

FINAL

**Sandy River and Willamette River
Total Maximum Daily Load
Implementation Plans**

For

City of Sandy

May 21, 2009

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INTRODUCTION

TMDL

The Sandy and Willamette Rivers and numerous tributaries do not currently meet several water quality standards, including bacteria, mercury and temperature. These standards assure that beneficial uses of the river and tributaries, such as swimming, fish consumption and fish rearing, are protected. When water quality standards are not met, the Federal Clean Water Act requires a Total Maximum Daily Load (TMDL) to be established. A TMDL determines how much pollution can be added to the river without exceeding water quality standards.

The Oregon Department of Environmental Quality (DEQ) has set Total Maximum Daily Loads (TMDLs) for the Sandy River, the Willamette River and their tributaries¹. Total Maximum Daily Loads limit the total amount of specific pollutants that may be discharged to a given waterbody. Under Oregon law, TMDLs must include a Water Quality Management Plan (WQMP) that identifies how the TMDLs will be implemented. Management strategies identified in a WQMP must be implemented through water quality permits for those sources subject to permits, and through sector-specific or source-specific implementation plans for other sources.

TMDLs, the WQMP, and associated implementation plans and activities are designed to restore water quality to comply with water quality standards. In this way, designated beneficial uses, such as aquatic life, drinking water supplies, and water contact recreation, will be provided. When implemented, the TMDL will result in cleaner, healthier rivers for current and future generations.

Portions of the Sandy River watershed and the Willamette River watershed lie within the City of Sandy (City). Stormwater runoff from the City ends up in both the Willamette and Sandy basins. Treated wastewater from the City is discharged into the Willamette basin under NPDES permit # 102492. The City's runoff to the Sandy River flows from Cedar Creek. Runoff from the City to the Willamette River begins with Tickle Creek and then flows to the Clackamas River. As a Designated Management Agency (DMA), DEQ requires the City to develop and implement actions to reduce pollution inputs to both watersheds for sources originating in the City limits. Specifically, the City is responsible for the following areas:

Sandy River Watershed

The Sandy River TMDL requires an 86% reduction in bacteria loads Cedar Creek and the implementation of "system potential vegetation" along any perennial creeks in the City limits.

¹ The Sandy River TMDL document was finalized by DEQ in March 2005, and approved by the U.S. Environmental Protection Agency (EPA) on April 14, 2005. The Willamette River TMDL document was finalized by DEQ on September 21, 2006, and approved by the U.S. EPA on September 29, 2006.

Willamette River Watershed via Clackamas River Basin

The Willamette River TMDL requires a 78% reduction in bacteria loads to Tickle Creek, a 26.4% reduction in mercury loads to the Willamette River, and the implementation of “system potential vegetation” in riparian zones adjacent to perennial streams within the City limits.

CITY OF SANDY

The City of Sandy is located east of the Portland Metropolitan Area, and is the eastern-most city in Clackamas County. Sandy has a population of approximately 8,000 people and covers 1,999 acres. Approximately four hundred and thirty two (432) acres within the city limits north of Highway 26 and east of Bluff Road drain to tributaries to the Sandy River, including Cedar Creek. One thousand, five hundred and sixty-six (1,566) acres in the city limits drain to Tickle Creek, which drains to the Clackamas River (Figure 1).

The City regulates a number of activities that can affect the quality of surface waters. Impacts from urbanization are the primary factor related to water quality, including: sanitary waste collection and treatment, solid waste recycling and disposal, and control of stormwater runoff from public and private lands. The City operates a wastewater treatment plant that discharges treated wastewater to Tickle Creek in the winter (November 1st to April 30th). From May 1st to October 31st, treated wastewater is used for irrigation at a local nursery, and cannot be discharged to Tickle Creek during this period. Solids are land applied and meet DEQ requirements. The City’s wastewater treatment plant is operated under NPDES permit No. 102492 and stormwater 1200-Z permit (file 78615).

Recreational opportunities are available in the Sandy River just outside of the City boundaries. The City owns over 100 acres along the Sandy River that is accessible by trail from the end of a local road. Eventually a trail system and natural open space area will be developed. Other areas of the Sandy River just outside of the City are used for swimming and kayaking.

The City recognizes that urbanization in the City may have impacts on the Sandy and Clackamas Rivers for bacteria, mercury and temperature. The management strategies described below have and will be implemented in the City, and water quality improvements have already been observed. In particular, spawning salmon have been observed in the City’s creeks, including Cedar Creek, No-Name Creek, and Tickle Creek.

Although City-owned land located outside of the City is subject to Clackamas County’s TMDL implementation plan, the City will work with the County to apply management strategies to protect and improve water quality.

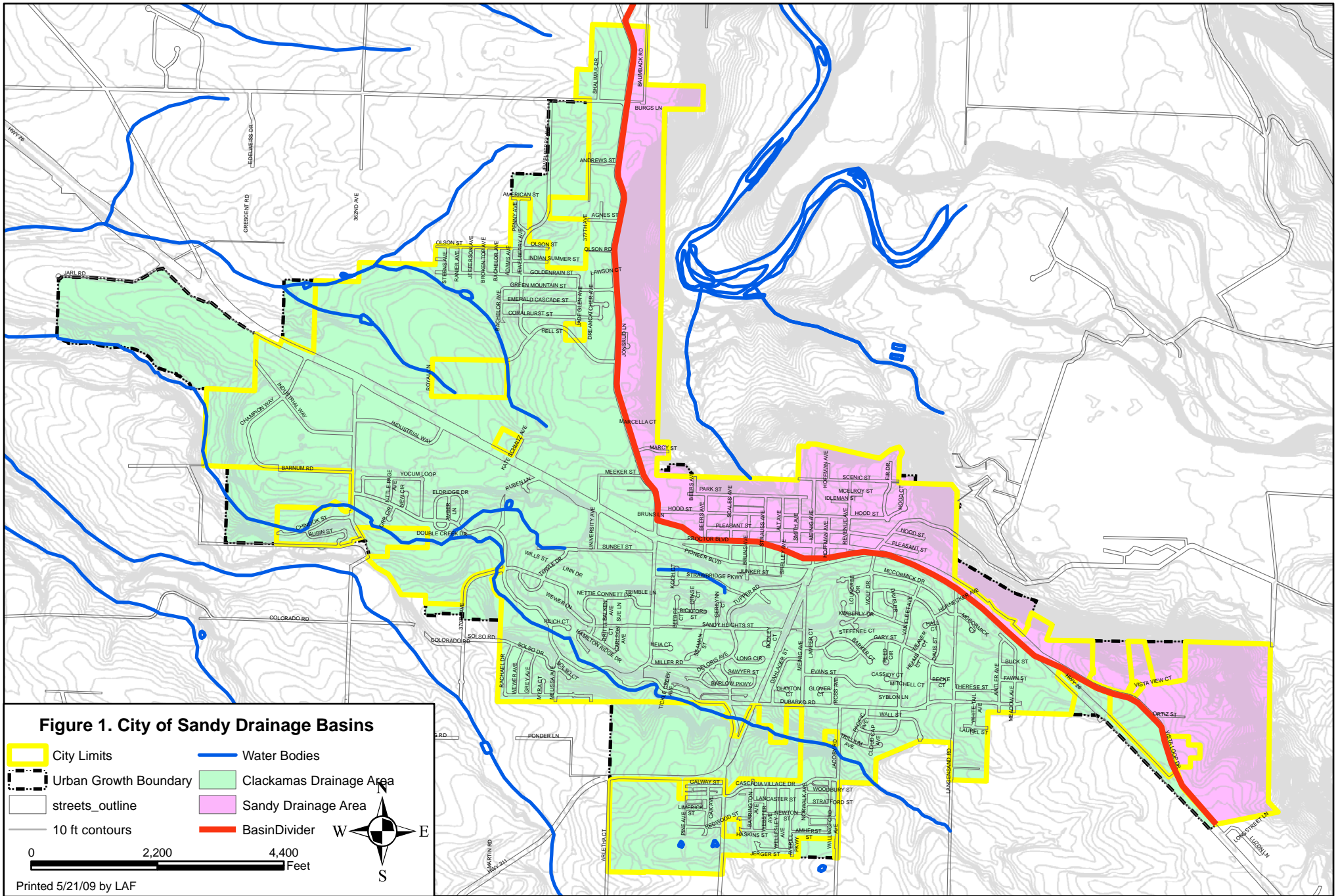
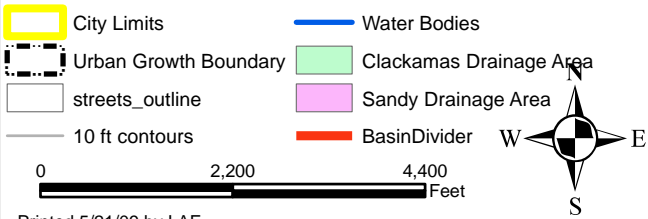


Figure 1. City of Sandy Drainage Basins



Water Quality Limited 303(d) Listings Addressed by TMDLs

BACTERIA

Introduction

DEQ has set TMDLs for bacteria that affect both of the City's watersheds. The bacterium that serves as the basis for freshwater bacteria TMDLs is *Escherichia coli* (*E. coli*), which is an indicator of contamination by human or animal waste. *E. coli* serves as a proxy for other pathogens such as other harmful bacteria, viruses, amoebas, etc. Such pathogens may cause infections of the eyes, ears, skin, and gastroenteric systems of those who engage in water-contact recreation. Water contact recreation is the most sensitive beneficial use related to bacteria; thus the TMDL targets river concentrations that will limit the loading and result in concentrations acceptable to protect the most sensitive beneficial use. Other beneficial uses occurring in the Sandy River watershed, including all other tributaries to the Sandy River, include water supply; irrigation; livestock watering; fish rearing, spawning, and passage; resident fish and aquatic life; wildlife and hunting; fishing; boating; aesthetic quality; and hydro power.

Oregon Administrative Rules section 340-31 contain the bacteria criteria for Oregon's waters. OAR 340-041-0009 states that "organisms of the coliform group commonly associated with fecal sources...may not exceed: (C) A 30-day log mean of 126 *E. coli* organisms per 100 ml, based on a minimum of five (5) samples; and (D) No single sample shall exceed 406 *E. coli* organisms per 100 ml." The 30-day log mean of 126 *E. coli* organisms per 100 milliliters criterion was used as the target for the TMDL.

The City is responsible to develop and implement TMDL Implementation Plans to reduce the contribution of bacteria to surface waters from activities and discharges that are under the City's jurisdiction. The City's jurisdiction includes discharges that enter and exit the public sanitary and storm sewer systems.

Although onsite sewage disposal systems (e.g. cesspools & septic systems) are regulated by DEQ and Clackamas County, rather than the City, the City has adopted policies in support of these agencies' missions to minimize the contribution of bacteria from onsite systems.

The City also responds to sewage spills from public collection systems as needed to protect public health, safety, and the environment. Table 1 summarizes potential sources of bacteria, and lists the relevant plan that addresses each source.

Background

Sampling provided by DEQ shows that *E. coli* levels exceed state water quality standards in all of the streams in the City from which samples have been taken.

The two relevant streams are Tickle Creek, which drains to Deep Creek, then to the Clackamas River, and ultimately to the Willamette River, and tributaries to Cedar Creek, which drain to the Sandy River. Tickle Creek and Cedar Creek are 303(d) listed for bacteria in the summer. Sampling in Tickle Creek does not indicate wet-weather

exceedances; according to the TMDL, potential sources of bacteria loads in the summer are failing septic systems and livestock or pets in or near the stream, and cross connections between sanitary and storm sewer systems.

Exceedances of the bacteria standard in Cedar Creek and Tickle Creek occur less frequently than in other, more highly developed watersheds in the Sandy River and Willamette River watersheds. TMDLs apply to both creeks to bring the creeks into full compliance, and to prevent the number of exceedances from increasing as the surrounding areas continue to urbanize.

The City has not conducted tests to determine the relative contribution of bacteria from various sources.

Requirements

The TMDLs for both of the watersheds within the City have slightly different requirements related to bacteria reductions associated with either nonpoint sources or onsite systems. The relevant requirements are listed below.

- The TMDL for the Sandy Basin requires an 86 percent reduction in bacteria loads for Cedar Creek, and encourages bacteria source tracking as a useful way to focus management efforts in the future once reasonable steps to reduce bacteria levels have been taken.
- The Willamette TMDL requires 78 percent reductions for Tickle Creek.
- The City’s wastewater treatment plant waste load allocation remains at the NPDES permit limit.

Table 1. Potential Sources

Potential sources of <i>E. coli</i> in the Sandy River and Willamette River watersheds	Plan that addresses the source	Watershed affected	
Treated sewage from the wastewater treatment plant	National Pollutant Discharge Elimination System (NPDES) permit #102492 for wastewater treatment plant and associated 1200-Z stormwater permit.	Willamette River	
Untreated sewage from overflows at the wastewater treatment plant or the public collection system		Sandy & Willamette Rivers	
Stormwater contaminated by contact with feces from wildlife or human wastes at the wastewater treatment plant		Willamette River	
Untreated sewage from failures or spills from private systems (onsite systems – e.g. cesspools & septic systems; or blocked private pipes)		TMDL Implementation Plan and Section 13.12.030 of the Sandy Municipal Code.	Sandy & Willamette Rivers
Stormwater contaminated by contact with pet and wildlife feces			
Stormwater contaminated by illicit			

dumping such as from recreational vehicles, or from cross connections with sanitary sewer		
Direct discharge of human or animal wastes into streams		

MERCURY

Introduction

DEQ has set a TMDL for mercury for the Willamette River with the objective to reduce average fish tissue mercury concentrations so that fish in the Willamette River are safe for human consumption.

According to Oregon Administrative Rules (OAR) 340-041-0340, water quality in the Willamette Basin must be managed to protect a range of beneficial uses including fishing (see Table 340A; November 2003). The beneficial use of fishing applies to the entire mainstem Willamette River and its tributaries. The multiple fish consumption advisories issued for the Willamette Basin by the DHS indicate that this beneficial use is not currently being attained. The TMDL for mercury is designed to restore the beneficial use of fishing to the Willamette River and its tributaries.

The initial fish consumption advisory for the mainstem Willamette River, dated February 13, 1997, advised the public of elevated mercury levels in the edible fish tissue of bass and northern pikeminnow (squawfish) and recommended specific limits for consumers who eat these fish caught anywhere in the mainstem river system (from the mouth of the river upstream to the Cottage Grove Reservoir). The average level of mercury found in bass and northern pikeminnow was 0.63 mg/kg. The DHS issues fish consumption advisories when average mercury levels reach or exceed 0.35 mg/kg in edible tissue

Background

Numerous fish consumption advisories for mercury have been issued in the Willamette Basin. The entire mainstem Willamette River is considered water quality limited based on the levels of mercury found in fish tissue; thus the TMDL applies to all tributaries to the Willamette. Due to uncertainties in the understanding of the fate, transport, bioaccumulation, loading and sources of mercury in the Willamette Basin, DEQ has established an interim water column guidance value deemed to be protective of the beneficial use of fish consumption in the Willamette Basin. DEQ will continue to develop a comprehensive conceptual framework for assessing mercury behavior in the Basin, along with the methodological and modeling tools needed to calibrate and validate the model. DEQ will develop revised estimates of the water column guidance values and allocations by 2011.

Requirements

In 2003, DEQ proposed a fish tissue methyl mercury criterion of 0.3 mg/kg in lieu of establishing specific water column criteria. Although methyl mercury is the criterion for fish tissue, as it is the form of mercury most prone to bioaccumulation, the TMDL guidance values and allocations are based on unit of total mercury due to the paucity of

ambient and source-specific methyl mercury data, and the difficulty and expense of methyl mercury analysis. Additionally, establishing guidance values in units of total mercury allows greater analysis of source loading, relative contributions, and effectiveness of control strategies. DEQ empirically estimated the relative ratio of dissolved methyl mercury to total mercury in the water column to develop a translator to establish water column guidance values based on units of total mercury.

The water quality guidance value for total mercury is 0.92 nanograms per liter (ng/l). Based on this guidance value, the analysis predicts that the average fish tissue concentrations of mercury in the northern pikeminnow will eventually fall below the threshold of 0.3 mg/kg. To achieve the water quality guidance value of 0.92 ng/l, a 26.4% reduction in ambient total mercury concentrations in the Willamette River is necessary. Based on an assumption of a linear relationship between total mercury mass load and water column concentrations, a 26.4% reduction in the loading of total mercury will result in the desired water column mercury value.

Potential Sources

Potential sources of mercury in the Willamette River include:

- atmospheric deposition (including deposition on the ground that ultimately runs off)
- erosion of native soils
- historical mining activity
- sediment resuspension
- municipal and industrial water discharges

In the City, the main potential sources of mercury are stormwater runoff and erosion of native soils. The City's wastewater treatment plant may discharge small amounts of mercury, and is required to provide monitoring results of the metal content of the effluent to DEQ on a semi-annual basis per the NPDES permit. The results of 2006 analyses show effluent mercury levels less than or equal to 0.10 micrograms/liter (the method reporting limit). The City's wastewater treatment plant was not required in the NPDES permit or by the TMDL to provide additional data or implement additional measures. Thus, the City's TMDL implementation plan will only address reduction of mercury through best management practices for stormwater and erosion control.

TEMPERATURE

Introduction

DEQ has set a TMDL for temperature that affects both of the City's watersheds. Percent effective shade is used as a surrogate measure for nonpoint source pollutant loading since it is easily translated into quantifiable water management objectives. This TMDL establishes site-specific shade targets for the mainstem of the Sandy River and major tributaries, and basin-wide "shade curves" that can be used to establish shade targets for all other streams in the basin. Load allocations were developed for anthropogenic and background nonpoint sources of heat. Oregon's temperature standard contains provisions that effectively limit the cumulative anthropogenic (point and nonpoint source) heating of

surface waters to no more than 0.3 degrees Celsius at the point of maximum impact. In theory, once the system potential condition with respect to nonpoint source pollution is known, DEQ could then calculate the amount of additional nonpoint source loading that a waterbody can assimilate without resulting in more than a 0.3°C cumulative increase in water temperature. DEQ chose to assign 0.05°C of the 0.3°C to nonpoint sources, 0.05°C for reserve capacity and allow 0.2°C for point source allocations. However, DEQ did not attempt to calculate this additional allowable nonpoint source heat load or incorporate the information into nonpoint source load allocations. Rather, DEQ considers the conservative methodology that bases nonpoint source load allocations on achieving system potential shade conditions to be part of the explicit margin of safety. *The means of achieving these conditions is through restoration and protection of riparian vegetation, increasing instream flows, and, where appropriate, narrowing of stream channel widths.*

DEQ set allowable stream temperatures to reflect conditions needed to support the most sensitive beneficial uses of each watershed. For both the Clackamas and Sandy Basins, DEQ has determined that rearing and migration needs of native salmonids (salmon and steelhead trout) represents the most sensitive beneficial use, and has therefore set the stream temperature standard for these basins to be 18° C (64.4° F).

The City is responsible to develop and implement TMDL Implementation Plans to restore and protect and restore riparian vegetation, increase instream flows, and narrow stream channel widths for streams that are under the City's jurisdiction. The City's jurisdiction includes streams and tributaries located within the City, including No-Name Creek, a tributary to Tickle Creek, Tickle Creek itself, and any other unnamed perennial and intermittent drainages. The City works cooperatively with Clackamas County to address development occurring outside of the City but within the City's Urban Growth Boundary and Urban Reserve (see Figure 1 for a map of the City boundaries and mapped streams).

Background

Four stream segments in the Sandy River basin were included on the 2002 303(d) list for exceeding numeric temperature criteria. Four stream segments in the Clackamas River basin also exceed the numeric temperature criteria. Since stream temperature results from cumulative interactions between upstream and local sources, the TMDL considers all surface water that affect the temperatures of 303(d) listed waterbodies.

Requirements

Since the City of Sandy WWTP does not discharge treated wastewater to Tickle Creek between May 1st and October 31st, and based on temperature data submitted to DEQ as required by the WWTP NPDES permit, DEQ assumed that the facility will not have a significant effect on stream temperature and did not calculate a waste load allocation.

The Clackamas Subbasin and Sandy River Temperature TMDLs use percent effective shade as a surrogate measure for allocating heat to nonpoint sources. Shade curves were developed for the both basins, which determine the nonpoint source load allocation. For the Clackamas Subbasin, the City was determined to be in the "Upland Forest"

geomorphic class (Figure 2). For the Sandy basin, the City was determined to be in the “Willamette Valley Vegetation Association” (Figure 4).

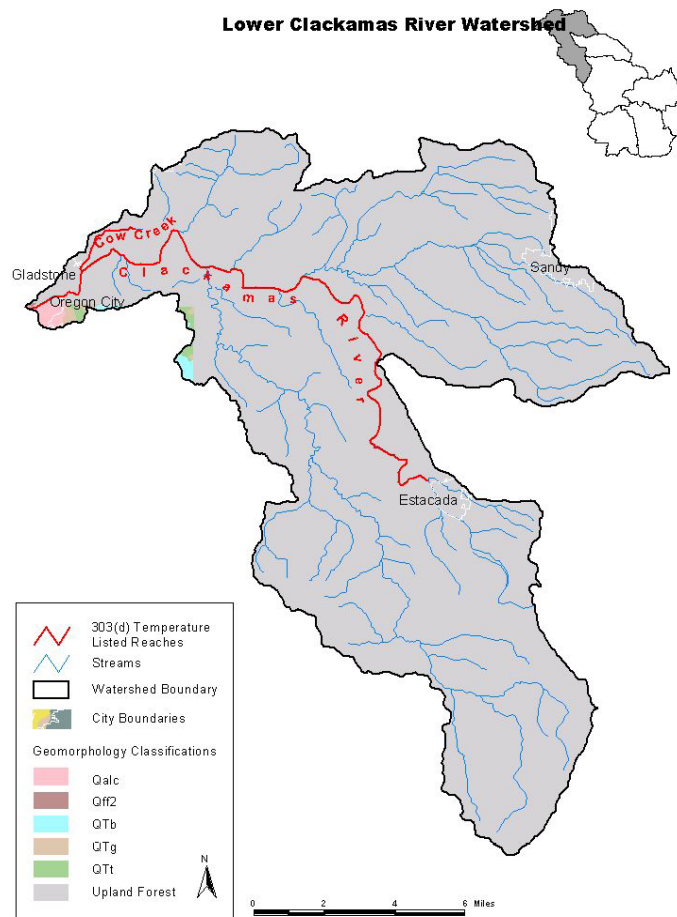


Figure 2. Lower Clackamas River geomorphic coverage. The City is classified as “Upland Forest”.

Based on the geomorphic classification, the appropriate shade curve identifies the non-point source load allocation established for the creeks in the City in the Clackamas Subbasin (Tickle Creek, No-Name Creek, and tributaries to both creeks), which is defined as percent effective shade based on system potential vegetation. In order to achieve the load allocation, the City needs to establish system potential vegetation, defined as “an estimate of a condition without anthropogenic activities that disturb or remove near stream vegetation”.

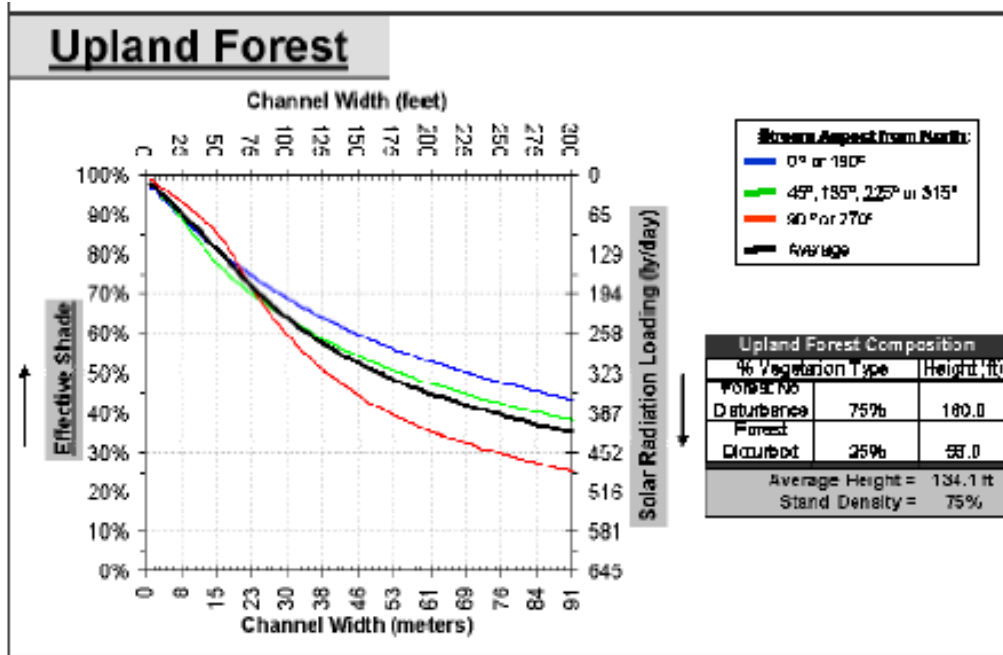


Figure 3. Shade curve applicable in the Clackamas Subbasin portion of the City. For stream channels less than 25 feet, greater than 90% effective shade is expected with system potential vegetation.

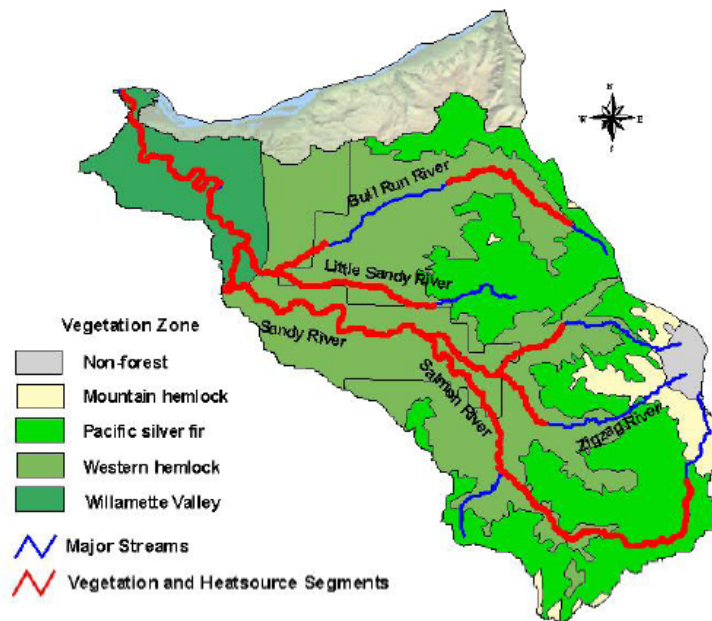


Figure 4. Potential Vegetation Zones for the Sandy River Basin. The City is located in the Willamette Valley vegetation association. Shade curves for the Sandy River basin are developed based on vegetation associations.

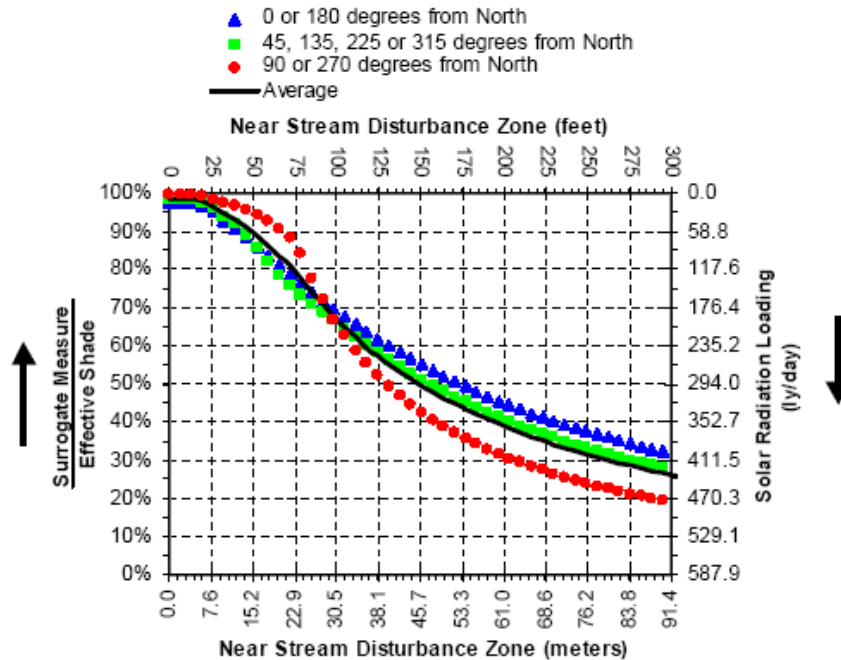


Figure 5. Shade curve applicable in the Sandy Basin portion of the City. For the small headwater streams located in the City that drain to the Sandy, nearly 100% effective shade is expected with system potential vegetation.

MANAGEMENT STRATEGIES

The City’s proposed management strategies, funding, and timeline for implementation are detailed in Table 2. The City population is less than 10,000, and as such, the City is not required to address the six Urban/Residential Stormwater Control Measures described by ODEQ in the Willamette Basin TMDL. They are included to identify items that the City already accomplishes and as suggestions for future directions for the City, given adequate funding and staff. Other measures taken by the City are listed by pollutant below.

STORMWATER MANAGEMENT TO CONTROL BACTERIA AND MERCURY
Pollution Prevention in Municipal Operations

The City of Sandy has started a “Green Team” which is looking at reducing the environmental impacts of City operations. Through the Green Team, we will review the current operations and maintenance actions, and develop training materials to prevent and reduce stormwater pollution from municipal operations.

Current actions used to reduce and prevent stormwater pollution from municipal operations include collecting, filtering, and re-using water from washing transit buses and public works trucks, using native and low-water-use plants.

Public Education and Outreach on Stormwater Impacts

Web Information

The City of Sandy has developed a page on their web site describing green stormwater options, maintenance, and benefits. Outreach to homeowners with green stormwater management or sensitive natural resources will occur in the next year.

Status – partially implemented

Funding – partially funded; some additional resources may be available from a local developer.

Arbor Day/Earth Day Fair

For the past two years, the City has hosted a combined Arbor Day/Earth Day celebration, and partnered with SOLV to clean up public areas in Sandy. Rain barrels were provided free-of-charge to Sandy residents who pre-registered, and water conservation and recycling information was distributed. The event was quite successful, and is expected to grow in the future.

Status – Implemented – continuing to grow

Funding – Unknown.

Public Involvement/Participation

The City encourages public involvement and participation in all aspects of governance. Any change to City code will go through a full public process, and the City will keep the citizens informed on actions the City is taking to improve water quality. Additionally, once this TMDL Implementation Plan is approved by ODEQ, it will be presented to the City Council.

Illicit Discharge Detection and Elimination

The City does not currently have a formal illicit discharge detection and elimination program. We rely on citizens to report illicit discharges or to the City, which is then investigated by City staff. The City will work to develop a program that meets the requirements of the TMDL.

Status – not implemented.

Funding – not funded

Chapter 13.20.010.C of the Sandy Municipal Code prohibits the discharge of any wastes into the City stormwater system. Wastes include, but are not limited to the following:

- Any discharge having a visible sheen such as, but not limited to, petroleum-based products.
- Any discharge having a pH of less than 6.0 standard units (S.U.) or greater than 9.0 S.U.
- Any discharge that contains toxic chemicals in toxic concentrations
- Any discharge that contains visible floating solids
- Any discharge which causes or may cause visible discoloration (include, but not limited to, dyes and inks) of the receiving waters

- Any discharge which causes or may cause damage to the city's stormwater management system
- Any discharge which causes interference in the city's stormwater management system
- Any discharge which causes or may cause a nuisance or a hazard to the city's stormwater management system, city personnel or the receiving waters
- Any discharge with a temperature great than one hundred fifty degrees Fahrenheit
- Any discharge (other than noncontract cooling water) from commercial or industrial operations such as, but not limited to, concrete waste, rug and carpet cleaning waste, or paint clean-up waste
- Any discharge containing human or animal waste or other waste intended for the sanitary sewer system.

Status – fully implemented. Need to review whether there is a need to change the City Code to meet state water quality standards for pH of 6.5 to 8.5.

Funding – none needed

Construction Site Stormwater Runoff Control

The City has adopted best management practices (BMPs) for erosion control implementation within the City limits (Section 15.44 of the Sandy Municipal Code). The building code requires all land disturbing activity, including disturbed areas totaling less than an acre, to apply for and receive a grading and erosion control permit, and references the City of Portland Erosion Control Manual as the standard. Disturbed areas totaling more than 1 acre are required to apply for and receive a DEQ 1200-C permit in addition to the City permit. The City does not administer the DEQ 1200-C permits, but works with DEQ to ensure compliance with City and State requirements.

As a Condition of Approval for Land Use Actions, the City routinely requires developers of residential and commercial to restore and revegetate disturbed and bare soils with native vegetation.

Status – fully implemented. Revisions to City code and standards will occur as needed

Funding – none needed

Post-Construction Stormwater Management in New Development and Redevelopment

Stormwater Utility

The City implemented a stormwater utility in order to minimize stormwater runoff, reduce storm water peak flows and volumes to pre-development conditions, increase groundwater recharge and evapotranspiration and minimize the discharge of pollutants to receiving water bodies. To achieve these ends, the City requires new development or re-development that results in an increase of impervious surfaces to detain the 2, 5, 10, and 25 year storms to pre-developed conditions so that post-developed runoff is equal to pre-developed runoff, and to remove at least 70% of the Total Suspended Solids from site-generated runoff or treat 80 percent of the average annual volume of storm water runoff

for the site. The City adopted the City of Portland Stormwater Management Manual to administer stormwater quantity and quality requirements.

Status – fully implemented. In the next 5 years, the City will update the stormwater regulations and adapt the City of Portland Stormwater Management Manual (with approval from the City of Portland) to better fit the needs and conditions of the City while being user friendly. Better written regulations will improve the quality of water leaving the City and entering our creeks.

Funding - None needed for current actions; revision of the stormwater regulations will require additional funding.

Impact Areas: Bacteria, Mercury, and all other soil-binding pollutants

Stormwater System Maintenance

The City of Sandy maintains the stormwater system, including annual removal of weeds and trash from vegetated stormwater features (ponds, swales).

Status – fully implemented.

Funding – none needed

Impact Areas: Bacteria, Mercury, and all other soil-binding pollutants

Stormwater Demonstration Program

The City has money donated by a local developer to construct stormwater education projects throughout the City. These projects will enhance stormwater treatment in the City, demonstrate the application of alternative stormwater treatment technologies, and enhance citizens' awareness of stormwater issues in the City. Projects may include: construction of an eco roof on either a City building or one of the covered stages in Meinig Park; construction of off-channel storage and restoration of a portion of No-Name Creek; construction of permeable paver roadside parking areas with underground stormwater storage in an area of the City without developed stormwater infrastructure; construction of additional areas of permeable paving and sidewalks; and other applicable projects

Status – Start-up

Funding – some grant money available

Meinig Park Stormwater Treatment and Detention

The City has prepared a draft design for a detention facility under the Meinig Park parking lot. Currently No-Name Creek is piped under the parking lot and under Meinig Rd and Highway 211. This project will provide water treatment and detention, reducing peak flows downstream and improving water quality in No-Name and Tickle Creeks.

Status – Start-up

Funding - Waiting for funding

BACTERIA

The City owns, operates, and maintains separated sanitary sewer and stormwater collection systems. In addition to the activities listed above to reduce bacterial inputs into water resources, the City has taken or will take the actions listed below.

Sanitary Sewer System

The City has made significant efforts to address the risk of bacteria pollution from onsite systems. These efforts are fully implemented and include:

- Requiring all new development (with the exception of single-family dwellings on lots larger than 1 acre) to be served by the public collection and treatment system, and extend public utilities through the site to adjacent properties (Section 17.84.60 of the Sandy Municipal Code (SMC)). The City is rapidly growing, and this requirement ensures that waste from all new development is appropriately treated, protecting water quality in Sandy.
- Requiring property owners to connect to public sewer service if the property poses a public health risk as determined by the County or State Public Health officials and public sewer service is available within 200 feet of the property (Section 13.12.030 of the SMC).
- Inspecting the City's existing sewer lines and pump stations and replacing older leaking lines (required by the City's NPDES permit).
- Upgrading the WWTP to assure adequate capacity for the City as it continues to grow.
- Owning, operating and maintaining separated sanitary sewer and stormwater collection systems, which minimizes the potential for cross connections between the systems.

Status – fully implemented.

Funding – none needed.

Pet waste

Pet waste is a growing problem in the City of Sandy, and measures will need to be taken to address these concerns. Sandy Municipal Code Section 6.04.035 requires pet owners to remove "...excrement or other solid waste deposited by the animal in any public area not designed to receive those wastes, including but not limited to streets, sidewalks, parking strips and public parks". Runoff of domestic animal waste is likely the main source of bacteria from animals.

Potential solutions include:

- 1) Pet waste bags and trash cans in public parks
- 2) Public outreach campaign to home owners
- 3) Increased enforcement of the Municipal Code.

Status – Partially implemented. Pet waste bags and trash cans have been placed in some City parks.

Funding - Unfunded. However, as the City receives more complaints regarding pet waste, the City (Public Works, Parks Department and City Council) will take action to implement a pet waste program.

Human Waste from Illegal Campsites

The City of Sandy owns several large parks, with remote, forested areas. To discourage trespassing and camping, the City passed Ordinance 2008-08 on April 21, 2008, effective 30 days from passing, in part amending Chapter 8 of the City Municipal Code to prohibit camping in or upon any "...public park or any other place to which the general public has access".

Status – passed by City Council

Funding – none needed at this time

MERCURY

Planning

The City has implemented ordinances that reduce development on steep or hazardous areas, and provide buffers to wetlands, streams, and steep slopes. Chapter 17.56 of the Sandy Municipal Code regulates Hillside Development, and Chapter 17.60 of the Sandy Municipal Code governs the Flood and Slope Hazard Overlay District.

Hillside Development

The Hillside Development requirements of the City's Development Code minimize seismic and landslide hazards, and soil erosion associated with development on steep or unstable slopes. Development may be permitted on potentially hazardous areas, provided that the recommendations of approved studies are implemented as conditions of building permit or land use approval. These regulations apply to any parcel with slopes greater than twenty-five percent (25%) as-shown on the Hillside Development Overlay District Map or with slope hazards mapped by the Department of Geology and Mineral Industries (DOGAMI). The Hillside Development restrictions apply to uses that require a building, grading, tree removal and/or land use permit.

Status – fully implemented

Funding – none needed

Flood Slope Hazard Overlay

Through the Comprehensive Plan and Zoning Map, the City has adopted a Flood Slope Hazard (FSH) Overlay District that limits development on steep slopes or wetlands. Restricted development areas within the FSH overlay district as shown on the City of Sandy Zoning Map include:

- Slopes of 25% or greater that (a) encompass at least 1,000 square feet and (b) have an elevation differential of at least 10 feet.
- Protected water features, including locally significant wetlands, wetland mitigation areas approved by the Division of State Lands, and perennial streams.
- Required setback areas as defined in section 17.60.30 of the Sandy Municipal Code.

- 70 feet from the top of bank of Tickle Creek
- 50 feet from the top of bank along other perennial streams, except for “No Name Creek” east of Towle Drive, as provided below
 - The required setback for “No Name Creek” east of the Towle Drive crossing may be reduced to 25 feet, subject to approval of a “stream bank restoration plan” that meets the standards of section 17.60.20.B.10 of the Sandy Municipal Code (see below)
 - Be prepared by a team of specialists in the fields of stream morphology, water quality and riparian vegetation approved by the Planning Director.
 - Remove invasive vegetation and replace it with multi-layered native vegetation that provides for stream shading within the entire stream bank.
 - Reduce the steepness of the bank along reaches that have been highly eroded.
 - Reduce the velocity of water carried by the stream.
 - Include guarantees and funding to assure at least a 90% survival rate of native plants over a 3-year period.
- 25 feet around the edge of any mapped locally significant wetland
- 25 feet from the top of any 25% slope break where the slope break occurs within the FSH overlay district as mapped by the City.

Status – fully implemented

Funding – none needed

Roads

The City contracts with a street sweeping service to sweep all City streets once a month. The street sweeping program reduces the input of dirt and debris to the City stormwater system.

Status – fully implemented.

Funding – funded in City budget

TEMPERATURE

To achieve the effective shade requirements for City creeks, the protection and enhancement of riparian vegetation is imperative. The City has already implemented many activities to protect our natural resources, as described below. These actions apply to both the Clackamas Subbasin of the Willamette River TMDL and the Sandy River TMDL.

Tree Protection & Restoration

The City has undertaken ambitious measures to protect tree canopy throughout the City, recognizing the benefits to wildlife, microclimate, and aesthetics provided by mature trees. The City adopted an Urban Forestry code (Section 17.102 of the Sandy Municipal Code) that regulates tree cutting on properties greater than an acre located within the City and within the Urban Growth Boundary.

The City has been awarded Tree City USA status and is actively pursuing opportunities to expand the city's tree canopy.

Arbor Day

The City celebrates Arbor Day annually. Events include a weekend day of outreach, and have included information from the Sandy River Basin Watershed Council, arborists, Master Gardeners, free trees, etc. In 2008 and 2009, the City combined the Arbor Day celebration with an Earth Day celebration, and partnered with SOLV to clean up public areas in Sandy. The event was quite successful, and is expected to become an annual tradition.

Status – Implemented – continuing to grow
Funding – Unsure.

Riparian Protection & Restoration

The City conducted a Local Wetland Inventory (LWI) in 1997, and updated the LWI in 2002. A draft Stream and Riparian Assessment was also conducted. The LWI was used to determine wetland setbacks that are incorporated into the Flood Slope Hazard overlay (see below for more information).

Status – Fully implemented.
Funding – None needed for current actions; revision of the LWI will require additional funding.

Flood Slope Hazard Overlay

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 - Reduce the velocity of water carried by the stream.
 - Include guarantees and funding to assure at least a 90% survival rate of native plants over a 3-year period.
- 25 feet around the edge of any mapped locally significant wetland
 - 25 feet from the top of any 25% slope break where the slope break occurs within the FSH overlay district as mapped by the City.

Status – fully implemented

Funding – none needed

Sandy River Park

The City of Sandy owns approximately 100 acres of land outside of the City Limits and Urban Growth Boundary/Urban Reserve to maintain in a relatively undeveloped state. A rough trail currently connects the City to the park. The following measures are being taken to improve natural conditions in the park:

- The City Parks Department has applied for a grant to design and build improvements to the trail, including reducing existing erosion problems on the trail, improving water quality, and connecting portions of the trail to reduce off-trail travel.
- The Sandy Police Department has worked to reduce trespass, illegal dumping and habitation in the Park
- The Parks Department is working with the Nature Conservancy to remove invasive species and replant native species in the park.

Status – Start-up

Funding – applied for grant

RESPONSIBLE PARTIES

As the City is small, staff works collaboratively to operate, monitor, permit, and inspect all public and private utilities in the City. Primary responsibilities are divided as follows.

The Building Official is responsible for reviewing, permitting, and inspecting all private utilities including private stormwater and sanitary sewer systems.

The Public Works Department is responsible for reviewing, permitting, inspecting, locating, and maintaining all public utilities, including public stormwater and sanitary sewer systems, and reviewing private stormwater designs for compliance with Section 13.18 of the Sandy Municipal Code.

The Clackamas County Water Environment Services (WES) Department is responsible for all onsite systems in the city limits and unincorporated Clackamas County. The City defers all permitting and regulation of onsite systems to WES. WES directs applicants who apply for permits for replacement systems to the City to connect to the public system, where it is available.

The Planning Department reviews all new and re-development plans to ensure that they meet all City standards including setbacks, wetland protection, and riparian corridor enhancement.

The Parks Department is in charge of maintaining all existing parks and planning for new parks in the City.

The Planning Department, Public Works Department, Building Department and City Engineer work together to ensure that all proposed development and re-development provide adequate services to fully serve the development, and that such services are properly installed. The Building, Planning and Public Works Departments further ensure that Best Management Practices for erosion control are installed and maintained to prevent the flow of pollution and sediment into surface waters.

The Public Works Department and Building Department work together to ensure that private plumbing blockages do not result in the flow of human wastes into surface waters.

The City coordinates with the Clackamas Basin Watershed Council and the Sandy Basin Council to complete education and habitat restoration projects within the city limits and adjoining properties.

FUNDING AND PRIORITIZATION OF PROJECTS

The City of Sandy will develop priority and funding plans for management actions that are currently unfunded during the development of the 2009-2011 budget cycle. Other management strategies are addressed in the course of conducting City business, and do not require designated funding at this time.

The City believes that its current actions to serve the City with sewer, maintain a stormwater utility, and protect and enhance riparian areas are adequate to protect water quality in the Sandy and Clackamas Rivers.

TIMELINE AND MONITORING OF PROGRESS

Timelines are shown in the Implementation Matrix for monitoring the progress of implementing the management strategies described above and in the Matrix. Data collection and compilation will be accomplished by Public Works with assistance from other City departments.

REPORTING, MONITORING OF WATER QUALITY, AND ADAPTIVE MANAGEMENT STRATEGY

Staff will report on implementation of the management measures annually. Annual reports will likely take the form of entries in a spreadsheet based on Table 2. The annual report will allow for review of the effectiveness of current actions and a chance to propose new implementation measures or changes to existing measures as part of the adaptive management system. A brief narrative will be included that will discuss potential changes to the Implementation Plan and results of current actions. Five year reviews will likely include the relevant annual report, and an assessment of whether different or additional efforts are needed by the City to further protect and enhance water quality.

The City will coordinate with Clackamas County to determine if bacteria source testing is needed to better focus efforts on our shared streams.

TIMELINE FOR MEETING LOAD ALLOCATIONS

The City has determined, based on other TMDL Implementation Plans, that a 20-year planning horizon will provide an appropriate timeline for implementation of projects to improve water quality throughout Sandy. This timeline is for implementation of management measures; it is expected that management measures addressing bacteria will achieve the desired reduction in load allocations by this time, and that system potential vegetation will be established along the City's water bodies, although shade targets will not be met in this time period.

LEGAL AUTHORITY

Most of the actions described above are already listed in the City of Sandy Municipal Code.

REASONABLE ASSURANCE OF IMPLEMENTATION AND MAINTENANCE EFFORT OVER TIME

The City is already implementing many of the management strategies, and will continue to do so within existing resources. Additional measures, funding, and priorities will be determined during the preparation for the 2009-2011 budget, and will be determined by City Council.

CONSISTENCY WITH LAND USE REQUIREMENTS

The Sandy City Council adopted the Comprehensive Plan on October 20, 1997 (Ordinance 8-97). The Plan contains multiple goals and objectives that are in line with the objectives of the TMDL Implementation Plan. The Comprehensive Plan goals that relate to the TMDL Plan include Goals 2, 5, 6 and 11.

GOAL 2 – LAND USE

Objective 8: Protection and Conservation of Natural Resources

GOAL 5 – OPEN SPACES, SCENIC AND HISTORIC AREAS AND NATURAL RESOURCES

- Objective 3: Natural features and areas determined to be significant shall be preserved or have their losses mitigated.
- Objective 4: The City promotes development practices which maintain or enhance the environmental quality enjoyed by the residents of the community.
- Objective 7: Employ development regulations to preserve and protect open space and environmentally sensitive lands, integrate the natural environment of Sandy into project designs, minimize the creation of impervious surface, and discourage the unnecessary clearing of trees and other natural vegetation.
- Objective 10: The City shall work with property owners and developers to preserve open space along Tickle Creek as part of the Tickle Creek Greenway.

Stream Corridor Protection Policies

- Objective 11: Designate and map approximate areas of known stream corridors, wetlands, and associated buffers.
- Objective 12: Encourage projects which will protect, maintain, enhance, and restore the natural functions and values of stream corridors. This includes maintenance of water quality, storm runoff and floodwater conveyance, wildlife habitat, open space, recreation and aesthetic values.
- Objective 13: Require activities which use stream corridors and associated buffers to be compatible with the preservation of stream corridor functions and values.
- Objective 15: Promote innovative site and building designs which reduce the adverse impacts of development on stream corridors.

Indigenous Growth Protection Policies

- Objective 16: Require development and construction projects to minimize disturbance of significant indigenous growth and to enhance the cohesive quality of tree stands through sensitive site design and construction methods.
- Objective 17: Promote innovative site and building designs which reduce the adverse impacts of development on native tree stands and other areas of significant vegetation.
- Objective 18: Where feasible, preserve natural vegetation resource sites through public acquisition, conservation easements or other available methods to permanently limit development.
- Objective 19: Encourage and, if necessary, require reforestation in open space areas to help mitigate the adverse impacts of development.

GOAL 6 – AIR, WATER AND LAND RESOURCES QUALITY

- Objective 1: Maintain environmental quality by guiding future development and land use activities. Allow activities that will not significantly deteriorate the existing high quality of air, water and land resources.
- Objective 6: Favor the use of the natural drainage system and other non-structural methods to treat, convey and dispose of runoff.

Objective 7: Require all development to comply with applicable local, state, and federal water quality and erosion control standards. Require all development to implement measures to minimize runoff from the development site during and after construction.

GOAL 11 – PUBLIC FACILITIES AND SERVICES

Objective 12: Encourage the utilization of swales and natural ponding areas to satisfy storm drainage retention and detention requirements where possible.

Conclusion: The City of Sandy’s comprehensive plan has provisions that are relevant to the TMDL Implementation Plans. Based on the above findings, it is found that the TMDL plans are compatible with these provisions.

CITY ORGANIZATIONAL CHART

The City of Sandy is governed by the City Council, composed of six City Council members and the Mayor. Sandy uses a “council-manager” form of government, with the City Manager responsible for the day-to-day operations of the City, consistent with the policy direction set by the Council.

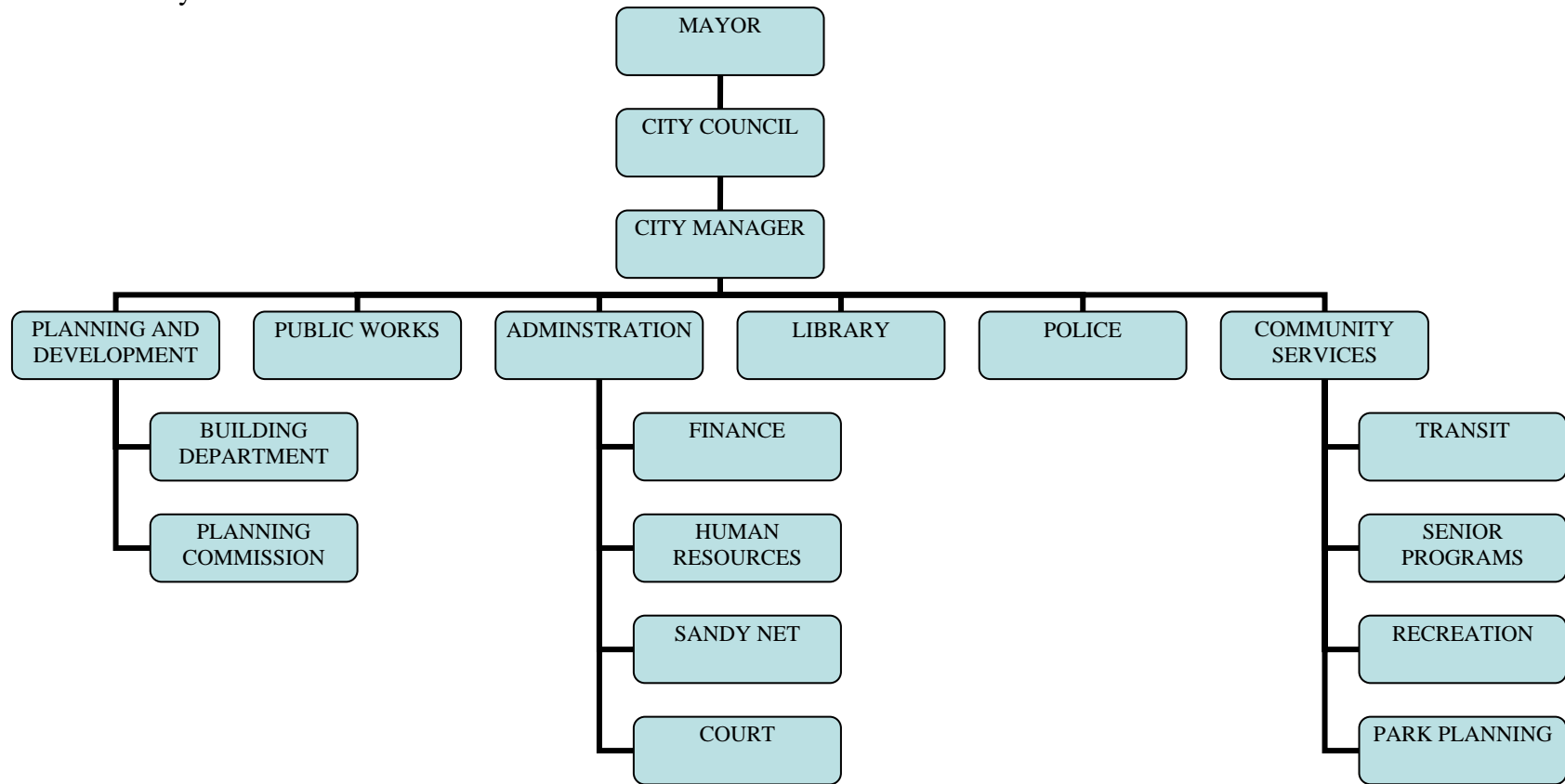


Figure 6. City of Sandy Organizational Chart

Table 2. Implementation Matrix

Best Management Practice	Commitment	Performance Measure	Bacteria	Mercury	Temp	Management Directive	Fiscal Analysis	Timeline	Status
Sanitary System									
New and Redevelopment	Connection of all new development to public collection and treatment system with the exception of single-family dwellings on lots larger than 1 acre.	Number of new connections to City system	X			City Code 17.84.60	No funding necessary	Ongoing	Fully implemented
Require Failed Systems to Connect to Public System	Ensure that onsite systems that pose a public health risk as determined by the County or State Public Health officials are replaced by connection to City system, where City system is available within 200 feet of property	Number of onsite properties that connect to public system	X			City Code 13.12.030	No funding necessary	Ongoing	Fully implemented
Inspect, maintain and replace sewer lines	Ensure adequate maintenance and function of the sanitary sewer system.	Miles of line inspected and maintained	X			NPDES	Currently funded	Ongoing	Fully implemented
Stormwater									
Stormwater Utility	Implement the Stormwater requirements specified in Sandy Municipal Code 13.18 and 13.20	Track the acreage and land uses of new and redevelopment projects	X	X	X		Partially funded	Ongoing	Partially implemented
		Track the location and type of all new WQ facilities	X	X	X		Partially funded	Ongoing	Partially implemented
		Create a map of the City's stormwater system	X				Not funded	By 2010	Partially implemented
Illicit Discharge Detection and Elimination	Create a program to detect and eliminate illicit discharges	Number of illicit discharges corrected	X				Not funded	Ongoing	Not implemented
Stormwater Management Manual	Prepare a City of Sandy Stormwater Management Manual to reflect changes in available best management practices and information from neighboring jurisdictions, and adapt the information to apply specifically to conditions in Sandy	Preparation and adoption of City of Sandy Stormwater Management Manual	X	X	X		Not funded	Adopted manual by 2013	Not implemented
Promote Low Impact Development (LID) Practices	Implement practices or programs that promote the use of low impact development techniques and report on activities annually	Track the location, drainage area, and type of LID practices implemented	X	X	X		Not funded	Ongoing	Partially implemented

Table 2. Implementation Matrix

Best Management Practice	Commitment	Performance Measure	Bacteria	Mercury	Temp	Management Directive	Fiscal Analysis	Timeline	Status
Private water quality facility tracking	Collect and record maintenance agreements for private water quality facilities that legal code allows, in order to encourage proper maintenance of facility and limit stormwater pollutant sources	Track the number, type, year installed, and maintenance activities for all private water quality facilities	X	X	X		Not funded	To be included with Sandy stormwater manual	Not Implemented
Private water quality facility maintenance	Stand inspection program and conduct inspections	Track number of facilities inspected/year and overall condition	X	X	X		Not funded	Implemented by 2010	Not implemented
Pipe Cleaning	Continue annual pipe cleaning	Miles of pipe cleaned/yr	X	X	X		Currently funded	Ongoing	Fully implemented
Catchbasin Cleaning	Continue annual catchbasin cleaning	Number of catch basins cleaned/yr	X	X	X		Currently funded	Ongoing	Fully implemented
Maintain public water quality facilities	Clean vegetated facilities & remove invasive species	Number and type of facilities cleaned/yr	X	X	X		Currently funded	Ongoing	Fully implemented
	Clean and inspect proprietary facilities annually	Number and type of facilities cleaned/yr & condition/required maintenance	X	X	X		Currently funded	Ongoing	Fully implemented
Stormwater Maintenance Manual	Prepare a City of Sandy Stormwater Operations and Maintenance Manual to improve the overall maintenance program efficiency and to enhance the water quality related BMP as appropriate	Preparation and adoption of City Stormwater Operations and Maintenance Manual	X	X	X		Not funded	Adopted manual by 2013	Not Implemented
Stormwater Demonstration Program	Create stormwater demonstration projects, such as permeable pavers, eco-roofs, etc	Number and type of projects constructed	X	X	X		Funding available	Ongoing	Start-up
Meinig Park Stormwater Treatment & Detention	Create a detention facility under the Meinig Park parking lot to improve water quality in No Name Creek	Construction of facility	X	X			Funding unknown	Begin construction by 2011	Start-up
Parks									
Pet Waste	Provide pet waste bags and trash cans in public parks	Number of parks provided with pet amenities	X				Not funded	Ongoing	Partially implemented
	Increased enforcement of Sandy Municipal Code	Track number of violations	X				Not funded	Implemented by 2011	Not Implemented

Table 2. Implementation Matrix

Best Management Practice	Commitment	Performance Measure	Bacteria	Mercury	Temp	Management Directive	Fiscal Analysis	Timeline	Status
Sandy River Park	Develop a master plan for improvements to the Sandy River Park, including trails, native vegetation planting, and education	Completion of master plan and adoption by council	X	X	X		Not funded	By 2014	Start-up
Erosion Control									
Erosion Control Requirements	Continue implementing Erosion Control requirements for single family building and development projects	Track updates to City's Erosion Control requirements	X	X			Fully funded through building department	Ongoing	Fully implemented
Inspections	Develop an EC site inspection program with appropriate actions to address violations of the Erosion Control plans	Track number of sites inspected Consider tracking number and type of violation	X	X	X		Not funded	By 2010	Not implemented
Roads									
Street Sweeping	Sweep City streets monthly	Total miles swept/yr	X	X			Fully funded	Ongoing	Fully implemented
Planning									
Hillside Development	Continue implementing Hillside Development Code	Track number of projects in regulated areas		X		City Code 17.56	Fully funded	Ongoing	Fully implemented
Flood Slope Hazard (FSH) Overlay	Continue implementing Flood Slope Hazard Overlay	Track number of projects in regulated areas		X	X	City Code 17.60	Fully funded	Ongoing	Fully implemented
Riparian Protection and Restoration	Update the Local Wetland Inventory	Completion of inventory		X	X		Not funded	By 2013	Not implemented
Tree Protection & Restoration	Continue implementing Urban Forestry Code	Track number of violations			X	City Code 17.102	Fully funded	Ongoing	Fully implemented
Education and Outreach									
Arbor Day and Earth Day event	Conduct a yearly outreach event	Track number of participants	X				Partially funded	Ongoing	Partially implemented