

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	3963510	0.4	7.5	1.0	89.9	1.3
Little Deschutes	2727086	1.9	61.9	0.4	32.4	3.3
Lower Crooked	4787028	2.7	20.8	6.0	70.0	0.5
Lower Deschutes	5945972	1.5	28.1	6.7	62.6	1.2
Trout	1792740	1.0	11.2	3.6	84.2	0.0
Upper Crooked	2993911	0.2	28.4	0.9	68.5	2.0
Upper Deschutes	5579652	4.2	57.3	2.5	30.0	6.1

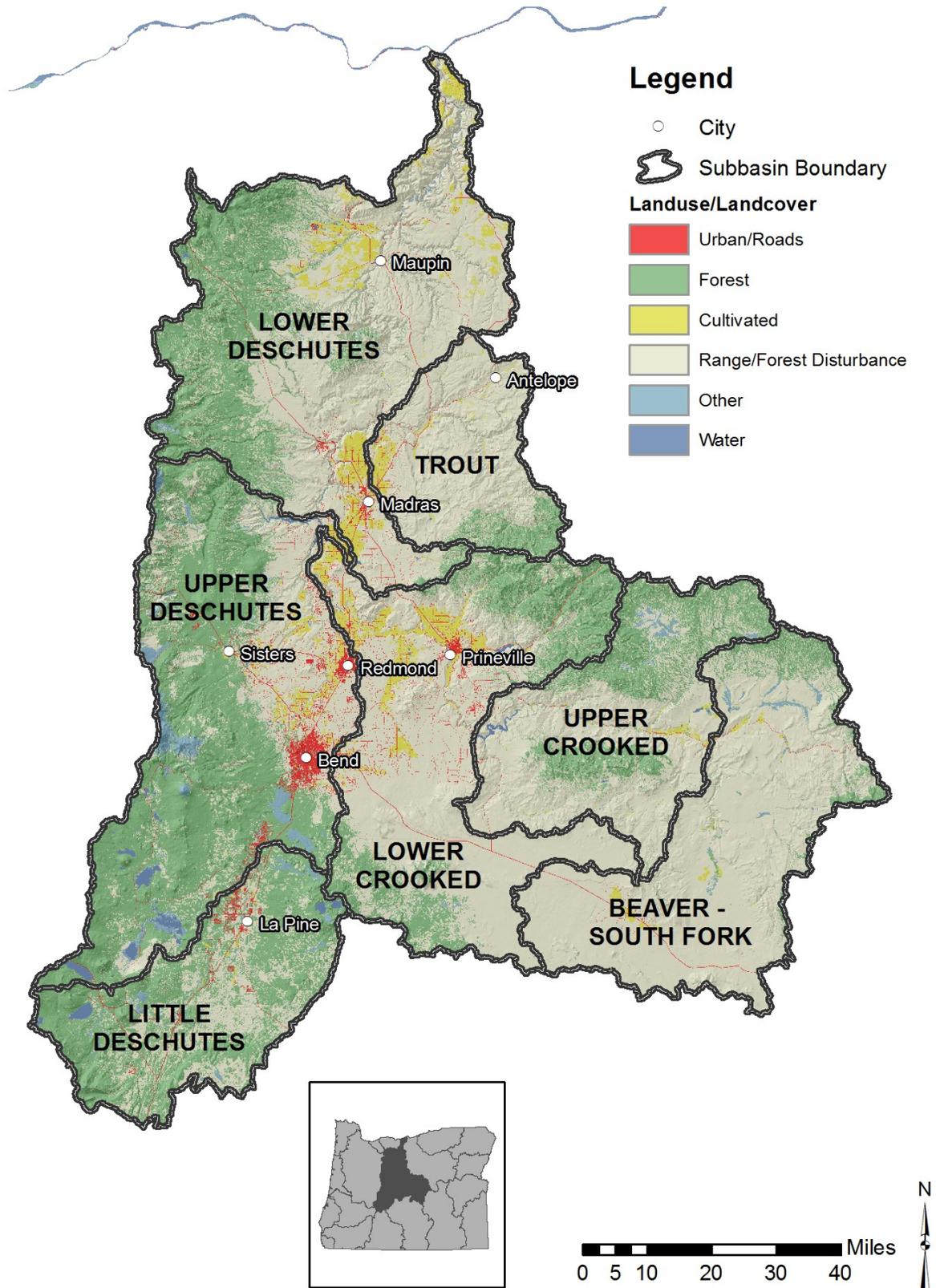


Figure A-1: Landuse in the the Deschutes administrative basin.

1.1 Basin Contacts

Table A-2: Oregon DEQ basin contact.

Administrative Area	DEQ Basin Coordinator
Deschutes	Smita Mehta: 541-633-2027: mehta.smita@deq.state.or.us

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
Aquatic Weeds Or Algae	10	0
Biological Criteria	16	0
Chlorophyll a	10	0
Dissolved Oxygen	17	0
E. Coli	4	0
Mercury	4	0
pH	23	0
Sedimentation	12	0
Temperature	99	0
Total Dissolved Gas	1	0
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 2017. Note this section does not identify or include projects proposed and awarded a grant in 2017. 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 2017 see Section 3.6.2 of the main report.

In 2017 there were no 319 projects with reported outputs in the Deschutes.

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 2017.

In 2017 there was one nonpoint source related Clean Water State Revolving Fund project active that reported project outputs and accomplishments to DEQ. Combined the projects have a total budget of \$1,080,500. Table A-4 describes the project and the reported outputs.

Table A-4: Nonpoint source related Clean Water State Revolving Fund project outputs reported in 2017.

Project Name	Grantee	Project Description	Reported Outputs
Watson & 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.	The piping of the canal is 83% complete.

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 2017.

In 2017 there was one nonpoint source related Safe Drinking Water State Revolving Fund project active that reported project outputs and accomplishments to DEQ. Combined the projects have a total budget of \$32,200. Table A-5 describes the project and the reported outputs.

Table A-5: Nonpoint source Safe Drinking Water State Revolving Fund projects and outputs for 2017.

Project Name	Grantee	Project Description	Reported Outputs
City of Maupin spring protection project	City of Maupin	Purchase sensitive land above spring (\$20,000 Loan), install security fencing in sensitive area (10,000 grant).	Completed initial project planning, site preparation, and fence installation.



Figure A-2: Exclusion fencing around City of Maupin’s spring source of drinking water.

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 2017.

In 2017 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 2016 with a total cash and inkind budget of \$2,539,589. The bar graph in Figure A-3 shows the total cash and inkind budget for the different project types in each Deschutes subbasin. Table A-6 describes the projects and the reported outputs.

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

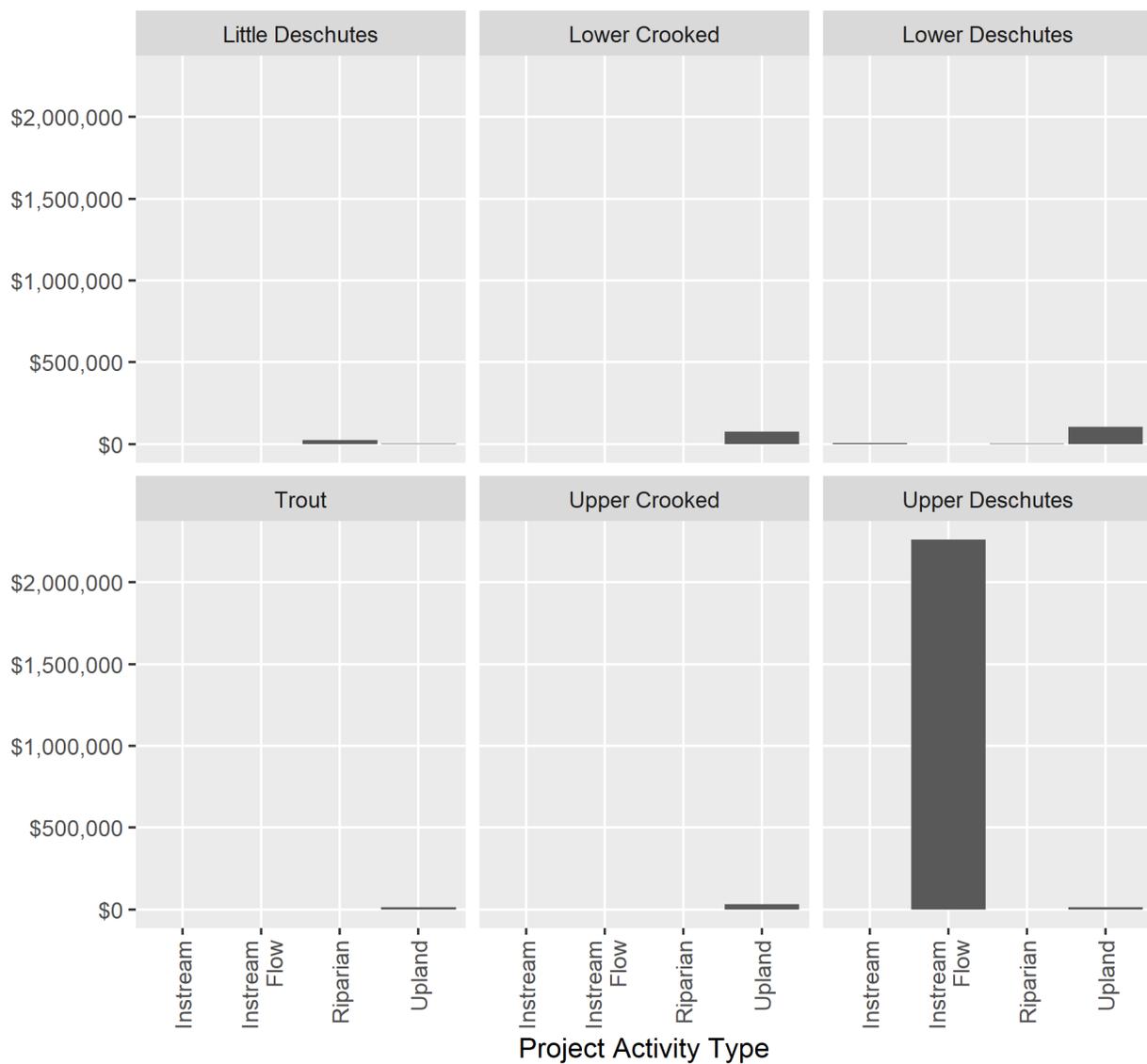


Figure A-3: Cash and inkind dollars spent in each subbasin for different project types completed in 2016, the most recent year data is available in OWEB’s OWRI database.

Table A-6: OWEB grant funded projects completed in 2016, the most recent year data is available in the OWEB OWRI database.

Subbasin	Project Name	Project Type	Project Description	Participants	Reported Outputs
Little Deschutes	Reed WQ and Spotted Frog Habitat Restoration	Riparian, Upland	Riparian fencing; Riparian shrubs or herbaceous vegetation planted/reseeded; Grazing management: livestock rotation (pasture forage improvement through rotational livestock grazing)	Deschutes SWCD, OWEB, Private Landowners, USFWS	1 acre treated (riparian activities), 0.25 linear stream miles treated (riparian activities), 26 acres treated (upland activities)
Lower Crooked	Barnes Butte "J2" Water Quality	Upland	Irrigation system improved: converted from dirt ditch to pipeline delivery	Crook SWCD, Ochoco Irrigation District, OWEB, Private Landowners	40 acres treated (upland activities)
Lower Crooked	Hidden Falls Invasive Species Treatment	Upland	Upland treated for juniper by clearing, burning, thinning, or removal	Crook SWCD, Crooked River Weed Management Area, OWEB, Private Landowners	200 acres treated (upland activities)
Lower Crooked	Hidden Falls Restoration Phase I	Upland	Upland treated for juniper by clearing, burning, thinning, or removal	Crook SWCD, OWEB, Portland General Electric, Private Landowners	53 acres treated (upland activities)
Lower Crooked	LePore Pond and Irrigation Water Efficiency	Upland	Irrigation system improved: converted from dirt ditch to pipeline delivery; Irrigation system improved: tailwater collection system improved	Jefferson SWCD, OWEB, Private Landowners	75 acres treated (upland activities)
Lower Crooked	McKay Creek Forest Health Project	Upland	Upland treated for juniper by clearing, burning, thinning, or removal	Crook SWCD, OWEB, Private Landowners	70 acres treated (upland activities)

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Subbasin	Project Name	Project Type	Project Description	Participants	Reported Outputs
Lower Deschutes	Campbell Creek Restoration	Instream, Riparian	Anchored habitat structures placed; Riparian treated for non-native or noxious plant species	Jefferson SWCD, OWEB, Private Landowners	0.35 miles of stream treated (instream activities), 6 pools expected to be created by channel structure placement treatments, 6 habitat structures placed in channel, 0.3 linear stream miles treated (riparian activities), 5 acres treated (riparian activities)
Lower Deschutes	C Lazy K Ranch Juniper Treatment	Upland	Upland treated for juniper by clearing, burning, thinning, or removal	C Lazy K Ranch, Jefferson SWCD, OWEB	85 acres treated (upland activities)
Lower Deschutes	Dufur School Irrigation Efficiency	Upland	Other irrigation system improvement	Dufur School District , OWEB, Wasco SWCD	4 acres treated (upland activities)
Lower Deschutes	J. Wilson Upland Cross Fence	Upland	Upland fencing	OWEB, Private Landowners, Sherman County Area Watershed Council, Sherman SWCD	1085 acres treated (upland activities)
Lower Deschutes	Nelson Irrigation Efficiency	Upland	Other irrigation system improvement	OWEB, Private Landowners, Wasco SWCD	11.3 acres treated (upland activities)
Trout	Blizzard Ridge Juniper Treatment II	Upland	Upland treated for juniper by clearing, burning, thinning, or removal	Fessler Angus, Jefferson SWCD, OWEB	85 acres treated (upland activities)

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Subbasin	Project Name	Project Type	Project Description	Participants	Reported Outputs
Upper Crooked	Indian Creek Spring Development	Upland	Off-channel watering sites developed; Upland shrubs or herbaceous vegetation planted/reseeded	Crook SWCD, OWEB, Private Landowners	40 acres treated (upland activities)
Upper Crooked	Tweedt Upland Restoration	Upland	Upland treated for juniper by clearing, burning, thinning, or removal; Upland treated for non-native or noxious plant species	Crook SWCD, Crooked River Weed Management Area, OWEB, Private Landowners	480 acres treated (upland activities)
Upper Deschutes	Tumalo Feed Canal Phase 4	Instream Flow	Instream water right transferred / leased; Other irrigation practice improvement (for instream flow)	Bureau of Reclamation, OWEB, Tumalo Irrigation District	193.8 stream miles protected for adequate flow, 1.4 water flow acquired
Upper Deschutes	Central Oregon ID Noxious Weeds	Upland	Upland shrubs or herbaceous vegetation planted/reseeded; Upland treated for non-native or noxious plant species	Central Oregon Irrigation District, Deschutes SWCD, OWEB	109 acres treated (upland activities)