



DEPARTMENT OF
ECOLOGY
State of Washington

Deschutes Advisory Group (DAG)

January 21, 2016

Deschutes River, Percival Creek, and Budd Inlet Tributaries - Phase 1 TMDL



**Deschutes River, Percival Creek,
and Budd Inlet Tributaries
Temperature, Fecal Coliform
Bacteria, Dissolved Oxygen,
pH, and Fine Sediment
Total Maximum Daily Load**

***Water Quality Improvement Report
and Implementation Plan - FINAL***



December 2015
Publication no. 15-10-012

Delivered to EPA
December 2015

- ▶ Advisory group members
- ▶ Interested citizens
- ▶ Technical team
- ▶ Coworkers



Key sections of the Phase 1 report

Watershed Description

Geographic setting

Ecology, in cooperation with the Squaxin Island Tribe, Thurston County, the cities of Olympia, Lacey, and Tumwater, and others, developed a water cleanup plan for the Deschutes River, Percival Creek, and Budd Inlet watersheds.

The geographic boundary for this phase of the TMDL (Figure 1) extends from the headwaters of the Deschutes River northward to Capitol Lake, entirely within Water Resource Inventory Area (WRIA) 13, the Percival Creek watershed including Black Lake Ditch, and tributaries to Budd Inlet. This TMDL project *does not* include the marine waters of Budd Inlet nor Capitol Lake. The marine waters and the lake will be addressed subsequent to the approval of this TMDL. The study area includes portions of Thurston County and Lewis County, as well as the cities of Olympia, Lacey, Tumwater, and Rainier. The Deschutes River originates within the steep, heavily-forested Bald Hills and flows generally northwest for approximately 60 miles before discharging into Capitol Lake.

Land uses

The northern part of the TMDL project boundary is urbanized and within incorporated city boundaries for Olympia, Tumwater, and a small part of Lacey. These three municipalities and Thurston County are Western Washington Phase II Municipal Stormwater general permittees. Budd Inlet tributaries outside of incorporated city boundaries include residential and small scale agricultural land uses.

Analytical Approach

Details on the analytical approach are presented in Roberts et al. (2012). Excerpts in this section provide an overview. The analytical approach includes data collection and analysis, as well as model calibration and application to scenarios for waters included in this phase of the TMDL.

Technical Study Results and Discussion

Roberts et al.(2012) describes the results from data collection, analyses, and modeling applications for fecal coliform bacteria, temperature, DO, pH, and fine sediments in the Deschutes River, Percival Creek, and their tributaries. Summary results follow:

Meteorology and hydrology: The data collection period (July 2003 through March 2005) was warmer than average, although summer 2004 precipitation was wetter than average. Summer low flows were near 7Q10 levels in both 2003 and 2004. The 7Q10 is a statistical estimate of the lowest 7-day average flow that can be expected to occur once every 10 years on average. It is usually calculated for the months of July and August because they typically represent the critical months for temperature. Tracer studies indicated a 76-hour travel time between the Vail Cutoff

Key sections of the Phase 1 report

TMDL Analyses

Roberts et al. (2012) included the TMDL analyses for fecal coliform bacteria, temperature, DO, pH, and fine sediments. This included compliance with standards for each parameter in addition to the following:

- Analytical framework for fecal coliform bacteria in the Deschutes River and tributaries, Percival Creek system, and streams tributary to Budd Inlet
- Analytical framework, calibration of the Deschutes River temperature model, and assessment of Percival Creek temperature

Wasteload and Load Allocations

Wasteload allocations

Wasteload allocations for general permittees are summarized in Appendix C. Information about Ecology's stormwater permit program can be found at www.ecy.wa.gov/programs/wq/stormwater/index.html.

Table 10: Municipal Stormwater Permits receiving WLAs within the TMDL Boundary.

Permit Type	Permittee Name and ID	NPDES ID	Potential Receiving Waters
Municipal Stormwater Permit	WA State Dept. of Transportation	WAR043000	I-5: potential discharges to Southern basin of Capitol Lake, Indian Creek, Moxlie Creek, the lower Deschutes River Hwy 101: potential discharges to lower Percival Creek and southern basin of Capitol Lake
Phase II Municipal Stormwater Permit	Olympia, City of	WAR045015	All receiving surface water bodies within the stormwater permit boundary
	Thurston County	WAR045025	
	Tumwater, City of	WAR045020	
	Lacey, City of	WAR045011	

Key sections of the Phase 1 report

Load allocations

Load allocations (LA) for nonpoint sources (NPS) of pollution apply to all land uses within the TMDL project boundary including: agriculture, residential (including non-commercial farms), forestry, and commercial uses. Each category of land use has potential effects on water quality, and there are best management practices (BMPs) to reduce pollution impacts in the implementation plan. The LA compliance area is the drainage area that contributes to the point at which water quality is measured for compliance with the LA (see Figure 20 and Table 11); each LA applies to all NPS within each compliance area. When the appropriate BMPs for reducing pollution are used, those activities will be considered compliant with the TMDL.

Table 11: Load allocation (LA) compliance areas for bacteria LAs.

This table is also the key for maps that include these LA compliance areas.

LA Station	Load Allocation Compliance Area Description	Map Label
13-ADA-00.5	Adams Creek east fork at Boston Harbor Rd	B
13-ADA-UNK	Adams Creek Ave S fork @ 47th Ave NE	C
13-AYE-00.0	Ayer Creek	D
13-BLA-00.0	Black Lake Ditch at mouth	E
13-BUT-00.1	Butler Creek	F
13-CHA-00.1	Chambers Creek	H
13-DES-00.5	Deschutes River at E St Bridge	I
13-DES-02.7	Deschutes River at Henderson Blvd	J

Conclusions and Recommendations

Mature riparian vegetation will have several secondary benefits to temperature, DO, pH, and fine sediment. Cooler water holds more oxygen, and decreased solar radiation decreases periphyton growth and primary productivity. A mature riparian forest also would provide large woody debris (LWD) that protects banks from enhanced erosion, which could improve fine sediment and phosphorus loads. LWD also increases channel complexity, enhances hyporheic exchanges, and reduces transport of fine sediment. Increased channel complexity provides more zones where biogeochemical processes decrease nutrient transport downstream (Roberts et al., 2007). Controlling anthropogenic sediment sources would benefit temperature and decrease phosphorus. Because most of the Deschutes River is phosphorus limited, decreasing phosphorus would decrease primary productivity and improve DO and pH.

Appendices

- A: Glossary, Acronyms, and Abbreviations
- B: Record of Public Participation
- C: Wasteload Allocation (WLA) Summary Tables
- D: Funding Sources - Detailed Information
- E: Effective Shade Targets for the Deschutes River and Percival Creek Watersheds
- F: Responses to Comments

Appendices

Appendix A. Glossary, Acronyms, and Abbreviations

Glossary

1-DMax or 1-day maximum temperature: The highest water temperature reached on any given day. This measure can be obtained using calibrated maximum and minimum thermometers or continuous monitoring probes having sampling intervals of 30 minutes or less.

303(d) List: Section 303(d) of the federal Clean Water Act requires Washington State periodically to prepare a list of all surface waters in the state for which beneficial uses of the water – such as for drinking, recreation, aquatic habitat, and industrial use – are impaired by pollutants. These are water quality-limited water bodies (ocean waters, estuaries, lakes, and streams) that fall short of state surface water quality standards and are not expected to improve within the next two years.

Appendix C. Wasteload Allocation (WLA) Summary Tables

The following tables include all of the WLA and implementation information that pertain to each general permit type. The information is a condensed form of what is in the body of this TMDL WQIR/IP and intended to be one-page (front and back) summary for ease of use by permit managers, general permittees, and others.

Appendix B. Record of Public Participation

Introduction

This section provides a record of the public outreach which occurred during the public comment period for the draft Deschutes River, Percival Creek, and Budd Inlet Tributaries Temperature, Fecal Coliform Bacteria, Dissolved Oxygen, pH, and Fine Sediment Total Maximum Daily Load Water Quality Improvement Report/Implementation Plan.

Appendix D. Funding Sources – Detailed Information

Centennial Grants, Clean Water Act Section 319 Federal Grants, Clean Water State Revolving Fund Loans, and Stormwater Grants: The first three funding sources are managed by the Washington State Department of Ecology through one combined application program.

Centennial Grants: This program is funded by state dollars, provided primarily via the State Building Construction Account. The Centennial program provides grants for water quality infrastructure and nonpoint source pollution projects to improve and protect water quality. Eligible infrastructure projects are limited to wastewater treatment construction projects for financially distressed communities. Eligible nonpoint projects include stream restoration and buffers, on-site septic repair and replacement, education and outreach, and other eligible nonpoint activities.

Appendices

Appendix E. Effective Shade Targets for the Deschutes River and Percival Creek Watersheds

The following tables are the reach averaged, system potential effective shade load allocation for each 1 kilometer model reach as displayed graphically in Figures 21 and 22 in the main body of this report. Highest priority reaches include areas with a large recommended increase in effective shade and where the greatest improvements in dissolved oxygen are needed.

Table E-1: Deschutes River Effective Shade Reductions

Distance from upstream boundary (km)	Current	Potential	Load Allocations	
	Reach-averaged effective shade	Mature vegetation and channel modifications	Recommended increase in effective shade (%)	DAve decrease in solar Radiation (W/m ²)
0	89.1%	91.1%	2.0%	6
1	79.7%	92.3%	12.6%	37
2	34.4%	82.1%	47.7%	140
3	51.3%	81.5%	30.3%	88

Appendix F. Response to Public Comments

The following pages include Ecology's responses to the comments received during the public comment period. They are in alphabetical order and the comments text is duplicated from the original letter or email. Please note all references to pages numbers, tables, and figures pertain to the draft April-May 2015 public review and comment version of this report. Many have changed in the final version.

Deschutes Estuary Restoration Team (DERT)

DERT1 Comment: Thank you for the opportunity to comment on the draft Deschutes River, Percival Creek and Budd Inlet Tributaries Phase 1 TMDL. In general, I think you have done an excellent job of data collection and analysis and of encouraging discussion of different points of view at the advisory group meetings. The technical and program presentations at advisory group meetings have been superb, and I especially appreciate the staff willingness to respond to questions, comments and suggestions for further analysis and information.

DERT1 Response: Thank you for your comments and your participation.

Implementation Actions

Pollution sources and organizational actions, goals, and schedules

Through research conducted for the *Deschutes River, Capitol Lake, and Budd Inlet Temperature, Fecal Coliform Bacteria, Dissolved Oxygen, pH, and Fine Sediment Total Maximum Daily Load Technical Report*, publication no. 12-03-008, and discussions with the Deschutes TMDL Advisory Group, the tables in this section identify specific actions needed to improve the water quality in the Deschutes River, Percival Creek, and Budd Inlet tributaries. This information expands on the technical report and describes the roles and authorities of cleanup partners (the organizations with the jurisdiction, authority, or direct responsibility for cleanup) and the programs or other means through which they will address the water quality issues.

Activities to address pollution sources

The following tables outline specific actions, priority areas, and schedules. They are presented in alphabetical order by entity.

Table 21: Commercial Forest Landowner actions

Action	Comments	Schedule
Implement Forests and Fish Law	This includes environmental protections to restore riparian habitat to support harvestable levels of salmon; meet requirements of the Endangered Species Act for aquatic species; meet requirements of the Clean Water Act for water quality; and ensure forest industry economic viability.	Ongoing

Table 22: Construction Stormwater General Permittees (CSWGP) (new and existing)

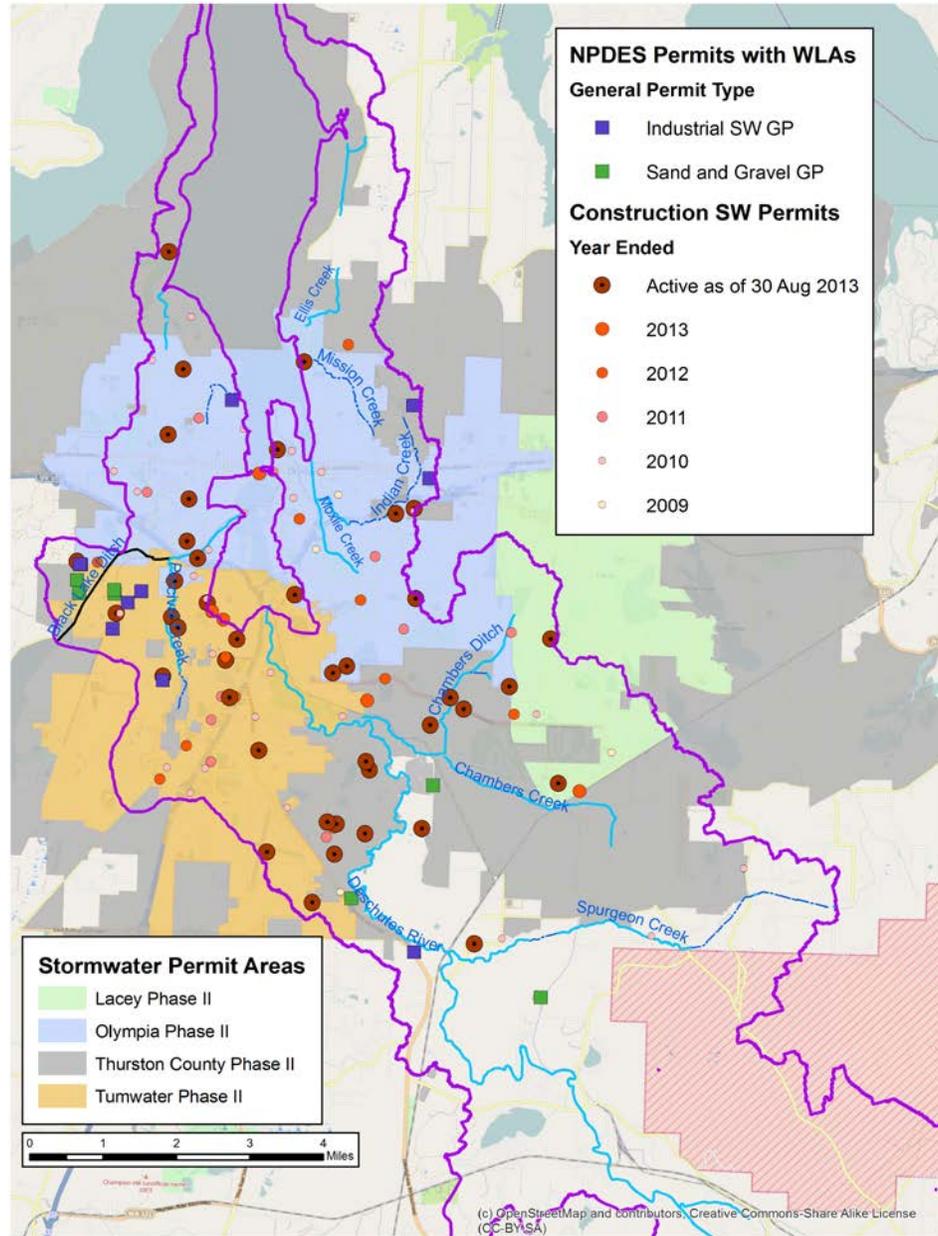
Action	Comments	Schedule
<i>Note: These permits are temporary and for the appropriate duration of the construction process. The number and name of permittees varies from month to month and year to year.</i>	<i>See Appendix C for specific requirements for each permit. The critical period for fine sediment, turbidity, and pH is from June-September and applies to any stormwater discharge from a permitted facility.</i>	
Comply with all requirements of the National Pollutant Discharge Elimination System (NPDES) and State Waste Discharge General Permit for Stormwater Discharges Associated with Construction Activity	This is generally referred to as the Construction Stormwater General Permit (CSWGP). The permit applies within the NPDES coverage area.	The current permit is in effect until December 31, 2015
Where applicable, implement additional monitoring or source controls to prevent pollutants released into the watershed.	See Appendix C for specific requirements for each permit.	As needed

Table 33: Thurston County

Stormwater Related		
Action	Comments	Schedule
Comply with the Municipal Stormwater Phase II Western Washington General Permit, #WAR045025 to implement the permit obligations that address the TMDL-listed pollutants for the Deschutes TMDL. This includes, but is not limited to, public education and outreach; illicit discharge detection and elimination (IDDE); controlling runoff from new development, redevelopment, and construction sites; and municipal operations.	The next permit revision is anticipated to include Deschutes River basin TMDL requirements. The permit applies to areas served by municipal separate storm sewer systems (MS4s) within the National Pollutant Discharge Elimination System (NPDES) coverage area.	The current permit is in effect until 7/31/18.
Develop a plan to reduce nutrient, bacteria, and sediment loading with a schedule of prioritized projects to add to their stormwater management plan during the first permit cycle. The prioritized projects will need to be implemented during subsequent permit cycles.	Identify priority locations, scope, and projects.	Subsequent permit cycles
Work with existing commercial businesses to identify pollution sources and best management practices (BMPs) needed to prevent discharge of TMDL pollutants of concern to the MS4.	Continue to implement the Thurston County Hazardous Waste Management Plan (adopted July 2014) for existing businesses and new development. This plan includes the IDDE ordinance and applies to Thurston County and all local jurisdictions contained within.	Ongoing
On-site Sewage Systems (OSS) Related		
Action	Comments	Schedule
Provide oversight through the county's On-site Sewage System Operation and Maintenance Program of all septic systems with design flow 3500 gallons per day (gpd) or less throughout the county. <i>The only exception is for areas under tribal jurisdiction.</i>	Work is conducted by Thurston County Environmental Health.	Ongoing

NPDES Permits

Wasteload Allocations (WLAs)



Appendix C

Wasteload Allocations (WLA) Summary Tables

- Construction Stormwater General Permit
- Industrial Stormwater General Permit
- Sand & Gravel General Permit
- Western WA Phase II Municipal Stormwater General Permit
- WSDOT Municipal Stormwater Permit

WLA Summary Tables Sections

- Name of permit
- Discharge location
- Pollutants addressed
- Surface water quality standard (SWQS)
- Current permit limits
- Means of compliance with TMDL

WLA Summary Tables Sections - continued

- WLA and critical period
- Special operating effluent conditions
- Flow-based limits
- Implementation actions
- TMDL monitoring and reporting requirements

Capitol Lake and Budd Inlet - Phase 2 TMDL

- Budd Inlet modeling
- Draft Phase 2 Timeline
- Wasteload allocations discussions
- Implementation actions

The work continues...

- ▶ March 17 - next meeting
- ▶ EPA completes review of Phase 1 report
- ▶ Share information about potential funding opportunities
- ▶ Listening sessions



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www.ecy.wa.gov/programs/wq/tmdl/deschutes/