Appendix D
Hood Basin Report

1 Basin Description

The Middle Columbia-Hood Basin is in the north-central part of Oregon occupying approximately 1,140 square miles. The basin is a collection of rivers and creeks which are tributaries to the Columbia River and enter the river roughly between the cities of Cascade Locks to the west and The Dalles to the east. The basin can be split into two geographic regions that generally follow county lines: Hood River County in the western half of the basin (including the Hood River Watershed) and Wasco County in the eastern half (including the Mosier Creek, Mill Creek and Fifteenmile Creek Watersheds). Projects and active partnerships generally follow the county lines. The entire basin contains lands ceded to the Confederated Tribes of the Warm Springs Reservation of Oregon.

Hood River County Streams in the basin's western half originate on the eastern slope of the Cascade Range largely in conifer forests and flow north from Mt. Hood. The Hood River and a number of its upper tributaries are fed by glacial sources and can transport large amounts of bedload and sediment. This portion supports a wide range of native fish, including bull trout, spring Chinook salmon, summer and winter steelhead, rainbow and cutthroat trout, and lesser numbers of fall Chinook and Coho salmon. In 1998, steelhead and bull trout in the Hood River were listed as threatened under the Endangered Species Act.

In this western half of the basin, approximately 85 percent of the land is forestland, with more than two-thirds of this managed by the Mt. Hood National Forest. Agriculture, primarily fruit production, is the second largest land use, accounting for over 7 percent of the land area. Agriculture is the leading industry, followed by tourism, outdoor recreation and forestry. Approximately 4 percent of the land area has urban and/or residential development. The population in the county is dispersed, with almost 70 percent of county residents living outside urban growth boundaries. There are four small urban centers in the county: Hood River, Cascade Locks, Odell and Parkdale.

Major human disturbances that have affected hydrology, aquatic life and water quality in the area include: * Diminishment or depletion of stream flows at irrigation, hydropower and municipal water diversions * Fish migration barriers at dams, diversions and road crossings * Loss of large woody debris recruitment and reduced riparian-floodplain interactions caused by historic timber practices * Channel confinement and interference with stream and riparian processes by roads and other land use * Water quality alteration by sediment inputs from roads and irrigation networks, pesticide and nutrient contamination from agricultural and other non-point sources, temperature increases from flow modification, reservoir discharge, or riparian vegetation removal

Wasco County Streams in this eastern half of the basin originate on the forested eastern slopes of the Hood River Range, a north-south range starting approximately nine miles east of Mt. Hood and running north to the Columbia River. The Cascade Mountains produce a rain-shadow effect, drastically reducing the total precipitation to the east. Average annual precipitation varies from 65-80 inches in the higher elevation headwaters in the west to 10-11 inches on the eastern border of the basin. Only 5-10 percent of the moisture falls from June through August. Because of both the seasonality of moisture and the total low precipitation, tributaries originating at lower elevations are usually not perennial. The watershed is home to a variety of fish species, including Pacific lamprey, resident Redband trout and coastal cutthroat trout.

The economy of the eastern half of the basin is based on agriculture, recreation and grazing, with a smaller component of forest production. Approximately 84 percent of the land is privately owned and is largely dominated by cropland and rangeland. Of the cropland, the vast majority is non-irrigated and is

almost exclusively in wheat or other grain production. Less than 5 percent is irrigated orchards and vineyards. Approximately 4 percent of the land area has urban and/or residential development.

Major human disturbances that have affected hydrology, aquatic life and water quality in the area include: * Changes to land cover that affect wildlife habitat, hydrologic regimes and erosion rates * Alteration of instream and riparian conditions through channelization of streams, road-building, removal of large woody debris, and historic logging patterns * Pesticide and fertilizer use * Groundwater overdraft

Table D-1: 2011 Land use and land cover for each subbasin in the Hood.

Subbasin	Watershed Area (km2)	% Urban/Roads	% Forest	% Cultivated	% Range/Forest Disturbance	%Other
Middle Columbia-Hood	2958793	3.9	37.9	20.7	36.1	1.5

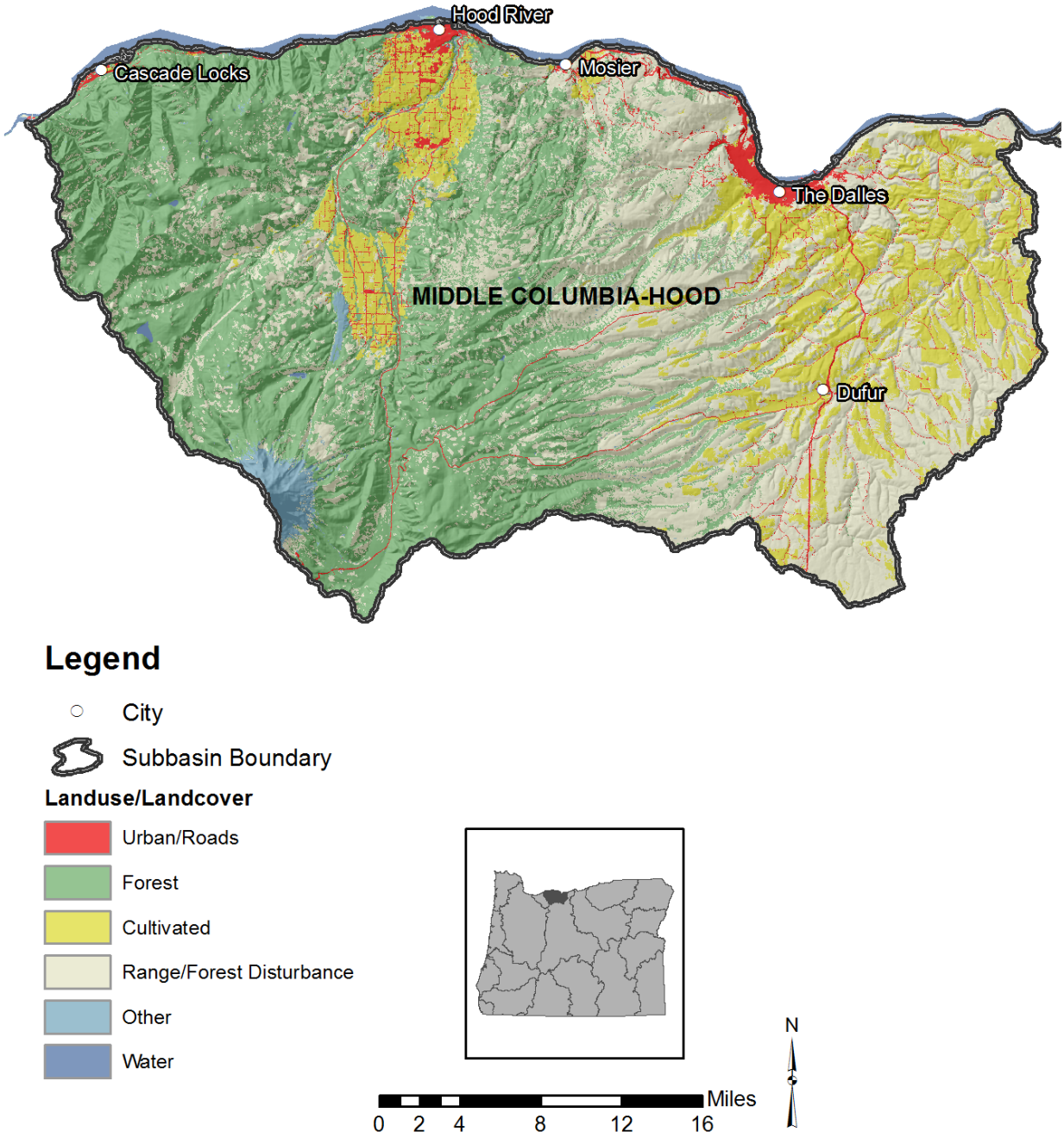

Figure D-1: Landuse in the the Hood administrative basin.

1.1 Basin Contacts

Table D-2: Oregon DEQ basin contact.

Administrative Area	DEQ Basin Coordinator
Hood	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 D-3 identifies the number of Hood Basin waterbody segments impaired by parameter from the 2012 Integrated Report and and the number of segments with approved TMDLs. Sources: ODEQ, USEPA

Table D-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
Arsenic	1	0
Biological Criteria	10	0
Chlorpyrifos	4	0
Copper	3	0
Dissolved Oxygen	2	0
E. Coli	2	0
Guthion	3	0
Iron	6	0
Lead	1	0
Malathion	1	0
pH	2	0
Sedimentation	6	0
Silver	2	0
Temperature	0	43
Thallium	3	0
Zinc	1	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(l)). The TMDL and WQMP serve as a multi-sector plan and provides the blueprint for TMDL related implementation activities. Table D-4 lists the TMDLs that have been approved in the Hood Basin.

Table D-4: Approved TMDLs in the Hood Basin and the impairments addressed by those TMDLs.

TMDL Document Name	Impairments Addressed
Middle Columbia-Hood (Miles Creeks) Subbasin TMDL and WQMP	Temperature
Western Hood Subbasin Temperature TMDL and WQMP	Temperature

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 Hood.

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 $3,071,574. Table D-5 describes the project and the reported outputs.

Table D-5: Nonpoint source related Clean Water State Revolving Fund project outputs reported in 2017.

Project Name	Grantee	Project Description	Reported Outputs
Farmers Irrigation District Reservoir Enhancement Project-Multi-phased	Farmers Irrigation District	Water efficiency use; increased in-stream flow to reduce temperature; mitigating agricultural chemicals, seasonal turbidity, and the presence of fecal contamination in the Hood River and Indian Creek; and restoring fish habitat by converting open canals to pressurized piping systems throughout the district.	Phase 1 of Kingsley Reservoir completed.

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 were no nonpoint source related Safe Drinking Water State Revolving Fund projects with reported outputs in the Hood.

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 Hood.

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 11 OWEB funded projects completed in 2016 with a total cash and inkind budget of $765,588. The bar graph in Figure D-2 shows the total cash and inkind budget for the different project types in each Hood subbasin. Table D-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.

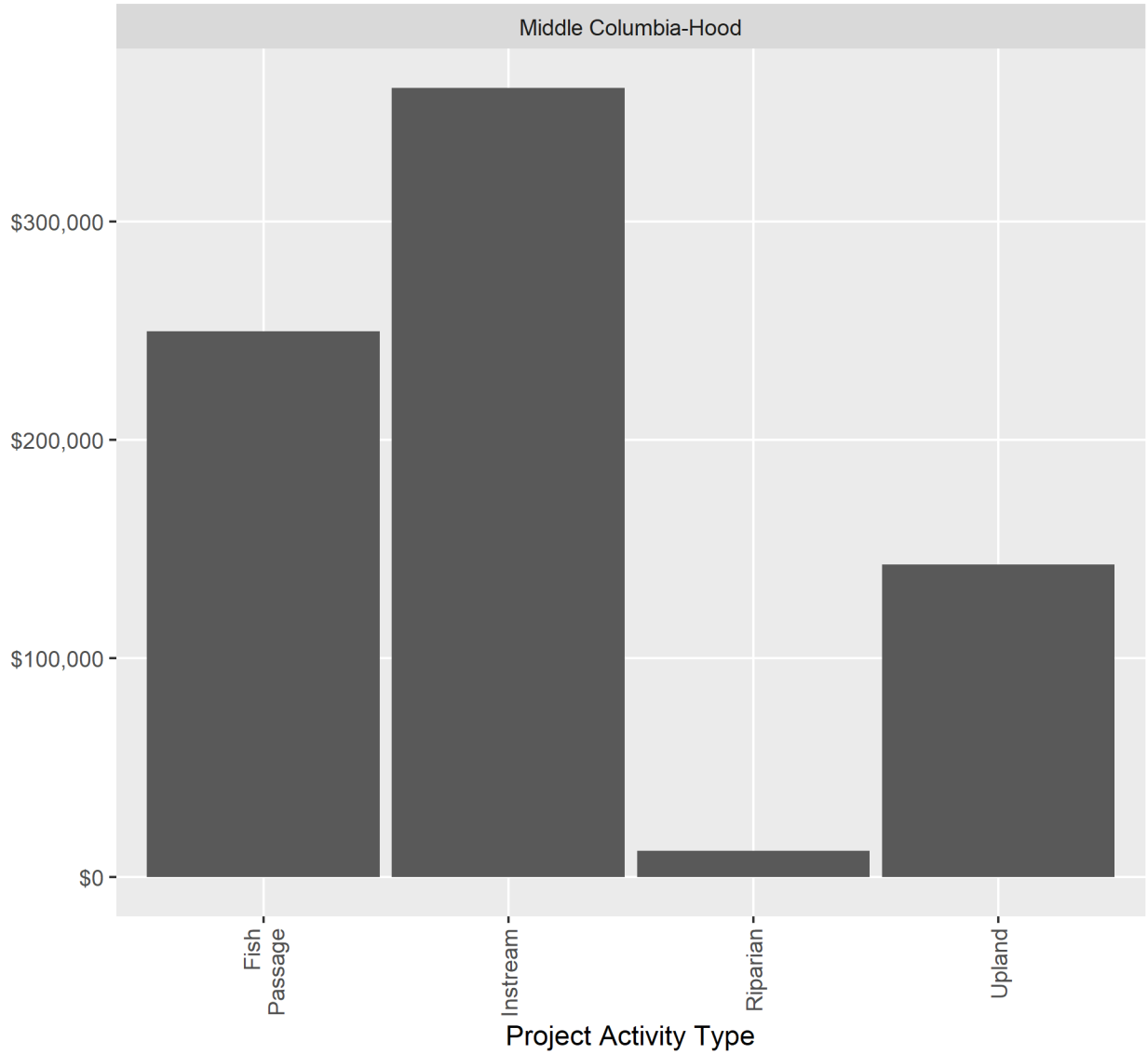

Figure D-2: Cash and inkind dollars spent in each subbasin for different project types completed in 2016, the most recent year data is available in OWEB's OWRI database.

Table D-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
Middle Columbia-Hood	West Fork Hood River Restoration	Instream, Fish Passage	Large wood placed; Rootwads placed; Culverts/structures/fords replaced with bridges	Confederated Tribes of Warm Springs Reservation, Ecotrust, Hood River SWCD, OWEB, USFS, Weyerhaeuser Columbia Timberlands, LLC	1.1 miles of stream treated (instream activities), 60 pools expected to be created by channel structure placement treatments, 23 habitat structures placed in channel, 2.2 miles of habitat opened-previously inaccessible for both adults and juveniles, 2.2 miles of fish habitat made accessible due to road/stream crossing improvements (e.g. improvement or removal of culverts and other structures), 1 road/stream crossing improved for fish passage

Subbasin	Project Name	Project Type	Project Description	Participants	Reported Outputs
Middle Columbia-Hood	Lower Mill Creek Side Channel	Instream, Riparian, Fish Passage	Large wood placed; Side channels reconnected to stream or access improved; Riparian trees planted: hardwood; Culverts/structures/fords replaced with culverts placed embedded or flat	DEQ, OWEB, Private Landowners, Wasco SWCD	0.15 miles of stream treated (instream activities), 7 pools expected to be created by channel structure placement treatments, 7 habitat structures placed in channel, 0.15 linear stream miles treated (riparian activities), 0.5 acres treated (riparian activities), 0.09 miles of habitat opened-previously inaccessible for both adults and juveniles, 1 road/stream crossing improved for fish passage, 0.09 miles of fish habitat made accessible due to road/stream crossing improvements (e.g. improvement or removal of culverts and other structures)
Middle Columbia-Hood	Indian Creek Golf Riparian Restoration Project	Riparian	Riparian treated for non-native or noxious plant species; Riparian shrubs or herbaceous vegetation planted/reseeded	Hood River SWCD, Indian Creek Golf Course, Indian Creek Stewards, OWEB, SOLVE	0.05 linear stream miles treated (riparian activities), 0.43 acres treated (riparian activities)

Subbasin	Project Name	Project Type	Project Description	Participants	Reported Outputs
Middle Columbia-Hood	Annala Irrigation Improvement Project	Upland	Other irrigation system improvement; Irrigation system improved: water measurement devices installed	Farmers Irrigation District, Hood River SWCD, OWEB, Private Landowners	4.75 acres treated (upland activities)
Middle Columbia-Hood	Benjamin Orchards Irrigation Improvement Project	Upland	Other irrigation system improvement; Irrigation system improved: water measurement devices installed	Hood River SWCD, Middle Fork Irrigation District, OWEB, Private Landowners	15.5 acres treated (upland activities)
Middle Columbia-Hood	G. Simpson Sediment Control	Upland	Water/sediment control basins installed	OWEB, Private Landowners, Sherman County Area Watershed Council , Sherman SWCD	204 acres treated (upland activities)
Middle Columbia-Hood	Hukari Irrigation Improvement Project	Upland	Other irrigation system improvement; Irrigation system improved: water measurement devices installed	Hood River SWCD, OWEB, Private Landowners	10 acres treated (upland activities)
Middle Columbia-Hood	McCarthy Irrigation Improvement Project	Upland	Other irrigation system improvement; Irrigation system improved: water measurement devices installed	Hood River SWCD, OWEB, Private Landowners	4.5 acres treated (upland activities)
Middle Columbia-Hood	Moore Bros Upland Sediment Control	Upland	Upland terraces installed, constructed or rebuilt	OWEB, Private Landowners, Sherman County Area Watershed Council, Sherman SWCD	355 acres treated (upland activities)

Subbasin	Project Name	Project Type	Project Description	Participants	Reported Outputs
Middle Columbia-Hood	Nick Swyers Irrigation Improvement Project	Upland	Other irrigation system improvement; Irrigation system improved: water measurement devices installed	Hood River SWCD, OWEB, Private Landowners	13.2 acres treated (upland activities)
Middle Columbia-Hood	Red Barn Orchards Irrigation Improvement	Upland	Other irrigation system improvement; Irrigation system improved: water measurement devices installed	Hood River SWCD, OWEB, Private Landowners	8.6 acres treated (upland activities)

3.6 TMDL Implementation Highlights

TMDL implementation actions taken by Designated Management Agencies (DMAs) or third parties are described in the table below. Most of these actions were summarized from annual reports submitted by DMAs to DEQ in calendar year 2017.

Table D-7: TMDL implementation activities reported in 2017 by Designated Management Agencies or third parties.

TMDL	DMA or Third Party	Reported Actions
Middle Columbia-Hood (Miles Creeks) Subbasin TMDL	Wasco SWCD and Fifteenmile Watershed Council	The Fifteenmile Action Plan to Stabilize Temperatures (FAST) is a program focused on keeping water instream in order to decrease stream temperatures. At the heart of the plan is an ODFW-developed model that forecasts stream temperatures for the following week at four sites along Fifteenmile Creek. When temperatures lethal to juvenile steelhead are predicted, the Watershed Council issues an alert to irrigators via phone and email to prompt a voluntary self-regulation period when irrigators curtail diversions. In 2017, the program conserved 3.17 cfs instream, which moved the stream closer towards the flow target of 7 cfs at the mouth of Fifteenmile Creek.
Western Hood Subbasins Temperature TMDL	Middle Fork Irrigation District	Middle Fork Irrigation District completed calibration of Heat Source temperature models for Clear Branch and Middle Fork Hood River and ran scenarios in order to optimize reservoir management scenarios to cool temperatures on Clear Branch below Laurance Lake Dam.