

# **Appendix A**

# **Deschutes Basin Report**

# 1. Basin Description

The Deschutes Basin is the second largest watershed in Oregon, covering 10,759 square miles (more than 6.8 million acres) in the north-central part of the state. The basin extends west to the crest of the Cascade Mountains, south to lava plateaus, east into the Ochoco Mountains and to the plateau between the Deschutes and John Day Rivers, and north to its confluence with the Columbia River. Much of the geography of the basin has been shaped by volcanic activity, from the young cinder cones and pumice deposits of the Cascades to the massive Columbia River basalts in the canyons of the lower river.

The headwaters of the Deschutes River and most major tributaries receive large amounts of precipitation, but much of the subbasin lies in the rain shadow of the Cascade Mountains and is sheltered from western Oregon’s heavy rainfall. Average annual precipitation amounts to more than 100 inches on the eastern slopes of the Cascades, mostly as snow, but drops to only 40 inches in the Ochoco Mountains and 10 inches at lower central locations. Consequently, while the Metolius drainage receives up to 50 inches of precipitation annually, the Bakeoven drainage receives only 10-12 inches.

The climate in much of the basin is considered continental, with low precipitation and humidity, large daily temperature fluctuations throughout the year, and high evaporation rates. Cold winters and hot, dry summers are common. Temperatures in the Crooked River watershed, for example, can exceed 100 degrees Fahrenheit in the summer and drop below 30 below Fahrenheit in the winter. The City of The Dalles, located near the basin’s mouth on the Columbia River, is often the warmest location in the state.

Parts or all of nine Oregon counties are situated in the Deschutes watershed. These counties include Crook, Deschutes, Harney, Hood River, Jefferson, Klamath, Lake, Sherman and Wasco. Five of these counties — Crook, Deschutes, Jefferson, Sherman and Wasco — comprise most of the watershed. Larger population centers in the subbasin include Bend, Redmond, Madras and Prineville.

Land ownership in the Deschutes Basin is approximately 51 percent public, 7 percent tribal and 42 percent private. The federal government owns and manages most public land in the basin, including three National Forests, one National Grassland and one Bureau of Land Management District. Lands of the Warm Springs Tribal Reservation extend over approximately 641,000 acres and lie mostly in the Lower Deschutes Subbasin.

**Table A-1: 2011 Land use and land cover for each subbasin in the Deschutes.**

Subbasin	Watershed Area (km2)	% Urban/Roads	% Forest	% Cultivated	% Range/Forest Disturbance	%Other
Beaver - South Fork	3963.510	0.4	7.5	1.0	89.9	1.3
Little Deschutes	2727.086	1.9	61.9	0.4	32.4	3.3
Lower Crooked	4787.028	2.7	20.8	6.0	70.0	0.5
Lower Deschutes	5945.972	1.5	28.1	6.7	62.6	1.2
Trout	1792.740	1.0	11.2	3.6	84.2	0.0

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<b>Subbasin</b>	<b>Watershed Area (km2)</b>	<b>% Urban/Roads</b>	<b>% Forest</b>	<b>% Cultivated</b>	<b>% Range/Forest Disturbance</b>	<b>%Other</b>
Upper Crooked	2993.911	0.2	28.4	0.9	68.5	2.0
Upper Deschutes	5579.652	4.2	57.3	2.5	30.0	6.1

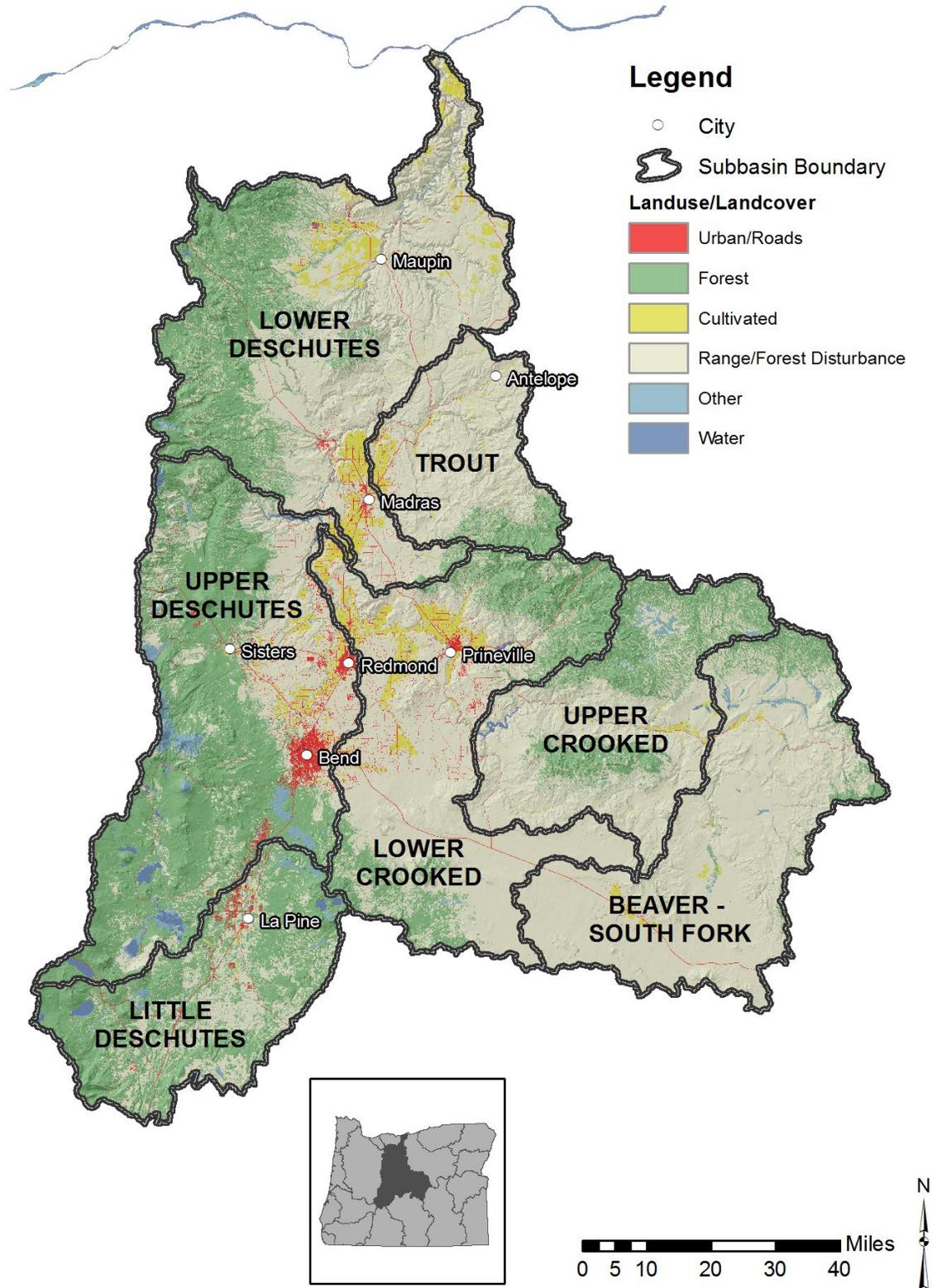


Figure A-1: Land use in the Deschutes administrative basin.

## 1.1 Basin Contacts

Table A-2: Oregon DEQ basin contact.

Administrative Area	DEQ Basin Coordinator
Deschutes Basin	Smita Mehta: 541-633-2022: <a href="mailto:mehta.smita@deq.state.or.us">mehta.smita@deq.state.or.us</a>

# 2. Water Quality Impairments and TMDLs

## 2.1 Water Quality Impaired Stream Segments

Under Section 303(d) of the Clean Water Act, states, territories and authorized tribes must submit lists of impaired waters. Impaired waters are those that do not attain water quality standards or support all designated uses. The law requires that states establish priority rankings for waters on the lists and develop Total Maximum Daily Loads (TMDLs) for these waters. Table A-3 identifies the number of Deschutes Basin waterbody segments impaired by parameter from the 2012 Integrated Report and the number of segments with approved TMDLs. Sources: [ODEQ](#), [USEPA](#)

Table A-3: Number of impaired stream segments with and without a TMDL as identified in Oregon's 2012 Integrated Report and Assessment database.

Parameter	Segments without a TMDL	Segments with a TMDL
4,4'-DDE	1	0
Aquatic Weeds Or Algae	5	0
Arsenic	1	0
Biological Criteria	17	0
Chlorophyll a	6	0
Dieldrin	1	0
Dissolved Oxygen	19	0
E. Coli	11	0
Fish tissue, Mercury	3	0
Iron	2	0
Mercury	2	0
pH	30	0
Sedimentation	12	0
Temperature	101	0
Total Dissolved Gas	1	0
Total Phosphorus	9	0

Parameter	Segments without a TMDL	Segments with a TMDL
Turbidity	2	0

## 2.2 Total Maximum Daily Load Watershed Plans

The federal Clean Water Act requires that water pollutant reduction plans, called Total Maximum Daily Loads (TMDLs), be developed for water bodies that are listed in Category 5 of the Integrated Report (303(d) List). TMDLs describe the maximum amount of pollutants that can enter the river or stream and still meet water quality standards.

TMDLs take into account the pollution from major sources including discharges from industry and sewage treatment facilities, runoff from farms, forests and urban areas, and natural sources. TMDLs include a margin of safety to account for uncertainty, and may include a reserve capacity that allows for future discharges to a river or stream. DEQ typically develops TMDLs on a watershed, subbasin, or basin level and occasionally at the reach level depending on the type and extent of impairments.

The Water Quality Management Plan (WQMP) is the framework for TMDL implementation that is issued by Oregon along with the TMDL (Oregon Administrative Rules 340-042-0040(1)). The TMDL and WQMP serve as a multi-sector plan and provides the blueprint for TMDL related implementation activities.

- **Currently there are no TMDLs in the Deschutes Basin.**

# 3. Implementation Highlights

## 3.1 Section 319 Grants

Federal Section 319(h) funds are provided annually through the EPA to states for the development and implementation of each state’s Nonpoint Source Management Program. In Oregon a portion of 319 grant funding is “passed through” to support community or partner projects that address Oregon’s nonpoint source program priorities. Generally, DEQ requires grantees to report annually on the progress made implementing their grant project. This section highlights those outputs and accomplishments reported to DEQ in 2019. Note this section does not identify or include projects proposed and awarded a grant in 2019. Outputs and accomplishments for those projects will be reported to DEQ in future years once they have been implemented. For a listing of projects proposed and awarded a grant in 2019 see Section 3.6.2 of the main report.

In 2019, there was one 319 project active that reported project outputs and accomplishments to DEQ. Combined the projects have a total grant budget of \$15,206. Table A-4 describes the project and the reported outputs.

**Table A-4: Project outputs reported in 2019 for Section 319 pass through grants.**

Project Name	Grantee	Project Description	Reported Outputs
Sherman County	Sherman County Soil	The project aims to enhance local education on	This grant was closed 12/31/2019 and had provided a positive

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Project Name	Grantee	Project Description	Reported Outputs
Conservation Awareness Program (CAP) Phase II	and Water Conservation District	salmonids and water quality in general and increase community engagement through class-room presentations, tree planting, tree sales, farm field days, meetings, surveys, and soil quality programs.	outcome for the Sherman County SWCD to improve outreach and education to the local communities and to participate as a part of basin-wide partnerships and assist with outreach and planning. In 2018 and 2019, the SWCD has conducted many school programs, including field trips and the Salmon and Trout Education Program, hosted annual meetings on diverse topics related to the local environment and local crops with 40-60 attendees each year, and conducted annual tree sale and helped educate community members on planting. The SWCD worked with Oregon State Park to host Arbor Day tree planting; partnered with the North Central Livestock Association Bull Tour, the Sherman County Crop Hop, and the OSU Extension Field Day to showcase effective livestock and crop practices and new ideas in the county; and partnered with the Lower Deschutes Cooperative Weed Management Area at Maupin Daze in May 2019 and the CWMA partner raft trip down the Deschutes in August 2019. These programs were incredibly educational for partners and the community about noxious weeds, noxious weed treatment, and noxious weed prevention. The SWCD also had a large booth at the Sherman County fair both years and provided information about the programs and educational materials about conservation issues and fire issues in the county.

### 3.2 Clean Water State Revolving Fund (CWSRF)

The Clean Water State Revolving Fund loan program provides below market rate loans to public agencies for the planning, design and construction of various projects that prevent or mitigate water pollution. Eligible agencies include federally recognized Indian tribal governments, cities, counties, sanitary districts, soil and water conservation districts, irrigation districts, various special districts and intergovernmental entities. DEQ partners with Oregon communities to implement projects that attain and maintain water quality standards, and are necessary to protect beneficial uses. This section highlights the ongoing projects and the outputs and accomplishments reported to DEQ in 2019.

In 2019 there were three nonpoint source related Clean Water State Revolving Fund projects active that reported project outputs and accomplishments to DEQ. Combined the projects have a total budget of \$5,080,500. Table A-5 describes the projects and the reported outputs.

**Table A-5: Nonpoint source related Clean Water State Revolving Fund project outputs reported in 2019.**

<b>Project Name</b>	<b>Grantee</b>	<b>Project Description</b>	<b>Reported Outputs</b>
Smith Rock and Kingway Irrigation District Piping Project	Central Oregon Irrigation District	The project will conserve water/reduce water loss, restore instream flow to the Deschutes River, improve aquatic habitat and water quality, and potentially reduce stream temperature.	In progress - planning and design
Watson and McKenzie Main Canal Pipeline Project	Three Sisters Irrigation District	The project will conserve water/reduce water loss, restore instream flow to the Whychus Creek, improve aquatic habitat, and reduce temperature.	In progress - construction continues, with project approximately 90% completed.
Tumalo Feed Canal Piping Project	Tumalo Irrigation District	The project will conserve water/reduce water loss, restore instream flow to the Tumalo Creek, improve aquatic habitat, and reduce temperature.	Completed - initiation of operations of irrigation system improvements



Figure A-2: Construction of the Tumalo Feed Canal Piping Project.

### 3.3 Source Water Protection Grants

The Oregon Health Authority regulates drinking water under state law and the Safe Drinking Water Act and works cooperatively with DEQ on source water protection efforts. Using the Drinking Water Revolving Loan Fund, OHA funds Source Water Protection Grants (up to \$30,000 per public water system) for source water protection activities, monitoring, and planning in Drinking Water Source Areas. In addition, loans are available for improving drinking water treatment, source water protection activities, or land acquisition in source areas. Oregon’s Infrastructure Finance Authority is responsible for administering these projects. The loan fund set-asides also fund five Drinking Water Protection positions at DEQ that provide technical assistance to public water systems and communities while they develop and implement strategies that reduce the risk within the delineated source water areas. This section highlights the ongoing projects and the outputs and accomplishments reported to DEQ in 2019.

In 2019 there were two nonpoint source related Drinking Water Source Protection program projects active that reported project outputs and accomplishments to DEQ. Combined the projects have a total budget of \$57,170. Table A-6 describes the projects and the reported outputs.

Table A-6: Nonpoint source Drinking Water Source Protection program projects and outputs for 2019.

Project Name	Grantee	Project Description	Reported Outputs
One Watershed Shared by Many: Bend Municipal Watershed	Bend Water Department (00100)	Conduct public outreach campaign, in collaboration with the USFS Deschutes National Forest, in the Tumalo Creek watershed. This area is a popular recreation destination as well as the City of Bend’s drinking	Contract was signed in 2019 which included a collection agreement between USFS and City of Bend that will serve as a template for other projects with USFS to ensure that state

Project Name	Grantee	Project Description	Reported Outputs
Entry and Education Sign Project		water source. Bend and the USFS will design, fabricate, and install watershed protection/education signs to increase visitors' awareness of watershed and drinking water values.	and federal procurement and contracting requirements are addressed and met. Project implementation will occur in 2020.
Purchase sensitive land above spring, install security fencing insensitive area.	City of Maupin (00510)	Protection of City of Maupin's drinking water source area by purchase sensitive land above spring (\$20,000 Loan) and installing security fencing in sensitive area (10,000 grant).	2019 work includes further discussions with local governments to determine best course of action for spring source area protection. After discussions with Wasco County, Maupin is now considering a land swap instead of land purchase. Contract is extended to conduct further evaluation.

### 3.4 Drinking Water Provider Partnership Grants

Oregon DEQ participates in the Drinking Water Providers Partnership (DWPP) with USDA Forest Service Region 6, EPA Region 10, the U.S. Bureau of Land Management OR/WA Office, the Washington Department of Health, Geos Institute and WildEarth Guardians. Together, these partners coordinate a competitive grant solicitation and award program for environmental conservation and restoration projects in municipal watersheds across the Northwest. The Drinking Water Providers Partnership made the first of the annual awards in 2016 and most projects have a focus on nonpoint sources of pollution. The goal of the Partnership and the funding is to develop and support local partnerships to restore and protect the health of watersheds which communities depend upon for drinking water while also benefiting aquatic and riparian ecosystems, including the native fish that inhabit them. This section highlights the ongoing projects and the outputs and accomplishments reported to the DWPP in 2019.

In 2019 there were no active Drinking Water Providers Partnership projects with reported outputs in the Deschutes.

### 3.5 OWEB Grant Funded Projects

The Oregon Watershed Enhancement Board (OWEB) is a state agency that provides grants to help Oregonians take care of local streams, rivers, wetlands, and natural areas. These grant projects often address nonpoint sources of pollution and are thus included in this report.

Based on the most recent data available in OWEB's Oregon Watershed Restoration Inventory (OWRI) database, there were 16 OWEB funded projects completed in 2018 with a total cash and in-kind budget of \$7,188,745. The tables below summarize reported outputs for different project activities in each Deschutes subbasin.

Learn more about OWEB grant programs at <https://www.oregon.gov/OWEB/grants/Pages/grant-programs.aspx>.

**Table A-7: Summary of OWEB grant funded fish passage projects completed in 2018, the most recent year data is available in the OWEB OWRI database.**

Subbasin	New fish screens installed on diversions (where no screen had existed previously) (Number of treatments)	Fish Passage Non-crossing improvement (Number of treatments)
Upper Deschutes	1	1
Lower Deschutes	NA	1

**Table A-8: Summary of OWEB grant funded instream projects completed in 2018, the most recent year data is available in the OWEB OWRI database.**

Subbasin	Main stream channel modified / created (Feet)	Main stream channel modified / created (Number of treatments)
Upper Deschutes	6600	4

**Table A-9: Summary of OWEB grant funded instream projects completed in 2018, the most recent year data is available in the OWEB OWRI database.**

Subbasin	Instream habitat: Large wood placement (Number of treatments)	Off-channel habitat created, protected, or reconnected (Feet)	Off-channel habitat created, protected, or reconnected (Number of treatments)
Upper Deschutes	1350	7000	20

**Table A-10: Summary of OWEB grant funded riparian projects completed in 2018, the most recent year data is available in the OWEB OWRI database.**

Subbasin	Riparian fencing (Area treated)	Riparian fencing (Length of treatment)	Riparian fencing (Stream sides treated)
Lower Crooked	6	NA	2
Upper Crooked	NA	0.4	NA

**Table A-11: Summary of OWEB grant funded riparian projects completed in 2018, the most recent year data is available in the OWEB OWRI database.**

Subbasin	Riparian vegetation planting (Area treated)	Riparian vegetation planting (Length of treatment)
Lower Deschutes	2	NA
Upper Deschutes	NA	1.2

**Table A-12: Summary of OWEB grant funded upland projects completed in 2018, the most recent year data is available in the OWEB OWRI database.**

Subbasin	Irrigation system improvement (Acre)	Water/sediment control basins (Acre)	Water/sediment control basins (Number of treatments)
Lower Deschutes	70	1.4	3
Trout	15	NA	NA

**Table A-13: Summary of OWEB grant funded upland projects completed in 2018, the most recent year data is available in the OWEB OWRI database.**

Subbasin	Off-channel livestock or wildlife watering (Number of treatments)	Upland fencing (Acre)	Upland fencing (Mile)
Lower Crooked	1	NA	NA
Lower Deschutes	2	2121.5	3.0
Upper Crooked	NA	548.0	0.6

**Table A-14: Summary of OWEB grant funded upland projects completed in 2018, the most recent year data is available in the OWEB OWRI database.**

Subbasin	Upland vegetation management (Area treated)	Upland vegetation planting (Area treated)
Lower Deschutes	120	269
Trout	78	NA