

Lower Deschutes Agricultural Water Quality Management Area Plan

4th Biennial Revision

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Developed by the

LOWER DESCHUTES LOCAL ADVISORY COMMITTEE

with assistance from

OREGON DEPARTMENT OF AGRICULTURE

and

WASCO COUNTY SOIL AND WATER CONSERVATION DISTRICT

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TABLE OF CONTENTS

ACRONYMS AND ABBREVIATIONS	4
MAP OF MANAGEMENT AREA	5
FOREWORD	6
APPLICABILITY	6
INTRODUCTION	7
GEOGRAPHIC AREA AND PHYSICAL SETTING	8
LAND USE	9
WATER USE	9
WATER QUALITY ISSUES	10
BENEFICIAL USES	10
303(D)-LISTED STREAMS	10
CONTRIBUTORS TO WATER POLLUTION	10
PURPOSE, GOALS, AND OBJECTIVES	12
STRATEGIES TO ACHIEVE GOALS & OBJECTIVES	15
PROHIBITED CONDITIONS (AREA RULES)	18
1. SOIL EROSION ON UPLANDS	18
2. ACTIVE STREAM BANK EROSION	20
3. PLACEMENT, DELIVERY OR SLOUGHING OF WASTES	20
4. RIPARIAN VEGETATION	22
MONITORING AND ASSESSMENT	23
BASELINE	23
AREA PLAN IMPLEMENTATION AND EFFECTIVENESS	23
PRIORITY AREAS AND STRATEGIES FOR AREA PLAN IMPLEMENTATION	25
IMPLEMENTATION SCHEDULE	25
ADMINISTRATIVE ROLES AND RESPONSIBILITIES	26
TOTAL MAXIMUM DAILY LOADS	26
DESIGNATED MANAGEMENT AGENCY	26
TECHNICAL AND FINANCIAL ASSISTANCE	26
AREA PLAN EVALUATION	28
RESOLUTION OF COMPLAINTS AND ENFORCEMENT ACTION	28
REFERENCES	30
ATTACHMENT 1: IRRIGATION	31
ATTACHMENT 2: FISHERIES	32
ATTACHMENT 3: WATER QUALITY LIMITED STREAMS ON 2002 (303(D) LIST	34
ATTACHMENT 4: FIELD OFFICE TECHNICAL GUIDE (FOTG)	35
ATTACHMENT 5: CONSERVATION PRACTICES	37

ACRONYMS AND ABBREVIATIONS

AMS - Acceptable Management System

Area Plan - Lower Deschutes Agricultural Water Quality Management Area Plan

Area Rules - Oregon Administrative Rules 603-95-0600 through 603-95-0660

DEQ - Oregon Department of Environmental Quality

EPA - United States Environmental Protection Agency

FOTG - Field Office Technical Guide

HEL - Highly Erodible Land

LAC - Lower Deschutes Local Advisory Committee

Management Area - Lower Deschutes Agricultural Water Quality Management Area

NRCS - United States Natural Resources Conservation Service

OAR - Oregon Administrative Rules

ODA - Oregon Department of Agriculture

ODFW - Oregon Department of Fish and Wildlife

ORS - Oregon Revised Statutes

RMS - Resource Management System

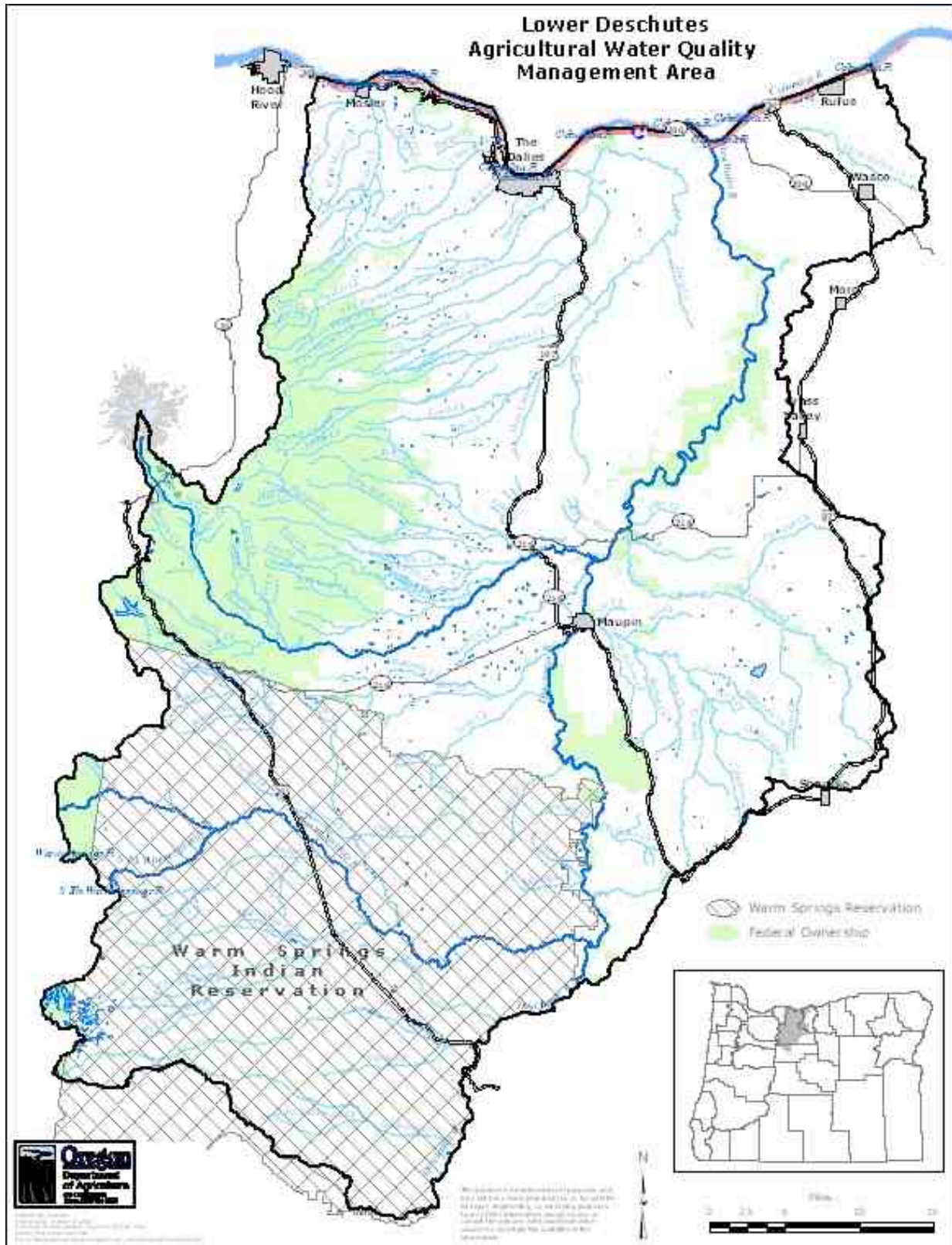
RUSLE - Revised Universal Soil Loss Equation

SWCD - Soil and Water Conservation District

TMDL - Total Maximum Daily Load

USDA - United States Department of Agriculture

MAP OF MANAGEMENT AREA



FOREWORD

This Agricultural Water Quality Management Area Plan (Area Plan) provides guidance for addressing agricultural water quality issues in the Lower Deschutes Agricultural Water Quality Management Area (Management Area). This Area Plan identifies strategies to reduce water pollution from agricultural lands through a combination of educational programs, suggested land treatments, management activities, and monitoring. The Area Plan does not establish legal requirements or prohibitions. The Oregon Department of Agriculture (ODA) exercises its enforcement authority for the prevention and control of water pollution from agricultural activities under Oregon Administrative Rules (Area Rules) for the Lower Deschutes (603-095-0600 through 603-95-0660) and Oregon Administrative Rules 603-090-0120 through 603-090-0180.

The administrative rules for the Lower Deschutes set forth the requirements and/or prohibitions that are used by ODA to exercise its enforcement authority for the prevention and control of water pollution from agricultural activities. In addition, Oregon Administrative Rules 603-090-0120 through 603-090-0180 describe the enforcement actions that may be triggered upon the finding of a violation by ODA.

APPLICABILITY

This Area Plan applies to agricultural activities on all non-Federal and non-Tribal Trust agricultural, rural, and forest lands in the Management Area. This Management Area consists of 1) all lands drained by the Deschutes River and its tributaries downstream but not inclusive of the Trout Creek drainage and 2) all streams flowing into the Columbia between the Hood River drainage and the John Day Basin (see map). It applies to tribally-owned land off reservation. It applies to lands in current agricultural use and those lying idle or on which management has been deferred. It also applies to agricultural operations within incorporated city boundaries.

INTRODUCTION

The 1993 Oregon Legislature, in passing Senate Bill 1010 (ORS 568.900-568.933), provided for ODA 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 regulations; it is also an important element of the Oregon Plan. The Agricultural Water Quality Management Area Plans recognize that the best way to prevent or control pollution from land in agricultural production is to work to reduce the conditions on that land that cause pollution.

This Area Plan was developed by volunteer members of the Lower Deschutes Agricultural Water Quality Local Advisory Committee (LAC) with assistance from ODA and the Wasco County Soil and Water Conservation District (SWCD), in consultation with members of the community. Current members are:

Ken Bailey, Co-Chair : The Dalles, orchardist Neal Harth, Co-Chair : Boyd, small grain producer Gary Brown: Gordon Ridge, crops Rod French: ODFW District Fish Biologist Bill Hammel: Fifteenmile, SWCD, cattle and wheat Lee Kaseberg: Fulton Canyon, small grain producer Dick Lindley: Bakeoven, cattle	Norm Lyda: Dufur, SWCD, cattle and wheat Tom McCoy: Wasco, small grain producer Glenn Miller: Dufur, City Superintendent Art Wassenmiller: Tygh Valley, livestock producer Alternate: Jon Justesen: Kent, small grain and livestock producer
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In summary, this Area Plan provides farmers, ranchers, and other agricultural land users in the Management Area a tool to achieve the following conditions on the land they occupy and manage:

1. Soil erosion on uplands within acceptable rates.
2. Streambank erosion within acceptable levels.
3. Elimination of placement, delivery, or sloughing of wastes into streams (currently the State law).
4. Adequate riparian vegetation exists for bank stability and stream shading consistent with vegetative site capability.

The intent of this Area Plan is not to tell anyone how to farm, ranch, or otherwise utilize his or her natural resources. However, the Natural Resources Conservation Service (NRCS) along with SWCD personnel in local offices can provide technical assistance to help farmers, ranchers, and other agricultural land users implement recommendations in this Area Plan. For detailed information, please refer to the “Prohibited Conditions” section. Each farmer, rancher, or other agricultural land user is expected to observe their property to ensure that either prohibited conditions do not exist or that they are beginning to improve. If problems are encountered in meeting the goals of this Area Plan, land managers are encouraged to seek assistance, as they must bring the land they own or operate into compliance with Area Rules.

This Area Plan recognizes that planning for water quality is only part of a successful plan for overall management of agricultural and rural land and that other, broader objectives must also be

considered in total farm or resource management planning. Sustaining agricultural production capacity for future generations is one of those broader objectives. Conserving water and soil resources helps achieve that.

GEOGRAPHIC AREA AND PHYSICAL SETTING

The Lower Deschutes Agricultural Water Quality Management Area is located east of the Cascade Mountain Range in North Central Oregon. This area includes portions of the Mount Hood National Forest, Bureau of Land Management parcels, and State of Oregon Lands. Counties within this area include Hood River (eastern-most portion), Wasco, and Sherman (western portion). The Management Area contains 1,311,493 acres (2,049 square miles).

The Deschutes and Columbia Rivers are the largest watercourses within the area. Major tributaries of the Deschutes River in the Management Area include White River, Buck Hollow Creek, and Bakeoven Creek. The Trout Creek watershed is the southern boundary of, but is not included in, this Management Area. All waters of the Management Area flow into the Columbia River, which is the northern boundary of the area. Streams between Rufus and Mosier and their drainages are also part of the area. This includes Spanish Hollow, Fifteenmile Creek, Threemile Creek, Mill Creek, Chenoweth Creek, and Mosier Creek.

The average annual precipitation ranges from about 109.5 inches on Mount Hood to about 10 inches in the eastern areas. This results from the rain shadow effect produced by the Cascade Mountain Range. While most of the precipitation is in the form of rain, there is substantial snowfall almost every winter in the higher elevations. Elevations range from 98 feet at The Dalles, to 11,240 feet at the top of Mount Hood (headwaters of White River). The low annual rainfall on the majority of the landscape is characteristic of the Intermountain Region, which receives 70-80% of its precipitation between November and March. This reflects the strong influence of marine air masses moving in from the Pacific Ocean. Most of the area was once native grassland. The Dalles, located on the Columbia River on the northern end of the Management Area, is often the warmest location in the state. Two types of events that produce substantial and frequently damaging runoff events in this area are heavy precipitation or rapid snowmelt on frozen soils, and violent cloudbursts in the summer.

The Management Area lies within the Columbia Plateau and the Eastern Cascade Mountain physiographic province. The Columbia Plateau is a lava-floored plain that has been uplifted since molten basalt flooded the area. The Eastern Cascade province is a high upland terrace of coarse alluvial and pyroclastic materials. This terrace is eroded and is characterized by wide nearly level ridge tops and deep V-shaped canyons up to 1000 feet deep. The Columbia River Basalt of the Miocene series is the most prominent formation. It is part of a widespread series of basalt flows that extend from Astoria, in the western part of Oregon, east into Idaho and north into Washington. The Columbia River Basalt has preserved major ridges in the basin and is between 1000 to 2000 feet thick.

Soils in the basin were formed in residuum from the weathering of bedrock and in colluvium on sloping uplands and plateaus; material transported by water and deposited as unconsolidated deposits of clay, silt, and gravel; pumice and ash from volcanic activity (Newberry Crater and Mount Mazama); and loess that has been transported by wind from other areas.

Land Use

Agriculture is the predominant land use in the Management Area. The small portion of Hood River County in the Management Area is primarily National Forest land.

Wasco County was established in 1854 and has a total area of 2,396 square miles, including the Warm Springs Indian Reservation. Farming became the principle industry in Wasco County in the 1860s.

Water Use

The largest watercourses in this Management Area are the Deschutes and Columbia Rivers. The Deschutes River drains approximately 10,500 square miles, with an average discharge of 4,222,000 acre feet/year (5,828 ft³/second). The third largest water course in the area is the White River, which originates from Mount Hood. The White River drains approximately 417 square miles, with an average discharge of 308,600 acre feet/year (426 ft³/second).

Five reservoirs store water in the Lower Deschutes Basin and are used for irrigation and municipal water supply. Three of the five reservoirs reside in the Mount Hood National Forest. Badger Lake has a maximum volume of 660 acre feet available for irrigation and feeds Badger Creek. Clear Lake has a maximum volume of 13,060 acre feet and feeds Clear Creek. Rock Creek Reservoir has a maximum volume of 1,280 acre feet. It is fed by Rock Creek, Gate Creek, and Threemile Creek. Crow Creek Reservoir is surrounded by National Forest land, but resides within land owned by the City of The Dalles. The maximum volume is 955 acre feet and it is fed by the South Fork of Mill Creek and Dog River. Crow Creek Reservoir is the primary water source for the City of The Dalles. Pine Hollow Reservoir has a maximum volume of 4,750 acre feet that allots 3,550 acre feet for irrigation use. Many orchards near The Dalles are irrigated with Columbia River water. Several irrigation ditches are present in the area (Attachment 1).

WATER QUALITY ISSUES

The Clean Water Act requires that each state designate beneficial uses for every stream and lake, decide which parameters to measure to determine whether beneficial uses are being met, and to set water quality standards based on the beneficial uses and parameters. Section 303(d) of the Clean Water Act directs states to develop a list of water quality limited streams, which are streams that violate water quality standards and do not support their beneficial uses. The Clean Water Act also directs states to develop Total Maximum Daily Loads (TMDLs) for 303(d)-listed streams. These TMDLs result in allocations of pollutant loads, e.g. degrees of temperature or tons/acre of sediment, to different sources such as private agriculture, urban areas, and federal lands. Because TMDLs have not yet been approved for the Management Area, this Area Plan will address water quality issues as they are currently understood. Once load allocations are established by TMDLs, this Area Plan will be modified, if necessary, to meet those allocations. The Draft TMDL for the Miles Creeks drainage was released for public comment in October 2008 by DEQ; TMDLs for the rest of the Management Area are expected in 2010.

Beneficial Uses

Beneficial uses in the Management Area include drinking water, irrigation, industrial, municipal, livestock watering, aquatic life, boating, fishing, water contact recreation, and aesthetics. Uses related to aquatic life are the most sensitive. Attachment 2 discusses fisheries.

303(d)-Listed Streams

Some stream segments in the Management Area have been declared water quality limited by Oregon's Department of Environmental Quality (DEQ) under Section 303(d) of the Clean Water Act (Attachment 3). This list of streams was last updated in 2006. Water quality standards are violated on some streams for temperature, pH, and sedimentation. Of these, temperature, and pH primarily are summer concerns. Exceeding these standards indicates potential problems for fish. Additionally, some streams exceed the standards for the pesticides malathion and chlorpyrifos but are not yet on the 303(d) list.

Contributors To Water Pollution

Both point and nonpoint sources contribute to water pollution. Point sources discharge pollutants into the water through a pipe or conveyance. In contrast, nonpoint source pollution cannot be tracked to a single source; the accumulation of nonpoint source pollution results in water quality impairments. Nonpoint sources of pollution in the Management Area can include runoff and erosion from agricultural and forest lands, leaching of pollutants to groundwater, eroding stream banks, and runoff from roads and urban areas. Rerouting 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 can be carried to the surface water or groundwater through the actions of rainfall, snowmelt, irrigation, and leaching. Heat input due to direct solar radiation, seasonal flow reduction, changes in channel shape, and floodplain alteration can contribute to water quality impairment. Channelization and bank instability may

alter gradient, width/depth ratio, and sinuosity, thereby causing undesirable changes in sediment transport regime, erosional and depositional characteristics, and stream temperature.

PURPOSE, GOALS, AND OBJECTIVES

Purpose

The purpose of this Area Plan is to establish a framework to minimize agriculture's impact on water quality within the Lower Deschutes Agricultural Water Quality Management Area. The Area Plan establishes procedures to identify and control factors that contribute to pollution originating on agricultural and rural lands. It also describes a program designed to achieve the goals of this Area Plan.

Goal

The goal of this Area Plan is to prevent or control water pollution from agricultural activities and to achieve applicable water quality standards.

Objectives

To achieve the Area Plan purpose and goal, the following water quality related objectives are established:

1. Control soil erosion on uplands to acceptable rates.

- Soil erosion must be minimized through appropriate vegetation management or structural practices to protect soils and increase water infiltration rates.

Intent: While all soils lost from fields through erosion may not necessarily enter streams, due to distance from stream or practices such as sediment basins, the reduction in such erosion reduces the likelihood that soils will enter Management Area streams.

2. Achieve stable stream banks

- Active stream bank erosion must not exceed that expected for stream flow regimes and channel types. Also, stream channel modification that extends well beyond the level anticipated from natural disturbance, given system characteristics, is not allowed.

Intent: Streams naturally experience bank erosion; a general rule-of-thumb is that a stable stream system has 20% or less eroding stream bank. The Wasco County SWCD estimates, based on field observations, that banks of perennial and intermittent streams currently are approximately 60% stable. Stable stream banks reduce sediment in the stream caused by mass wasting and bank erosion and help narrow channels, thereby reducing the amount of surface water exposed to solar radiation.

Ephemeral streams (dry draws) rarely have defined banks and are primarily influenced by upland management practices. Appropriate cropping and rangeland practices minimize the sediment contributed by such streams.

3. Prevent the following, which are already prohibited under Oregon Law ORS 468B:

- Activities that 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.
- Discharge of 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.
- Violation of conditions of any waste discharge permit issued under ORS 468B or ORS 568.

“Wastes” includes but is not limited to commercial fertilizers, soil amendments, composts, animal wastes, vegetative materials, or any other wastes as defined in ORS 468B.005(7).

Intent: This ensures that high nutrient concentrations, pathogens associated with high animal density areas, high sediment concentrations in run-off, or other potential pollutants are not readily transported to streams and groundwater. It is also consistent with existing state statutes.

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 entering waters of the state, 2) livestock waste accumulated in drainage ditches or areas of flooding, and 3) fecal coliform 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 Prohibited Conditions in the Area Rules. Livestock facilities located near streams should employ an adequate runoff control system. Compliance with the riparian objectives shown below help keep wastes from running into waters of the state. Landowners can contact the NRCS and appropriate SWCD for assistance with complying with this objective.

4. Provide adequate riparian vegetation for stream bank stability and stream shading consistent with site capability.

- Activities that preclude establishment and development of adequate streamside riparian vegetation for stream bank stability and stream shading, consistent with site capability are not allowed.

Riparian vegetation means plant communities consisting of plants dependent upon or tolerant of the presence of water near the ground surface for at least part of the year.

Site potential refers to the type and amount of vegetation that occurs in an advanced ecological status (climax) in a particular area. Site potential is determined primarily by channel morphology, climate, elevation, and soil parent material. *Site capability*, however, refers to the types and amount of vegetation that could be expected to occur in a particular area given certain physical constraints, such as the presence of a bridge, water gap, building, or highway.

Intent: The purpose of this objective is to provide for stream bank stability and stream shading, not to restore riparian areas to their pre-settlement conditions or to address wetland areas away from streams. Landowners must eliminate activities restricting the growth of streamside riparian vegetation, because most of these changes take time and may require planning and implementation of management changes. Adequate vegetation for stream bank stability and stream shading also result in: interception and immobilization of nutrients and sediment, more complex stream structure, and, where applicable, presence of large woody debris. The potential width of the vegetated riparian area varies depending on site capability.

Adequate riparian vegetation should:

- include a variety of plant species and ages
- include plants that have root masses capable of withstanding high stream flows
- provide adequate cover to protect the stream bank and dissipate energy during high flows
- include sufficient ground cover to filter out excess sediment or nutrients in overland flows
- provide shade

Adequate vegetation includes: visible ongoing renewal of riparian vegetation through natural processes; vigorous growth; presence of native species; and the maintenance of a majority of each year's new growth of woody vegetation (trees and shrubs). Noxious weeds are undesirable as they generally provide less shade, filtering capacity, and stabilizing root mass than the plants they replace.

As riparian vegetation matures, stream channels are expected to narrow and deepen. These stream channels will have less water surface area exposed to solar radiation (thereby reducing heating rates during summer) and will be more connected to their floodplain. Better floodplain connectivity has the added benefit of increasing storm water storage and reducing storm water velocities. These streams will also meander more, which will reduce flow velocities and reduce the damage from flooding.

STRATEGIES TO ACHIEVE GOALS & OBJECTIVES

To achieve clean water, an effective strategy must increase awareness of the problem and the range of potential solutions, motivate appropriate voluntary action, and provide for technical and financial assistance to plan and implement effective conservation practices. The following strategies are used at the local level by the appropriate SWCD through work plans and Memoranda of Agreement with ODA, in cooperation with landowners and other agencies and organizations.

1. Work to improve the quality of water in the Management Area through planning and implementation of technically sound and economically feasible conservation practices that contribute to meeting Area Plan objectives.
 - A. Limit soil erosion and pollution caused by agricultural activities, as close to the source as possible, by achieving soil erosion targets and sediment control.
 - B. Show progress in reduction of pollution from agricultural and rural lands through periodic surveys of stream reaches and associated lands. Methods will be selected as targets become better understood and quantified.
 - C. Implement successful practices for stream bank stabilization, reduction in high summer water temperatures, restoration and enhancement of wetlands and riparian areas, and Integrated Pest Management, while avoiding adverse fish habitat modification.
 - D. Implement conservation practices to improve irrigation water use and conveyance efficiency to reduce the impact of seasonal flow modifications on streams resulting from water withdrawals.
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. Incorporate implementation of the Area Plan as a priority element in the Wasco and Sherman County SWCDs' Annual Work Plan and Long Range Plan with support from partner organizations.
 - B. Inform landowners of the Area Plan and Rules and encourage landowners to make such changes as may be needed.
 - C. Showcase successful practices and systems and conduct annual tours for landowners and media.
 - D. Recognize successful projects and practices through appropriate media and newsletters.
 - E. Promote cooperative on-the-ground projects to solve critical problems identified by landowners/operators and in cooperation with partner organizations.

- F. Conduct educational programs to promote public awareness of water quality issues and their solutions.
 - G. Examine current research and monitoring results and conduct such monitoring as may be necessary to better quantify current conditions and objectives contained in this Area Plan in preparation for biennial Area Plan reviews.
3. Encourage active participation by the agricultural community and rural public in the process of solving our water quality problems.
- A. Encourage development of individual conservation plans by assisting landowners with plans that address water quality and with the implementation of conservation practices adopted in those plans.

(1) Conservation Plans

A Conservation Plan is a comprehensive management plan that addresses site-specific problems through the selection of individual management practices or systems of practices. To adequately address water quality issues, conservation plans should outline specific measures necessary to limit water pollution from agricultural activities and soil erosion.

Conservation Plans may contain any of the following elements or additional elements not listed here, depending on the site and the condition for which preventive or corrective measures are being implemented:

- Soil Erosion and Sediment Control
- Streamside Area Management
- Livestock Management
- Waste Management
- Nutrient and Farm Chemical Management
- Irrigation Management
- Channel and Drain Management

Landowners have flexibility in choosing management approaches and practices to address water quality issues on their lands. They may develop management systems to address problems on their own, or they may choose to develop a Conservation Plan with assistance from their local SWCD or NRCS office. Conservation Plans developed by SWCD or NRCS personnel are approved by the appropriate SWCD.

(2) Conservation Practices

Agricultural conservation practices for pollution control are those management practices and structural measures that are the most effective, practical means of controlling and preventing pollution from agricultural activities. Conservation practices are actions taken by individual agricultural operations to achieve production and water quality goals.

Appropriate conservation practices for individual farms vary with the specific cropping, topographical, environmental, and economic conditions existing at a given site. No set of conservation practices is universally applicable to all areas and all agricultural activities within the Management Area.

A detailed listing of specific practices that can be used to control or reduce the risk of agricultural pollution are contained in other documents such as the Field Office Technical Guide (FOTG) (overview in Attachment 4). This Guide is available from NRCS at the local United States Department of Agriculture (USDA) Service Center. An electronic version ('efotg') is available on the internet at <http://www.nrcs.usda.gov/technical/efotg/>. Attachment 5 lists examples of conservation practices typically used in the Management Area.

Conservation practices are most effective when implemented as integral parts of a comprehensive resource management plan and are based on natural resource inventories and an assessment of management practices. The conservation planning process used by NRCS and the SWCDs should produce an effective, systems approach to resource management tailored for a specific land area and type of operation.

- B. Promote the continued development, evaluation, and adoption of practices and technologies that enhance water quality in an efficient, effective, economic manner, by reviewing research and development needs with agriculture assistance agencies and consultants.
 - C. Promote incentive and cost-share programs to assist with implementation of Area Plans and related practices, by annually identifying water quality funding needs with agencies providing cost-share and technical assistance to agricultural operations.
4. Encourage adequate funding and administration of the program to achieve Area Plan goals and objectives by systematic, long range planning and focusing of coordinated efforts on full-scale, watershed-based approaches, identifying needs, developing projects, actively seeking funding, and ensuring successful implementation of funded projects.

In addition to these voluntary strategies, required measures (Prohibited Conditions) are included as an implementation strategy. ODA uses enforcement where appropriate and necessary to gain compliance with Prohibited Conditions in the Rules. Any enforcement action is pursued only when reasonable attempts at a voluntary solution have failed (See Resolution of Complaints and Enforcement Action section).

PROHIBITED CONDITIONS (AREA RULES)

To prevent and control pollution from agricultural land in the Management Area, the conditions identified below must be met. These conditions relate directly to the Objectives of this Area Plan. Terms are defined in the Objectives section.

All landowners or operators conducting agricultural activities on non-Federal and non-Tribal lands (including timber lands) must comply with the Area Rules (603-95-0600 through 603-95-0660) for the following Prohibited Conditions. A landowner's responsibility is to implement measures that prevent or end the occurrence of Prohibited Conditions. Prohibited Conditions are least likely to occur where an effective program for their identification and control is in place. Implementation of a voluntary, individual conservation plan that addresses the conditions offers a way of meeting this responsibility. Individual conservation plans can be modified to meet changing conditions.

Structural conservation practices generally are designed to withstand different levels of storm events. For instance, terraces and waterways typically should handle a 10-year, 24-hour event, while drop structures, streambank protection, and larger dams should handle at least a 25-year, 24-hour event. Most agronomic practices can handle a 2-5 year event. Riparian systems in healthy condition are expected to withstand a 25-year event with minimal damage.

Conditions will be monitored (see Monitoring Section). In each category of the Prohibited Conditions described below, Section C provides at least one practical method of monitoring for that condition.

Activities governed by the Forest Practices Act are outside the jurisdiction of the Area Rules.

OAR 603-095-0640(1)

All landowners or operators conducting activities on lands in agricultural use must comply with the following criteria. Implementation of these rules must begin upon adoption and must be fully implemented by the dates listed below. A landowner is responsible for only those conditions caused by agricultural activities conducted on land controlled by the landowner. A landowner is not responsible for prohibited conditions resulting from actions by another landowner. Conditions resulting from unusual weather events or other exceptional circumstances are not the responsibility of the landowner.

1. Soil Erosion on Uplands

A. Characteristic to Achieve

Soil erosion on uplands is within acceptable limits. While all soils lost through erosion may not necessarily enter waters of the state, due to distance from the stream or to

practices such as sediment basins, the reduction in such erosion reduces the likelihood that soils will enter Management Area streams.

In addition to complying with this rule, landowners should be aware that the waste rule requires them to prevent pollution from sediment delivery to streams. While an NRCS-approved farm plan may show compliance with the erosion rule, farming in accordance with the plan may still result in pollution in violation of rule #3 (OAR 603-095-0640(4)). If ODA determines during a compliance investigation that a landowner's farm plan is not adequate to comply with the waste rule, ODA works with NRCS and the landowner to modify the plan to comply with the waste rule.

B. Prohibited Condition (OAR 603-095-0640(2))

Effective on rule adoption, landowners must control soil erosion on uplands using practical and available methods.

(a) On croplands, a landowner may demonstrate compliance with 603-095-0640(2) by:

- (A) operating consistent with a Soil and Water Conservation District (SWCD)-approved conservation plan that meets Resource Management System (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.**

(b) On rangelands, a landowner may demonstrate compliance with 603-095-0640(2) by:

- (A) operating consistent with a Soil and Water Conservation District (SWCD)-approved conservation plan that meets Resource Management System (RMS) quality criteria for soil and water resources; or**
 - (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.**
- (c) Landowners must control active gully erosion to protect against sediment delivery to streams. 'Active Gully Erosion' means gullies or channels that at the largest dimension have a cross-sectional area of at least one square foot and that occur at the same location for two or more consecutive years of cropping or grazing.**

C. Monitoring for Conditions

Compliance can be documented through a variety of methods. Landowners may choose to follow a voluntary conservation plan. The Revised Universal Soil Loss Equation (RUSLE) provides a standard method of calculating predicted sheet and rill erosion rates. Photo points may be used to show compliance with active channel erosion requirements or upland vegetation requirements. Paragraph “B” above (Prohibited Condition) describes several ways in which adequate erosion control can be demonstrated.

2. Active Stream Bank Erosion

A. Characteristic to Achieve

Active stream bank erosion is within acceptable levels. Stream channel modification caused by short-term erosion is minimal. Stabilization of stream banks reduces stream sediment loads. Vegetation used to stabilize banks helps reduce the rate of heating of water.

B. Prohibited Condition (OAR 603-95-0640(3))

By January 1, 2005, active stream bank erosion is not allowed beyond that expected for stream flow regimes and channel types. Stream channel modification that extends well beyond the level anticipated from natural disturbance given system characteristics is not allowed.

C. Monitoring for Condition

Methods for monitoring stream bank stability include, but are not limited to: Environmental Protection Agency’s (EPA) monitoring protocol for bank stability (1993), protocols described in Platts (1987) and Rosgen (1996), and NRCS-developed protocols (Oregon Tech Note No. 12 “Procedures for using Oregon Stream Habitat Data Sheet” and National Water and Climate Center Tech Note 99-1 “Stream Visual Assessment Protocol”). Selection of the appropriate protocol is site-specific.

3. Placement, Delivery or Sloughing of Wastes

A. Characteristic to Achieve

Wastes are placed so they are not likely to pollute waters of the state. This is already State law under ORS 468b (see Objective #3 in this Area Plan); the following Prohibited Condition is consistent with the current law.

Wastes include manure, sediment, commercial fertilizers, soil amendments, composts, vegetative materials, or any other substances that will or may cause water pollution (OAR 603-095-0010(53)).

B. Prohibited Condition (OAR 603-095-0640(4))

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

C. Monitoring for Conditions

Initial monitoring for this condition consists of visual inspection. If visual inspection discloses a potential problem then an appropriate monitoring protocol may be selected to determine if there is an adverse effect on water quality. The nature of the waste involved determines which monitoring protocol is appropriate.

4. Riparian Vegetation

A. Characteristic to Achieve

Riparian vegetation provides sufficient: 1) root mass for stream bank stability and 2) above-ground herbaceous material for stream shading to reduce the solar heating rate of surface water.

B. Prohibited Condition (OAR 603-095-0640(5))

By January 1, 2005, agricultural management or soil-disturbing activities that preclude establishment and development of adequate riparian vegetation for stream bank stability and shading, consistent with site capability, are not allowed.

C. Monitoring for Condition

ODA uses a modification of the Greenline method (Bureau of Land Management, 1993) to determine compliance with this condition. The method evaluates ground cover, canopy cover, and plant diversity in relation to stream shading and stabilizing streambanks. Site capability is determined on a site-specific basis, generally by comparison with nearby sites in good condition with similar characteristics and by reviewing scientific information.

Photographic records with a time sequence of photographs taken from the same point are the simplest method for qualitative assessments and for monitoring of trends.

MONITORING AND ASSESSMENT

Biennial assessments of the Management Area are done with inputs from Wasco and Sherman County SWCDs in conjunction with the biennial plan reviews. The assessments:

- characterize existing water quality and land conditions throughout the Management Area, including an estimate of current percent reduction in sheet and rill erosion from a “no treatment level”
- present status of Area Plan implementation
- evaluate Area Plan effectiveness
- identify priority areas, and
- provide recommendations for changes to Area Plan strategies

Baseline

Water quality currently is monitored on a limited basis by: Oregon Departments of Environmental Quality, Fish and Wildlife, and Water Resources; Wasco County SWCD; US Forest Service; Bureau of Land Management; City of Dufur; City of The Dalles; and the Confederated Tribes of the Warm Springs Reservation. These groups primarily are measuring temperature, although some also monitor turbidity and physical fish habitat. DEQ monitors temperatures in the “Miles Creeks” system for their upcoming TMDL.

The Oregon Plan for Salmon and Watersheds’ *Water Quality Monitoring Technical Guide Book* is the preferred reference manual; other water quality monitoring protocols can be obtained from DEQ, the Oregon Cattlemen’s Association, and the local SWCD or Watershed Council. Specific monitoring protocols depend on the condition being assessed.

Most soil erosion and sediment transport to waterways occurs during rain or snowmelt on frozen ground in the winter, although sediment from cropland also may enter waterways during and after severe thunderstorms in the summer. These events are often separated by periods of several years or more when little sediment enters streams. The lack of data and the sporadic and unpredictable timing of erosion events make it difficult to determine water quality conditions and trends relating to sediment in the Management Area. The LAC would like to see enough sediment monitoring stations established in the Management Area so that the amount and timing of sediment delivery to the waterways can be estimated each year. A record of yearly sediment delivery will be useful in determining trends in the condition of the Management Area.

In 2006 and 2007, staff from ODA, Wasco Co. SWCD, and DEQ collected data at 23 sites in the Fifteenmile drainage to characterize sediment transport in the streams. The data have been analyzed using the Relative Bed Stability (RBS) method, which assesses the size of sediment compared to what would be expected under natural conditions. Preliminary data analyses are

finished, and these suggest that the major sediment issues are in the Eightmile drainage below Endersby. These sites will be revisited every 3 years to track trends in sediment dynamics.

Area Plan Implementation and Effectiveness

The Wasco County SWCD and ODA are responsible for determining progress towards Area Plan goals and whether they will be met in the timeframes identified in the Area Plan. The Wasco and Sherman County SWCDs maintain Memoranda of Agreement with ODA that outline their responsibilities for implementation of the Area Plan.

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 methods will be refined when the specific targets are better understood and quantified.

The Wasco and Sherman County SWCDs will, as appropriate:

- track numbers and acreage of operations with approved Conservation Plans and the calculated amount of soil erosion and/or pollution prevented
- identify additional sources of sediment, nutrients, and other contributors to non-attainment of all applicable water quality standards
- evaluate available current water quality monitoring data
- evaluate outreach and education programs designed to provide public awareness and understanding of water quality issues
- review reports, projects, demonstrations, and tours used to showcase successful management practices and systems
- evaluate the adequacy of technical and financial assistance sources available to the agricultural community
- review load allocations in the Management Area TMDLs and the effectiveness of this Area Plan in meeting those load allocations

ODA determines compliance with Prohibited Conditions on a Management Area scale through aerial photographs of riparian conditions taken every 5 years.

PRIORITY AREAS AND STRATEGIES FOR AREA PLAN IMPLEMENTATION

Information gathered through monitoring land and water conditions helps identify priority areas for education, technical, and financial assistance.

Top priorities for Wasco SWCD include: continuing to implement riparian buffers, making direct seed/no-till sustainable, conserving water, and working with small acreage landowners that have horses on streams. Sherman SWCD is focusing on reaching all residents of the county and their absentee landlord with conservation-related information, promoting CREP and CCRP to meet goals for improved water temperature, increasing the amount of “hands on” agriculture-related learning experiences available to youth, and providing quality assistance to NRCS and FSA in order to get more landowners involved in USDA programs.

The Wasco and Sherman County SWCDs maintain a list of resource concerns, which are prioritized in their long-range planning documents.

Implementation Schedule

A. Area Plan Period

Landowners are expected to achieve meaningful progress toward achieving the Area Plan’s objectives within the stated timeframes. These timeframes may be changed in subsequent amendments to the Area Plan and Rules as more information is gathered and when the TMDLs are developed by DEQ. TMDLs are expected for the Management Area as early as 2008.

B. Prohibited Conditions

Prohibited Conditions are in effect.

C. Monitoring and Feedback

Monitoring shall begin immediately upon approval and adoption of this Area Plan, and will continue for the duration of this Area Plan and its amendments.

D. Amendment

The Area Plan and Rules are reviewed by the LAC and ODA at two-year intervals and amended as necessary.

ADMINISTRATIVE ROLES AND RESPONSIBILITIES

Total Maximum Daily Loads

The Oregon DEQ is required by federal law to establish formal TMDLs for pollutants in waters designated as "water quality limited." The TMDLs set maximum limits on the amount of pollutants allowed to enter Management Area waters. This loading capacity is calculated to achieve water quality standards. DEQ is in the process of establishing TMDLs for the Management Area. Once a load allocation is established by the TMDL for agriculture, this Area Plan and Rules will be modified, if necessary, to meet that allocation.

Designated Management Agency

ODA is the Designated Management Agency for water pollution control activities on agricultural and rural lands in the Management Area. ODA is authorized to develop and carry out an Area Plan for any agricultural or rural lands, where such an Area Plan is required by state or federal law.

Wasco County SWCD is designated as the Local Management Agency for revisions of the Area Plan and for implementation of the Area Plan and projects in Wasco County. Sherman County SWCD is responsible for implementing the Area Plan and related projects within Sherman County. Implementation priorities are established on a periodic basis through annual work plans developed jointly by the SWCDs and ODA with input from partner agencies.

The Director of ODA, in consultation with the State Board of Agriculture, appointed the LAC representing local agricultural producers, local landowners, the Indian tribes, local agencies, and the Wasco County SWCD, to assist with the development of this Area Plan and Rules.

The Wasco County and Sherman County SWCDs and the LAC participate in biennial reviews of Area Plan implementation progress. Any future amendments to the administrative rules will be subject to the public participation process outlined in Oregon law.

Technical and Financial Assistance

As resources allow, Sherman and Wasco County SWCDs 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 Conservation Plans. Personnel in these offices can also design and assist with implementation of practices, and assist in identifying 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 conservation practices may be available through current USDA conservation programs such as Environmental Quality Incentive Program (EQIP), Continuous Conservation Reserve Program (CCRP); EPA's nonpoint source implementation grants (319); or state programs such as Oregon Watershed Enhancement Board (OWEB) and the Conservation Reserve Enhancement Program (CREP). Other agencies, such as

Oregon Department of Fish and Wildlife, may provide technical assistance or financial assistance to private landowners.

Area Plan Evaluation

By the end of 2010, ODA, with the cooperation and assistance of the Wasco County SWCD, the LAC, and DEQ, will assess the progress of Area Plan implementation toward achievement of Area Plan goals and objectives. Inputs may be sought on assessments from other partnering agencies as well. Based on these assessments, ODA, the Wasco County SWCD, the LAC and the State Board of Agriculture will consider making appropriate modifications to the Area Plan and Rules.

Resolution of Complaints and Enforcement Action

ODA investigates complaints against landowners or operators who are alleged to be out of compliance with the Rules associated with this Area Plan. Prior to any on-farm investigation, ODA evaluates complaints to ensure there is sufficient information and reasonable cause to warrant proceeding. If the landowner is in non-compliance, ODA consults with the appropriate SWCD, using the Field Office Technical Guide to develop solutions and timelines. Landowners that are in compliance receive verification in writing from ODA. Authority for any enforcement action rests with ODA, but may not preclude authorities vested in any other State or Federal agency.

Complaints and Investigations (OAR 603-095-0660)

(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 603-095-0660(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 603-095-0660(4), “person” does not include any local, state or federal agency.

(6) Notwithstanding OAR 603-095-0660, 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 to 568.933 or any rules adopted thereunder has occurred, the landowner may be subject to the

enforcement procedures of the department outlined in OARs 603-090-0060 through 603-090-0120.

REFERENCES

Oregon Revised Statutes, ORS 468B. Water Quality - Public Health and Safety - Water Pollution Control. 1997.

Oregon Administrative Rules, Oregon Department of Agriculture. Chapter 603. Division 90 and 95. Agricultural Water Quality Management. 1997.

Oregon's 2004/06 Section 303(d) List of Water Quality Limited Waterbodies. Oregon Department of Environmental Quality. 2006.

Field Office Technical Guide. USDA - Natural Resources Conservation Service.

BLM. Riparian Area Management: Greenline Riparian-Wetland Monitoring. TR 1737-8. 1993.

EPA. Monitoring Protocols to Evaluate Water Quality Effects of Grazing Management on Western Rangeland Streams. EPA 910/R-93-017. 1993.

Interagency Wildlife Committee. Managing Riparian Ecosystems for Fish and Wildlife in Eastern Oregon and Eastern Washington, March 1979. OR/WA.

Platts, William S., et al. Methods for Evaluating Riparian Habitats with Applications to Management. USDA - Forest Service. General Technical Report INT-221. 1987.

Rosgen, Dave. Applied River Morphology. Wildland Hydrology. 1996.

Oregon Watershed Enhancement Board. The Oregon Plan for Salmon and Watersheds' Water Quality Monitoring Technical Guide Book. July 1999.

ATTACHMENT 1: IRRIGATION

Irrigation Ditches

Ditch Name	Sources	# Users	Quantity (cfs)	Acres Irrigated	Length
Badger Ditch	Badger Creek Threemile Creek Badger Reservoir Pine Hollow Reservoir	26	30.0	4,063	8 miles
Juniper Flat Ditch	Clear Creek Clear lake Frog Creek	50	53.0	2,107	18 miles to Pine Grove
Lost & Boulder Ditch	Lost Creek Boulder Creek Forest Creek	16	30.0	2,570	7 miles
Orchard Ridge Ditch	Fifteenmile Creek	2	8.9	707	5 miles
Rock Creek Ditch	Rock Creek Gate Creek Threemile Creek Rock Creek Reservoir	14	46.0	4,081	4 miles
Tygh Valley Highline Ditch	Tygh Creek Badger Creek	6	6.2	495	7 miles
Wolf Run Ditch	Eightmile Creek	17	5.9	465	8 miles

Streams

Source	# of Water Rights	Acres Irrigated	Quantity (cfs)
Badger Creek	20	4,085.7	79.43
Bakeoven Creek	2	6.5	0.08
Buck Hollow Creek	1	34.2	0.57
Chenoweth Creek	13	96.4	1.63
Deschutes River	10	581.4	9.96
Eightmile Creek	54	1,003.9	18.04
Fifteenmile Creek	103	2,830.6	48.33
Fivemile Creek	15	216.1	3.31
Mill Creek	41	488.2	6.96
Mosier Creek	27	206.8	2.55
Threemile creek	19	546.6	7.93
Tygh / Jordan Creek*	23	1,449.7	29.03
Wapinitia Creek	3	37.3	0.52
White River	15	9 38.6	15.04

* A number of water rights list both Tygh Creek and Badger Creek as sources. On these rights, the figures are listed under Tygh Creek.

ATTACHMENT 2: FISHERIES

Sensitive Fish Species

The Lower Deschutes Agricultural Water Quality Management Area is located within the climatic transition zone between Eastern and Western Oregon. A wide variety of fish species have evolved in the diverse stream habitats of this area.

The small Columbia River tributary streams, including Rock, Mosier, Chenoweth, Mill, Threemile, and Fifteenmile Creeks, support coastal cutthroat trout, rainbow trout, winter steelhead, coho salmon, pacific lamprey, and a variety of non-game fish. In addition, Mill Creek periodically provides spawning and rearing habitat for fall chinook salmon, and the Fifteenmile Creek system provides spawning and rearing habitat for spring chinook salmon.

The lower Deschutes River supports summer steelhead, summer/fall chinook, resident redband trout, bull trout, mountain white fish, and a variety of non-game fish. The river also serves as a migration corridor, as well as rearing habitat, for spring chinook salmon. The river and tributaries, including White River, Macks Canyon, Jones Canyon, Ferry Canyon, Oak Canyon, Stag Canyon, Wapinitia, Nena, Bakeoven, Buck Hollow, and Eagle Creeks, provide spawning and rearing habitat for summer steelhead, redband trout, and a variety of non-game fish.

White River and tributaries upstream from White River Falls support resident redband and brook trout, mountain whitefish, and several non-game fish species.

Status of Fish Populations

Steelhead throughout the Lower Deschutes Water Quality Management Area are listed as "Threatened Species" under the Endangered Species Act (ESA). Bull Trout also are currently listed as "Threatened". Fall chinook salmon in the Deschutes River have been proposed for listing as "Threatened", however the listing was deemed unwarranted. In recent years, fall Chinook populations in the Deschutes River have rebounded to near historic highs. Cutthroat trout throughout the Management Area also have been considered for listing as "Threatened", however this listing was also considered unwarranted.

Redband trout and mountain white fish populations throughout the Management Area are considered to be healthy. The redband trout upstream from White River Falls are genetically unique and are most closely related to redband populations found in the desert streams in Southeast Oregon. Brook trout, found in upper White River tributaries (Clear, Frog, and Badger Creeks), are an introduced species with limited distribution.

Habitat Requirements

- Temperatures above 55°F inhibit salmonid spawning, egg incubation, and fry emergence from the egg and from stream gravels. Salmonid rearing is impaired by temperatures greater than 64°F. The water quality standard requires that waters supporting all life stages of bull trout

must be cooler than 50°F. This temperature is required for spawning, but other bull trout life stages exist at higher temperatures.

- Fine sediment can reduce aquatic production by silting in redds (affecting egg incubation), damaging gills, reducing food availability, and causing other problems.
- High pH and low dissolved oxygen generally result from excessive plant growth, which is stimulated by the availability of nutrients, temperature, and light. Nutrients occur naturally in streams and rivers, but human activities can elevate concentrations of nutrients. Excessive plant growth can increase water pH, which can harm fish. And, dead plants are broken down by bacteria, which use up oxygen in the process. The breakdown of aquatic plants can use up large amounts of the oxygen needed by aquatic animals for survival.
- Some riparian areas have been so modified that they no longer provide sufficient habitat to sustain aquatic life. Examples include devegetated stream banks that don't provide large woody debris, don't reduce the rate of heating of water, and add sediment to the river. Channelized, degraded stream channels do not provide a diversity of habitat features such as pools, riffles, and stable overhanging banks.
- Reduced stream flows can result in warmer water temperatures, lower concentrations of dissolved oxygen, increased levels of pollutants, and can create passage problems for fish. Warmer water holds less dissolved oxygen. Slow-moving water is less turbulent; turbulent flow creates additional surface area for absorption and improved mixing of oxygen-enriched waters throughout the water column.

ATTACHMENT 3: WATER QUALITY LIMITED STREAMS ON 2004/06 (303(D) LIST

For more details, see the 303(d) list at

<http://www.deq.state.or.us/wq/assessment/rpt0406/search.asp#db>

STREAM SEGMENT	PARAMETER		
	Temperature (various criteria*)	Sedimentation	PH
LOWER DESCHUTES SUBBASIN			
Bakeoven Creek (River Mile 0-20.5)	X		
Buck Hollow Creek (0-37.7)	X		
Clear Creek (0-15.1)	X		
Deschutes River (0-88)	X		X
Gate Creek (0-14.3)	X	X	
Oak Canyon (0.6.3)	X		
Rock Creek (0-15.9)		X	
Rock Creek (0-14.1)	X		
Sixteen Canyon (0-3.7)	X		
Tenmile Creek	X		
Threemile Creek (tributary to White River) (0-11.3)	X		
Wapinitia Creek (0-14.4)	X		
White River (0-12)	X		
Willow Creek (0-33.2)	X		
MIDDLE COLUMBIA-HOOD SUBBASIN			
Chenowith Creek (0-7.9)	X		
Dry Creek (0-16.6)	X		
Eightmile Creek (0-42.5)	X		
Eightmile Creek (0-34.5)		X	
Fifteenmile Creek (0-53.5)	X		
Fifteenmile Creek (0-52.7)		X	
Fivemile Creek (0-18)	X		
Mill Creek (0-7.7)	X		
Mosier Creek (0-16.2)	X		
North Fork Mill Creek (0-3.8)	X		
Ramsey Creek (0-13.2)	X	X	
Rock Creek (0-10.6)	X		
South Fork Mill Creek (0-810.6)	X		
Threemile Creek (0-14.7)	X		
West Fork Mosier Creek (0-7.9)	X		

*Criteria include: salmonid fish spawning $\leq 12.8^{\circ}\text{C}$, salmon and steelhead spawning $\leq 13^{\circ}\text{C}$, core cold water habitat $\leq 16^{\circ}\text{C}$, anadromous fish passage/salmonid fish rearing $\leq 17.8^{\circ}\text{C}$, salmon and trout rearing and migration $\leq 18^{\circ}\text{C}$.

ATTACHMENT 4: FIELD OFFICE TECHNICAL GUIDE **(FOTG)**

The NRCS provides national leadership and administration of programs to conserve soil, water, and related resources on the private lands of the Nation. SWCDs provide local leadership for those programs. A primary goal is to provide technical assistance to decision-makers for the planning and implementation of a system of conservation practices and management that achieves a level of natural resource protection that prevents degradation and permits sustainable use. Where degradation has already occurred, the goal is to restore the resource to the degree practical to permit sustainable use. The FOTG provides procedures and criteria to develop and evaluate resource management systems that achieve these goals and, when needed, to develop and evaluate acceptable management systems that achieve these goals to the extent feasible.

The FOTG is a primary technical reference for NRCS and SWCDs. It contains technical information about conservation of soil, water, air, and related plant and animal resources. Technical guides are localized so that they apply specifically to the geographic area for which they are prepared.

Technical Guides provide:

1. Soil interpretations and potential productivity within alternative levels of management intensity and conservation treatment;
2. Technical information for achieving NRCS, SWCD, and decision-maker's objectives;
3. Information for interdisciplinary planning for conservation;
4. A basis for identifying resource management system (RMS) options and, when needed, acceptable management system (AMS) options and related components;
5. Information on effects of RMS, AMS, and component practices;
6. Criteria to evaluate the quality of RMS and AMS options and their components;
7. Standards and Specifications for conservation practices;
8. Information for evaluating economic feasibility and effects of RMS options and practices;
9. Information for locating and identifying cultural resources, and methods to account for their significance; and
10. Technical material for training employees

The FOTG contains the following sections:

1. General Resource References
2. Soil and Site Information
3. Conservation Management Systems
4. Practice Standards and Specifications
5. Conservation Effects

Additional, descriptive information on the FOTG may be found in the USDA NRCS General Manual, Section 401 and is available at any USDA Service Center. An electronic version ('efotg') is available on the internet at <http://www.nrcs.usda.gov/technical/efotg/>.

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ATTACHMENT 5: CONSERVATION PRACTICES

The following are examples of conservation practices typically used in the Lower Deschutes Management Area.

Soil Erosion and Sediment Control

Conservation tillage (crop residue management)

- reduced tillage, minimum tillage, no-till, direct seeding, modified conventional tillage, reservoir tillage, sub-soiling or deep chiseling

Enrollment in Conservation Reserve Program (CRP) and Continuous CRP

Cover crops (perennial, annual)

Contour farming practices

- strip cropping, divided slopes, terraces (level and gradient), contour tillage

Water and Sediment Control Basins (“WASCOBs”)

Crop rotations

Early or double seeding

Vegetative buffer strip (filter strips, grassed waterways, field borders, contour buffer strips)

Irrigation scheduling

Prescribed burning

Weed control

Grazing management plans

Range plantings

Livestock distribution

Stream Side Areas

Critical area planting

Enrollment in Conservation Reserve Enhancement Program (CREP) and Continuous CRP

Vegetative buffer strips (filter strips, riparian buffers, riparian forest buffers)

Livestock management (see below)

Conservation tillage practices

Weed control

Nutrient and chemical application scheduling

Road, culvert, bridge, and crossings maintenance

Wildlife management

Livestock

Grazing management or scheduling

- intensity, duration, frequency, season pasture rotations, rest/deferral

Vegetation management (grazing management, grass seeding, weed control, controlled burning)

Fencing (temporary, cross, exclusion)

Watering facilities (spring development, off-stream water, water gaps)

Salt and mineral distribution

Waste management systems

- clean water diversions; waste collection, storage, and utilization; facilities operation and maintenance

Irrigation

Irrigation scheduling

- crop needs, soil type, climate, topography, and infiltration rates

Irrigation system efficiency (flood, sprinkler, drip)

Diversion maintenance (push-up dam management, fish screens)

Return flow management

Back-flow prevention devices

Reservoir tillage

Cover crops

Nutrient and Farm Chemical Application

Nutrient budgeting (soil testing, tissue testing, plant needs, water testing)

Application methods

Application timing

Tail water management

Hydraulic connectivity

Label requirements

Irrigation scheduling

Integrated Pest Management

Pest and disease modeling

Weather monitoring

Selection of low toxicity pesticides

Mating disruption

Ground cover management

Spray drift barriers

Low volume sprayers

Channel and Drain Management

Vegetation management (burning, chemical, clipping)

Stream bank stabilization (structural, bio-engineered)

Critical area planting

Channel management

Obstruction removal

Wetland development

Out-fall protection