

UPPER DESCHUTES AGRICULTURAL WATER QUALITY MANAGEMENT AREA PLAN

3rd Biennial Revision

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Developed by the

**UPPER DESCHUTES
LOCAL ADVISORY COMMITTEE**

with assistance from

OREGON DEPARTMENT OF AGRICULTURE

and

DESCHUTES SOIL AND WATER CONSERVATION DISTRICT

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ACRONYMS AND ABBREVIATIONS

Area Plan - Upper Deschutes Agricultural Water Quality Management Area Plan

Area Rules - Oregon Administrative Rules 603-095-3000 through 603-095-3060

BOR - US Bureau of Reclamation

cfs - cubic feet per second

DEQ - Oregon Department of Environmental Quality

DMA – Designated Management Agency

DO - dissolved oxygen

LAC - Upper Deschutes Local Advisory Committee

LWD - large woody debris

Management Area - Upper Deschutes Agricultural Water Quality Management Area

NTU - Nephelometric Turbidity Unit (measure of the cloudiness of water)

NRCS - USDA Natural Resources Conservation Service

OAR - Oregon Administrative Rules

ODA - Oregon Department of Agriculture

ODFW - Oregon Department of Fish and Wildlife

ORS - Oregon Revised Statutes

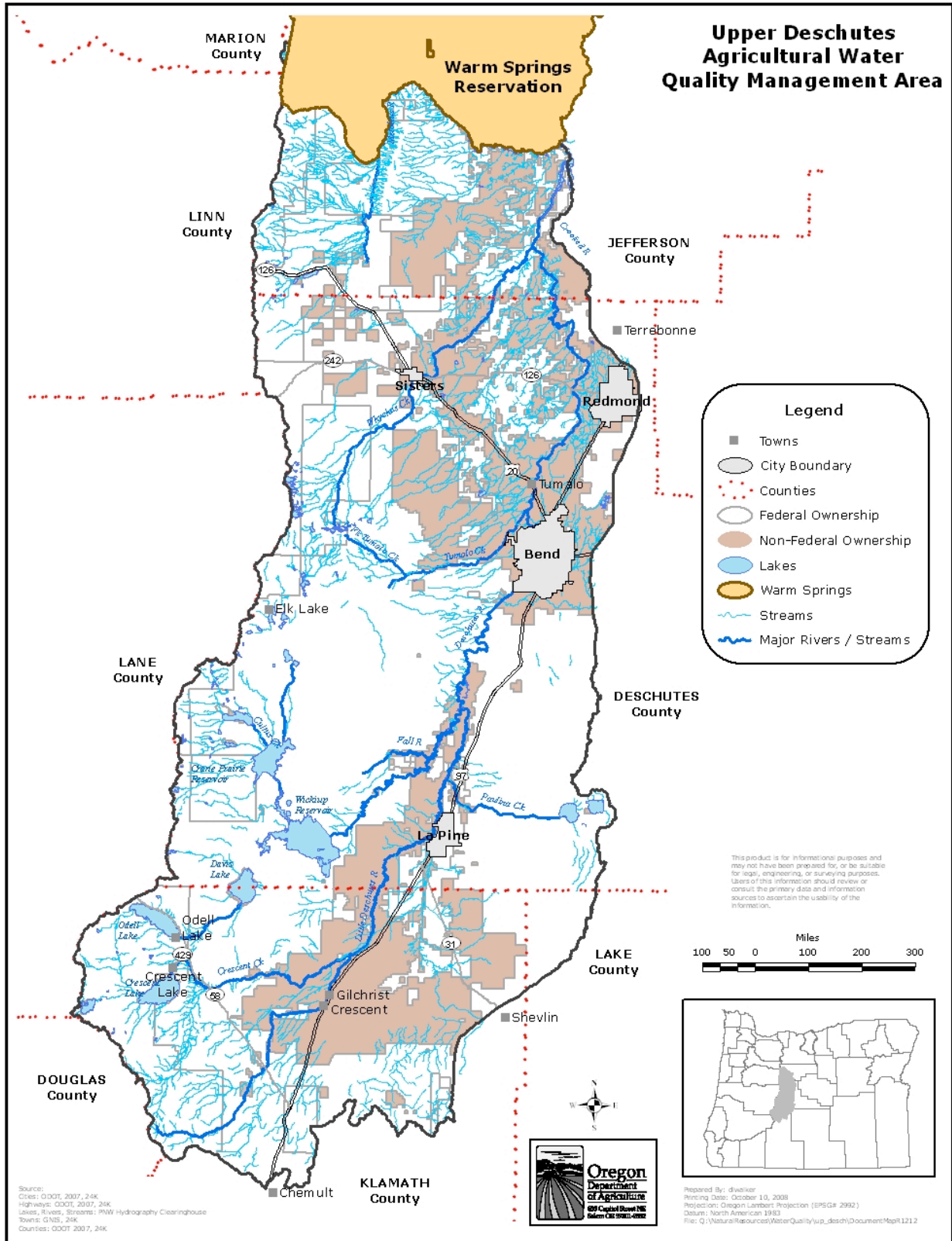
OSU - Oregon State University

SWCD - Soil and Water Conservation District

TMDL - Total Maximum Daily Load

USDA - United States Department of Agriculture

MAP: MANAGEMENT AREA



FOREWORD

UPPER DESCHUTES AGRICULTURAL WATER QUALITY MANAGEMENT AREA PLAN

This Upper Deschutes Agricultural Water Quality Management Area Plan (Area Plan) and associated Upper Deschutes Agricultural Water Quality Management Area Rules (Area Rules) address water quality and water’s designated beneficial uses in the Upper Deschutes Management Area that must be protected. The Area Plan and Rules address temperature, sediment, turbidity, chlorophyll, pH, dissolved oxygen, and bacteria concerns related to agricultural activities on private lands in the Management Area. All these parameters, except for bacteria, are on DEQ’s 2004/06 303(d) list of “water quality limited” streams in the Management Area. Inadequate fish habitat and low streamflows are also concerns.

The goal of the Area Plan is to prevent and control water pollution from agricultural activities and soil erosion through voluntary activities by landowners, aided by information and technical and financial assistance from local, state, and federal agencies, and other sources.

Water quality standards for surface water are not designed to provide water of sufficient purity for direct human consumption or food preparation. It may be hazardous to human health to use agricultural water for direct human consumption.

This Area Plan addresses conditions resulting from agricultural management that may affect water quality. These activities include, but are not limited to, the management of:

- Streambanks
- Cultivated lands
- Nutrients, farm chemicals, and pesticides
- Livestock
- Agricultural wastes
- Irrigation water and surface drainage
- Invasive plants (noxious weeds)

The Area Plan is voluntary and can help landowners comply with the Area Rules. The Area Rules (Oregon Administrative Rules (OARs) 603-095-3000 through 603-095-3060) contain required conditions to protect water quality. When voluntary approaches do not adequately achieve those conditions, as a last resort the Oregon Department of Agriculture (ODA) exercises its enforcement authority under the Area Rules.

Landowners who are implementing voluntary, individual conservation plans approved by their SWCD likely are meeting the Area Plan goal and likely are in compliance with the Area Rules. They may wish, however, to have their conservation plan periodically reviewed by their local SWCD to ensure that no additional changes to the conservation plan are necessary.

The Upper Deschutes Local Advisory Committee (LAC) helped develop the Area Plan and Rules and participates in biennial reviews of the Area Plan and Rules. The LAC is assisted by the Deschutes Soil and Water Conservation District (SWCD) and ODA. Proposed members were appointed by the Director of ODA after consultation with the Board of Agriculture. LAC members represent the interests of local landowners, irrigation districts, Upper Deschutes Watershed Council, conservationists, and the Deschutes SWCD. LAC members are:

Marc Thalacker , Chair: Three Sisters Irrigation District Leonard Knott , Vice Chair: Sisters, irrigated farm Rex Barber : Lower Bridge, irrigated farm, DSWCD Gordon DeArmond : Crescent, citizen: Bend, irrigation district & small farm	Bob Mullong : Tumalo, citizen & fish aficionado Terry Penhollow : Sunriver, pasture management Larry Roofener : Central Oregon Irrigation District, Deschutes SWCD Dan Sherwin : Deschutes County Weed Program
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APPLICABLE LAWS AND REGULATIONS

Federal Clean Water Act of 1972

The **Federal Clean Water Act** requires states to protect the quality of their waters, including rivers, streams, and lakes. Each state must determine the quality of its waters, identify those with poor quality, and address water quality problems. In Oregon, the Department of Environmental Quality (DEQ) is the lead agency responsible for implementing the Clean Water Act.

To determine water quality, states designate **beneficial uses** of the water that must be protected, select water quality parameters most directly related to those beneficial uses, and set standards for those parameters to ensure that the beneficial uses are being met.

Oregon's beneficial uses are defined in the OARs for each basin. Commonly, designated beneficial uses include drinking water, cold-water fisheries, industrial water supply, recreation, agricultural uses, and other activities. When there are multiple beneficial uses in a river or stream, federal law requires DEQ to protect the most sensitive, in terms of its susceptibility to pollution, which would result in the protection of all the beneficial uses.

States must select **parameters** that define and contribute to water quality and are related to the beneficial uses. These water quality parameters include, but are not limited to: bacteria, pH, turbidity, dissolved oxygen, temperature, total dissolved gas, certain toxic and carcinogenic compounds, and aquatic weeds or algae. Also, each state must establish **standards** for each parameter to determine whether or not the parameter is, or is not, contributing to limitations in the quality of the water body. Finally, the state must monitor water quality and review available data and information to determine if the standards are being met.

Section 303(d) of the Clean Water Act requires each state to develop a list of **Water Quality Limited waterbodies** that do not meet standards and to submit an updated list of noncompliant waterbodies to the federal Environmental Protection Agency (EPA) every two years. The most recent **303(d)** list was 2002. The list is designed to identify water quality concerns only and not their causes. DEQ follows federal criteria, state water quality standards and scientific protocols to assess water quality and determine which waterbodies should be on the 303(d) list. Oregon, like most states, has information on many, but not all, of its waterbodies.

Section 303(d) also requires that each state establish **Total Maximum Daily Loads (TMDLs)** for any water quality limited waterbodies. TMDLs set maximum limits on the amount of pollutants allowed to enter state waters and still meet water quality standards. When establishing TMDLs, DEQ reviews existing data and collects additional data as needed to determine the location, amount, and source of pollutants. A TMDL consists of both **load allocations** and a strategy that will ensure that waterbodies will attain and maintain water quality standards. In Oregon, DEQ generally develops TMDLs for subbasins, not for specific waterbodies.

Load allocations are limits assigned by DEQ to the different entities that contribute to the water quality problem. Load allocations may include such things as a required reduction in sediment expressed in tons/acre/year or required shade targets that must be met to reduce water temperatures. Land use types such as agriculture, private forest lands, federal lands, and urban areas in each TMDL area will be assigned a load allocation as appropriate.

The strategy for achieving load allocations consists of area **water quality management plans** developed by the Designated Management Agencies (DMA's) responsible for the various land use types (e.g. ODA for agriculture). Each DMA will develop a pollution control plan and programs designed to meet the load allocations.

The management plans are sent to DEQ for inclusion in the TMDL package. DEQ submits the TMDL to EPA for approval. DEQ will continue to evaluate waterbodies to ensure that management plans are being implemented, are adequate, and water quality standards are achieved.

Oregon Revised Statute (ORS) 468B

ORS 468B.010 to 468B.050 lays out a broad framework under which **water pollution is defined and controlled** to protect beneficial uses of water. State water quality standards (e.g. 64 degree temperature criteria, 406 colonies of E. coli bacterial standard) are set at levels sufficient to protect beneficial uses.

DEQ is responsible for enforcement of ORS 468B, except as provided below under ORS 561.191 for agricultural practices that affect water quality. Reference to ORS 468B.025 and ORS 468B.050 in area rules provides ODA with regulatory authority for these statutes.

ORS 568.900 – 568.933 (Senate Bill 1010)

Due to increased awareness of the requirements of the Federal Clean Water Act, the state of Oregon realized that it would need to be more assertive in developing TMDLs and associated water quality management plans. In 1993, the State Legislature approved Senate Bill 1010, which was codified into ORS 568.900-568.933 and OAR 603-090. ORS 568.900-.933 gave ODA the authority to develop **agricultural water quality management area plans and rules** where required by Federal or State law. The statute and administrative rules outline the process for the development and implementation of agricultural water quality management area plans to help prevent and control water pollution resulting from agricultural activities and soil erosion. The process includes the formation of a **LAC** that consists primarily of landowners in the management area to assist ODA in the development of the area plan and rules.

ORS 561.191 (Senate Bill 502)

In 1995, the Oregon legislature recognized potential confusing authorities that belonged to both ODA and DEQ regarding the enforcement of water quality statutes. To clarify authorities granted to ODA in Senate Bill 1010, the state legislature passed Senate Bill 502, which was codified into ORS 561.191. This statute states that ODA shall develop and implement any program or rules that directly regulate farming practices that are for the purpose of protecting water quality. A 1996 opinion from the Oregon Attorney General's office states that **ODA has the statutory responsibility to regulate agriculturally related water pollution**. That same opinion also recognized the need to define that authority by developing water quality plans and rules that specifically address agricultural practices and land conditions and achieve the standards adopted by the Environmental Quality Commission.

APPLICABILITY

MANAGEMENT AREA

The Upper Deschutes Agricultural Water Quality Management Area (Management Area) consists of the Upper and Little Deschutes Subbasins, as defined by the state of Oregon. Additionally, it includes lands in the Crooked River drainage south of the Crooked River and west of the range line between R12E and R13E in T14S WM to include the entire Crooked River Ranch subdivision. The Management Area consists of the drainage of the Deschutes River and all its tributaries upstream of and inclusive of the Metolius River, and a fraction of the Crooked River (see map). Major tributaries include the Metolius River, Whychus Creek (formerly Squaw Creek), Tumalo Creek, and the Little Deschutes River and its tributaries. Additionally, the Management Area includes the communities of Crooked River Ranch, Sisters, Redmond, Bend, La Pine, and Crescent.

TYPES OF ACTIVITIES COVERED

The Area Plan applies to both commercial and noncommercial agricultural activities, including those within urban growth boundaries. For example, it applies to activities involved in maintaining a horse in a pasture within city limits.

The Area Plan applies to agricultural activities on all agricultural, rural, and forested lands within the Management Area except those owned by the federal government and those held in Tribal Trust for the Confederated Tribes of the Warm Springs Reservation. The Area Plan applies to agricultural lands in current use, those lying idle or on which management has been deferred, and lands (like private roads) not strictly in agricultural use but that support agricultural activities.

Agricultural use consists of "the use of land for the raising or production of livestock or livestock products, poultry or poultry products, milk or milk products, fur-bearing animals, or for the growing of crops such as, but not limited to, Christmas trees, grains, small grains, fruit, vegetables, forage grains, nursery products; or any other agricultural or horticultural use or animal husbandry or any combination thereof. Wetlands, pasture, and woodlands accompanying land in agricultural use are also defined as agricultural use areas" (OAR 603-95-0010 (4)).

Activities governed by the Forest Practices Act are outside the jurisdiction of this Area Plan. Pesticide use is governed by the Pesticide Control Act (ORS 634); this law is administered by the ODA Pesticides Division. DEQ has not identified pesticide use as a water quality problem in the Management Area.

1: MISSION, GOALS, AND OBJECTIVES

MISSION

Maintain the Upper Deschutes Agricultural Water Quality Management Area Plan that guides agricultural activities to prevent and control water pollution and soil erosion and to help achieve water quality standards that protect beneficial uses (OAR 603-090).

The LAC used the following guiding principles to develop the Area Plan:

- Protect beneficial uses of the water in the Management Area
- Control pollution as close to its source as possible
- Base recommended actions on best available scientific information
- Develop cost-effective, practical, flexible, and realistic site-specific solutions that work
- Recognize that landowners are not responsible for naturally occurring water quality conditions that violate state standards.

GOAL

Promote voluntary agricultural practices that improve and protect water quality while sustaining a healthy agricultural economy.

OBJECTIVES

1. **Education:** create a high level of awareness and understanding of water quality issues related to agriculture.
2. **Voluntary conservation plans:** increase the voluntary adoption of agricultural practices to improve water quality.
3. **Funding:** secure funding for administration and successful implementation of the Area Plan.
4. **Evaluation:** conduct periodic reviews of the Area Plan and implementation activities by the LAC and other interested parties.

2: WATER QUALITY CONCERNS

The Clean Water Act requires that each state designate beneficial uses of the water that must be protected, select water quality parameters most directly related to the beneficial uses, and set standards for those parameters. It then requires that the beneficial uses be met. The state allocates pollution limits (TMDLs) for streams that violate water quality standards; agriculture will receive a load allocation that must be met. See “Water Quality” in the Background section for more details.

BENEFICIAL USES

Beneficial uses of water in the Management Area include domestic and industrial water supplies, crop irrigation, livestock watering, aquatic life, recreation, aesthetics, and hydropower. Of these, domestic water consumption (especially drinking water), aquatic life (especially salmonid fish rearing and spawning), and recreation (especially human contact such as swimming) are the most sensitive uses in terms of their ability to be adversely affected by human activities. Drinking water is affected primarily by nitrates; aquatic life by temperature, sedimentation, turbidity, nutrients, pH and dissolved oxygen; and human contact recreation by bacteria.

EFFECTS ON WATER QUALITY

Water temperatures are critical to salmonid growth and survival at all life stages, and to other aquatic life. Warm stream temperatures increase stress and disease, raise metabolism, lower growth rates, and enhance conditions for introduced non-native predators. Temperature affects the dissolved oxygen potential in water - the warmer the water, the less dissolved oxygen it can hold.

Excessive aquatic plant or **algal growth** can harm fish and other aquatic life by creating extremes in water **pH** and low levels of **dissolved oxygen**. These conditions can be stimulated by the availability of nutrients, warm temperatures, and light, which in turn are often caused by low stream flow and lack of protective vegetative cover.

Sediments carried in basin streams can adversely affect aquatic life by reducing light penetration and visibility, reducing water infiltration through stream substrate (harming incubating fish eggs), and irritating gill filaments. **Turbidity** is a measure of the cloudiness of water and is often used as a surrogate measure for suspended sediment.

Reduced stream flows can contribute to warmer water, increased pH, reduced dissolved oxygen, a general reduction in available habitat, and in extreme cases interfere with fish migration.

Modification of physical habitat can directly harm aquatic life. Channelization reduces both the amount and complexity of habitat. Loss of streamside vegetation often destabilizes streambanks, resulting in increased erosion, and decreases shade that could help reduce stream temperatures.

3: RECOMMENDED CONSERVATION PRACTICES

To help achieve water quality standards in the Management Area, an effective strategy should:

- Maintain adequate streamside vegetation
- Minimize streambank erosion
- Minimize runoff that contains potential pollutants

The following conservation practices (Table 1) address the objectives of the Area Plan and help improve and protect water quality while being economical and practical. Widespread adoption of these practices addresses the water quality parameters of concern in the Management Area. These practices should also maintain the economic viability of agriculture in the area. While recommended, they are not required.

Table 1. Some recommended conservation practices for the Upper Deschutes Agricultural Water Quality Management Area.		
MANAGEMENT	OBJECTIVES	RECOMMENDED CONSERVATION PRACTICES
STREAMS	<p><i>Achieve adequate riparian vegetation</i></p> <p><i>Reduce streambank erosion</i></p> <p><i>Minimize stream temperature extremes beyond natural variation</i></p> <p><i>Minimize pollutants from surface runoff</i></p>	<ul style="list-style-type: none"> • Encourage plants that 1) provide shade, 2) trap or filter out excess nutrients, bacteria, and sediment in overland or shallow subsurface flow, 3) provide vegetative cover to protect the streambank during high flows, and 4) have root masses that will stabilize streambanks. • Stabilize streambanks, preferably with bioengineering techniques • Maintain vegetative buffer: continuous Conservation Reserve Program (CRP), Conservation Reserve Enhancement Program (CREP), riparian buffers, weed control (see below) • Manage livestock (see below) • Properly place, design, and maintain roads, culverts, bridges, and crossings. Use heavy equipment in streamside areas at appropriate times of year. Contact Oregon Department of Fish and Wildlife (ODFW) for sensitive locations and seasons. • Leave large woody debris (LWD) in streams. If it must be removed, don't destabilize the streambank. Time the removal of LWD to minimize disturbance to stream and streambank. • Contact Oregon Department of Fish and Wildlife (ODFW) for timing and technical assistance for instream activities. Oregon's Division of State Lands and the Federal government require permits for some types of fill or removal activities (Attachment B). Deschutes County requires a fill and removal permit for removal or placement of any instream materials, including LWD (Attachment C). Oregon's Parks and Recreation Department administers activities in the scenic waterway (Attachment D).

<p>LIVESTOCK</p>	<p><i>Reduce soil erosion</i></p> <p><i>Limit nutrients and bacteria in surface runoff</i></p> <p><i>Achieve adequate riparian and upland vegetation</i></p>	<ul style="list-style-type: none"> • Improve riparian buffers • Harrow pastures at least once per year • Clean manure out of irrigation ditches before receive irrigation water that will continue off property to another user • Install adequate waste management systems: clean out water diversions; collect, store, and utilize wastes; properly operate and maintain facilities • Control runoff from concentrated feeding areas and irrigated pastures • Control livestock access to water that flows off-property: <ul style="list-style-type: none"> - manage the timing and intensity of livestock access to streams by using a grazing strategy that addresses livestock distribution and the duration and season of riparian area use - provide off-stream drinking water (stock tanks, nose pumps, etc.) - place salt licks and supplemental feeding stations away from streams or ditches - provide shade and shelter for livestock away from the stream - install fencing (temporary, exclusion, etc.) - use a herder to encourage livestock to use uplands on large properties - pipe irrigation water conveyances
<p>WEEDS</p>	<p><i>Minimize soil erosion</i></p> <p><i>Improve riparian and upland vegetation</i></p>	<ul style="list-style-type: none"> • Remove existing weeds (Attachment E); replace with desirable vegetation. An integrated vegetation plan may include: grazing, mowing, bio-control, cultivating, or pulling • Control the spread of weeds near moving water; weeds are transported by water • Seed areas susceptible to weeds with desirable competitors • Use weed-free hay for forage and mulch • Wash equipment to remove weed seeds • Apply herbicides at appropriate rates and locations; follow the pesticide label
<p>IRRIGATION</p>	<p><i>Reduce unnatural fluctuations in stream flows</i></p> <p><i>Reduce runoff</i></p> <p><i>Minimize pollutants</i></p> <p><i>Reduce soil erosion</i></p>	<ul style="list-style-type: none"> • Inform irrigation districts of water needs in a timely manner so appropriate amount of water can be provided • Schedule irrigation based on crop needs, soil type, climate, topography, infiltration rates • Improve irrigation efficiency through sprinkler conversion, pressurized delivery, gated pipe, rotating pooling agreements • Minimize return flows through the use of cover crops, straw mulch, grass filter strips • Grade and slope property to retain runoff • Line ponds to minimize water loss from seepage • Pipe or line surface water delivery systems • Manage tailwater • Lease water rights for instream use

CROP NUTRIENTS & FARM CHEMICALS	<i>Reduce potential for surface and groundwater pollution</i> <i>Reduce runoff</i>	<ul style="list-style-type: none"> • Develop nutrient application plans (“nutrient budgets”) based on water and soil testing, tissue testing, plant needs • Apply appropriate amounts at proper times; dispose of containers properly • Avoid potential spills and their effects: have clean-up plan, store tanks away from water, check valves on delivery trucks • Apply non-farm chemicals appropriately on landscaping and lawns
WASTES	<i>Reduce potential for water pollution</i>	<ul style="list-style-type: none"> • Store and manage waste hay, chemicals, compost, or organic wastes away from streams or flowing waters • Compost or use organic wastes • Don’t pump wastes into dry wells

Contact your local SWCD (Attachment A) for guidance on selecting appropriate management practices or for assistance with developing a voluntary, individual conservation plan.

Landowners who are implementing conservation plans approved by their SWCD likely are meeting the Area Plan goal and likely are in compliance with the Area Rules. They may wish, however, to have their conservation plan periodically reviewed by their local SWCD to ensure that no additional changes to the conservation plan are necessary.

4: STRATEGIES TO ACHIEVE OBJECTIVES

The appropriate SWCD works with landowners, agribusiness, commodity and volunteer organizations, and other agencies to implement this Area Plan. These SWCD activities are delineated in Memoranda of Agreement with ODA. The success of the Area Plan relies on landowners voluntarily using conservation measures that reduce pollution from agricultural lands.

OBJECTIVE 1: EDUCATION

Create a high level of awareness and understanding of water quality issues related to agriculture.

SWCDs coordinate the education efforts and work with partners such as ODA, NRCS, OSU Extension Service, watershed councils, agribusiness partners, and other interested parties to carry out these education strategies. The focus of the educational effort is on:

- Water quality: current conditions and ways to improve water quality where necessary
- Prevention of water pollution from agricultural activities
- Regulations related to water quality
- Conservation planning and success stories
- Watershed restoration and enhancement
- Available programs and project funds

Strategies include:

1. Hold educational programs.
 - Hold workshops on water quality issues and the agricultural practices that help improve water quality.
 - Encourage demonstration projects to showcase successful conservation practices and systems.
 - Work with others to organize tours of demonstration projects for agricultural managers and producers.
 - Produce and distribute brochures about water quality issues.
2. Conduct a media program.
 - Submit news articles and public service announcements to area newspapers, radio stations, and newsletters.
 - Invite media to conservation tours and workshops.
3. Involve the agricultural community in conservation education.
 - Create and maintain a list of experienced agricultural operators willing to share their conservation practices with other interested people by speaking, leading tours, and providing tour sites.
4. Build partnerships with agribusiness to promote conservation.
 - Co-sponsor workshops and tours between the SWCDs and agribusinesses.
 - Share education materials with agribusiness field representatives.
 - Develop educational materials in conjunction with agribusinesses and commodity and volunteer organizations.

OBJECTIVE 2: VOLUNTARY CONSERVATION PLANS

Increase the voluntary adoption of conservation practices to improve water quality.

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 work with specialists (see Attachment A) to develop a voluntary conservation plan. The LAC recommends that landowners develop a conservation plan so that they can both resolve current problems and avoid future ones. A conservation plan is a comprehensive management plan that addresses site-specific concerns 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 enhance water quality and limit soil erosion from agricultural activities.

Landowners may seek planning and financial assistance from any agency or a consultant. Landowners are encouraged to ask their local SWCD for assistance with developing a conservation plan or reviewing an existing one. Conservation plans may enable producers to apply to a variety of funding programs (see Objective 3) for implementing conservation practices outlined in their plans. The USDA and other government agencies and organizations offer such assistance (Attachment A).

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

Strategies include:

1. Encourage agricultural producers to develop and implement conservation plans.
 - Promote the benefits of having an individual farm conservation plan that incorporates conservation practices.
 - Provide assistance in planning and implementation from the SWCDs, NRCS, and partner organizations.
 - Showcase positive and effective conservation practices through workshops and tours of demonstration projects.
2. Identify conservation practices that will protect and improve water quality in the Management Area.
 - Develop and distribute a list of conservation practices.
 - Access ongoing research into effective conservation practices.
 - Obtain practical knowledge from agricultural producers.

OBJECTIVE 3: FUNDING

Secure funding for administration and successful implementation of the Area Plan

Landowners may need financial assistance to meet Area Plan objectives and area rule requirements. Cost-sharing assistance for installation of certain management practices may be available through current USDA conservation programs such as the Environmental Quality Incentive Program (EQIP), Conservation Reserve Enhancement Program (CREP), and the Continuous Conservation Reserve Program (CCRP). Other potential funding sources include Oregon Watershed Enhancement Board, EPA Section 319 grants, Bonneville Power Administration, Deschutes River Conservancy, Deschutes Basin Land Trust, and Oregon Water Trust. This list is by no means all-inclusive. Attachment A provides more information.

SWCDs and watershed councils provide direction and help seek funding to implement the Area Plan. Funding is necessary for:

- a. Education – to fund education programs such as workshops, tours, and development of published materials.
- b. Technical assistance – to hire staff to help agricultural producers develop and implement voluntary conservation plans
- c. Implementation assistance – to provide cost-share dollars to assist producers in implementing the Area Plan.

Strategies include:

1. Obtain financial assistance for implementation of conservation practices; and funding for conservation planning assistance and conservation education.
 - Submit grant proposals to ODA, Oregon Watershed Enhancement Board (OWEB), USDA, US EPA, DEQ, and other agencies and private organizations.
 - Submit ongoing reports of successes to granting agencies.
 - Form partnerships with the business sector for additional funding.
 - Promote USDA incentive-based cost-share programs to assist producers with conservation plan implementation.
2. Ensure adequate administration of the Area Plan.
 - Include implementation of the Area Plan in the annual and long-range work plans of the appropriate SWCDs.

OBJECTIVE 4: EVALUATION

Conduct periodic reviews of the Area Plan by the LAC and other interested parties

The LAC works with ODA, DEQ, SWCDs, watershed councils, and others to establish ways to measure Area Plan success. The LAC reviews the Area Plan and Area Rules every two years and updates them as necessary.

The following strategies help the LAC determine the effectiveness of the Area Plan and Rules in preventing and controlling water pollution from agricultural activities.

Strategies include:

1. The appropriate SWCD will provide the number of individual conservation plans written, the number and percentage of acres planned in the basin, and the number of practices implemented.
2. The Deschutes SWCD will track the increased awareness of water quality issues.
 - Document the number of attendees of conservation workshops and tours.
 - Document the number of business partnerships produced.
3. ODA will provide the number and nature of violations of Area Rules in the Management Area.
4. The Deschutes SWCD will evaluate the availability of cost-share funds to implement Conservation Practices outlined in individual conservation plans.
5. ODA will provide an inventory and assessment of watershed conditions. Water quality monitoring currently is coordinated by the Upper Deschutes Watershed Council. Primary monitoring entities include: the Upper Deschutes Watershed Council, DEQ, US Forest Service, Bureau of Land Management, and ODFW. Monitoring of land conditions related to the Area Rules is the responsibility of ODA.

The LAC has the following recommendations regarding water quality assessment:

- Continue monitoring water quality at permanent sampling stations.
- Determine what stream reaches are naturally warmer than water quality temperature criteria.
- Determine whether Oregon's turbidity standard is meaningful when natural turbidities run less than 5 Nephelometric Turbidity Units (NTUs), which is the case for the Deschutes River.
- Determine what flows (in cfs) would be needed to meet water quality standards.

5: RESPONSIBILITIES

TOTAL MAXIMUM DAILY LOADS

The Oregon DEQ implements the federal Clean Water Act in Oregon. As part of its responsibilities, it establishes “TMDLs” for pollutants on the 303(d) list.

TMDLs for the Management Area are expected from DEQ in 2011, at the earliest. The Area Plan will be the implementation plan for agriculture’s load allocations in the Management Area (see Foreword for explanation).

AREA PLAN DEVELOPMENT AND IMPLEMENTATION

ODA is the DMA (see Foreword) for controlling pollution from agricultural activities on agricultural, rural, and forested lands in the Management Area. ODA is authorized to develop and carry out a water quality management area plan for any agricultural or rural lands where a water quality management area plan is required by state or federal law.

The Deschutes SWCD is the Local Management Agency (LMA) for development of the Area Plan. It assists with administration, outreach, and providing technical assistance to landowners. The Deschutes SWCD coordinates with the Jefferson County and Klamath SWCDs to provide assistance to landowners outside of Deschutes County.

The LAC is appointed by the director of ODA to assist with the development and implementation of this Area Plan and Rules. The LAC represents local agricultural producers, local landowners, irrigation districts, the City of Bend, and the Deschutes SWCD. The LAC reconvenes biennially to review Area Plan implementation and to review the Area Plan and Rules and amend them as necessary. Area Plan and Rule revisions will address load allocations assigned to agriculture in future TMDLs for this Management Area.

The day-to-day implementation of this Area Plan is accomplished through Memoranda of Agreement between the Jefferson County, Deschutes, and Klamath SWCDs and ODA. Under such agreements, the Deschutes SWCD acts as the primary LMA.

As resources allow, staff from the SWCDs, USDA Natural Resources Conservation Service, Deschutes County Weed/Vegetation Program, Cooperative Extension, and Central Oregon Agricultural Research Center are available to assist landowners in evaluating the effectiveness of conservation practices for reducing soil erosion and runoff. Personnel in these offices 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. Implementation priorities are established on a periodic basis through annual work plans developed jointly by the SWCDs and ODA.

ODA and the SWCDs provide presentations to interested groups on an ongoing basis. They also meet individually with landowners to explain the Area Plan and Rules and to provide site-specific educational reviews of land conditions relative to water quality.

Any actions related to determination of noncompliance with Area Rules or enforcement are taken up directly by ODA, as outlined in OARs 603-090-0000 through 603-090-0120.

Area Plan success is reviewed and/or evaluated by the LAC, ODA, and the Deschutes SWCD.

6: AREA RULES

The **Area Rules** are enforceable by ODA and are cited here for your information. The **Area Plan** is not enforceable. The Area Plan and Rules complement each other. The Area Plan provides an overall proactive strategy for meeting water quality objectives and for complying with the Area Rules.

All landowners conducting agricultural activities on non-federal and non-Tribal Trust lands must comply with the Area Rules (OAR 603-095-3000 through 603-095 3060). ‘Landowner’ includes any landowner, land occupier or operator (OAR 603-095 0010(24)). The landowner’s responsibility is to implement measures that ensure compliance with these Area Rules. Sanctions can come into effect from ODA if a landowner is out of compliance with the Area Rules.

Activities governed by the Forest Practices Act are outside the jurisdiction of this Area Plan. Pesticide use is governed by the Pesticide Control Act (Attachment F); those laws are administered by the ODA Pesticides Division.

Area Rules may become more specific over time, as information becomes available on land conditions and water quality or as new requirements are developed by the state or federal government. The streamside vegetation rule may change as a result of the load allocations for the TMDLs that DEQ is currently developing.

The LAC will reconvene within 60 days of DEQ’s Notice for Public Comment on the draft Upper Deschutes TMDL to assess the effect of the TMDL on the Area Plan and Rules.

Rule #1: Limitations

OAR 603-95-3040(1)

Landowners must comply with OAR 603-95-3040(2) through (3) within the following limitations:

- (a) A landowner is responsible for only those conditions resulting from activities controllable by the landowner. A landowner is not responsible for conditions resulting from activities on other lands.**

Rule #2: Streamside Vegetation

OAR 603-95-3040(2)

- (a) Effective January 1, 2005, agricultural activities must allow the establishment and development of appropriate vegetation along natural and channelized streams, consistent with site capability. Noxious weeds are not appropriate. Vegetation must be adequate to prevent unnatural streambank erosion, moderate water temperature, and filter sediment and nutrients from surface runoff.**
- (b) Part (a) does not apply to irrigation water conveyance systems, including but not limited to irrigation canals, ditches, and laterals.**

Rule #2 addresses stream temperature, sediment, nutrients, and bacteria.

Rule #2 addresses the moderation of water temperature. Riparian vegetation can help reduce water temperatures in the summer and increase water temperatures in the winter.

Any type of vegetation other than noxious weeds qualifies as long as it assists the functions required in the Rule. The rule does not specify any activities that must cease and does not require any particular activity to take place. Landowners are not responsible for the destruction of vegetation by wildlife browsing and grazing.

Rule #2 also does not require that all sediment be kept out of streams. This rule refers to the filtration of sediment caused by agricultural activities, not sediment resulting from natural processes. Sufficient vegetation to filter out sediment also helps reduce the amount of bacteria and nutrients entering streams; nutrients can bind to sediments and can be carried into waterways in greater proportions than by water flow without sediments.

Rule #3: ODA Authority to Control Water Pollution

OAR 603-95-3040(3)

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

Rule #3 references current State Law (ORS 468B.025 and ORS468B.050). ORS 468B.025 states that no person shall:

- (1)(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) Violate the conditions of any waste discharge permit issued under ORS 468B or ORS 568.

ORS 468B.050 refers to situations when permits are required, such as for certain confined animal feeding operations.

Compliance with rule #3 ensures that concentrated nutrients, pathogens associated with high animal density areas, high sediment concentrations in run-off, toxics, or other potential pollutants are not readily transported to waters of the state.

Livestock wastes can include manure from pastures draining to or bisected by irrigation ditches and any other situations not already covered by Oregon's confined animal feeding operation (CAFO) laws. Indicators of potential noncompliance include: 1) runoff flowing through areas of livestock usage and entering waters of the state, 2) livestock waste located in drainage ditches or areas of flooding, or 3) E. coli counts that exceed State water quality standards. Livestock facilities located near streams must employ an adequate runoff control and waste management system.

Wastes can also include excess sediment discharges. Indicators of potential noncompliance with Rule #3 include: 1) visible active erosion scars, 2) sediment-laden runoff, or 3) obvious deposits of sediment on the stream or canal bottom that can be traced to a specific source.

Definitions:

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

Waste discharge means the discharge of waste, either directly or indirectly, into waters of the state (ODA's OAR 603-095-0010(54)).

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 (State statute for water quality: ORS 468B.005(7)).

Waters of the state include lakes, bays, ponds, impounding reservoirs, springs, wells, rivers, streams, creeks, marshes, inlets, canals, and all other bodies of surface or underground waters, natural or artificial, public or private (except those private waters which do not connect to natural surface or underground waters) within Oregon (from state statute for water quality: ORS 468B.005(8)).

Complaints and Investigations

The following Area Rules provide for resolution of complaints.

Complaints and Investigations (OAR 603-095-3060)

- (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 603-095-3060(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 603-095-3060(4), "person" does not include any local, state or federal agency.**
- (6) Notwithstanding OAR 603-095-3060, 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.**

BACKGROUND INFORMATION

A. MANAGEMENT AREA

GEOGRAPHIC AREA and PHYSICAL SETTING

Location and physical setting

The Management Area consists of the Upper and Little Deschutes Subbasins, as defined by the state of Oregon. Additionally, it includes lands in the Crooked River drainage south of the Crooked River and west of the range line between R12E and R13E in T14S WM in order to include the entire Crooked River Ranch subdivision. The Management Area consists of the drainage of the Deschutes River and all its tributaries upstream of and inclusive of the Metolius River, and a fraction of the Crooked River (see map). Major tributaries include the Metolius River, Whychus Creek, Tumalo Creek, and the Little Deschutes River and its tributaries. Additionally, the Management Area includes the communities of Crooked River Ranch, Sisters, Redmond, Bend, La Pine, and Crescent.

The Management Area encompasses approximately 3,200 square miles in central Oregon and includes the communities of Sisters, Redmond, Bend, La Pine, and Crescent (see map). The Management Area includes half of Deschutes County and portions of Jefferson, Klamath, and Lake counties. It is bounded to the west by the crest of the Cascades, to the south by the Klamath drainage, to the east by the Crooked River drainage, and to the north by the Reservation of the Confederated Tribes of the Warm Springs and by the Middle Deschutes Agricultural Water Quality Management Area. Approximately one-third of the land is state- or privately-owned. The remaining lands are federally owned; almost all are managed by the US Forest Service. The Management Area consists primarily of a long, wide-plain ranging in elevation from 2,700 feet at the confluence of the Crooked and Deschutes Rivers in the north to 4,300 feet in the south. Volcanic peaks on the western boundary exceed 10,000 feet.

Mountain forest, juniper, grass and shrub rangeland, rugged rock outcrops, and deep canyons characterize the Management Area¹. The pristine nature of the area has been recognized through federal and state designations of numerous wilderness areas and the establishment of wild, scenic, and recreational river stretches on the Deschutes River, Little Deschutes River, Crescent Creek and Whychus Creek. Several stretches of the Deschutes River around Bend have been designated Oregon Scenic Waterways.

Climate

The Management Area is characterized by moderate days and cool nights. Typical summers are dry and hot; winters tend to be relatively dry and cold. Most precipitation falls in the winter. Temperatures and precipitation vary throughout the Management Area due to changes in elevation and topography (Table 2).

Location of weather station	January Temperature °F (mean, min, max)	July Temperature °F (mean, min, max)	Temperature Extremes °F (1961-1990)	Annual precipitation, including snowfall (inches)
Redmond	32, 22, 41	65, 46, 84	-27, 105	8
Bend	32, 22, 42	63, 45, 82	-24, 102	12
Wickiup Dam	28, 17, 38	62, 44, 80	-30, 101	21
Santiam Pass	27, 20, 34	58, 43, 73	-16, 96	87

Rain or snow events above 3,500 feet can cause very high peak flows in the streams and rivers, resulting in severe erosion¹. The likelihood of flooding increases when warm “Chinook winds” arrive in the spring. Rapid snowmelt can result from these warm, southwest winds and, when accompanied by rainfall, flooding can become severe.

Geology and Soils

The geology is complex due to several periods of volcanism, faulting, and erosion dating back at least 40 million years¹. More than 500 large volcanoes, cinder cones, or volcanic vents have been identified in Deschutes County alone. The four major periods of mountain building and river moving activities have been interspersed with periods of erosion and sedimentation associated with glaciation and stream runoff. The general permeability of volcanic rock allows rain and melting snow to trickle into the ground to the water table where underlying sediments play a primary role in natural spring occurrence. Groundwater flowing through adjacent volcanic rocks is forced to the surface due to much older and complex geologic structures of low permeability, creating springs.

Soils in the Upper Deschutes watershed are largely from volcanic materials, including volcanic ash, pumice and cinders¹. Most of the soils are uniform over large areas and cover buried soils formed of hard basalt and andesite, tuff, breccia, glacial till and outwash gravel. Because of the relatively recent volcanic activity, soils have not had time to develop and mature³. In many areas of the basin, the soil horizon is only a few feet to a few inches thick leaving much of the basalt flows, pumice fragments, and cinders exposed at the surface as if you were looking at a lava flow only a few days old.

Volcanic soils are naturally high in phosphorus⁴. Data from the Metolius drainage suggest that natural background levels of phosphorus in the water vary between 0.05 and 0.15 mg/L.

Detailed information on soil types is found in the Upper Deschutes soil survey, available at the USDA Agricultural Services Center (Deschutes SWCD office) in Redmond. Digital data are on the web at <http://www.or.nrcs.usda.gov/soil/mlra.html>.

Hydrology³

The Deschutes River and its western tributaries start high in the Cascade Mountains. The head of the Deschutes River is formed by overflow from Little Lava Lake when there is abundant water, but during dry years the source consists of large springs in Blue Pool. Along its 132-mile course to Lake Billy Chinook, the Deschutes is fed by some of the largest springs in the United States. Cultus River, Quinn River, Snow Creek, Browns Creek, Fall River, Spring River, Alder Springs, and some unnamed springs near Lake Billy Chinook are all springs that discharge the abundant groundwater that has infiltrated high in the pumice rich soils and rocks of the Cascade Mountains. Flows of many springs in the upper watershed peak in summer because of the time delay and distance from when and where the water enters the ground and where it discharges to the surface again; springs at lower elevations tend to have more constant flows. The Deschutes River is so dominated by springs that a US Geological Survey concluded in 1914 that the Deschutes River at Bend was the most even-flowing river for its size of any river in the United States.

Whychus Creek and Tumalo Creek are quite a contrast to the spring-fed tributaries to the Deschutes River. Their source is very high in the Cascade Mountains at the toes of glaciers around Broken Top and the Three Sisters mountains. These two creeks typically peak at the height of snowmelt, usually in May and June, and then reach minimum flows in late fall and winter. When there is a moderate to heavy snowpack and a warm Chinook wind, these creeks can increase in flow 20 times over in one day. These streams are also a good source of cold water to the Deschutes River.

To increase the supply of water for irrigation, several reservoirs were built high in the headwaters of the Deschutes River. Crane Prairie and Crescent Lake were first constructed around the early 1920s and were later rehabilitated in the 1940s and 50s. Wickiup Reservoir was started in 1939 and finished by 1945. All together, these three reservoirs store 341,050 acre-feet for irrigation of approximately 105,000 acres.

After Wickiup was built, the flow regime of the Deschutes River immediately below Wickiup changed dramatically. During very dry years, the river is reduced to 20 to 30 cfs in the winter and in the summer time during the height of irrigation season, the flow has been increased to 2,000 cfs. Presently, the maximum is around 1,700 cfs. The water released from the reservoir travels down the Deschutes to Bend where nearly all of it is diverted into six major canals. The flow below these canals during the summer is very low. Until recently, the lowest flow in dry years was around 30 cfs. Recent instream transfers and conservation work has brought that minimum to approximately 130 cfs. The canals themselves are mostly unlined and were dug through the very recent volcanic lava flows and leak a substantial amount of water. Some estimates have put the overall transmission losses at 50 percent. Some of the irrigation districts in the Management Area are working on lining and piping projects to conserve water. For example, North Unit Irrigation District has lined the first twelve miles of its canal to prevent this seepage so that the irrigators can use the saved water on their farms.

The vast majority of water diverted from the Deschutes River is taken out by the irrigation districts (Table 3). All other private diversions add up to less than 100 cfs.

Table 3. Irrigation District diversions and flow rates in the Management Area^k.

Canal	Maximum Water Right (cfs)	Usual Maximum (cfs)
Arnold	150	95
Central Oregon and North Canal	1,385	1,000
Bend Feed	150	135
North Unit Main	1,100	800
Swalley	120	105
Tumalo Feed	230	180
Three Sisters	185	150
Crooked River Feed	400	180

Vegetation

Vegetation is dominated by mixed conifer stands of ponderosa and lodgepole pine, fir, juniper, grasses, and shrubs¹. Forest habitat is characterized by ponderosa pine with old-growth characteristics, interspersed with dense lodgepole thickets of old and new growth characteristics and thinned young pine/ponderosa stands. Meadows comprised of dry bunch grass, primarily Idaho fescue, needle grasses, or sedges, are scattered throughout the forest understory.

The west to east transition shifts from ponderosa pine/bitterbrush/manzanita to juniper/sage/bitterbrush/Idaho fescue plant communities¹. Numerous rare plant species are scattered throughout the area; several are candidates for listing as Endangered or Sensitive species.

Fire exclusion has significantly modified vegetation¹. Junipers, once limited to areas not burned by fire under natural conditions, now crowd and displace conifers and rangeland vegetation, while other shrubs displace native grasses and forbs.

Noxious weeds are on the rise and have become a serious management issue⁵. Within the past 20 years, periodic drought cycles, the lack of a coordinated control and abatement program in the Deschutes Basin, and expanding commercial and residential development have fostered an explosion of invasive noxious weeds. Riparian and agricultural lands within the Management Area are rapidly transforming from diverse native plant communities and productive farmlands to weed-choked monocultures. Purple loosestrife is showing up in irrigation ditches. Areas infested with spotted and diffuse knapweed; bull, Canada, and/or Russian thistle; Dalmatian toadflax; and other unwelcome species contribute to higher soil erosion and runoff from agricultural and riparian lands, thereby boosting levels of sedimentation, turbidity and other water quality-limiting parameters in the Management Area.

The Deschutes County Weed Board has developed a comprehensive vegetation management plan to control and eliminate weed infestations and restore those areas to native species.

LAND USE

Most of the Management Area is comprised of federal forest and rangelands. The US Forest Service manages the majority of Paulina Creek land, all the lands in the headwaters of the Deschutes River and its western tributaries, and lands surrounding montane lakes and reservoirs. The Bureau of Land Management manages primarily small, sporadic areas directly adjacent to the waterways.

Approximately one quarter of the Management Area is privately owned¹. Private owners manage the majority of the land adjacent to the Deschutes and Little Deschutes Rivers and over half of the lands adjacent to Tumalo and Whychus Creeks. Use of agricultural lands varies throughout the Management Area⁶. Most grazed timberland and subirrigated pasture is around LaPine. Irrigated cropland is concentrated around Lower Bridge. Irrigated pastures and haylands occur throughout the Management Area.

In the late 1800s and early 1900s, settlers realized the Deschutes River and its tributaries could irrigate thousands of acres if the water could be diverted from the river and onto potential farmland. Many of the canals that presently divert water from the Deschutes River at Bend were dug within the first few years of the 20th century by irrigation companies. Most of these companies were subsequently reorganized into irrigation districts.

Forage, cereals, and seed crops comprise the majority of crops grown on irrigated lands, with irrigated pasture and alfalfa accounting for most of the consumptive use of water¹. The subdivision of large farms and ranches into “hobby” farms has resulted in increased livestock numbers. Livestock include llamas, horses, beef and breeding cattle, poultry, sheep, goats, and a few dairy cows.

Approximately 23,168 acres were harvested in Deschutes County in the year 2008, of which 23,000 acres consisted of hay and pasture⁷. Cropland production in 2008 in Deschutes County was valued at \$16,247,000; nursery crops brought in 2,700,000 and livestock brought in \$9,525,000. Three quarters of the livestock income accrued from cattle and calves-

The population of Deschutes County in 1980 was 62,142, and it grew to 74,958 by 1990¹. By 2008, 167,015 individuals resided in the county⁸. Deschutes County is one of the fastest growing counties in Oregon.

The Management Area continues to undergo changes in its social and economic character. Historically, agriculture and timber sectors played a major role, but they have been replaced by an urban economy based on service, trade, and government.

B. WATER QUALITY

BENEFICIAL USES

State agencies use the term “beneficial use” in different ways. The Water Resources Department issues water rights for specific uses (OAR 690-300) such as irrigation, agriculture, municipal, domestic, hydropower, recreation, fish and wildlife, and other instream benefits. *Uses tied to water rights are outside the scope of area plans. Area plans and rules address beneficial uses of water, related to water quality that must be protected for the public interest.* These beneficial uses of water are designated by state law and generally apply basin-wide to all waters of the state. Waters of the state include lakes, bays, ponds, impounding reservoirs, springs, wells, rivers, streams, creeks, marshes, inlets, canals, and all other bodies of surface or underground waters, natural or artificial, public or private (except those private waters which do not connect to natural surface or underground waters) within Oregon (from ORS 468B.005(8)).

Beneficial uses designated for all Management Area waterbodies (OAR 340-41-0562) are: public domestic water supply, private domestic water supply, industrial water supply, irrigation, livestock watering, aquatic life, wildlife and hunting, fishing, boating, water contact recreation, and aesthetic quality. Public and private drinking water uses apply where natural water quality is such that adequate treatment (filtration and disinfection) will meet drinking water standards. In addition, hydropower is a beneficial use, with two power generation projects on the Deschutes River.

Domestic water consumption (especially drinking water), aquatic life (especially salmonid fish rearing and spawning), and recreation (especially human contact such as swimming) are the most sensitive uses in terms of their ability to be adversely affected by human activities. Drinking water is affected primarily by nitrates; aquatic life by temperature, sedimentation, turbidity, nutrients, pH and dissolved oxygen; and human contact recreation by bacteria.

Because aquatic species are so sensitive to a variety of pollutants, they are often viewed as an indicator of water quality. Therefore, in this section, the Area Plan will focus on salmonid populations and habitat requirements.

MOST SENSITIVE BENEFICIAL USE: SALMONIDS

Migratory (anadromous) fish were eliminated from the Management Area following construction of the Pelton-Round Butte Hydropower complex⁹. Anadromous fish species in the Management Area were spring Chinook salmon, summer steelhead, and sockeye salmon. These species were found in the Metolius River, Deschutes River upstream to Big Falls, the Crooked River, and tributaries to these rivers. Whychus Creek and the Crooked River were especially important for steelhead production, while the majority of Chinook Salmon production occurred in the Metolius River. Sockeye salmon were found in the Metolius and used Suttle Lake as part of their life history requirement for lake rearing. Reintroduction of anadromous fish is currently being implemented through a settlement agreement associated with the new federal license for the hydropower complex. Releases of summer steelhead fry began in 2007 and will continue with annual spring releases into Whychus Creek and the lower Crooked River. Spring Chinook salmon fry releases were initiated in 2008 and will continue annually into the Metolius River, Whychus Creek and the lower Crooked River. The Mid-Columbia summer steelhead population is listed as threatened under the Federal Endangered Species Act. The goal of the reintroduction effort is to have naturally producing, self-sustaining populations of all three species.

Resident fish species in the Management Area were redband trout, bull trout, mountain whitefish, and other non-game species. Bull trout were eliminated from most of the area due to increased water temperatures from reservoir management, increased passage barriers resulting from human activities, and harvest. Bull trout currently are found in the Deschutes River between Lake Billy Chinook and Big Falls (below Lower Bridge), the Lower Crooked River below Opal Springs Dam, the Metolius River and tributaries, Odell Lake and some tributaries, and rarely in Davis Lake. This population of bull trout, along with the rest of the Columbia River Basin populations, was listed as threatened under the Federal Endangered Species Act in 1998. Lake Billy Chinook supports one of the healthiest bull trout populations in the state. The trout migrate to the reservoir from the tributaries and feed on the reservoir fish. These bull trout are fluvial fish (i.e. live in rivers) that have adapted to reservoir life and become adfluvial (i.e. live in rivers and lakes). They depend on the clean, cold waters of the Metolius River and its tributaries, which contain ample gravel suitable for spawning. Currently, Lake Billy Chinook and the Metolius River are the only bull trout fisheries allowed within the state. The Endangered Species Act allows for a limited fishery to continue for species under a threatened status, provided these actions do not threaten recovery of the species and are consistent with state law. Consequently, a signed agreement between Oregon and the US Fish and Wildlife Service provides for a limited bull trout harvest to continue within Lake Billy Chinook.

Water temperatures are critical to salmonid growth and survival at all life stages, and to other aquatic life. Warm stream temperatures increase stress and disease, raise metabolism, lower growth rates, and enhance conditions for introduced non-native predators. Temperature affects the dissolved oxygen potential in water - the warmer the water, the less dissolved oxygen it can hold. Temperature controls the rate of many chemical reactions including the equilibrium between ammonium (NH_4) and un-ionized ammonia NH_3 (toxic form). Lethal temperatures for adult salmonids vary according to a variety of factors - but are generally reported in the range of 70° to 77°F. Salmonid eggs and juveniles are much more sensitive to high temperatures. Extremely low temperatures can also affect egg incubation and survival, but the extent of this problem in the Management Area is unknown.

Generally, water temperatures above 55°F inhibit salmonid spawning, egg incubation, and fry emergence from the gravel. However, salmonids have successfully survived in some areas where natural water temperatures are higher. Egg development and the subsequent timing of emergence are closely associated with stream temperatures.

Bull trout have very narrow temperature tolerances. Optimal water temperature for bull trout is less than 50°F. Egg survival is highest for temperatures from 39°F to the low 40s. Egg survival approaches 0% as temperatures near 48°F. Bull trout subadults and adults are rarely found in water temperatures above 52°F.

Excessive aquatic plant or **algal growth** can harm fish and other aquatic life by creating extremes in water **pH** and low levels of **dissolved oxygen**. (The death and subsequent decomposition of aquatic plants can consume large quantities of dissolved oxygen.) These conditions can be stimulated by the availability of nutrients, warm temperatures and light, which in turn are often caused by low stream flow and lack of protective vegetative cover.

Sediments carried in basin streams can adversely affect aquatic life by reducing light penetration and visibility, reducing water infiltration through stream substrate (harming incubating fish eggs), and irritating gill filaments. **Turbidity** is a measure of the cloudiness of water and is often used as a surrogate measure for suspended sediment.

Reduced stream flows can contribute to warmer water, increased pH, reduced dissolved oxygen, a general reduction in available habitat, and in extreme cases interfere with fish

migration. Slow-moving streams are more likely to warm and are less turbulent, all of which can contribute to reduced oxygen levels.

Modification of physical habitat can directly harm aquatic life. Channelization reduces the amount of habitat (stream length is usually reduced as meanders are eliminated), as well as the instream habitat complexity such as the normal mixture of pools, riffles, and runs. Loss of riparian vegetation often destabilizes streambanks, which results in increased erosion, increased stream sedimentation, loss of instream habitat complexity and cover, and the loss of future large woody debris that naturally falls into streams.

Adequate riparian vegetation helps:

- Minimize streambank erosion by increasing the cohesiveness and structural strength of streambanks and by reducing flow velocities
- Reduce increases in summer water temperature
- Maintain late season flows by increasing the ability of the adjacent soils to store water during runoff seasons
- Moderate winter stream temperatures through the inflows of relatively warmer groundwater from adjacent soils
- Filter out and process excess nutrients, bacteria, and sediment in runoff that could pollute adjacent streams

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).

Stream channels that are not incised (deeply cut down) will be more connected to their floodplain. Better floodplain connectivity has the added benefit of increasing stormwater storage and reducing stormwater velocities. These streams will also meander more, which will reduce flow velocities and reduce the damage from flooding.

WATER QUALITY STANDARDS

Water quality standards are developed by each state to determine whether water quality is sufficient to support the beneficial uses. These standards are reviewed periodically and may change over time. Current standards are defined in OAR 340-041 and can be found at <http://www.deq.state.or.us/wq/wqrules/wqrules.htm>.

WATER QUALITY PARAMETERS ON THE 2004/06 303(d) LIST

Stream segments in the Management Area are on the 2004/06 303(d) list for exceeding some water quality standards (Table 4).

Stream Segment	Water Quality Parameters						
	Temperature	pH	Dissolved Oxygen	Chlorophyll <i>a</i>	Bacteria	Sediment	Turbidity
Deschutes River/Lake Billy Chinook (Mile 110.1–116)		summer		summer			
Deschutes River; Lake Billy Chinook to Steelhead Falls (116-126.4)	year-round (64.4°F)		Jan 1 – May 15				
Deschutes River: Steelhead Falls to North Unit Main Canal (126.4-162.6)	year-round (64.4°F)	year round	Jan 1 – May 15				
Deschutes River: North Unit Main Canal to Central Oregon Canal (162.6 –168.2)	year-round (64.4°F)	year round	Jan 1 – May 15				
Deschutes River: Central Oregon Canal to Wickiup Reservoir (168.2-189.4)	year-round (64.4°F)		year-round	summer		undefined season	spring/ summer
Deschutes River: Wickiup Reservoir to Crane Prairie Reservoir (189.4-222.2)	year-round (64.4°F)		Sept 1–June 30			undefined season	spring/ summer
First Creek (3.6-12.1)	Sept 1-June 30 (55°F)						
Indian Ford (0-12.3)	year-round (64.4°F)						
Lake Creek (0-5.9)	year-round (53.6)°F						
Lake Creek, Middle Fork, South Fork (0-1.7)	year-round (53.6)°F						
Lake Creek, Middle Fork (0-2.2)	year-round (53.6)°F						
Lava Lake			summer				
Link Creek (0-2.5)	year-round (53.6)°F						
Metolius River (8.5-39.6)	year-round (53.6)°F						
Odell Creek (3.4-16.3)	year-round (53.6)°F						
Odell Lake /Odell Creek (0-16.3)		summer		summer			
Whychus (Squaw) Creek (0-40.3)	year-round (64.4°F)						
Tumalo Creek (0-12.5)	year-round (64.4°F)						
LITTLE DESCHUTES SUBBASIN							
Big Marsh Creek (0-15.6)	year-round (53.6)°F						
Crescent Creek (0-11)	year-round (64.4°F)						
Crescent Creek to Crescent Lake (11-30.1)	year-round (53.6)°F						
Hemlock Creek (0-5.9)	year-round (53.6)°F						
Little Deschutes River (0-68.8)	year-round (64.4°F)		Jan 1 – May 15				
Little Deschutes River (68.8-92.4)	year-round (53.6)°F						
Paulina Creek to Paulina Lake (0-15)	year-round (64.4°F)						
CROOKED RIVER SUBBASIN							
Crooked River to High Bridge	summer (64°F)	year round					

1. The **temperature** establishes biologically-based numeric criteria to support the different life stages and species of salmonid fish. The standard includes maps that designate the water body and time of year where the criteria apply. In the Management Area, the applicable

criteria are: 64.4°F for salmon and trout rearing (year round) and 53.6°F for bull trout spawning and juvenile rearing (year round). The 64.4°F criterion applies throughout the Management Area. The 53.6°F criterion applies in specific reaches identified by DEQ in conjunction with fisheries agencies. The spawning criterion applies only in reaches used by anadromous salmonids for spawning; there is currently no spawning criterion for the Management Area as there are no anadromous salmonids in the Upper Deschutes Basin. If DEQ determines that the temperature of a water body naturally exceeds the criteria, then the criteria for that water body will be revised accordingly (OAR 340-041 0028(8)).

Oregon's temperature standard states that "for farming and ranching operations on state or private lands, water quality standards are intended to be attained and are implemented through the Agricultural Water Quality Management Act (ORS 568.900 to 568.933) and rules thereunder, administered by the ODA. Therefore, farming and ranching operations that are in compliance with the Agricultural Water Quality Management Act requirements will not be subject to DEQ enforcement under this rule." (ORS 340-041-0028(12)(f))

2. The allowable **pH** range of 6.5 to 8.5 was exceeded in the summer in multiple streams in the Management Area. A more comprehensive study is needed to identify the causes and extent of the problem.
3. **Dissolved oxygen** levels were measured below the state standard in the Deschutes River near Sunriver. A more comprehensive study is needed to identify the sources and extent of the problem.
4. **Chlorophyll *a*** exceeded state standards in Lake Billy Chinook and in the Deschutes River between Wickiup Reservoir and Bend due to excessive algal growth. More comprehensive studies are needed to identify the causes and extent of the problem.
5. **Sediment:** Spawning gravels in the Upper Deschutes contain a high percent of fine sediments, which reduce embryo survival rates for trout.
6. **Turbidity** in the Deschutes River between Wickiup Reservoir and the Central Oregon Canal and increases as much as 30-fold (from < 1 to 31 NTUs) when irrigation water is released from Wickiup Reservoir in early spring and remains to twice background until late July. The State standard allows only a 10% increase in turbidity.

OTHER WATER QUALITY CONCERNS

Bacteria numbers have exceeded State standards in the Crooked River, but at a sampling point just upstream of the Management Area. The sampling site is near Smith Rock, upstream of Crooked River Ranch. Crooked River Ranch is the only portion of the Management Area that drains into the Crooked River. Crooked River Ranch consists mostly of unirrigated, 5-acre lots, with a few horses. The lack of significant agricultural activities in Crooked River Ranch makes this area an unlikely contributor to agriculture-related water quality problems in the Crooked River. Bacteria sampling in the Upper Deschutes drainage has not warranted 303(d) listing.

DEQ no longer lists streams on the 303(d) list for habitat and flow modification; however, these factors are still important for sustaining the beneficial uses related to aquatic life.

1. **Habitat modification:** lack of large woody debris in the channel limits cover and protection for trout from high flows in the upper reaches of the Deschutes River. ODFW and the US Forest Service have ongoing, extensive habitat restoration projects that have made localized

improvements. Deschutes County and Oregon's Division of State Lands have tightened their requirements for bank stabilization projects. Both recommend 'bioengineering' as the preferred stabilization method to meet multiple objectives for aquatic resources and landowner streambank stabilization. Deschutes County will waive fill/removal fees if the project provides fisheries enhancement benefits and requires justification if a landowner applies to do rip-rap project.

2. **Flow modification:** low flows are believed to contribute to water temperature fluctuations. Flow regimes changed profoundly in the Deschutes River and its tributaries near Bend due to irrigation development in the early 1900s. Specifically, during dry years (less than average precipitation), flows immediately below Wickiup Reservoir can drop to 20 to 30 cfs during the winter storage season whereas prior to the dam, flows ranged from 419 cfs to 929 cfs (1923-1941 monthly averages). In the summer, the releases from Wickiup are higher than the pre-dam flows. Prior to the dam, the maximum monthly flow averaged 1,220 cfs in August 1938 and after Wickiup was completed in 1943, the maximum monthly outflow was 2,120 in August 1951. More recently, as conservation and efficiencies have improved, the maximum flows from the reservoir are typically less than 1700 cfs and then only for a few days.

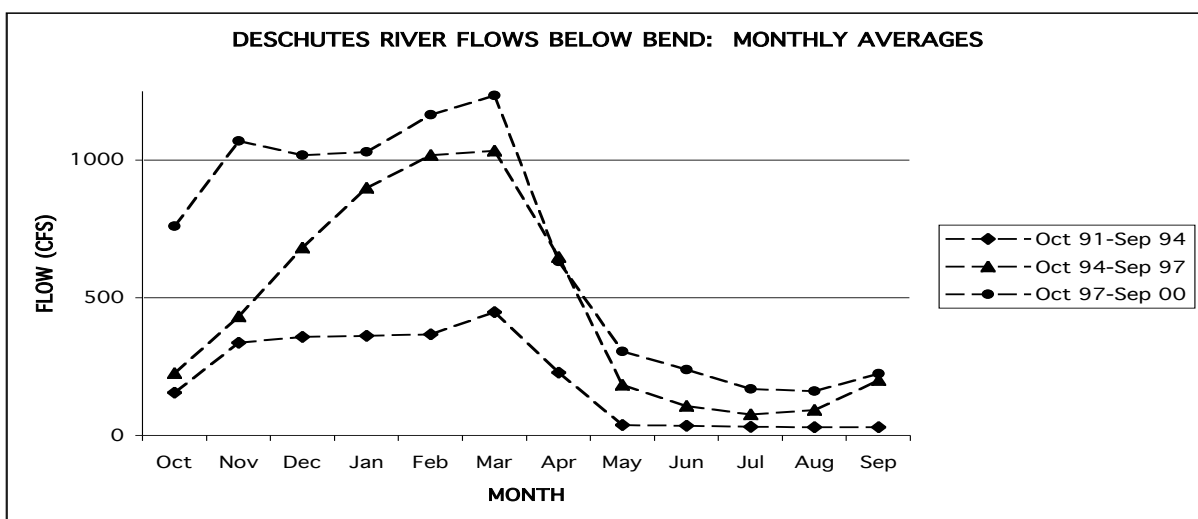
The three reservoirs on the Deschutes have no flood control authorization. However, the dams have reduced flood flows at Bend. During the December 1996 and January 1997 floods, the gauge below Bend peaked at 2,500 cfs. The natural flows, had there been no dams, were estimated at over 4,000 cfs in several instances.

During summer, when irrigation canals are diverting water at Bend, the flow below Bend has dropped below 30 cfs during the very dry years (Table 6). An application for an instream water right for the Deschutes River below Bend is pending but protests have not been resolved at this time; therefore, there is no instream water right. The instream right, once issued, will have a priority date much junior to the existing irrigation rights and will likely be unmet in most years. However, instream leasing programs have helped increase flows below Bend. For example, in 2004, instream leases contributed an extra 50 cfs below Bend. More recently, the work of the irrigation districts and the Deschutes River Conservancy through instream leasing, instream transfers as a result of conservation and the Groundwater mitigation program have brought the flow in the Middle Deschutes River to nearly 120 cfs.

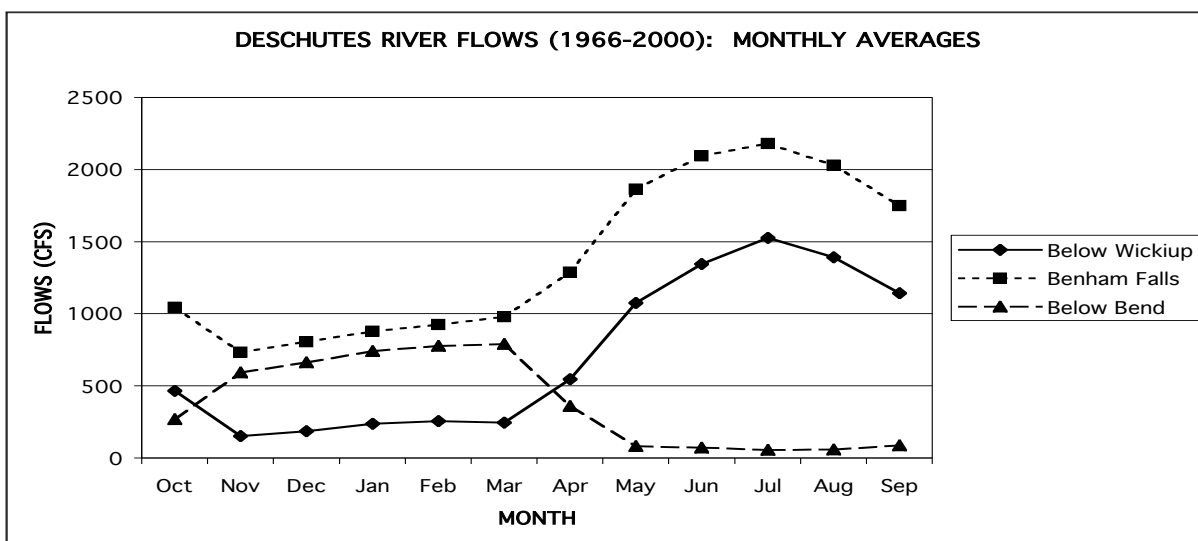
Table 5 and the two resulting graphs illustrate the major flow regime of the Deschutes River. Wickiup Reservoir is managed to provide irrigation water. Lowest flows below Wickiup Dam are in the winter and spring, while the reservoir fills; greatest releases are during the summer irrigation season. Flows at Benham Falls (44 miles downstream from Wickiup) reflect the addition of the tributaries Fall River, Spring River, and Little Deschutes, which are relatively unregulated and have relatively stable flows due to being spring-fed. Flows measured below Bend are downstream of the irrigation district diversions and reflect summer diversions to the irrigation district delivery systems. The flows below Bend over a recent 9 year period (Graph 1) show both the effects of drought years (1991-1997) and the increase in flows in the last few years compared to the 35 year average (Graph 2).

Site	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept
Below Wickiup	466	154	188	239	258	247	546	1075	1345	1527	1392	1144
Benham Falls	1044	733	807	878	926	980	1289	1864	2096	2181	2031	1751
Below Bend	270	593	663	742	778	792	361	84	72	57	60	88
Below Bend (10/91-9/94)	156	337	358	362	368	449	229	39	36	32	31	30
Below Bend (10/94-9/97)	226	432	682	900	1018	1035	648	184	107	77	93	201
Below Bend (10/97-9/00)	760	1070	1019	1030	1165	1235	632	306	239	169	161	225

Graph 1



Graph 2



Tumalo Creek has one major diversion now, aside from the City of Bend diversion high in the drainage on Bridge Creek. The Tumalo Irrigation District diverts water through the Tumalo Feed Canal at river mile 2.5. Tumalo Creek below the Feed Canal had been dry during late summer nearly every year from 1913 to 1992. However, conservation efforts by the Tumalo Irrigation District restored 2.5 cfs between this diversion and the mouth between 1992 and 2005. In 2005, the state approved a senior instream water right for 5.82 cfs from the Feed Canal to the mouth. More recently, with several large conserved water projects, the flow below the Feed canal can be as high as 15 cfs of protectable water i.e. water flow with a water right priority date.

The Little Deschutes River above Crescent Creek is unregulated and resembles as close to a natural stream as any in the basin. There are relatively few irrigation withdrawals on the river. Crescent Lake is a natural lake, but its depth has been increased and its outflow regulated by the Tumalo Irrigation District (TID). This management has little effect on winter flows in the Little Deschutes River. The average summertime flows exceed natural flows, but are significantly lower than the average runoff, high flows that would occur naturally during April, May and June. The stored water released from Crescent Lake actually benefits the flows in the Little Deschutes River in that baseflows generally are higher than they would be naturally, yet peak flows have been reduced by 75%.

Whychus Creek is used heavily for irrigation and consequently suffers low flows between the Three Sisters Irrigation District canal (River Mile 23.5) and where the springs near Camp Polk Road contribute about 7 cfs (River Mile 17). In the lower reach of Whychus Creek, Alder Springs (River Mile 2) contribute about 20 cfs, and at the mouth nearly 100 cfs discharges to the Deschutes River because of groundwater springs. Until 1998, the stream through town used to dry up. With the state's first instream transfer, 1.8 cfs was left instream to begin the reconnection of the stream from its lower section to the upper section, which is essentially pristine. With the work of the Upper Deschutes Watershed Council, Deschutes River Conservancy, the Three Sisters Irrigation District, flows can be expected to be in excess of 15 cfs during the summer time through a segment that frequently was dry.

Crooked River is a very flashy stream and contrasts significantly to the Deschutes River due to the clay rich soils and differing geology. The river is used heavily for irrigation. In the very lowest stretch of the Crooked River, large springs contribute 1,100 cfs in flow just before it enters Lake Billy Chinook. The Crooked River system is used mainly for irrigation purposes. Two reservoirs authorized for flood control and irrigation are located on Ochoco Creek and Crooked River. Those two reservoirs benefit the stream system significantly by providing cool consistent flows throughout the summer time when historically flows were none existent through the Prineville Valley reach during summer. They also protect the town from devastating floods during the winter when flood flows into the reservoirs can easily be triple what the outflows are held at.

CITED SOURCES

- ¹ *Upper Deschutes Subbasin Assessment*. Upper Deschutes Watershed Council. 2003.
- ² Oregon Climate Data (Oregon State University). www.ocs.orst.edu
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- ⁴ *Restoring Oregon's Deschutes River. Developing Partnerships and Economic Incentives to Improve Water Quality and Instream Flows*. Deborah Moore, Zach Willey, and Adam Diamant. Environmental Defense Fund. 1995.
- ⁵ Dan Sherwin, Deschutes County Weed Program Manager. Personal communication.
- ⁶ Todd Peplin, USDA Natural Resources Conservation Service, Redmond. Personal communication.
- ⁷ Oregon State University Extension Service, Oregon Agricultural Information Network. <http://oain.oregonstate.edu>
- ⁸ Population Research Center – Portland State University. <http://www.pdx.edu/prc/>
- ⁹ Brett Hodgson, Oregon Department of Fish and Wildlife Biologist, Bend. Personal communication.
- ¹⁰ *Oregon's 2004/06 Section 303(d) List of Water Quality Limited Waterbodies*. Oregon Department of Environmental Quality. 2007.

ATTACHMENTS

ATTACHMENT A: Technical and Financial Assistance for Natural Resource and Farm Management

Watershed councils and SWCDs are primary resources for technical and financial assistance. The most common state and federal assistance programs are listed after contacts for various agencies and groups.

1. AGENCY AND GROUP CONTACTS

The following agencies or groups provide cost-share, grants, and other incentives on a case-specific basis to improve water quality on public and private lands.

Soil and Water Conservation District (SWCD)

Prepares management plans and helps implement them by coordinating with other technical experts in natural resources. <http://www.oacd.org/districts.html>

Jefferson County: 923-8018
Deschutes County: 923-2204
Klamath County: 883-6932 x3

Irrigation districts in the Management Area

Provide information in such areas as water management, irrigation practices and procedures, and basic (first-level) irrigation water rights laws and responsibilities. They also generally provide further contacts for resources such as irrigation easements, water right holder's responsibilities, and basic irrigation system education and design.

Arnold: 382-7664 <http://www.owrc.org/basins/arnold.htm>
Central Oregon: 548-6047 <http://www.coid.org>
Three Sisters: 549-8815 <http://www.owrc.org/basins/3sisters.htm>
Swalley: 388-0658 <http://www.swalley.com>
Tumalo: 382-3053 <http://www.tumalo.org>

Deschutes County Weed/Vegetation Program

The Weed/Vegetation Division is under the Deschutes County Road Department. The division is responsible for educating the general public about noxious weed control. The integrated vegetation plan includes all aspects of weed control such as cultural, mechanical, biological, and chemical. The division also helps implement revegetation plans for landowners.

Bend: 322-7135 <http://www.deschutes.org/go/government/departments/road-department/citizen-involvement/noxious-weeds>

USDA – Natural Resources Conservation Service (NRCS)

Provides information on soil types, soils mapping, and interpretation. Administers and provides assistance in developing plans for Conservation Reserve Program (CRP), Conservation Reserve Enhancement Program (CREP), Environmental Quality Incentives Program (EQIP), Wetland Reserve Program (WRP), and other cost-share programs. Prepares management plans. Makes technical determinations on wetlands and highly erodible land. <http://www.or.nrcs.usda.gov>

Jefferson and Deschutes counties: 923-4358 x3
Klamath County: 883-6932 x3

USDA – Farm Service Agency (FSA)

Maintains agricultural program records and administers various federal cost-share programs. Their offices also provide up-to-date aerial photography of farm and forestland.

<http://www.fsa.usda.gov/or>

Jefferson & Deschutes counties: 923-4358 x2
Klamath County: 883-6932 x2

Oregon Department of Agriculture (ODA)

Oversees the agricultural water quality management (Senate Bill 1010) program, issues permits and helps producers comply with confined animal feeding water management programs, and provides support to SWCDs.

<http://www.Oregon.gov/ODA/NRD/index.shtml>

Central Oregon Water Quality Planner, Bend: 541-617-0017
Livestock Water Quality Specialist, Bend: 541-617-0055
Noxious Weed Control, Redmond: 541-548-2241
Natural Resources Division, Salem: 503-986-4700

Oregon State University Extension Service

Offers educational programs, seminars, classes, tours, and publications to guide landowners in managing their resources. OSU has been instrumental in the Oregon Cattlemen's extremely successful WEST Program. Since its inception, it has grown into several distinct natural resources related workshops offered to ranchers and farmers free of charge. The WEST Program workshops help ranchers and farmers understand their watersheds and stream function better through assessments and monitoring. OSU has also been providing Proper Functioning Condition (PFC) workshops and assessments with landowners. <http://extension.oregonstate.edu>

Jefferson County: 541-475-3808 Deschutes County: 541-548-6088
Crook County: 541-447-6228 Klamath County: 541-883-7131

Oregon Watershed Enhancement Board (OWEB)

Provides funding for watershed enhancement projects under the general categories of education/public awareness, monitoring, management, and assessment/action planning.

Redmond: 541-923-2010 <http://www.oweb.state.or.us>

Upper Deschutes Watershed Council (UDWC)

Brings diverse interests together to work towards solutions on local natural resource issues in the Upper Deschutes watershed. Conducts watershed assessments, develops and funds watershed enhancement projects, provides educational opportunities, and works with local stakeholders to improve watershed stewardship.

Bend: 541-382-6103 <http://www.deschuteswatersheds.org/udwc/>

Crooked River Watershed Council (CRWC)

Promotes stewardship of the Crooked River Watershed and its natural resources by balancing conservation and economic sustainability. The Council is comprised of local residents and provides technical and financial assistance to landowners or groups willing to engage in voluntary restoration projects. In addition, the Council works with local residents and schools on education and outreach, and also conducts its own research and monitoring in the watershed.

Prineville: 541-447-3548 <http://www.deschuteswatersheds.org/crwc/>

Department of Environmental Quality (DEQ)

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

Bend: 541-388-6146 <http://www.deq.state.or.us>

Division of State Lands (DSL)

Administers state removal/fill law and provides technical assistance.

Bend: 541-388-6112

<http://www.oregonstatelands.us>

Oregon Water Resources Department (WRD)

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

Bend: 541-388-6669

<http://www.wrd.state.or.us>

Oregon Department of Fish and Wildlife (ODFW)

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

Bend: 541-388-6363

<http://www.dfw.state.or.us>

ODFW Fish Restoration and Enhancement Board (R&E)

Funds habitat restoration and enhancement projects to support recreational or commercial fisheries. Affiliated with ODFW.

Salem: 503-947-6259

<http://www.dfw.state.or.us/fish/RE>

Oregon Department of Forestry (ODF)

Technical advisor for state and federal cost share programs. Provide technical advice on forest management, reforestation, insect and disease problems, Oregon Forest Practices Act, Forest Resource Trust Program, Oregon forest tax programs and forest management plans.

<http://www.dof.state.or.us>

The Dalles: 541-296-4626

Prineville: 541-447-5658

Klamath Falls: 541-883-5693

Deschutes River Conservancy

The Deschutes River Conservancy (“DRC”) is a non-profit corporation dedicated to restoring streamflows and improving water quality in the Deschutes Basin through the implementation of on-the-ground projects. The DRC brings together state, federal, Tribal and local government representatives with private stakeholders to carry out basin-wide ecosystem restoration.

Opportunities exist for both technical and financial support for watershed restoration and water conservation projects within the Deschutes Basin.

Bend: 541-382-4077

<http://www.deschutesrc.org>

Oregon Water Trust (OWT)

Offers lease and buy-out options for water rights. This market-based approach to increasing stream flow may also be used to fund irrigation system changes in watersheds identified as priorities for OWT.

Portland: 503-226-3480

<http://www.owt.org>

Deschutes Basin Land Trust (DBLT)

Works cooperatively with landowners and communities to protect special lands in the Deschutes Basin for present and future generations through purchases of land and conservation easements.

Bend: 541-330-0017

<http://www.deschuteslandtrust.org>

2. SELECTED PROGRAMS

US Department of Agriculture (USDA)

CREP - Conservation Reserve Enhancement Program is a state-federal partnership that provides a modest rental payment and substantial cost share to encourage protection of riparian areas on agricultural lands. Under this program, participating landowners are paid to remove their land from agricultural production and plant the land to grass, shrubs, and trees.

CRP - Conservation Reserve Program is designed to reduce soil erosion, reduce sedimentation in streams and lakes, improve water quality, and establish wildlife habitat. It encourages farmers to convert highly erodible cropland or other environmentally sensitive acreage to vegetative cover, such as grasses, wildlife plantings, trees, filterstrips, or riparian buffers. Farmers receive an annual rental payment for the term of the multi-year contract. Cost-sharing is provided to establish the vegetative cover practices.

Continuous CRP - Continuous CRP is a voluntary program that offers annual rental payments and cost-share assistance to establish long-term, resource-conserving cover on eligible riparian land. Contracts range from 10 to 15 years. Eligible lands include croplands or marginal pasture within a riparian zone. Riparian buffers range in width from 35 to 180 feet.

EQIP - Environmental Quality Incentives Program works primarily in locally-identified conservation priority areas where there are significant problems with natural resources. Activities must be carried out according to a site-specific conservation plan. EQIP offers contracts that provide incentive payments and cost-sharing for conservation practices such as manure management systems, pest management, erosion control, irrigation waterway improvement, and other practices to improve and maintain the health of natural resources.

Farm and Ranch Protection Program - Provides cost share for purchasing agricultural conservation easements.

Other Programs

EPA 319 – The Environmental Protection Agency administers the 1972 Clean Water Act section 319 grants through DEQ to help meet their water quality mandates for nonpoint source pollution. The projects EPA likes to fund are those with directly measurable benefits for water quality and endangered species. See EPA Ag Info Center at <http://es.epa.gov/oeca/ag/index.html>

A&H - ODFW's Access and Habitat Program is designed to improve both wildlife habitat and public hunting access to private lands. Examples of projects include improving vegetation on wild lands, developing water in arid regions, reclaiming habitat by vehicular restrictions, or fencing to control movements of wildlife or livestock. Projects can be on public or private land.

R&E - ODFW's Fish Restoration and Enhancement Program benefits recreational and/or commercial fisheries. Expenditures are split between restoration and enhancement projects. The restoration program will focus on projects to repair fish passage facilities and collect information on physical and biological characteristics of streams and lakes. The enhancement program focuses on projects to increase fish production (either hatchery or natural production), increase recreational or commercial opportunities or access to the fish resources, or improve fish management capabilities. Any public or private non-profit organization may request funds to implement fish restoration or enhancement projects.

ATTACHMENT B: Oregon Removal-Fill Program

In general, Oregon's Removal-Fill Law (ORS 196.800-990) requires people who will remove or fill 50 cubic yards or more in waters of the state to obtain a permit from the DSL. "Waters of the state" include intermittent streams, constantly flowing streams, lakes, wetlands and other bodies of water in this state, navigable and non-navigable.

In areas designated by the DSL as State Scenic Waterways, most removal-fill activities require a permit, regardless of the number of cubic yards affected.

The following activities are statutorily exempt from the permit requirements:

- Fills for building, operating and maintaining dams that have a valid water right and a hydroelectric permit or license.
- Fills and removals associated with normal farming and ranching activities on converted wetlands.
- On lands zoned for exclusive farm use, fills and removals for:
 - Drainage or maintenance of farm or stock ponds.
 - Maintenance of farm roads that does not affect wetlands.
 - Fills and removals for the maintenance or reconstruction of structures such as dikes, dams, levees, rip rap, tide gates, and drainage and irrigation ditches that were serviceable within the past five years, provided the activity does not affect wetlands.
- Fills and removals for maintenance and emergency reconstruction of currently serviceable roads.

Even though these activities are exempt from the permit requirements, they still must be conducted in a manner that does not adversely affect other resources and uses (e.g. water quality, fish and their habitats, recreation, cultural resources). If you are not sure whether your proposed project meets the requirements for an exemption, or if you are not sure of the "best management practices" for an exempt activity, please contact the DSL (Attachment A).

All permits include design and operating conditions and "best management practices" that are intended to ensure the protection, conservation and best use of state water resources and prevent harm to fishery and recreational uses of the waters. In the case of projects involving wetlands, you also may be required to provide mitigation to compensate for any loss of wetland resources.

In most cases, it takes up to 90 days for the DSL to issue a permit. This is because of the number of other agencies and interested parties (e.g., adjacent landowners) who must have an opportunity to review the permit application. If you need a permit, you should apply at least three months before you plan to do the work, taking into consideration the in-water work periods. However, in an emergency, the DSL can authorize work orally as soon as all necessary information about the project has been received. Also, for certain types of activities the DSL issues a streamlined type of permit called a general authorization. Currently general authorizations are available for road construction, erosion control, fish habitat enhancement, wetland restoration and enhancement, and recreational and small-scale placer mining. General authorizations have uniform permit conditions that apply to all projects.

Most projects that need a state removal-fill permit will also require a federal permit from the Army Corps of Engineers (Corps). The DSL and the Corps use a joint permit application form, so you will only need to fill out one application to obtain both permits. When you send in your completed permit application, the Corps will notify you whether you need a federal permit.

ATTACHMENT C: Deschutes County Removal-Fill Program

ORDINANCE 18.04.425. Definition-Fill and removal.

"Fill and removal" means the deposit or removal by artificial means of material at a location within the waters of any lake, river or stream, or in wetlands or riparian areas.

18.128.040W. Conditional use.

Fill and removal. Except as otherwise provided in this title, no person shall fill or remove any material or remove any vegetation, regardless of the amount, within the bed and banks of any stream or river or in any wetland, unless such fill or removal is approved as a conditional use subject to the following standards:

1. An application shall be filed containing a plan with the following information:
 - a. A detailed explanation of the planned fill or removal including the amount of material to be filled or removed.
 - b. An explanation of why the fill or removal is necessary.
 - c. A site plan, drawn to scale and accompanied by such drawings, sketches and descriptions as are necessary to describe and illustrate the proposed fill or removal. The site plan shall, at a minimum, include:
 - i. An inventory of existing vegetation.
 - ii. The proposed modifications, if any, to the vegetation.
 - iii. Existing and proposed site contours.
 - iv. Location of property lines, easements and high water marks.
 - v. Other site elements or information that will assist in the evaluation of the proposed fill or removal.
2. Public facility and service uses such as construction or maintenance of roads, bridges, electric, gas, telephone, water, sewer transmission and distribution lines, and related facilities controlled by public utilities or cooperative associations, shall not be granted conditional use permits to fill or remove unless the following findings are made:
 - a. That all necessary state and federal permits will be obtained as a condition of approval of the conditional use.
 - b. That the public facility and service uses and related facilities cannot, as a practical matter, be located outside of the wetland or bed and banks of the stream or river.
 - c. That the construction or maintenance requiring the fill or removal will be done in a manner designed to minimize the adverse impact upon the wetland, stream or river.
 - d. That erosion will be adequately controlled during and after construction.
 - e. That the impacts on fish and wildlife habitat from the fill or removal will be minimized to the greatest extent practical. The ODFW will be requested to review and comment on the application.
 - f. That only the minimum removal of vegetation or material and dredging or excavation necessary for construction and maintenance will be done.
3. Fill or removal required for public park and recreation areas, natural and outdoor education areas, historic and scientific areas, wildlife refuges, public boat launching ramps, public docks and public walkways shall not be allowed as a conditional use unless the following findings are made:
 - a. That all necessary state and federal permits will be obtained as a condition of approval of the conditional use permit.
 - b. That only the minimum removal of vegetation or material and dredging or excavation necessary for construction and maintenance will be done.
 - c. That the specific location of the site will require the minimum amount of disturbance to the natural environment, considering alternative locations in the area and methods of construction.
 - d. That such construction and maintenance is designed to minimize the adverse impact on the site.

- e. That erosion will be adequately controlled during and after construction.
 - f. That the impacts on fish and wildlife habitat by the fill or removal will be minimized to the greatest extent practical. The ODFW will be requested to review and comment on the application.
 - g. That the specific location of a site for a public park, recreation area, natural and outdoor education area, historic and scientific area, wildlife refuges, public boat launching ramps, public docks and walkways will require the minimum amount of disturbance to the natural environment, considering alternative locations in the area and methods of construction.
4. Except for uses identified in paragraphs (2) and (3), above, an application for a conditional use permit for activity involving fill or removal of material or vegetation within the bed and banks of a stream, river or wetland:
- a. Shall be granted only after consideration of the following factors:
 - i. The effects on public or private water supplies and water quality.
 - ii. The effects on aquatic life and habitat, and wildlife and habitat. The ODFW will be requested to review and comment on the application.
 - iii. Recreational, aesthetic and economic values of the affected water resources.
 - iv. Effects on the hydrologic characteristics of the water body such as direction and velocity of flow, elevation of water surface, sediment transportation capacity, stabilization of the bank and flood hazards.
 - v. The character of the area, considering existing streambank stabilization problems and fill or removal projects which have previously occurred.
 - b. Shall not be granted unless all of the following conditions are met:
 - i. That all necessary state and federal permits will be obtained as a condition of approval of the conditional use.
 - ii. That there is no practical alternative to the proposed project which will have less impact on the surrounding area, considering the factors established in subsection (4)(a) above.
 - iii. That there will be no significant impacts on the surrounding area, considering the factors established in subsection (4)(a) above.
 - iv. That erosion will be adequately controlled during and after the project.
 - v. That the essential character, quality, and density of existing vegetation will be maintained. Additional vegetation shall be required if necessary to protect aquatic life habitats, functions of the ecosystem, wildlife values, aesthetic resources and to prevent erosion.
 - vi. That the proposed fill or removal activity will be consistent with all relevant goals and policies of the Deschutes County comprehensive plan.
 - vii. That a conservation easement, as defined in section 18.04.280, "conservation easement," shall be conveyed to the county, which provides, at a minimum, that all elements of the project will be carried out and maintained as approved, in perpetuity, for the regulated fill or removal area and all real property on the same lot, within 10 feet of any wetland, river or stream.

ATTACHMENT D: Land Management in Scenic Waterways (excerpts related to agricultural activities)

Contact Oregon Parks and Recreation Department for more information (Bend 388-6073)

OAR 736-040-0035. Rules of Land Management.

These rules and regulations governing the use of related adjacent lands and improvements made on or to these lands apply to all designated scenic waterways. Land management on scenic waterways includes, but is not limited to, the following examples:

(1) Timber Harvest: The forest cover on related adjacent land is a part of the scenic beauty of the scenic waterway and notification of planned timber harvest operations must be given to the Commission one year prior to commencement. The notification must include a plan specifying timber to be cut, road locations, logging methods, slash cleanup, soil stabilization, revegetation measures and any other details as the Commission may require.

(2) Tree Cutting: No person shall cut any living tree within a scenic waterway without prior written notice except as provided in these rules.

(3) Grazing and Farming: Existing use in the form of grazing or farming of the related adjacent land is a part of the scenic beauty of the waterway. Notification is not required for:

- (a) Construction of fences;
- (b) Maintenance of farm buildings, fences or appurtenances necessary to existing use;
- (c) Laying of irrigation lines;
- (d) Pumphouse construction, if not in violation of OAR 736-040-0030(5);
- (e) Additions to farm buildings, if not in violation of OAR 736-040-0030(5);
- (f) Crop rotation;
- (g) Variations in grazing land management;
- (h) Placing of grazing land under cultivation, except within classified natural river areas named in OAR 736-040-0045 through 736-040-0075;
- (i) Construction of silos and grain storage facilities, and other structures or buildings as are needed in connection with the existing use of the related adjacent land, if not in violation of OAR 736-040-0030(5), except within classified natural river areas named in OAR 736-040-0045 through 736-040-0075;
- (j) Cutting of danger trees. Notification is required for construction of new roads or improvement of existing roads.

(7) Structures, Buildings, and Other Improvements: Except as provided in OAR 736-040-0030(5), sections (3) and (4) of this rule and OAR 736-040-0045 through 736-040-0075, no structures, buildings, or other improvements shall be made, erected or placed on related adjacent lands without notification to the Commission as prescribed by the Act and herein. Permitted new structures, buildings, or other improvements on related adjacent lands which can be seen from the waters within a scenic waterway shall:

- (a) Be of such design and be constructed of such materials as to be unobtrusive and compatible with the scenic qualities of the area. For example, the following shall apply:
 - (A) All structures shall be finished in muted tones appropriate to their natural surroundings;
 - (B) No large areas, including roofs, shall be finished with white or bright colors or reflective materials;
 - (C) No structures shall exceed 30 feet in height from natural grade on a side facing the river;
 - (D) All structures shall be so designed and constructed that little or no soil is left exposed when construction is completed.

- (b) Be located in such a way that topography and natural vegetation make them as inconspicuous as reasonably practicable, and in no case obtruding on the view from the river. The Commission may require that additional vegetative screening be established and maintained. In such event, it shall be evergreen, wherever practicable, and compatible with natural growth in the area.

(9) Maintenance of Structures and Improvements: Owners and users of existing structures and other improvements shall maintain them and their surroundings in a manner and condition in harmony with the environment, compatible with the objectives set forth in these rules and regulations for the classified river area in which they lie, and without impairing substantially the natural beauty of the scenic waterway. The existing color of such structures may be maintained.

(10) Replacement of Existing Structures and Improvements: Replacement of existing structures and improvements, including those lost by fire, flood or other casualty, will be permitted, provided the new structure or improvement is in compliance with provisions of the Act and these rules and regulations. Notification procedures set forth in OAR 736-040-0040 and Commission approval are required.

(12) Erosion Protection: The Commission recognizes that erosion protection work and maintenance may be necessary on riverbanks and related adjacent lands along the scenic waterways. Notification, which shall include plans to protect the natural beauty of the scenic waterway, and Commission approval are required.

(13) Submerged and Submersible Lands:

- (a) No dam or reservoir or other water impoundment facility shall be constructed or placer mining permitted on waters within scenic waterways. No water diversion facility shall be constructed or used except by right previously established or as permitted by the State Engineer;
- (b) No bank protection works or dredging facility shall be constructed or used on such waters, except as permitted by the Director of the Division of State Lands and approved by the State Land Board.

(14) Emergencies:

- (a) The owner or his authorized agent may act in emergencies without prior notice when necessary in the interest of public safety, or safety of his own property, except that notice of any action taken shall be filed with the Commission not later than seven days following the commencement of the emergency procedures;
- (b) The owner or his authorized agent must show that the emergency situation required immediate action to prevent immediate danger or damage. Such emergency procedures shall not be extended beyond the minimum necessary to accomplish the needed protection safely and shall be conducted throughout in such manner as to minimize impairment of the natural beauty of the scenic waterway. For example, car bodies and similar scrap or trash shall not be used as riprap.

ATTACHMENT E: Deschutes County Noxious Weed List 2008

LIST A

These weeds are designated priority noxious weeds by the Deschutes Weed Board as a target weed species on which the Weed Control District will comply with a state-wide management plan and/or implement a count-wide plan for intensive control and monitoring. An “A” rated weed may also be a weed of known economic or ecological importance that occurs in small enough infestations to make eradication/containment possible; or one that is not known to occur here, but its presence in neighboring counties make future occurrence here seem imminent.

Recommended action: Infestations are subject to intensive control when and where found.

African rue	Peganum harmala
buffaloburr +	Solanum rostratum
common houndstongue	Cynoglossum officinale
dyer’s woad -	Isatis tinctoria
false brome	Brachypodium sylvaticum
hydrilla	Hydrilla verticillata
leafy spurge +	Euphorbia esula
meadow knapweed -	Centaurea pratensis
Mediterranean sage +	Salvia aethiopis
medusahead rye +	Taeniatherum caput-medusae
musk thistle -	Carduus nutans
orange hawkweed +	Hieracium aurantiacum
perennial pepperweed +	Lepidium latifolium
purple loosestrife +	Lythrum salicaria
rush skeletonweed	Chondrilla juncea
Russian knapweed +	Cenaturia repens
saltcedar tamarix +	Tamarix ramosissima
Scotch thistle +	Onopordum acanthium
squarrose knapweed	Centaurea virgata
sulfur cinquefoil	Potentilla recta
tansy ragwort +	Senecio jacobaea
whitetop; hoary cress +	Cardaria spp.
wild carrot +	Daucus carota
yellow starthistle -	Centaurea solstitialis

+ currently in the county

- all known populations in the county have been treated

/ Native but poisonous to animals or humans

LIST B

These weeds are economically important and are both locally abundant and abundant in neighboring counties.

Recommended action: Moderate control and/or monitoring at the county level.

Canada thistle +	Cirsium arvense
Dalmation toadflax +	Linaria dalmatica
diffuse knapweed +	Centaurea diffusa
kochia (annual) +	Kochia scoparia
myrtle spurge +	Euphorbia myrsinites
poison hemlock +	Conium maculatum
puncturevine +	Tribulus terrestris
Russian thistle +	Salsola spp.
Scotch broom +	Cytisus scoparius
spotted knapweed +	Centaurea maculosa
yellow toadflax or “butter and eggs” +	Linaria vulgaris
yellow flag iris +	Iris pseudacorus

LIST C

These weeds have the potential to harm agricultural production and transportation systems.

Recommended action: Control and monitoring at the county level

bur buttercup +	Ranunculus testiculatus
bull thistle +	Cirsium vulgare
cheat grass (downy brome) +	Bromus tectorum
common mullein +	Verbascum thapsis
dodder +	Cuscuta spp.
field bindweed +	Convolvulus arvensis
filaree redstem +	Erodium cicutarium
horseweed +	Conyza canadensis
poverty stumpweed +	Iva axillaris
quackgrass +	Agropyron repens
South American waterweed +	Elodea densa
spiny cocklebur +	Xanthium spinosum
St. Johnswort +	Hypericum perforatum
sweetclover(s) -Only on Right of Ways +	Melilotus spp.
western water-hemlock/ +	Cicuta douglasii

ATTACHMENT F: Selected Sections of Oregon's Pesticide Control Act (ORS 634)

634.055 Statewide system of pesticide regulation. The legislative assembly hereby determines that the citizens of this state benefit from a system of safe, effective and scientifically sound pesticide regulation. The legislative assembly further finds that a uniform, statewide system of pesticide regulation that is consistent, coordinated and comports with both federal and state technical expertise is essential to the public health, safety and welfare and that local regulation of pesticides does not materially assist in achieving these benefits. [1996 c.10 s.4 (enacted in lieu of 634.007)]

634.057 State preemption of local pesticide regulation. No city, town, county or other political subdivision of this state shall adopt or enforce any ordinance, rule or regulation regarding pesticide sale or use, including but not limited to:

- (1) Labeling;
- (2) Registration;
- (3) Notification of use;
- (4) Advertising and marketing;
- (5) Distribution;
- (6) Applicator training and certification;
- (7) Licensing;
- (8) Transportation;
- (9) Packaging;
- (10) Storage;
- (11) Disclosure of confidential information; or
- (12) Product composition. [1996 c.10 s.6 (enacted in lieu of 634.009)]

634.063 Exceptions to state preemption of pesticide regulation. Nothing in ORS 634.057 shall limit the authority of a city, town, county or other political subdivision of this state to adopt or enforce a local ordinance, rule or regulation strictly necessary to comply with:

- (3) Any requirement of a state or federal statute or regulation pertaining to pesticides. [1996 c.10 s.10 (enacted in lieu of 634.013)]

634.322 Enforcement powers of department. In carrying out and enforcing the provisions of this chapter, the State Department of Agriculture is authorized:

- (6) To establish limitations and procedures deemed necessary and proper for the protection of persons, pollinating insects, bees, animals, crops, wildlife, land or environment, on the following:
 - (c) Uses or applications;

634.372 Prohibited acts. No person shall:

- (2) As a pesticide applicator or operator, intentionally or willfully apply or use a worthless pesticide or any pesticide inconsistent with its labeling, or as a pesticide consultant or dealer, recommend or distribute such pesticides.
- (3) Operate a faulty or unsafe pesticide spray apparatus, aircraft or other application device or equipment.
- (4) Perform pesticide application activities in a faulty, careless or negligent manner.

For more information, read ORS 634 or contact ODA's Pesticide Division (503-986-4635)