

## **4b Analysis for Tosh Creek**

The Washington Department of Ecology (Ecology) Integrated Report (IR) proposes to exclude one listing for fecal coliform in Tosh Creek from the 303(d) list and place this waterbody in category 4b of the IR. The specific listing is:

- 42139

This segment was in Category 5 of the 2012 IR.

Ecology's basis for excluding this waterbody from the 303(d) list is outlined in this evaluation.

### **Identification of Segment and Statement of Problem Causing Impairment**

Tosh Creek is located in southwest Redmond, collects drainage from approximately 146 acres of the Overlake neighborhood, and is a tributary to the Sammamish River, just downstream of the river's origin at the outlet from Lake Sammamish.

Tosh Creek's geomorphology is typical of other streams in Redmond. The stream originates near the top of a hill made of poorly infiltrating "glacial till" soils and it has a well-defined ravine that cuts through multiple layers of varying soil types. The Tosh Creek valley is incised up to 80 feet through the low relief upland surface. The valley bottom sediments are typically comprised of deposits of slumps from the valley walls and alluvium.

The valley bottom is typically about 30 feet wide, but some areas are considerably wider (50-100 feet). The valley walls are typically steep (45 to 90 percent), with local slumps. In the upper part of the valley, the side-walls are cut by several well-developed ravines. Some of these contain perennial flow, while others show some signs of channel formation, and still others have only colluvial topography.

At West Lake Sammamish Parkway, Tosh Creek emerges from the confined valley described above onto its alluvial fan within the Sammamish River Valley. Below this, it crosses a terrace of the Sammamish River, and a small area of the river's floodplain.

Land use in the Tosh Creek watershed is dominated by single-family residential (38 percent) and multifamily residential (23 percent), with other areas of commercial (15 percent), parks and undeveloped land (13 percent) and roads (10 percent). Forest cover in the basin is concentrated in the Tosh Creek valley, which includes a wide vegetated riparian buffer that is dominated by deciduous trees and immature conifers. There is a pasture area downstream of West Lake Sammamish Parkway on the stream's alluvial fan, which was recently planted with scrub-shrub and forest species as part of the Tosh Creek Culvert Replacement and Restoration Project, completed in November 2013. As can be expected, invasive species such as reed canarygrass in the lower reaches and Himalayan blackberries are prevalent along portions of the stream's buffer.

Most of Redmond's streams, the Sammamish River, and Lake Sammamish are impacted by decades of land conversion from forest to development. Compounding those impacts is the lack of stormwater controls or critical area regulations in the past. In response to

those impacts, development regulations have been strengthened over time, but those regulations do little to address the impacts from existing development.

The impaired segment of Tosh Creek is the lowest portion of the creek, extending from the point where it enters the Sammamish River upstream under Lake Sammamish Parkway, and to the western boundary of Section 13, T25NR05E. The high levels of bacteria in Tosh Creek are caused by stormwater, both by stormwater that runs across impervious surfaces and discharges directly into the creek, and by leaks from aging and poorly-performing infrastructure.

The fecal coliform criterion for Tosh Creek requires that the water meet Washington's two-part bacteria standard. Fecal coliform organism levels must not exceed a geometric mean value of 100 colonies/100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 200 colonies/100 mL.

### **Description of Pollution Controls and How They Will Achieve Water Quality Standards**

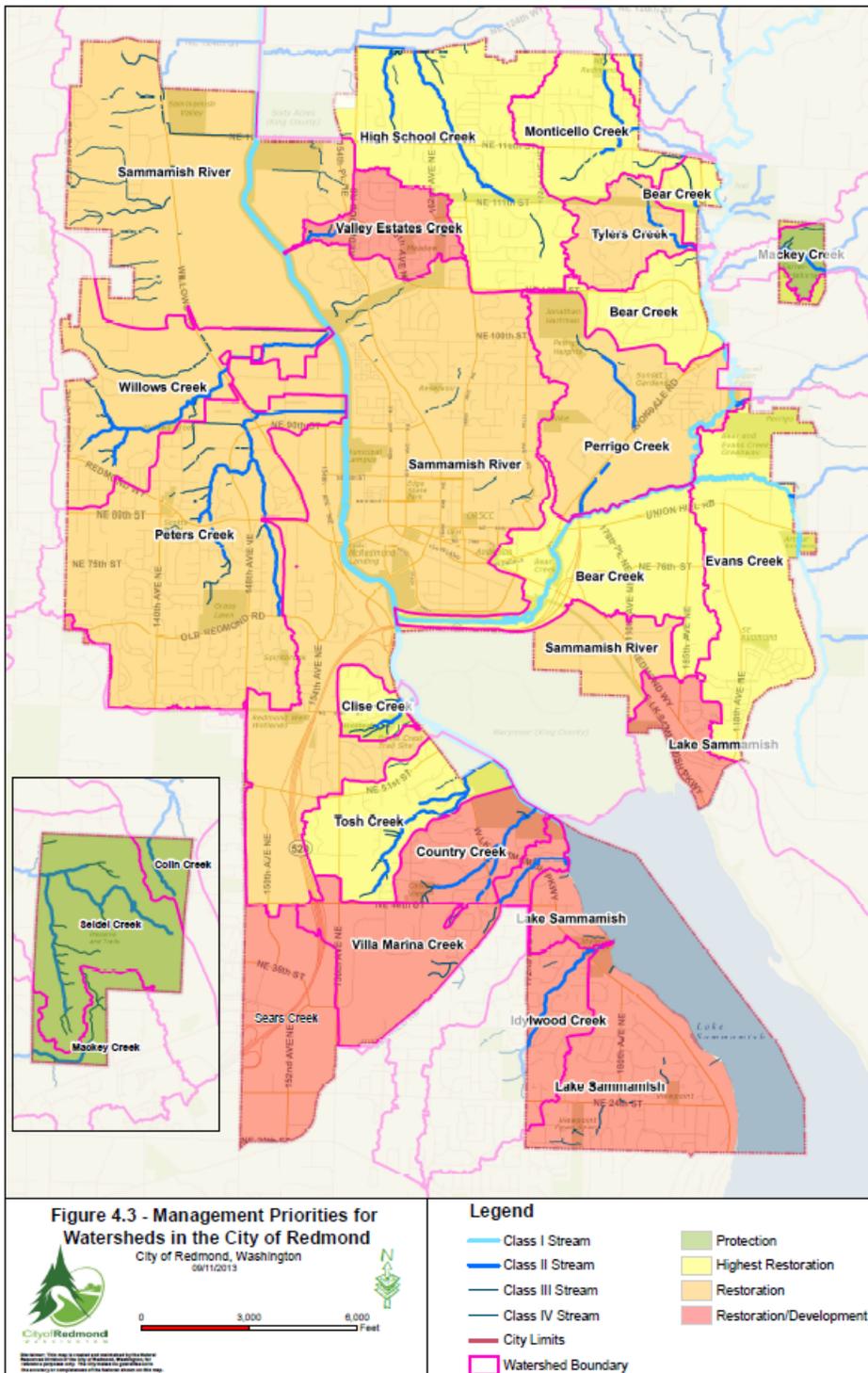
The City of Redmond has shown a consistent commitment to improving the quality of streams within its jurisdiction. In the early 2000s, the City worked with Ecology and the Environmental Protection Agency to explore ways to reduce stormwater-related impacts to the City's surface waters. This effort was called the Redmond Urban Waters Initiative (RUWI).

The RUWI team examined the relationships between land use and pollutants generated by stormwater systems in Redmond. To do this, they:

- Summarized the history of stormwater management in Redmond.
- Examined interrelationships among land-use, impervious surface, and surface water quality across Redmond watersheds.
- Examined the relationship between Bellevue, Washington's (an adjacent city) storm-event water quality data (1988-1993) and watershed impervious surface levels.
- Applied EPA's water quality duration curve methodology to Redmond's streamflow and surface water quality data. Explored the relationship between several additional landscape-levels, watershed land-use variables, and surface water quality.
- Modeled alternative futures for Redmond's land-use and applied them to future surface water quality.

The reports were completed in late 2008.

In 2013, the City adopted the Citywide Watershed Management Plan. This plan divided the city into 20 watersheds, evaluated and prioritized those watersheds, and established strategies (both capital investments and programs) to restore water bodies in Redmond. The plan coordinates Redmond's response to multiple regulatory drivers, and establishes a mechanism to fund retrofits in prioritized watersheds. The Citywide Watershed Management Plan identified Tosh Creek, among others, as a high priority for restoration.



Redmond’s Watershed Map identifies the 20 watersheds, and associated water bodies, within Redmond’s city limits. Each watershed is color coded based on the strategy needed to restore a healthy water body in each watershed. Green color coded watersheds are in good shape, yellow watersheds are the most likely to become healthy with investment (programs and projects), orange watersheds are likely to become healthy with investment over a longer period of time, and red watersheds are heavily impacted and will take substantial time and investment to become healthy. No water body will be

allowed to get worse, but improvements will be implemented first in the yellow color coded watersheds.

Ecology has approved Redmond's Citywide Watershed Management Plan as an alternative approach to stormwater management minimum requirements detailed in its NPDES Municipal Stormwater Permit.

In 2014, Redmond received a \$250,000 National Estuary Program grant from Ecology to help fund a study of the Tosh Creek Watershed. The City and its consultant team recently completed that study and produced the Tosh Creek Watershed Restoration Plan in February 2015. The plan identifies projects to be completed within the next six years to address the water quality impairment. The City will implement the plan through construction of stormwater retrofit projects; in-stream stabilization, habitat and riparian projects; and upgrades to stormwater infrastructure. These improvements will provide stream conditions that support aquatic life as well as protecting the residents and businesses living and working around Tosh Creek, now and in the future.

Funding for restoring the Tosh Creek Watershed comes from three sources.

- **City of Redmond Stormwater Utility.** The City's stormwater utility has set aside funds within its six year capital improvement plan to fund projects that will be constructed within the Tosh Creek watershed.
- **Grants.** The City will aggressively seek grant funding for stormwater retrofits and instream improvements. Development of the Tosh Creek Restoration Plan was partially funded by a National Estuary Program grant.
- **Developer Contributions.** Through the City's Ecology-approved Watershed Management Plan, developers will be able to pay fees to contribute to completed restoration projects within the Tosh Creek Watershed, in lieu of building some improvements at their own project sites.

Ecology has just offered Redmond a grant of \$4,887,750 and a low interest loan of \$1,629,250 to help fund restoration of Tosh Creek. This funding will be used to construct a new stormwater detention vault and stormwater treatment facilities near the 4700 block of 159th Avenue NE.

### **Estimate or Projection of Time When Water Quality Standards Will be Met**

Even though Tosh Creek has been identified as one of Redmond's watersheds with the most potential to be restored to a healthy condition, the time this will take is somewhat uncertain. The work that must be completed to control stormwater flow will take several years, and that work must be completed before any work on restoring the stream itself can start. Once riparian areas are restored and buffers are in place, it will still take some time for the stream to recover. At this time, Ecology expects that the fecal coliform criterion will be met in 2030.

### **Schedule for Implementing Pollution Controls**

The proposed projects are summarized below. This plan proposes a sequence of projects that balances staffing and funding availability, grant cycles, property rights, and public support to sustain a program most likely to succeed.

The capital improvement plan is supported by a robust monitoring program and delays construction until that monitoring program has had the opportunity to develop baseline stream data that will be used to confirm modeling that has been done and develop project designs. Additionally, monitoring will be useful in evaluating the effectiveness of constructed projects. With continuous monitoring and periodic updates to this plan, a progression of improvements can be documented and the program can change course, if needed.

The table below shows the capital improvement projects the City will implement. Specific to the 303(d) listing for fecal coliform, the City will focus on runoff treatment facilities that are known to reduce fecal coliform, including bioretention. The City intends to update the Tosh Creek Watershed Restoration Plan in 2020, and to use the results of its monitoring program to determine what additional actions, if any, must be taken to achieve compliance with state water quality standards.

ID	Project Name	2015	2016	2017	2018	2019	2020	Cost Estimate
IF05	50 <sup>th</sup> Way Flooding							\$220,000
IF07	Onyx Pond Control Structure							\$50,000
IF01	Pipe 15 Replacement							\$16,000
IF03	Pipe 121 Replacement							\$49,000
IF08	Archstone Pond Control Structure							\$50,000
IF10	Marymoor Hills Biofiltration swale Renovation							\$150,000
FC05	156th Ave Flow Splitter							\$220,000
FC06	159th Vault							\$6,500,000
IS06	Stabilize Tributary B							\$910,000
FC01	Onyx Pond – Phase 1							\$1,300,000
FC12	Prescott Vault							\$1,500,000
	<b>Total Cost</b>							<b>\$10,965,000</b>

## **Monitoring Plan to Track Effectiveness of Pollution Controls**

The capital improvement plan is supported by a robust monitoring program that is collecting baseline stream data that will be used to confirm modeling that has been done and develop project designs. Additional monitoring will be used to evaluate the effectiveness of constructed projects. With continuous monitoring and periodic updates to this plan, a progression of improvements can be documented and the program can change course, if needed.

Redmond has received more than \$1,000,000 from the Stormwater Work Group, which is made up of municipalities covered by Phase 1 and Phase 2 municipal stormwater permits, to monitor the in-stream response to the Tosh Creek restoration work. Ecology stormwater and scientific staff are members of the steering committee that is developing the monitoring design.

## **Commitment to Revise Pollution Controls as Necessary**

Redmond will use the results of the effectiveness monitoring study to update the plan and to identify additional projects as needed. Ecology expects that the City's implementation of the Tosh Creek Restoration Plan will achieve compliance with water quality standards. However, if it does not, Ecology will continue to work with the City to identify other controls that could be used to achieve compliance.