City of Tigard
STORMWATER
MASTER PLAN

Summer Lake Water Quality Enhancement Program

Problem Statement

Summer Creek is dammed approximately 1/4 mile upstream of SW 121st Avenue, forming Summer Lake. The lake is surrounded by urban residential development and Summerlake Park, which includes natural areas, ball fields, and a dog park.

Summer Lake suffers from several water quality problems, including:

- High temperatures from wide slow-moving expanses of water with little shade;
- Excess nutrients from urban runoff; and
- High bacteria from urban runoff, use of the dog park, and wildlife.

Summer Creek is a tributary to Fanno Creek. Both creeks are water quality limited under the Clean Water Act for bacteria, dissolved oxygen, phosphorus, and temperature.

Bacteria in Summer Lake comes primarily from wild and domestic animals. In 2005, the City began several efforts to control these sources. Vegetated filter strips were installed at the dog park to reduce bacteria from pet waste. Soon after, the City began removing nutria from the park and worked with a private property owner to take down a waterfowl feeding station that attracted large numbers of geese to the lake. A pet waste pick-up outreach program in 2007 was targeted to the adjacent neighborhood.

Water quality monitoring downstream of the lake shows that these source control activities significantly decreased bacteria levels in Summer Creek.

The lake is still lacking shade to cool the water, and the surrounding neighborhoods lack treatment facilities that could help decrease nutrients from landscaping practices and pollutants from roadways. Waterfowl populations have begun to rise. As a result of these existing conditions, high bacteria, low dissolved oxygen, high phosphorus, and high temperatures continue to be present in the lake and downstream in the creek.

Recommendation

The recommendation is to implement a suite of additional source controls, treatment, shading, and education efforts around Summer Lake aimed at reducing temperature, bacteria, and nutrients.

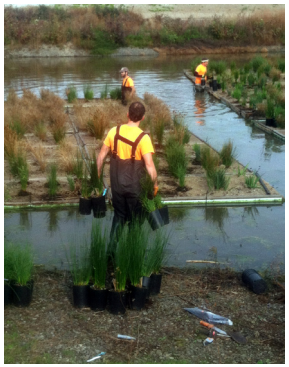
Restore and enhance riparian areas to add shade and habitat to Summer Lake. Plant trees and native vegetation in cooperation with lake neighbors. This may include island plantings and selected shoreline plantings that maintain and enhance aesthetics as well as provide shading for cooling and vegetative filtering for water quality enhancement.

Establish floating treatment wetlands (FTWs), an innovate treatment technology using constructed vegetated islands. FTWs provide shade for cooling in open water where shade from trees cannot reach and can help with update of nutrients. As a pilot project, partner with Portland State University and Clean Water Services (CWS) to involve students in constructing and launching FTWs, as well as in monitoring performance and outcomes.

Add small distributed vegetated treatment facilities (Low Impact Development Approaches, or LIDA) in the surrounding neighborhoods. Partner with CWS to plan and build bump out rain gardens on residential streets, water quality swales, and filter strips.

Increase outreach efforts to Summerlake Park users and lake neighbors that target dog waste pick-up and waterfowl feeding. Begin targeted outreach to lake neighbors about the benefits of native plants, and encourage participation in CWS' Clean Water Hero program. Begin a targeted outreach and enforcement campaign to eliminate encroachment into both the park and the Summer Hills Greenway from private structures and non-native landscaping features that negatively impact water quality.

Continue reducing nutria and waterfowl populations through a partnership with Department of Agriculture.



Launching and planting FTWs (photo courtesy Port of Vancouver)

Cost Estimate

The cost estimate assumes one-time materials costs for FTWs based on a non-proprietary design used at Port of Vancouver. It assumes that design, labor, and initial monitoring are provided by college students at no cost to the City. One-time riparian restoration costs are estimated at $10,000 per acre.

The cost estimate assumes ongoing annual costs for LIDA retrofits and an outreach specialist. The LIDA program is assumed to include four 250 square foot LIDA retrofits per year at $50 per square foot.

The average annual cost of 1.0 FTE in the Stormwater Division is $91,000, including salaries and benefits, based on 8.68 FTE in the draft 2017 budget.

One-time Costs				
Items	**Qty**	**Unit**	**Unit Price**	**Total**
Materials for FTWs	40	100 SF	$900	$36,000
Portable Monitoring Equipment	1	EA	$1,500	$1,500
Riparian Restoration	1.4	AC	$10,000	$14,000
Project Administration, 15% of Services				$7,725
Total (Rounded)				**$60,000**
Annual Costs				
LIDA Retrofits	1000	SF	$50	$50,000
Outreach Specialist	0.25	FTE	$91,000	$22,750
Project Administration, 15% of Services				$10,913
Total (Rounded)				**$90,000**

Example LIDA neighborhood retrofit in Clark County, WA