Burnt Bridge Creek Partnership

Urban Forestry and Greenways Workgroup

Meeting Summary - April 28, 2021

*Please complete this **Doodle Poll** to find a time for the next Burnt Bridge Creek Partnership Meeting.*

Background

The Burnt Bridge Creek Partnership kicked off in February 2021 to develop a TMDL Alternative Restoration Plan for the Burnt Bridge Creek Watershed, which is also known as a "Water Cleanup Plan." After the kickoff meeting, the City of Vancouver established implementation workgroups for different priorities in the watershed. The workgroups include Sewer Connection and Septic Systems, Urban Forestry and Greenways, Stormwater and Capital Improvements, Operations and Maintenance, and Public Education and Outreach.

Urban Forestry and Greenways Workgroup

The Burnt Bridge Creek Urban Forestry and Greenways Workgroup met on April 28, 2021, from 9:00 a.m. – 11:30 a.m. The purpose of this workgroup was to provide input on priorities for urban forestry and greenways in the Burnt Bridge Creek watershed to support development of the *Burnt Bridge Creek Water Cleanup Plan*. The objective of the first workgroup meeting was to review priority locations for water quality improvement from the *Burnt Bridge Creek Source Assessment*, and to begin outlining implementation priorities using the Urban Forestry and Greenways Worksheet.

Discussion topics included tree planting and restoration, Vancouver's Urban Forestry Program, the Burnt Bridge Creek Greenway, Project Restore, property acquisition, and Vancouver's work with Friends of Trees to implement street trees. Instream restoration projects that go beyond tree planting and shade to help lower water temperatures were also discussed. These include as floodplain reconnection, wetland restoration, large wood installation, and streambank stabilization projects. The agenda and presentation from the workgroup meeting is available online.

Next steps

The next full Burnt Bridge Creek Partnership meeting will be held in July 2021. The purpose of this meeting is to review what was discussed at each Burnt Bridge Creek workgroup meeting, and to present draft priorities for long-term implementation.

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Water quality priorities

The Burnt Bridge Creek Watershed is on the Washington State's Polluted Waters List (303d list) for bacteria, dissolved oxygen, temperature, and pH impairments. Improving water temperature and dissolved oxygen conditions is the focus for the urban forestry and greenways workgroup. Increasing tree canopy in lowland, riparian areas provides important shade, which helps cool down Burnt Bridge Creek and its tributaries by reducing the amount of sunlight that can warm up the river. Reducing warm water temperatures may also help improve dissolved oxygen levels in the watershed, as warmer water often has lower dissolved oxygen levels. Increasing urban tree canopy throughout upland portions of the watershed, and not just in riparian areas, also has the potential to help manage stormwater runoff and promote groundwater infiltration to restore streamflow to the creek.

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Water quality summary

In the Burnt Bridge Creek Watershed, river mile (RM) 0 had the warmest water temperatures recorded in the *Source Assessment*, with 92 percent of the days exceeding water quality criteria for temperature. The temperature water quality standard for the Burnt Bridge Creek watershed is 17.5 degrees Celsius to support salmonid spawning, rearing, and migration. In addition to RM 0, river miles 5.9 and 7.0 in the middle watershed had the most number of days above temperature criteria, with RM 7 not meeting temperature standards 230 days out of the year, and RM 5.9 not meeting standards for 222 days. Sites with the most noncompliant days for dissolved oxygen are located in the upper watershed at river miles 9.5 to 11.4, and in the middle watershed at river miles 7.0 and 5.9.

Vancouver Watershed Health Assessment

In addition to Ecology's water quality assessment, the City of Vancouver contracted with Herrera Environmental Consultants to complete the Vancouver Watershed Health Assessment in February 2019. This report confirmed that the most significant water quality decline from 2004-2007 and from 2011-2017 is located at river miles 8.4, 7.0, and 5.9, and at the confluence of Peterson Channel with Burnt Bridge Creek. This data is consistent with Ecology's Source Assessment, and confirms that the middle watershed is a top priority for implementation. Generally, pH has increased at all sites measured in the Health Assessment.

Land use and land ownership

The Burnt Bridge Creek watershed is the main watershed draining the City of Vancouver's urban area. The City of Vancouver is the primary jurisdiction in the watershed, with Clark County having jurisdiction in northern portions of the watershed, mostly in Cold Creek. The Washington Department of Transportation also has jurisdiction on state roads which includes interstate 5 (I-5), Interstate 205 (I-205), and State Road 500 (SR 500). Only 11 percent of the land in Burnt Bridge Creek is publicly owned. Vancouver is the largest public landowner, owning 44 percent of the total public land. Clark County owns 10 percent of public land, and WSDOT owns 3 percent. The watershed can be divided into three parts, which includes the lower, middle, and upper watershed. The lower watershed is located between river miles 0 and 5, the middle watershed includes river miles 5 to 10, and the upper watershed is river miles 10 to 13. The primary land use in the watershed is residential, with approximately 44 percent of the total watershed consisting of residential land uses.

Land use and vegetation in riparian areas

Along the riparian corridor of Burnt Bridge Creek, which are areas located within 100 to 150 meters of the creek, approximately 36 percent of the riparian area is pastureland, 19 percent is developed, and 45 percent is a mix of varying tree heights and densities. The City of Vancouver has invested a significant amount of time and money into protecting and conserving land in riparian areas by establishing the Burnt Bridge Creek Greenway, which is an 8 mile conservation area located downstream of I-205. In total, the majority of the land use in the riparian corridor is trees. Overall, the system potential tree height that can be achieved in the Burnt Bridge Creek watershed is trees that are 41 meters tall or approximately 135 feet. The overhang potential of trees, which is related to the amount of shade a tree can produce, is 4.1 meters or approximately 13.5 feet. The system potential riparian density that can be achieved throughout the watershed is an 85 percent forested watershed. The minimum buffer width recommended for Burnt Bridge Creek is 50 feet on each side of the river. Listed below is a summary of vegetation height and density in the in the Burnt Bridge Creek riparian corridor.

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Table 1. Vegetation or land use in the Burnt Bridge Creek riparian corridor.

Vegetation or Land Use Type	Vegetation Height (m)	Vegetation Density	Fraction of Overall Area
Water	0	-	4%
Developed and paved	0	-	19%
Pasture	0.2	75%	36%
Golf course, scattered trees	22	25%	4%
Extra small trees	4	25-75%	1%
Small trees	10	25-75%	11%
Medium and large trees, low density	14-19	25%	2%
Medium and large trees, medium density	14-19	50%	6%
Medium and large trees, dense	14-19	75%	19%
Extra-large trees, very dense	27	85%	2%

Shade deficit analysis

A shade deficit analysis of the mainstem of Burnt Bridge Creek was completed in the *Burnt Bridge Creek Source Assessment* to identify priority locations for tree planting projects. Overall, the upper watershed located between RM 10 to 13 had the highest average shade deficits in the watershed, followed by the middle watershed located between RM 5 to 10. The following table summarizes results from the shade deficit analysis.

Table 2. Average shade deficits in Burnt Bridge Creek watershed.

Portion of Watershed	Average shade deficit
Upper watershed: RM 10-13	62 percent
Middle watershed: RM 5-10	39 percent
Lower watershed: RM0-5	27 percent

There are three different priority areas for increasing riparian shade, lowering water temperatures, and improving dissolved oxygen levels in the watershed. The following tables summarizes priorities. All of the river miles with shade deficits over 30 percent are priorities for restoration.

Table 3. Priorities for increasing shade and improving water quality.

Priority area #1	River miles with shade deficits over 50 percent • RM12-13 = 87% shade deficit • RM 7-8 = 83% shade deficit • RM11-12 = 73% shade deficit
Priority area #2	River miles with shade deficits over 30 percent • RM 8-9 = 44% • RM 0-1 = 43% • RM 4-5 = 36% • RM 6-7 = 35%

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	• RM 1-2 = 31%
Priority area #3	• River miles 0.0 for the highest water temperature and river miles 5.9 and 7.0 for most number of days above temperature criteria. • River miles 9.5 to 11.4, 7.0, and 5.9 for the most noncompliant days for dissolved oxygen.

A shade deficit analysis was not completed for the Burnt Bridge Creek tributaries, which includes Cold Creek, Peterson Channel, and Burton Channel. Completing a shade deficit analysis or survey for Burnt Bridge Creek's tributaries will be important to support future restoration and improvement of water quality.

Past Implementation

The Burnt Bridge Creek Greenway Trail

The City of Vancouver has implemented an 8-mile, recreational trail and greenway along the Burnt Bridge Creek mainstem, downstream of I-205, in the City of Vancouver. The City's Greenway provides significant riparian shade and habitat in the Burnt Bridge creek watershed, while also serving as a critical infrastructure corridor for public utilities including stormwater, wastewater, drinking water, and electric utilities. As of 2021, it is estimated that 600,000 trees and shrubs have been planted in the greenway and 10,000 cubic yards of invasive species have been removed. Restoration of the greenway began in 2005. A 3-mile stretch in the middle watershed was transformed through the Burnt Bridge Creek Greenway Improvement Project. This $10 million investment added water quality treatment through stormwater ponds and restored wetlands in the riparian corridor. The City plans to plant an additional 20,000 trees in the western portion of the watershed between 2019 and 2021. Priority areas for future tree planting projects have been mapped by the City and can be referenced in the Source Assessment. Current implementation efforts are focused on the City owned property downstream of river mile 1.6, between Alki Road and the Stewart Glen trailhead. Funding for the Greenway is provided through the City's stormwater utility.

City of Vancouver Urban Forestry Strategy

The City of Vancouver's Urban Forestry program aims to maximize the environmental, social, and economic benefits that trees provide to city residents and visitors. Through this program, the City has set a goal to reach 28 percent tree canopy citywide by 2030. In 2010, there were approximately 5,570 acres of tree canopy, over 5,579 acres. More information on the Urban Forestry program is provided later in this summary.

Friends of Trees

Friends of Trees is a non-profit organization dedicated to inspiring community stewardship of urban forestry by bringing people together in the Portland-Vancouver area to plant, care for and learn about city trees. Through its grassroots efforts, Friends of Trees forms partnerships with local governments and businesses, and recruits and trains volunteers to keep urban forests flourishing. Friends of Trees has been planting trees in the City of Vancouver for 16 years. Friends of Trees focuses its planting efforts in road right-of-ways, adding trees to transportation corridors. Friends of Trees plants more than 500 trees annually in the Burnt Bridge Creek watershed.

Watershed Alliance of Southwest Washington

The Watershed Alliance has a successful history working with private landowners in the Burnt Bridge Creek watershed through Project Restore. Project Restore is a public and private partnership funded by the City of Vancouver to improve water quality in Burnt Bridge Creek, by

assisting creekside property owners to remove invasive plants, improve bank stability, and increase tree canopy and native vegetation on their properties.

The goal of the program is to improve water quality in Burnt Bridge Creek and its tributaries within the City limits by creating and maintaining a healthy riparian corridor along the entire length of the creek. This goal is accomplished by establishing and maintaining relationships with private landowners, including those in residential, commercial, industrial and agriculturally zoned areas. The City has an aggressive program managed by the Greenway and Sensitive Lands Team to restore the riparian areas on multiple public properties along Burnt Bridge Creek. Project Restore is designed to fill the gaps with restored private properties.

Areas along the Burnt Bridge Creek corridor are targeted each year in coordination with Vancouver's Sensitive Lands, Surface Water Management, and Urban Forestry programs. The Watershed Alliance provides the key liaison role in recruiting and working with private property owners to undertake and support restoration efforts on their properties. City staff participate by identifying potential properties, designing and implementing site preparation work, and in evaluating the success of projects.

The Watershed Alliance staff regularly meet and work closely with City program staff to co-manage and grow this initiative. The Watershed Alliance is responsible for enrolling homeowners, businesses, and vacant lot owners along the creek. Watershed Alliance staff makes the property owner contacts, develops a 5-year agreement between the property owner, the City and the Watershed Alliance, and coordinates the restoration with the City's Sensitive Lands Team. City staff control invasive weeds on the properties and plant the riparian buffer area to native trees and shrubs. They continue to control invasive plants on the property and replant as necessary through the 5-year agreement period.

The Watershed Alliance maintains a database to keep track of the properties along Burnt Bridge Creek and their status within the program. Properties immediately adjacent to Burnt Bridge Creek that have a creek side area with the potential to be restored to a healthier riparian area are included in the database. As of 2020, approximately 110 individual lots have been identified for restoration. Approximately 40 are businesses or vacant lots and 70 are private homeowner properties.

Over the past five years, the Watershed Alliance has enrolled 28 private and business properties in the Project Restore Program. As of March 2020, 26 properties have been restored and are being maintained after their initial invasive species treatment and planting. These properties total 1.3 miles of the Burnt Bridge Creek corridor.

In addition to project Restore, the Watershed Alliance implements the Backyard Habitat program, which provides incentives to private landowners to restore native habitat on their properties. This program focuses on creekside properties within a 200-foot buffer from the creek. Through this project, Watershed Alliance conducted door-to-door outreach, distributed educational materials, and sent mailers to roughly 300 properties.

The Watershed Alliance also implements a small grant program with funding for neighborhood improvement projects, such as tree plantings. Additionally, Watershed Alliance hosts litter cleanups, conducts outreach to neighborhood associations and school groups, and hosts community-wide planting events. To date, the Watershed Alliance has planted over 83,000 trees and shrubs and cleared invasive species while engaging over 8,000 volunteers in restoration and litter cleanup efforts.

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Ecology Funding for Implementation
The Department of Ecology has funded multiple water quality projects in the Burnt Bridge Creek Watershed through the Water Quality Combined Funding Program. With Ecology's support, the following nonpoint source projects have been implemented in the Burnt Bridge Creek watershed since 2014.

- **Burnt Bridge Creek Stormwater OSPREY Project (2019-2021)** – The Lower Columbia Estuary Partnership (LCEP) established a native riparian forest on three acres of Burnt Bridge Creek floodplain, while providing comprehensive stormwater education to 24 classes from nearby schools. LCEP engaged students and parents in native tree plantings at the site. The goal was to restore the site to the healthy, self-sustaining, bottomland hardwood and wetland forest, by planting 6,000 native trees and shrubs. The project increased student and parent knowledge of stormwater and clean water interactions, and built a stewardship ethic that facilitates long-term protection and sustainability of the site through direct citizen engagement and behavior change. The total project cost is $147,178.67.

- **Lower Columbia River Estuary Enhancement Project (2019-2021)** – LCEP is improving water quality in tributaries of Burnt Bridge Creek by restoring approximately three acres of riparian area, and reducing temperature and stormwater runoff in the watershed. The project also included 20-25 public outreach events involving community volunteers and students in site preparation, riparian plantings, vegetative monitoring, and maintenance. The total project cost is $264,000. Additional phases of this project have been implemented through other funding sources.

- **Burnt Bridge Creek – Meadowbrook North** – LCEP restored 3.75 acres of riparian plantings adjacent to Burnt Bridge Creek, using funding from the department of Ecology and Lower Columbia Fish Recovery Board.

In addition to the projects already implemented, LCEP intends to implement an additional riparian restoration project on City of Vancouver property near Alki Road, in the lower Burnt Bridge Creek watershed. This project will add an additional 7,200 plants to three acres of floodplain habitat in the lower watershed, downstream of river mile 1.6. This project will help restore the floodplain area between Alki road and Stewart Glen trailhead, which is a priority implementation area for the City of Vancouver.

Washington Department of Transportation
The Washington Department of Transportation (WSDOT) has six mitigation sites within the Burnt Bridge Creek watershed. One is active, four are closed, and the Arnold Park site was turned over to the City of Vancouver for long-term management. These sites were established over the last twenty years to compensate for wetland and riparian impacts of various projects in the SR 500 corridor. They encompass 34 acres of currently protected wetland and riparian habitat in the Burnt Bridge Creek floodplain. Overall, mitigation performed by WSDOT includes 16 acres of wetland creation, restoration and enhancement (mostly scrub-shrub or forested wetland), and 18 acres of woody wetland buffer and riparian corridor preservation and restoration. These projects provide floodplain hydrological, water quality, and habitat functions, including stream shading, bio filtration, and storage.

Notes from workgroup meeting on April 28, 2021

Ecology hosted the first Urban Forestry and Greenways workgroup meeting on April 28, 2021. Charles Ray, Rich McConaghy, Tim Esary, Brian Potter, and Annette Griffy attended the workgroup on behalf of the City of Vancouver. Devan Rostorfer, Lawrence Sullivan, and Molly Gleason represented the Department of Ecology. The following are notes from the April meeting.

Urban Forestry

Vancouver's Urban Forestry Program manages urban tree canopy as a system, with the goal to achieve 28 percent tree canopy throughout the City. The program focuses on tree preservation, reforestation, and stewardship in the community, with the goal to create community stewards of the forest and natural environment. Increasing urban tree canopy is also one of Vancouver's green infrastructure strategies to help the city manage stormwater runoff in Burnt Bridge Creek. By planting trees, Vancouver hopes to reduce peak stormwater flows, alleviate community flooding, and reduce water pollution.

For residential planting, Vancouver focuses on planting street trees. The City collaborates with Friends of Trees to implement tree-planting projects in residential areas focusing on transportation corridors and road right-of-ways. In upland areas, Vancouver focuses plantings on public property such as parks and schools. Vancouver also collaborates with private property owners, business, and churches to plant trees in upland areas. In the riparian area, Vancouver focuses on restoration of the Burnt Bridge Creek Greenway and works with Project Restore to plant trees on privately owned properties adjacent to Burnt Bridge Creek. The City currently has approximately $20,000 per year to spend on reforestation, outreach, and education.

One challenge within the urban forestry program is completing long-term maintenance of trees planted on private property, specifically in overburdened communities. The City currently completes maintenance on private property plantings for five years. In year six, the private property owner is responsible for maintenance of the planting. Developing resources to support long-term maintenance is necessary to support survival and health of urban tree canopy.

The City of Vancouver has different tree canopy targets for different zoning designations. To promote and protect tree planting, Vancouver has a tree vegetation and soil conservation ordinance. The City also encourages developers to preserve trees where feasible, and if trees are impacted during construction projects, the city requires replanting to achieve a tree density per acre requirement. If the tree plantings cannot be achieved on site, the City charges a cost of $600 dollars per impacted tree, which is paid into a City managed tree fund.

One of the Urban Forestry Program's biggest projects in 2021 is completing a tree canopy assessment study, which is completed every 5 to 10 years. The last study was completed in 2011. The report and data for the 2021 study is expected to be available by fall of 2021.

Burnt Bridge Creek Greenway

The Burnt Bridge Creek Greenway was originally established by the City of Vancouver Planning Department, which created a greenway zone where development was not allowed. Most of the area downstream of river mile 8 at is publicly owned by the City of Vancouver as a part of the Burnt Bridge Creek Greenway, and the majority of properties upstream of river mile 8 are privately owned. The City has focused planting on all properties in the greenway that the city owns. As of now, most of the publicly owned areas in the greenway have been planted. It is estimated that the City of Vancouver owns approximately 200 acres of land in the Burnt Bridge

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Creek Greenway. Vancouver focuses primarily on planting areas 50 to 100 feet from the shoreline.

Since 2005, approximately 600,000 trees have been planted and maintained on the greenway, and 10,000 cubic yards of invasive species have been removed. Vancouver normally hosts two major volunteer planting events on Make a Difference Day and Martin Luther King Day to implement plantings in the Greenway.

Land acquisition

One of the biggest challenges with restoring the remaining riparian areas in Burnt Bridge Creek and achieving urban forestry goals is the City's limited funding for property acquisition and easements. Acquiring and conserving additional property within the Burnt Bridge Creek Greenway and in upland areas would enable Vancouver to expand its conservation areas and tree planting projects. The primary source of funding available to support land acquisition is generated by local utilities, which are paid by ratepayers. Vancouver's City Council adopted a 5 percent cap on rate increases for utilities, which limits the funding available for stormwater, water, sewer, greenways, and land acquisition.

As of now, the City of Vancouver does not have a strategic property acquisition plan for acquiring additional properties for conservation. Any land acquisition occurs opportunistically as properties and funding become available. Developing a strategic land acquisition plan or vision for the City, specific to water quality protection, may help support future acquisition of critical areas for conservation and restoration.

Instream restoration: *reconnecting floodplains, restoring wetlands, and addressing eroding streambanks*

Vancouver has not completed a formal assessment or planning exercise to identify areas that are priorities for instream restoration, streambank stabilization, floodplain reconnection, or wetland restoration. The City is interested in pursuing these types of projects to help address warm water temperatures, but recognizes this would require a multi-year assessment, design, engineering, and permitting process. To implement a larger planning process, Vancouver would most likely rely on partnerships and grant funding to complete the assessment and design work necessary to identify and implement instream restoration projects.

Vancouver is currently conducting a stormwater outfall assessment, which will identify opportunities to improve stream habitat at stormwater outfalls. This effort may help identify and inform instream restoration opportunities. However, developing a more comprehensive strategy for improving instream conditions, may be an important next step help improve water temperature in Burnt Bridge Creek. Most of the opportunities for these type of projects are located downstream of I-205, and specifically downstream of river mile 8. The privately owned wetlands located in the upper watershed may also provide opportunities to implementation restoration activities that go beyond tree planting and shade to help lower water temperatures.

Bonneville Power Administration

Much of the Burnt Bridge Creek Greenway is located underneath Bonneville Power Administration's electricity transmission lines. Under these transmission lines, Vancouver is not allowed to plant trees taller than 10 feet. This 10-foot maximum tree height applies to areas 150 feet from the center conductor, which is 75 feet on each side of conductor infrastructure. The presence of electrical utilities in the greenway causes barriers to implementation and prevents the ability to achieve system potential tree height on the greenway to maximize effective shade.

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The tallest tree Vancouver has planted in the greenway is a Red Osier tree, which can achieve a height of 20 feet; however, the Burnt Bridge Creek Source Assessment estimates that the maximum tree height that can be achieved in the watershed is approximately 135 feet. The paved walking path in the greenway also provides some constraint for planting minimum buffer widths in the watershed, which is 50 feet.

Washington Department of Transportation

Historically, the Washington Department of Transportation has paid money to the City of Vancouver for stormwater fees. This money was originally be spent across the City to support tree planting and other environmental efforts, but now WSDOT has restricted how and where their stormwater fee can be spent. The City of Vancouver can no longer use the funding to implement tree plantings and it cannot be used to plant trees in WSDOT right-of-way. WSDOT is now requesting the funds can only be used to benefit WSDOT stormwater. Currently,

Vancouver is considering opportunities to use the money is to implement a stormwater retrofit project in Peterson Channel. Vancouver has some parcels available to potentially implement a stormwater project that would help manage WSDOT stormwater flows while benefitting water quality Peterson Channel. Vancouver is proposing to study and design improvements on public property adjacent to Peterson Channel to treat runoff from I-205. It is uncertain how much volume of water enters Peterson Channel from I-205, but a significant amount of sediment loading has been observed and reported. Limitations on how Vancouver can spend WSDOT's stormwater fees is one of the biggest challenges Vancouver faces in its urban forestry program, as well as the limited funding available for land acquisition.

Public Private Partnerships

As of now, Vancouver is not receiving any funding from SEH America or Bonneville Power Administration, which are private entities that have impacts on water temperature and the ability to plant trees in the Greenway. In the past, the Port of Vancouver has contributed funding for planting street trees on development projects. Opportunities to establish public private partnerships to help fund tree planting may help generate more funding to support restoration in the future.

Maintenance challenge

Another long-term challenge within the urban forestry and greenways program is balancing the implementation of new plantings with increased maintenance needs. The primary focus of Vancouver's Urban Forestry and Greenways maintenance crews are root zone management, spraying, and irrigation. All of the Vancouver maintenance staff are licensed herbicide applicators. Irrigation of plantings is completed using a truck that brings in water. There are some concerns about compacting soils when driving the irrigation truck in planting areas; however, Ecology's water resources staff denied a water rights permit to withdraw water off Burnt Bridge Creek for irrigation, therefore trucking in water for irrigation is the only option.

To reduce maintenance needs, Vancouver uses mulch in their site preparation for weed suppression. The use of mulch also helps promote water retention and reduces the need to spray herbicide. Once the mulch breaks down, Vancouver eventually introduces cover crop to planted areas. One future challenge in the river is that maintenance staff are starting to see more pennywort in the river, which is an invasive plant. Pennywort was observed in the middle watershed near Meadowbrook Park. Efforts to remove the vegetation have not been successful.

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Another challenge Vancouver is facing in the Greenway is managing the impacts from homeless encampments. Some encampments have caused impacts to tree plantings and restored areas. Vancouver wants to ensure the public views the greenway as a beautiful natural area, and there are some public concerns about blight, litter, and safety in the Greenway. Destruction of restored areas has also had an impact on employee morale.

Education and Outreach

Vancouver has a strong urban forestry education and outreach program. Vancouver runs the Vancouver Water Resources Education Center, and has partnerships with Lower Columbia Estuary Partnership, Columbia Springs, Watershed Alliance of Southwest Washington, and Friends of Trees for education and outreach. More information on education and outreach for urban forestry is included in the Public Education and Outreach Summary.

Watershed Tour in May 2021

Ecology completed a tour of the Burnt Bridge Creek watershed on May 13, 2021, focusing on the Burnt Bridge Creek Greenway. Tim Esary, supervisor for the Greenways and Sensitive Lands team, directed the tour, which helped Ecology identify priority areas for implementation, and understand portions of the watershed where restoration has already occurred. The tour also helped explain where there are barriers, obstacles, and challenges to implementation. The following are notes from May tour.

Upper watershed – wetland mitigation (River mile 10 to 13)

In the upper watershed, there is a privately owned mitigation bank called Wetland Terrace Mitigation Bank on the north side of the creek. This is a 113-acre wetland mitigation bank approved for mitigation use in Clark County. The bank's goal is to establish, rehabilitate, and enhance wetland functions, as well as improve channel complexity to Burnt Bridge Creek. Just downstream of this site, an undeveloped, light-industrial zoned area has significant wetlands. The area has soil characteristics and a high water table that makes the area non-developable. The land is currently held in private ownership and some developers are looking at this area for wetland enhancement and mitigation. Opportunities to enhance riparian areas adjacent to Burnt in the wetland areas should be explored, as well as opportunities to enhance wetland areas to facilitate groundwater recharge. The City of Vancouver also owns a "Road Master" mitigation bank in the upper watershed, which is used to mitigate impacts of city transportation projects.

Middle watershed – Peterson Channel (River miles 5 to 10)

Peterson Channel is a high priority for temperature reduction. This channel is impacted by warm water discharge from SEH America to the creek and from the lack of riparian vegetation on privately owned properties. While some parcels along Peterson Channel have been planted through Project Restore, others have not been planted. These private parcels are harder to plant because the homes are close to the creek and parcels are mostly built out.

In the middle watershed, there have been some plantings implemented at Meadowbrook Park, which is located near the confluence of Peterson Channel and Burnt Bridge Creek. This park is the location where Vancouver has offered to work with SEH to implement thermal mitigation wetlands, but SEH and Vancouver have not made progress on implementing wetlands at this site to help reduce water temperatures.

The park also has a stormwater facility that has been implemented, but it is unknown what area is currently draining to the facility. Currently, many residents use Meadowbrook Park as an

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informal dog park; however, it is not a designated dog park and Vancouver has tried to get Google Maps to remove the dog park designation.

Upstream of Meadowbrook Park is the Royal Oaks Country Club, which is an affluent golf course in Vancouver. It is unknown what structural or operational BMPs are implemented at the golf course or how they are applying fertilizer. The Burnt Bridge Creek mainstem flows through the golf course and Peterson Channel is to the south. Between the golf course and Peterson Channel, the City of Vancouver owns a utility easement for wastewater infrastructure. This easement could be an opportunity to implement a buffer to enhance riparian vegetation between the golf course and Peterson Channel. The area is also downstream from I-205 and could potentially be used to help manage WSDOT's stormwater from I-205.

Reportedly, there are homes upstream of Meadowbrook Park withdrawing water off Peterson Channel for irrigation purposes, but there is uncertainty if the residences have water rights. Additionally, there have been modifications and armoring on the streambank of Peterson Channel upstream of Meadowbrook Park, which could limit floodplain connectivity and cause challenges if the area is receiving high stormwater flows. A manmade pond was also observed in the field with evidence of eutrophic, stagnant conditions. Removing any man made ponds or impoundments may help improve water quality and flow conditions in Burnt Bridge Creek.

Oakbrook Park is another area in the middle watershed that is not located in the riparian corridor, but may provide opportunities for education and outreach, stormwater management, or additional tree planting. Seasonal standing water has reportedly been observed in this park. Beaver Marsh is another natural area in the middle watershed, located upstream from the golf course with mature trees and public walking trails.

Lower watershed

In the lower watershed, the river has more canyons and cliffs, which cause erosion challenges, and present constraints for tree planting. The lower watershed also has more built infrastructure, including BPA power lines, the paved Burnt Bridge Creek trail, and significantly more sewer infrastructure in the riparian area and crossing the creek. At the confluence of Cold Creek, there is a large WSDOT wetland mitigation area. The Ross Industrial Complex, which is privately owned, takes up a large portion of Cold Creek, providing barriers to implementation. Cold creek is also in Clark County's jurisdiction; therefore, it is not a high priority area for the City of Vancouver to work.

Currently, the City is focusing plantings on river miles 0 to 1.6 between the Stewart Glen Trailhead and Alki Road. The north side of the property is harder to access, but there is approximately 200 to 300 feet of trees being planted with 75-foot buffer widths on the north side of Burnt Bridge Creek. There is also approximately 2,000 feet of shoreline on the south side that needs to be planted. Vancouver is also working with the Lower Columbia Estuary Partnership to address erosion challenges and to stabilize shorelines at this site. This portion of the watershed is floodplain and has challenges with seasonal flooding.

Although the middle and upper watershed have higher shade deficits, restoring the riparian area between river mile 0 to 1.6 presents a significant opportunity for Vancouver to not only plant trees, but to also implement instream restoration activities that would help maximize benefits to stream temperatures. To implement a larger scope of work in this area, assessment, design, and engineering may be necessary. Completing a more robust assessment to identify instream restoration opportunities within the floodplain may help maximize benefits to water temperature.

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Based on research, discussion at the Urban Forestry and Greenways Workgroup, and the watershed tour, the following implementation actions are recommended for Urban Forestry and Greenways in Burnt Bridge Creek. These implementation actions are draft, and may be edited, refined, and added to as Ecology and Vancouver continue to discuss water quality priorities.

Table 4. DRAFT Implementation Actions - Urban Forestry and Greenways

UF1	**Priority areas for urban forestry and greenways implementation**
UF1.1	Prioritize restoration of urban forestry and greenways to areas with the highest average shade deficits. This includes the upper watershed located between river miles 10 and 13, and middle watershed located between river miles 5 and 10.
UF1.2	Prioritize phase one implementation to areas with shade deficits over 50 percent. These areas are located in the upper and middle watershed and specifically include the following locations and shade deficits: RM 12-13 = 87%, RM 7-8 = 83% and 11-12 = 73%.
UF1.3	Prioritize phase two implementation to areas with shade deficits over 30 percent. These areas are located in the middle and lower watershed and includes the following locations and shade deficits: RM 8-9 = 44%, RM 0-1 = 43%, RM 4-5 = 36%, RM 6-7 = 35%, and RM 1-2 = 31%.
UF1.4	Target implementation to the lower and middle watershed, specifically to areas contributing to river miles 0, 5.9, and 7.0 to help reduce warm water temperatures in the watershed.
UF1.5	Target implementation to areas contributing to river miles 9.5 to 11.4, and at 7.0, and 5.9 to help improve dissolved oxygen levels. These are located in the middle and upper watershed.
UF2	**Greenways and sensitive lands**
UF2.1	Increase tree canopy in the Burnt Bridge Creek Greenway to help lower warm water temperatures. Currently, approximately 45 percent of the greenway is a mix of carrying tree heights and densities. Prioritize phase 1 implementation to areas with shade deficits over 50 percent, and phase 2 implementation to areas with shade deficits over 30 percent.
UF2.2	Focus property acquisition efforts upstream of river mile 8 and I-205 to extend the Burnt Bridge Creek Greenway into the upper watershed. Identify properties within the lower 8 miles that present opportunities for Project Restore, conservation easements, or future acquisition.
UF2.3	Identify, negotiate, and document locations where Bonneville Power Administration may allow implementation of trees taller than 10 feet, or implementation of floodplain reconnection or wetland enhancement projects under utility lines.
UF2.4	Where feasible, achieve a system potential tree height of 41 meters, or approximately 135 feet tall in the watershed. Achieve the maximum overhang potential of trees in riparian areas, which is 4.1 meters or approximately 13.5 feet tall.
UF2.5	Complete a shade deficit analysis of Burnt Bridge Creek tributaries including Burton Channel, Peterson Channel, and Cold Creek to identify opportunities for riparian restoration. Most properties on tributaries are privately owned.
UF2.6	Identify wetland areas in the watershed for wetland enhancement and restoration. If possible, work with private property owners to acquire properties or place a conservation easement on wetland areas for conservation and restoration purposes.

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UF2.7	Increase riparian buffer widths in areas where the river has less than 50 feet of riparian buffer implemented. The minimum buffer width recommended for Burnt Bridge Creek to protect water quality is 50 feet on each side of the river.
UF3	**Urban forestry**
UF3.1	Provide small grants to neighborhood associations to plant trees on private property.
UF3.2	Complete the Vancouver Tree Canopy Assessment every 10 years to assess Vancouver's progress on preserving and restoring urban tree canopy. An Assessment will be published in 2021, and should be published again in 2031, 2041, and 2051 in perpetuity.
UF3.3	Continue to plant trees in Vancouver's Parks. Prioritize implementation to parks that are hydrologically connected to outfalls that are contributing to water quality issues. According to Vancouver's Urban Forestry Program, The following parks may provide opportunities for tree planting: David Douglas; West Minnehaha; Bagley; The Downs; Centerpointe; Oakbrook, Burton Ridge; St Helens; Evergreen Park; Sam Brown; Orchards; and Brickyard.
UF3.4	Prioritize implementation of urban forestry efforts on residential properties, which make up 44 percent of the watershed. Target parcels for private property plantings and street trees using data from the tree canopy assessment and TreePlotter software. Focus implementation on properties that are hydrologically connected to outfalls that influence priority water quality areas in the Burnt Bridge Creek watershed.
UF3.5	Implement street trees on streets with the lowest tree canopy based on Vancouver's Tree Canopy Assessment and TreePlotter software. Focus implementation on streets that are hydrologically connected to outfalls that influence priority water quality areas in the Burnt Bridge Creek watershed.
UF3.6	Identify and prioritize commercial properties and parking lot areas with low tree canopy for implementation. Focus implementation on commercial properties and parking lots that are hydrologically connected to outfalls that influence priority water quality areas in the Burnt Bridge Creek watershed.
UF3.7	Identify and prioritize tree-planting opportunities on public properties including parks, open surface stormwater facilities, schools, sports fields, and WSDOT owned property, and other upland areas of the watershed outside of the riparian areas. Focus implementation on properties that are hydrologically connected to outfalls that influence priority water quality areas in the Burnt Bridge Creek watershed.
UF3.8	Identify and prioritize low canopy areas in upland portions of the watershed for implementation. These include parks and schools. Focus implementation on properties that are hydrologically connected to outfalls that influence priority areas in the Burnt Bridge Creek watershed.
UF3.9	Identify critical aquifer recharge areas that are hydrologically connected to Burnt Bridge Creek, and prioritize urban forestry implementation to these areas to promote groundwater recharge and streamflow restoration.
UF3.10	Identify publicly owned utility easements that present opportunities for restoration, and where feasible implement riparian restoration projects to help reduce water temperatures and buffer pollution in runoff.
UF4	**Other**
UF4.1	Update local codes and ordinances to increase the required landscaped area percentage or to cap impervious surface area percentages in new development and redevelopment. Update code to expand the root space required for new trees and

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	onsite infiltration. Consider opportunities to incorporate low impact development and green infrastructure into local codes and ordinances through reducing parking space sizes and building setbacks, and co-locating stormwater and vegetation requirements.
UF4.2	Identify opportunities to retrofit streets to remove impervious surfaces and implement low impact development or street trees, to reduce thermal loading from impervious surfaces.
UF4.3	Develop a preventative maintenance program for street trees implemented by Vancouver staff, rather than relying on adjacent private landowners to implement street tree maintenance.
UF4.4	Increase funding for Parks and Surface Water property acquisition programs to purchase and preserve more property for conservation and restoration.
UF4.5	Consider increasing tree impact fees and tree mitigation requirements to increase funding available for Vancouver's urban forestry program.
UF4.6	Develop public private partnerships with Bonneville Power Administration, SEH America, and other businesses to develop new sources of private funding for tree planting.
UF4.7	Identify unauthorized water withdrawals on Burnt Bridge Creek that are being withdrawn without a water right and provide education and outreach, and enforcement action to stop the withdrawal.
UF4.8	Remove riprap and bank armoring that has been implemented without authorization or a permit, and where feasible identify opportunities to reconnect the floodplain.
UF4.9	Identify and remove any manmade ponds or impoundments on Burnt Bridge Creek that are impacting water flow, causing eutrophication, or affecting water quality.
UF4.10	Collaborate with the Royal Oakes Golf Course to identify conservation, restoration, and tree planting opportunities on their property. Provide education on structural and operational BMPs to reduce pollutant loading to Burnt Bridge Creek.
UF4.11	Educate local elected officials on the benefits of increasing the City's utility rates to help generate more funding for water infrastructure, urban forestry, and land acquisition.
UF4.12	Complete outreach to landowners through Friends of Trees and Project Restore and other Urban Forestry programs to promote tree planting in the Burnt Bridge Creek watershed. Mailers, door-to-door outreach, and social media may help increase involvement in Vancouver's tree planting programs on private property.
UF4.13	Develop a strategic land acquisition plan for the Burnt Bridge Creek watershed focused on identifying high priority, critical conservation areas for future acquisition to protect water quality. Include shoreline management and critical areas, as well as critical aquifer recharge areas.
UF4.14	Develop an instream restoration plan focused on identifying locations streambank stabilization, floodplain reconnection, or wetland restoration. Identify areas to enhance cold-water refuge areas, implement large wood, establish side-channels or off-channel habitat, and reduce erosion issues. Incorporate results from the stormwater outfall assessment funded by LCFRB into the plan
UF4.15	Identify, map, and treat invasive species in the Burnt Bridge Creek watershed using best practices for early detection and rapid response. Educate the public on invasive species identification and management.
UF4.16	Acquire land to increase public property in the Burnt Bridge Creek watershed for conservation and restoration purposes. City of Vancouver owns 11 percent of public land followed by Clark County with 10 percent, and WSDOT with 3 percent.

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DRAFT Milestones, targets, and timelines for urban forestry and greenways

Table 5. DRAFT Milestones, targets, and timelines for urban forestry and greenways.

Milestones and targets	Target Date
Complete Vancouver Tree Canopy Assessment	2021
Identify priority areas with low tree canopy for outreach to promote implementation tree planting and reforestation. This includes private properties on the Burnt Bridge Creek Greenway, Creekside properties on Burnt Bridge Creek and its tributaries, and property owners in upland areas with low canopy.	2022
Implement urban forestry outreach.	2023
Develop land acquisition strategy for Burnt Bridge Creek watershed focused on acquisition of shoreline management, critical areas, and critical aquifer recharge areas for water quality protection, as well as low canopy areas.	2025
Develop instream restoration strategy to identify streambank stabilization, floodplain reconnection, and wetland restoration projects to help lower water temperatures including opportunities for large wood installation, establishing off-channel habitat, and creating cold-water refuge areas.	2025
Complete audit of local codes and ordinances and identify opportunities to preserve tree canopy, increase implementation of low impact development, increase the required landscaped areas, and expand the root space required for new trees and onsite infiltration.	2025
Implement 25 percent of tree planting and riparian restoration projects in priority areas in the Burnt Bridge Creek Greenway	2025
Implement 25 percent of tree planting and riparian restoration projects in priority areas in upland areas, outside of the greenway	2025
Implement 50 percent of tree planting and riparian restoration projects in priority areas in the Burnt Bridge Creek Greenway	2027
Implement 50 percent of tree planting and riparian restoration projects in priority areas in upland areas, outside of the greenway	2027
Implement 75 percent of tree planting and riparian restoration projects in priority areas in the Burnt Bridge Creek Greenway	2030
Implement 75 percent of tree planting and riparian restoration projects in priority areas in upland areas, outside of the greenway	2030
Complete Vancouver Tree Canopy Assessment	2031
Implement 100 percent of tree planting and riparian restoration projects in priority areas in the Burnt Bridge Creek Greenway	2033
Implement 100 percent of tree planting and riparian restoration projects in priority areas in upland areas, outside of the greenway	2030

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DRAFT Criteria to measure progress

Table 6. DRAFT Criteria to measure progress on urban forestry and greenways.

Criteria to measure progress	Reporting timeline
River miles planted and restored	Annual
Acres planted or restored	Annual
Number of trees and shrubs planted on designated areas (private property, public property, street trees)	Annual
Acres or river miles of wetlands protected or restored	Annual
Acres or river miles of floodplain reconnected	Annual
Lineal feet or miles of streambank stabilization	Annual
Acres of invasive species treatment and removal	Annual
Acres or river miles of land in public ownership	Annual
Number of landowners benefitting from Project Restore	Annual
Number of trees planted by Friends of Trees	Annual
Acres of land in public and private ownership	Annual
Acres under conservation easement or protection	Annual
Acres or river miles of land acquired	Annual
Number of parcels contacted by outreach	Annual
Tree survival rate after 5 years	5 years
Average tree height	10 years
Change in shade deficit from Source Assessment	10 years
Water Temperatures	TBD

DRAFT Funding and partnerships for implementation

Table 7. DRAFT Funding and partnerships for implementation.

Funding Sources	Water Quality Combined Funding Program, City of Vancouver's Stormwater Utility, Washington Department of Transportation Stormwater Fees
Implementation Partners	Watershed Alliance of Southwest Washington, Friends of Trees, Lower Columbia Estuary Partnership, Washington Department of Transportation, Private Landowners

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Timeline for Burnt Bridge Creek Water Cleanup Plan

COMPLETE

- **October 2020:** *Burnt Bridge Creek Source Assessment* published.
- **February 2021:** Burnt Bridge Creek Partnership kicked off.
- **March 2021:** Implementation workgroups assigned
  - Stormwater and capital improvements
  - Operations and maintenance
  - Urban forestry and greenways
  - Sewer connection and septic systems
  - Public education and outreach
  - Other TBD: SEH America, local water use, and monitoring
- **April-May 2021:** Implementation workgroups.
- **June 2021**: Submit completed worksheets to Ecology.

NEXT STEPS

- **July 2021:** Full Burnt Bridge Creek Partnership meeting.
- **Summer 2021**: External partnership meeting – Lower Columbia Estuary Partnership, Watershed Alliance of Southwest Washington, Washington Department of Transportation, DOT, Clark County Clean Water Division, Clark County Public Health, Clark Conservation District, Lower Columbia Fish Recovery Board, Clark Regional Wastewater District, Washington Department of Fish and Wildlife, Environmental Protection Agency.
- **Fall 2021:** Public Webinar.
- **January 2022:** Internal Draft (City of Vancouver, Ecology, and Environmental Protection Agency).
- **Spring 2022:** External Draft *Burnt Bridge Creek Water Cleanup Plan*.
- **Summer 2022:** Publish *Burnt Bridge Creek Water Cleanup Plan.*

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