 37) is about 495,000 acre-feet (AF) per year. The gauged yield at Umatilla (RM 2) is about 336,000 AF per year. The difference is due to withdrawals for irrigation and other purposes. The Umatilla River was adjudicated in 1916. The court decree defined rights for irrigation, municipal, domestic, stock, power, and industrial water use. 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 1954.8 cfs (out-of stream uses equals 1813.5 cfs).

Two major reservoirs store water in the Umatilla River Subbasin: McKay has a design capacity of 73,800 AF and Cold Springs is 50,000 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 1980's, 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 1960's. 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 as well as interference between wells. Critical Groundwater Areas have been established in the Ordinance, 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 requires a permit issued by OWRD, with the exception of statutorily exempt ground water 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). OWRD "classifies" the type of beneficial uses that may file for a permit in a given subbasin. For example, the ground water resources of the Butter Creek, Stage Gulch, and Ordinance 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 ground water 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 ground water 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 ground water 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.

### **C. 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).

<b>SPECIES</b>	<b>ESA STATUS</b>	<b>SENSITIVE SPECIES STATUS</b>
Bull trout	Threatened	Critical
Summer steelhead	Threatened	Vulnerable
Redband trout		Vulnerable
Margined sculpin		Vulnerable

## **IV. MISSION, GOALS AND OBJECTIVES**

### **A. Mission**

*Seek to achieve water quality standards appropriate to the Umatilla AgWQM Area through development and implementation of an Agricultural Water Quality Management Area Plan.*

### **B. Goals and Objectives**

1. Improve the quality of water in the Umatilla AgWQM Area through planning and implementation of scientifically based conservation practices.
  - a. 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.
- b. Demonstrate reduction in nitrate, ammonia, phosphorus, bacteria, and thermal contributions from agricultural and rural lands through monitoring and periodic surveys of stream reaches and associated lands.
  - c. Promote streambank stabilization and the restoration and enhancement of wetlands and riparian habitat through implementation of appropriate management practices.
  - d. 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 level triggering the GWMA declaration.
  - e. 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.
2. Create a high level of awareness and an understanding of water quality issues among the agricultural community and rural public in a manner that minimizes conflict and encourages cooperative efforts through education and technical assistance activities.
- a. Promote implementation of the AgWQM Area Plan as a priority element in the Umatilla County Soil and Water Conservation District's Long Range and Annual Work Plans with support from partner organizations.
  - b. Promote demonstration projects to showcase successful practices and systems and conduct annual tours for landowners and media.
  - c. Promote recognition of successful projects and practices through appropriate media and newsletters.
  - d. Promote cooperative on-the-ground projects to solve critical problems identified by landowners/operators and in cooperation with partner organizations.
  - e. Conduct educational programs to promote public awareness of water quality issues and their solutions.
  - f. Develop cooperative educational efforts related to water quality with the Umatilla Basin Watershed Council (UBWC), OSU Extension Service (Extension), Natural Resources Conservation Service (NRCS) and other local natural resource interests.

3. Proactively invite the agricultural community and rural public to become involved in the process.
  - a. Encourage voluntary individual and cooperative farm planning by providing planning and implementation assistance.
  - b. Promote the continued development, adoption, and evaluation of practices and technologies that enhance water quality in an efficient and effective manner, by reviewing research and development needs with agriculture assistance agencies and consultants.
  - c. Promote incentive and cost-share programs to assist implementation of plans and related practices by annually identifying water quality funding needs with agencies providing cost-share assistance to agricultural operations.
4. Ensure adequate funding and administration of the program to achieve mission goals and objectives by establishing target watersheds, identifying needs, developing projects, actively seeking funding, and ensuring successful implementation of funded project.

## **V. WATER QUALITY ISSUES**

### **A. Beneficial Uses**

Beneficial uses in the Umatilla AgWQM 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.

### **B. 303(d)-Listed Streams**

Approximately 40 river/stream segments in the Umatilla Basin have been declared “water quality limited” by the DEQ under Section 303 (d) of the Clean Water Act (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 indicates 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 plan.

### **C. Sources of Water Quality Impairment**

Sources of water pollution can be generalized into two types: point source pollution and nonpoint source pollution. Point source pollution emanates from clearly identifiable discharge points such as wastewater treatment plants and piped effluent from industrial operations. Permits are required for point source discharges. These permits, administered by the Oregon Department of Environmental Quality (DEQ), require that certain effluent standards be met. Nonpoint source pollution is pollution emanating from landscape scale sources and cannot be traced to a single point.

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 1900 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.

## D. Water Quality Parameters of Concern

The following discussion of water quality parameters of concern in the watershed addresses the CWA requirements for standards to be established for the most sensitive beneficial uses.

### 1. Temperature

Water temperature is primarily a summer concern, a season characterized by low flow and high air temperature, for rearing of 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 60's°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.

Current DEQ standards (*OAR 340-041-645*)(2)(b)) state that **no measurable surface water temperature increase resulting from anthropogenic (man-caused) activities is allowed:**

- in a basin for which salmonid fish rearing is a designated beneficial use, and in which surface water temperatures exceed 64.0°F.
- in waters and periods of the year supporting native salmonid spawning, egg incubation, and fry emergence from the egg and from gravels, which exceeds 55.0°F.
- in waters supporting or necessary to maintain the viability of native Oregon Bull trout, when surface water temperatures exceed 50.0°F.

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 locations of streams.

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 criteria are 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). (*Questions and Answers About DEQ's Temperature Standards*)

### 2. 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.

### **3. 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. 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 340-41-645(2)(a)). The water quality standard for pH (hydrogen ion concentrations) values range from 6.5 to 9.0. (OAR 340-041-645)(2)(d).

### **4. 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 30-day period, as well as a single sample maximum of 406 *E. coli* organisms per 100 ml. (OAR 340-041-645)(2)(e).

### **5. 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. High levels of nitrates are present in the Wildhorse Creek drainage.

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 basin. 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.

## **E. Total Maximum Daily Loads**

Federal law and court order require the DEQ, to establish formal "Total Maximum Daily Loads" (TMDLs) for pollutants in waters designated as "water quality limited." In response, 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 "TMDL Stakeholder Committee" provided balanced and

diversified local input into the TMDL development process. TMDLs for the Umatilla Basin were approved by the U.S. Environmental Protection Agency 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 Basin. The DEQ has requested the appropriate Designated Management Agencies (DMA) in the subbasin to develop pollution control plans and programs designed to achieve the load allocations. *OARs 340-041-0026, 340-041-0120, and 340-041-0642* require management plans and set the water quality standards.

<b>Table 2. Description of Load Allocations</b>					
<b>Water Quality Limitation</b>	<b>Quantity</b>	<b>Geographic Areas</b>	<b>Season</b>	<b>Responsibility</b>	
				<b>Land uses</b>	<b>Designated Mgt. Agency</b>
Temperature	<ul style="list-style-type: none"> <li>• Daily max. radiant energy</li> <li>• % effective shade</li> <li>• Channel Width and shade</li> <li>• Channel max. width/depth</li> </ul>	Perennial streams of the Umatilla Basin	July to August annual peak temperatures	Agriculture Forestry Urban  Transportation	ODA ODF DEQ, City, County ODOT, county
Sediment	<ul style="list-style-type: none"> <li>• % Upland erosion reduction</li> <li>• % Streambank erosion reduction</li> </ul>	All streams of the Umatilla Basin	Design storm (winter/spring)	Agriculture Forestry Urban  Transportation	ODA ODF DEQ, Cities, County ODOT, County
Nitrate	Flow-based daily instream limits in lbs/day of nitrate	Wildhorse Creek watershed	Throughout the year	Agriculture	ODA
Bacteria	Number of <i>E.Coli</i> organisms entering streams per design storm runoff	8 Major Watersheds	Design storm: McKay Ck (all year) Others (April to October)	Agriculture Urban	ODA DEQ, Cities, County

The TMDL identifies and describes numeric water quality goals applicable to this AgWQM Area Plan. Oregon’s TMDL process for agriculture involves goal development by DEQ and implementation guided by ODA and local management agencies through the Senate Bill 1010 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)

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, riparian vegetation 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 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 dependant, 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. 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.

## **F. Lower Umatilla Basin Groundwater Management Area**

In 1990, the Oregon Department of Environmental Quality (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% 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 4-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
- Confined animal feeding operations (feedlots and dairies)
- Domestic sewage where septic systems occur in high densities
- The U.S. Army Umatilla Chemical Depot's washout lagoons

The Lower Umatilla Basin 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 local SWCDs are the lead agencies in implementing the Action Plan with assistance from Extension and NRCS. DEQ and ODA have oversight responsibilities.

In 1997, the Lower Umatilla Basin Groundwater Management 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.

For the purposes of this AgWQM Area Plan, irrigated agriculture and confined animal feeding operations (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 feedyard 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 at through the SWCD.

## **VI. STRATEGIES FOR ACHIEVING PLAN MISSION, GOALS, AND OBJECTIVES**

The primary strategies of ODA and the SWCDs is to reduce amounts of pollution from agricultural and rural lands lie in the reduction of pollutants in runoff and the reduction of erosion through a combination of educational programs, land treatment, implementation of sound management practices, and installation of erosion control structures. These strategies will be carried out at the local level by ODA's local management agency, the USWCD, in cooperation with landowners, other agencies, volunteer organizations, and others.

In addition to the voluntary strategies, regulatory measures are included as a strategy in this Area plan. To gain compliance with prevention and control measures ODA will use enforcement where appropriate and necessary. Any enforcement action will be pursued only when reasonable attempts at voluntary solution have failed.

The strategies identified in this Area Plan for reducing pollution from agricultural and rural lands are consistent with goals for non-point source pollution reduction established in the Umatilla Basin TMDL. It is expected that adoption of management practices aligned with the following Prevention and Control Measures will, over time, result in achievement of TMDL goals and meeting water quality standards.

Landowners have flexibility in choosing management approaches and practices to address water quality issues on their lands. Landowners may choose to develop management systems to address problems on their own, or they may choose to develop an approvable Voluntary Water Quality Farm Plan (VWQFP), which affords them a limited "safe harbor" protection against immediate enforcement action if water quality standards violations are found to occur on lands under their management. Approval of VWQFP will be by the Local Management Agency. Adoption of individual farm plans will be at a rate consistent with the availability of technical and financial assistance. See Voluntary Water Quality Farm Plans, page 27, for criteria.

### **A. Prevention and Control Measures**

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. Implementation of the rules will begin upon adoption and shall be fully implemented by January 1, 2010.

#### **OAR 603-095-0340**

##### **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.

## **1. 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.

Current Oregon Law, Oregon Revised Statute (ORS) *468B.025* states that:

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

*ORS 468B.050* identifies the conditions when a permit is required for the discharge of wastes including from Confined Animal Feeding Operations (CAFOs). Current state rules, *OAR 603-074-0005 through 0080*, are consistent with federal rules that set minimum criteria for confinement periods, animal numbers, and wastewater treatment facilities.

Definitions (ORS 468B.005)

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

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

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

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 Confined Animal Feeding Operation laws. Indicators of noncompliance include 1) runoff flowing through areas of high livestock usage and carrying wastes into waters of the state, 2) livestock waste accumulated in drainage ditches or areas of flooding, and 3) 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

**603-095-0340**

(2) 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. 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
- Noxious weed and insect pest populations contained (see state weed laws and county weed regulations to determine weed species that must be controlled)

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, and management, and weed control. Similarly, agricultural lands must be managed to reduce the impacts of runoff onto public rights of way.

While the RUSLE equation 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.

#### **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.

### **3. Streamside Area Management**

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:

- Recruitment of desirable riparian or upland plant species
- 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

**603-095-0340**

**(3) 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).

**4. Livestock 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. 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. Offstream 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

**603-095-0340****(4) 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, drylots, 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.

**5. 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 waterbody 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 Oregon Water Resources Department 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 WRD 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 affect on stream flows and thus, indirectly affect 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, streamflows 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).

**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.

**6. 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. 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 and Oregon State University - Extension Service 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 1 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 concentrated potential contaminants is encouraged, including consideration of all those 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.

**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.

**7. 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.

**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.

**B. Implementation Strategies**

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.
- Providing incentives for the development and implementation of Voluntary Water Quality Farm Plans.

- Offering technical assistance for the development and implementation of Best Management Practices for pollution control.
- Developing a monitoring program to identify current and potential water quality problems.

Following up on any water quality complaints and providing assistance in solving identified problems.

### **1. Education Program**

As resources allow, the SWCD, DEQ, UBWC, NRCS and OSU Extension Service, 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 Umatilla County Soil and Water Conservation Districts' 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
- Coordinate the review of information and education materials with agencies or organizations as appropriate

### **2. Voluntary Water Quality Farm Plans**

Landowners are encouraged to develop and implement Voluntary Water Quality Farm Plans (VWQFPs). These plans may be developed by landowners or operators, consultants, or technicians available through the SWCD, NRCS, or 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. These plans will be subject to approval by the SWCD according to criteria set forth in this Basin Plan.

The VWQFP will employ a descriptive management system, which addresses and provides management practices for each area of concern. These plans may contain any or all of the following elements, depending on the site and the condition for which preventive or corrective measures are being implemented.

#### *General Components*

- Maps and/or aerial photographs, soil surveys, and other natural resource inventory information indicating soils, topography, fields, farm site plan, waterbodies and

drainages which may be necessary to assess or inventory the potential for water pollution.

- A list of fields, crops grown (including typical rotation), and other land uses, with the area in acres for each field or land use.
- Any agreements entered into by the landowner or operator involving any agency providing technical or financial assistance in the completion of the management practices included in the VWQFP.

### *Specific Components*

- Soil Erosion and Sediment Control measures to prevent soil erosion from exceeding acceptable levels and minimize the delivery of sediments to streams: a list of proposed management systems or practices for each field or land use, the general time of application, the general or more typical crop rotation, and the general time of application in proposed alternative management systems. In addition, the person(s) developing the Farm Plan is (are) encouraged to provide estimates of the rate of soil loss before and after application of the general sequence, or sequences of practices for different soil types and general field or range condition on his farm or ranch.
- Streamside Area Management: a list of activities conducted in the streamside management area and management practices used to prevent streambank instability, minimize the delivery of sediments, thermal loading, and nutrients to the stream, and to prevent degradation of water quality.
- Livestock Management measures to prevent soil erosion and delivery of sediment and animal waste to the stream: a list of grazing management systems or practices used to disperse livestock away from sensitive areas and maintaining adequate vegetative cover, the livestock facilities and water sources used, and practices used to prevent and control wastes from entering the waters of the state.
- Irrigation Management measures to better utilize irrigation withdrawals, to prevent return flow contamination, and to prevent streambank instability at diversion structures, a list of irrigation water sources (including water rights), amount of water used, how and when it is applied, and how the diversions and drains are managed.
- Nutrient and Farm Chemical Management measures used to prevent potential pollution by application and storage of fertilizers and farm chemicals, a description of fertility strategy, and a description of weeds or diseases being controlled.
- Channel and Drain Management measures to describe drainage needs during storm events, and a list of practices used to maintain drainage ditches and manage drainage discharges into waters of the state.
- Waste management measures to prevent and control the placement, delivery, or sloughing of wastes into waters of the state.

### *Available Sources for Farm Planning*

- Technical Assistance
  - NRCS - planning, design, implementation
  - SWCD – planning, design, implementation, grant writing
  - Watershed councils –planning, implementation, grant writing
- Workbooks and Publications

- *Voluntary Conservation On Your Land*, NRCS/Oregon Association of Conservation Districts (OACD)
- *Oregon Small Acreages Conservation Toolbox*, NRCS/OACD
- *WESt Program Workbook*, Oregon Cattleman's Assoc. (OCA)/OSU
- *Ranch Water Quality Planning Workbook*, OSU Extension
- The Oregon Plan Toolbox, OWEB
- Programs
  - Farm\*A\*Syst Program, OSU Extension
  - Stream\*A\*Syst Program, OSU Extension
  - Home\*A\*Syst Program, OSU Extension

### **3. Technical and Financial Assistance**

As resources allow, in the Umatilla AgWQM 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, EPA's nonpoint source implementation grants, or state programs such as the Oregon Watershed Enhancement Board (OWEB) and Conservation Reserve Enhancement Program (CREP).

### **4. 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 which can be employed 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; which may typically be used in the Umatilla AgWQM Area for effective prevention, and control of water pollution from agricultural activities.

#### ***For soil erosion and sediment control (pgs. 19-21)***

- Conservation tillage (crop residue management) - reduced tillage, minimum tillage, direct seeding, modified conventional tillage, reservoir tillage, subsoiling 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: (pgs. 21-23)***

- Critical Area Planting
- Vegetative buffer strips - Continuous CRP, 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 (pgs. 23-24)***

- 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 (pgs. 24-25)***

- Irrigation scheduling based on - crop needs, soil type, climate, topography, infiltration rates

- Irrigation system efficiency and uniformity monitoring
- Diversion maintenance - push-up dam management, headgates, screens
- Return flow management
- Flow measuring devices
- Backflow devices
- Reservoir tillage
- Cover crops

***For nutrient and farm chemical application (pgs. 25-26)***

- 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 (pg. 26)***

- Vegetation management -burning, chemical, clipping
- Streambank stabilization -structural, bioengineered
- Critical area planting
- Channel management
- Obstruction removal
- Wetland development
- Outfall protection
- Offstream or headwater storage

***For groundwater protection (pgs. 14-15)***

- Irrigation management - irrigation scheduling based on soil characteristics and crop needs; convert to more efficient systems; equipment maintenance
- Nutrient management – plant tissue and soil testing; time inputs to coincide with crop uptake requirement; water testing; deep soil testing; precision farming; minimize water and soil erosion; manage inputs for lower value crops; schedule deep rooting crops in rotation
- Grazing management – pasture maintenance, renovation, and rotation
- Surface water management – divert clean surface water and runoff
- Wastewater effluent management – design, construction, and maintenance of lagoons or holding ponds; application at agronomic rates;
- Solid manure management – proper storage; manure analysis
- Feedyard 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.

## **5. 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, WRD, 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.

For the purposes of this Area Plan, three main types of monitoring are appropriate. These are:

- **Baseline condition monitoring**  
Baseline condition monitoring provides a starting point for assessing water quality trends and for future evaluation of the effectiveness of water quality improvement efforts. Baseline condition monitoring typically includes identification and analysis of data previously and currently collected in the area according to accepted protocols.
- **Water quality trend monitoring**  
Water quality trend monitoring can help to track how water quality (typically on a watershed or sub-watershed scale) is changing over time, including after implementation of an Area Plan. It is recommended that trend monitoring follow recommendations in the Oregon Plan Water Quality Monitoring Technical Guide. This guide book describes accepted procedures and protocols for most activities that would be used to conduct baseline condition and trend monitoring on a watershed scale, including development of quality assurance/quality control plans to assure quality of data and protocols for data collection.
- **Effectiveness monitoring**  
Evaluates the effectiveness of specific management practices in reducing losses or loadings of components such as sediment or nutrients. The NRCS has a good amount of information about the effectiveness of various practices in protecting surface water and groundwater quality.  
  
Evaluates the net effect of the implementation of an Area Plan and watershed improvement activities on water quality trends

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

## **Future Evaluation Goals**

### Riparian site capability

By 2006, ODA and the SWCD will complete the riparian site capability mapping for the AgWQM Area. This will aid in the characterization of the potential vegetation that can be achieved, both short and long term, on any stream reach in the management area and further define the riparian vegetation goals stated in the TMDL.

### LUB GWMA

By December 2009, the goal for irrigated agriculture is that 95% of the irrigated acreage is implementing an accepted system of BMPs or are covered by an implementation plan and the recommendations are in place and being used. This goal is consistent with the LUB GWMA Action Plan goal.

By December 2009, the goal for dairies and feedlots is that 90% of all dairies and feedlots are implementing an accepted system of BMPs or are covered by an implementation plan. This goal is consistent with the LUB GWMA Action Plan goal.

## **Biennial Review**

By the end of 2007, ODA, with the cooperation and assistance of the SWCD, the LAC, and DEQ, will assess the progress of plan implementation toward achievement of plan goals and objectives. These assessments will include:

1. An accounting of the numbers and acreage of operations with approved VWQFPs and the calculated amount of soil erosion and pollution prevented.
2. Identification of additional sources of sediment, nutrients, and other contributors to non-attainment of all applicable water quality standards.
3. An evaluation of available current water quality monitoring data.
4. An evaluation of outreach and education programs designed to provide public awareness and understanding of water quality issues.
5. A review of projects, demonstrations, and tours used to showcase successful management practices and systems.
6. An evaluation of the effectiveness of the technical and financial assistance sources available to the agricultural community.
7. Review of load allocations as found in Umatilla Basin TMDL and effectiveness of this plan in meeting load allocations as described in the TMDL for the Umatilla Basin.

Based on these assessments, ODA, SWCD, LAC, and the State Board of Agriculture will consider making appropriate modifications to the Area Plan and Rules. Any future amendments to the administrative rules will be subject to public participation process as defined in Oregon law.

## **6. Resolution of Complaints and Enforcement Action**

ODA will investigate complaints against landowners or operators who are alleged to be out of compliance with the Rules associated with this Area Plan. If the landowner is in non-compliance, ODA will consult with the landowner/operator and the SWCD using the Field

Office Technical Guide to develop solutions and timelines. The authority and procedures for complaint investigation rests with the ODA under provisions of *OAR 603-095-0380*.

ODA will use enforcement mechanisms where appropriate and necessary to gain compliance with the prevention and control measures. Any enforcement action will be pursued only when reasonable attempts at voluntary solutions have failed. Landowners with chronic or egregious violations of Area Rules will be subject to enforcement action by ODA under authority provided in *OAR 603-090-0060 through 603-090-0120*.

Entry onto private property is authorized for the purpose of investigating lands within the Umatilla River Subbasin AgWQM Area to determine sources of pollution (*ORS 568.915*). ODA may investigate lands within the AgWQM Area to determine those actions that may be required of landowners under the Area Rules and to determine whether the landowner is carrying out the required actions. ODA will not enter onto private lands to gather information without first seeking landowner consent.

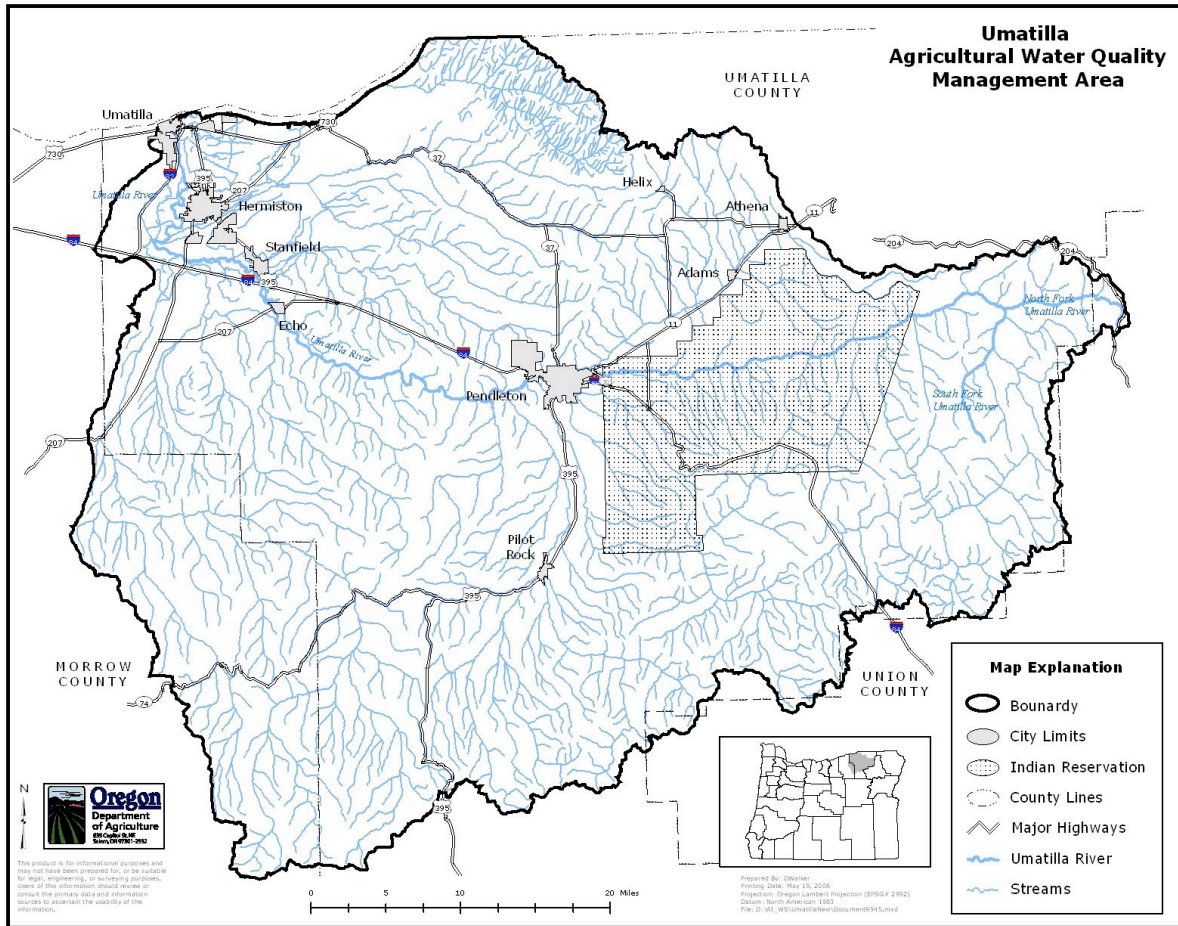
### **603-095-0380**

#### **Complaints and Investigations**

- (1) When the department receives notice of an alleged occurrence of agricultural pollution through a written complaint, its own observation, through notification by another agency, or by other means, the department may conduct an investigation. The department may, at its discretion, coordinate inspection activities with the appropriate Local Management Agency.
- (2) Each notice of an alleged occurrence of agricultural pollution will be evaluated in accordance with the criteria in *ORS 568.900 to 568.933* or any rules adopted thereunder to determine whether an investigation is warranted.
- (3) Any person allegedly being damaged or otherwise adversely affected by agricultural pollution or alleging any violation of *ORS 568.900 to 568.933* or any rules adopted thereunder may file a complaint with the department.
- (4) The department will evaluate or investigate a complaint filed by a person under section *OAR 603-095-0380* (3) if the complaint is in writing, signed and dated by the complainant and indicates the location and description of:
  - (a) The waters of the state allegedly being damaged or impacted; and
  - (b) The property allegedly being managed under conditions violating criteria described in *ORS 568.900 to 568.933* or any rules adopted thereunder.
- (5) As used in section *OAR 603-095-0380*(4), “person” does not include any local, state or federal agency.
- (6) Notwithstanding *OAR 603-095-0380*, the department may investigate at any time any complaint if the department determines that the violation alleged in the complaint may present an immediate threat to the public health or safety.
- (7) If the department determines that a violation of *ORS 568.900 through 568.933* or any rules adopted thereunder has occurred, that landowner may be subject to the enforcement procedures of the department outlined in *OAR 603-090-0060 through 603-090-0120*.

# Attachment 1:

## UMATILLA AgWQM Area MAP



## Attachment 2: 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](http://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.

<b>Table 2. Description of Load Allocations</b>				
<b>Water Quality Limitation</b>	<b>Quantity</b>	<b>Geographic Areas</b>	<b>Season</b>	<b>Responsibility</b>
Temperature	<ul style="list-style-type: none"> <li>• Daily max. radiant energy</li> <li>• % effective shade</li> <li>• Channel Width and shade</li> <li>• Channel max. width/depth</li> </ul>	Perennial streams of the Umatilla Basin	July to August annual peak temperatures	Land uses: Agriculture Forestry Urban Transportation
Sediment	<ul style="list-style-type: none"> <li>• % Upland erosion reduction</li> <li>• % Streambank erosion reduction</li> </ul>	All streams of the Umatilla Basin	Design storm (winter/spring)	Land uses: Agriculture Forestry Urban 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: Agriculture
Ammonia	Address through point source permits			
Bacteria	Number of <i>E.Coli</i> organisms entering streams per design storm runoff	8 Major Watersheds	Design storm: McKay Ck (all year) Others (April to October)	Land uses: Agriculture 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.<sup>8</sup> *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.

<sup>8</sup>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; and 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 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
- Large willow – Pacific Willow
- Alder – Thinleaf, White
- Black Cottonwood
- Choke Cherry
- 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.

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

Sedimentation OAR 340-41-645(2)(j)	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 OAR 340-41-027	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 OAR 340-41-645(2) c	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.

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	1694	86	95	22	73
Tutuilla	1599	70	96	38	58
McKay	251	72	72	33	39
Birch	376	110	71*	*30	*41
Butter	1186	110	91	9	82
Gulches/Canyons	2560	80	97	10	87
Stage Gulch	656	80	88	23	65
Sand Hollow	1115	80	93*	*10	*83
Cold Springs	1295	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

<b>Applicable Aquatic Weeds or Algae and pH Standards</b>	
Aquatic Weeds or Algae OAR 340-41-645(2)(h)	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 OAR 340-41-645(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: EPA has set a maximum contaminate level of 10 mg/l for nitrate (NO<sub>3</sub> -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 340-41-645(2)(p)(A) 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.

OAR 340-41-645(2)(p)(B) Levels of toxic substances shall not exceed 10 mg/l.

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 340-41-645(2)(p)(B) 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 340-41-645(2)(e)(A)(i) Prior to March 1996: a geometric mean of five fecal coliform samples should not exceed 200 colonies per 100 mls, and no more than 10% 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.

<b>Tables 56 – 61. Watershed Bacteria Load Allocations</b>					
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

### **Attachment 3:**

## **REFERENCES TO INFORMATION USED IN THE DEVELOPMENT OF THE AREA PLAN**

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