



Lake Whatcom Management Program 2025-2029 Work Plan

JANUARY 2025



Prepared by the Lake Whatcom
Interjurisdictional Coordinating Team

ACKNOWLEDGEMENTS

Lake Whatcom Management Committee

Satpal Sidhu, Whatcom County Executive

Kim Lund, City of Bellingham Mayor

Justin Clary, Lake Whatcom Water and Sewer District General Manager

Interjurisdictional Coordinating Team

Meghan Bugaj, City of Bellingham

Aaron Burkhardt, City of Bellingham

Stefanie Cilinceon, City of Bellingham

Justin Clary, Lake Whatcom Water and Sewer District

Cathy Craver, Whatcom County

Amy Dearborn, City of Bellingham

Chris Elder, Whatcom County

Holly Faulstich, Whatcom County

Riley Grant, City of Bellingham

Bryan Hatchell, City of Bellingham

Hayli Hruza, Whatcom County

Steven Janiszewski, City of Bellingham

Bennett Knox, Whatcom County

Renee LaCroix, City of Bellingham

Eli Mackiewicz, City of Bellingham

Kraig Olason, Whatcom County

Michael Parelskin, City of Bellingham

Jason Porter, City of Bellingham

Kate Rice, Whatcom County

Becky Snijder van Wissenkerke, Whatcom County

Gary Stoyka, Whatcom County

Cliff Strong, Whatcom County

Steve Sundin, City of Bellingham

Christ Thomsen, Whatcom County

Peg Wendling, City of Bellingham

Contributing Entities

City of Bellingham

Whatcom County

Lake Whatcom Water and Sewer District

Sudden Valley Community Association

Western Washington University Institute

for Watershed Studies

City of Bellingham Water Resources

Advisory Board



Table of Contents



Program Overview

<u>Introduction</u>	1
<u>Organizational Structure</u>	2
<u>Program History</u>	3
<u>Management Challenges</u>	4
<u>Five-Year Work Plans</u>	9
<u>Adaptive Management</u>	10
<u>2025-2029 Work Plan Program Areas</u>	11
<u>Tracking Progress</u>	12

Program Areas

<u>Land Preservation</u>	13
<u>Stormwater Management</u>	15
<u>Land Use</u>	19
<u>Monitoring and Data</u>	21
<u>Hazardous Materials</u>	24
<u>Recreation</u>	26
<u>Aquatic Invasive Species</u>	30
<u>Utilities and Transportation</u>	33
<u>Education and Engagement</u>	36
<u>Administration</u>	42
<u>Climate Action</u>	45
<u>Forest Management</u>	47

Appendix

<u>2025-2029 Work Plan Cost Estimates</u>	49
<u>2025-2029 Work Plan Funding Sources</u>	50
<u>Lake Whatcom Facts</u>	53
<u>Program Timeline</u>	54

PROGRAM OVERVIEW

Introduction

Since time immemorial, Lake Whatcom has played an important role in the quality of life for the people and ecosystems surrounding it. The Lake Whatcom watershed was first inhabited and utilized by Coast Salish tribes, who cared for the land long before European settlers arrived. Today, Lake Whatcom is the drinking water source for more than 100,000 people, valuable habitat for plants and animals unique to our region, a recreational destination for outdoor enthusiasts, and home to more than 19,000 people (see [Appendix for more Lake Whatcom facts](#)).

Improving the health of the lake and its surrounding forests and ecosystems while balancing human activities is no small task. Watershed residents and visitors play a critical role in this effort through stewardship of this shared resource. The Lake Whatcom Management Program (LWMP) brings together local governments who work with organizations and the community to promote stewardship and take cooperative action to restore water quality, protect environmental health and preserve healthy forests in the watershed.



Statement from County Executive, City Mayor, District General Manager

As leaders of Whatcom County, the City of Bellingham, and the Lake Whatcom Water and Sewer District, we stand by our organizations' long-standing commitment to restore, protect, and preserve Lake Whatcom's water quality and ecological health under a changing climate.

This updated work plan builds on over three decades of coordinated work and an impressive list of on-the-ground projects that are fulfilling our commitments to make steady progress in protecting and improving the lake.

We are committed to working with our staff and the community to accomplish the work identified in this work plan, while also understanding that this work is adaptive and may shift to respond to changes that arise in the next five years.

Our partnership is strong, and we continue to make progress on achieving a clean and protected source of drinking water for people and a healthy ecosystem.



Kim Lund
Bellingham Mayor



Justin Clary
District General
Manager



Satpal Singh Sidhu
County Executive

PROGRAM OVERVIEW

Organizational Structure

The LWMP is a coordinated effort between the City of Bellingham, Whatcom County, and Lake Whatcom Water and Sewer District (District), who work together to address challenges in the Lake Whatcom watershed. The LWMP is made up of a variety of staff and elected officials who each play a role in helping protect Lake Whatcom. The legislative bodies of each of the three jurisdictions provide policy guidance and direction for the LWMP.

This guidance informs the policies that are implemented by the Lake Whatcom Management Committee, which consists of the City of Bellingham Mayor, Whatcom County Executive, and Lake Whatcom Water and Sewer District General Manager. The guidance provided by the legislative bodies also informs the work of countless staff, including those that make up the Interjurisdictional Coordinating Team (ICT). ICT staff work across the three jurisdictions to plan and coordinate projects, programs, and activities as part of the LWMP.

Every five years, these staff create a coordinated LWMP work plan that provides a broad overview of the upcoming work between the three jurisdictions, which elected officials review and approve. Staff then document the work completed in the watershed each year through annual progress reports that include a summary of reporting metrics.

LEGISLATIVE BODIES

Who: Bellingham City Council, District Board of Commissioners, Whatcom County Council

Role: *Provide policy guidance and direction*

LAKE WHATCOM MANAGEMENT COMMITTEE

Who: Bellingham Mayor, County Executive, District Manager

Role: *Implement policy provided by legislative bodies*

INTERJURISDICTIONAL COORDINATING TEAM (ICT)

Who: Staff from the three jurisdictions in the LWMP

Role: *Coordinate and plan activities and programs between the jurisdictions*

PROGRAM OVERVIEW

Program History

The LWMP had its beginnings in the 1980s and early 1990s, when the cumulative deterioration of Lake Whatcom's water quality from historic and ongoing land use in the watershed was documented and brought to the attention of agencies and the community. In response, a [joint resolution](#) was passed by the City of Bellingham, Whatcom County, and the Lake Whatcom Water and Sewer District in 1992 to organize efforts to address the most serious threats to the watershed. This comprehensive approach to managing the lake became the basis of the LWMP, which was established by Interlocal Agreement in 1998.



The work of the LWMP is guided by the general goals established in the 1992 Joint Resolution, which include:

- Recognizing and managing Lake Whatcom and its watershed as the major drinking water reservoir for Whatcom County
- Protecting, preserving, and enhancing water quality and managing water quantity to ensure long-term sustainable supplies for a variety of uses
- Prioritizing protection over treatment in managing Lake Whatcom and its watersheds
- Managing water quantity to sustain long-term efficient use of the water
- Ensuring there are opportunities for public comment and participation in policy and management program development
- Promoting public awareness and responsible individual actions
- Promoting learning, research, and information opportunities which better our understanding of the watershed system, the impacts of activities, and benefits of potential policies implemented

Learn more about the history of the LWMP in the [Program Development and Accomplishments Timeline in the Appendix](#).

Management Challenges

Overview

In 1998, Lake Whatcom was placed on [Washington's 303\(d\) list for polluted water bodies](#) because it failed to meet state water quality standards for dissolved oxygen. In addition, 11 tributaries to Lake Whatcom were added to the list for failing to meet state water quality standards for fecal coliform bacteria. As a result, the Washington Department of Ecology completed the [Lake Whatcom Watershed Total Phosphorus and Bacteria Total Maximum Daily Load \(TMDL\)](#) water quality study and improvement reports, which were approved by the U.S. Environmental Protection Agency in 2016.

A TMDL represents the maximum pollutant amount that a water body can receive and still meet water quality standards. A TMDL plan is a requirement of the federal Clean Water Act for a 303(d)-listed water body. These TMDL documents inform our current cleanup plan for Lake Whatcom. Specific cleanup requirements are included in the respective National Pollutant Discharge Elimination System (NPDES) Phase II Municipal Stormwater Permits for the [City](#) and [County](#). These NPDES permits set requirements for municipalities to address stormwater runoff in areas determined to have population densities reaching urban standards.

To meet the foundational goals set in the 1992 Joint Resolution and the requirements of the 2016 TMDL, the LWMP partners work together and with the community to overcome challenges in the watershed by obtaining and applying the best available science, engaging the most knowledgeable local experts, and building a strong coalition amongst all who enjoy the benefits of Lake Whatcom.

The program strives to ensure that public dollars are spent responsibly and to the greatest benefit of the community and our quality of life by addressing the main challenges facing the lake and its watershed through long-term management strategies. Some of the greatest management challenges that the LWMP responds to are described in the following section.



Photo by Jeffrey Barclay

Management Challenges

Phosphorus Runoff from Human Activities

Runoff from developed areas enters the lake, changing water chemistry and disrupting the natural balance of the ecosystem. One pollutant of particular concern is phosphorus, which is a naturally occurring nutrient found in soils, sediments, and organic material. It stimulates plant growth and is essential for animal and plant life; however, too much phosphorus from human activities can promote excessive algae growth.



When algae die, the decomposition process depletes oxygen in the lake, which threatens the health of aquatic species and leads to additional phosphorus being released from lake sediments. Excess phosphorus has resulted in Lake Whatcom failing to meet state standards for dissolved oxygen levels. Some types of algae can produce toxins that may cause health issues for swimmers and pets. Furthermore, algae can impact water quality taste and odor, clog water intake structures, and interfere with water treatment, resulting in higher water treatment costs.

Excess phosphorus is primarily transported to Lake Whatcom through stormwater runoff from erosion, fertilizers and pesticides, organic materials (e.g., leaves, grass clippings, and other compost), animal waste, deforestation, and phosphorus-based soaps and detergents.

Addressing Water Treatment Impacts



To address the potential impact of algae growth on water treatment processes, the City built a Dissolved Air Flotation (DAF) pretreatment system at its Water Treatment Plant in 2018 to remove algae.

On natural landscapes, stormwater slowly seeps into the ground and pollutants are filtered by forests and soils before the stormwater enters nearby water bodies.

On developed surfaces, such as roads, roofs, driveways, and yards, stormwater picks up excess phosphorus generated by human activities and then flows unimpeded into the nearest ditch or storm drain leading directly to the lake.



Management Challenges

Phosphorus Runoff from Human Activities (continued)

Many LWMP activities focus on reducing excess phosphorus levels in Lake Whatcom, including:



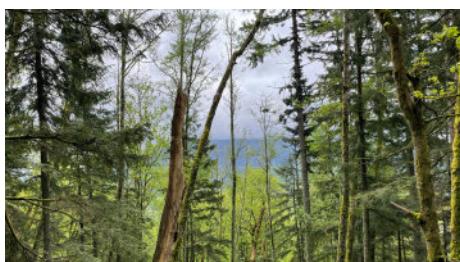
Adopting stormwater and land use regulations to reduce phosphorus pollution.



Constructing, operating, and maintaining stormwater treatment facilities.



Providing residential retrofit programs to reduce phosphorus pollution from existing developed lots.



Preserving land in the watershed to reduce development and other land disturbance activities.



Educating Lake Whatcom residents and visitors about the actions they can take to reduce phosphorus entering the lake.

Management Challenges

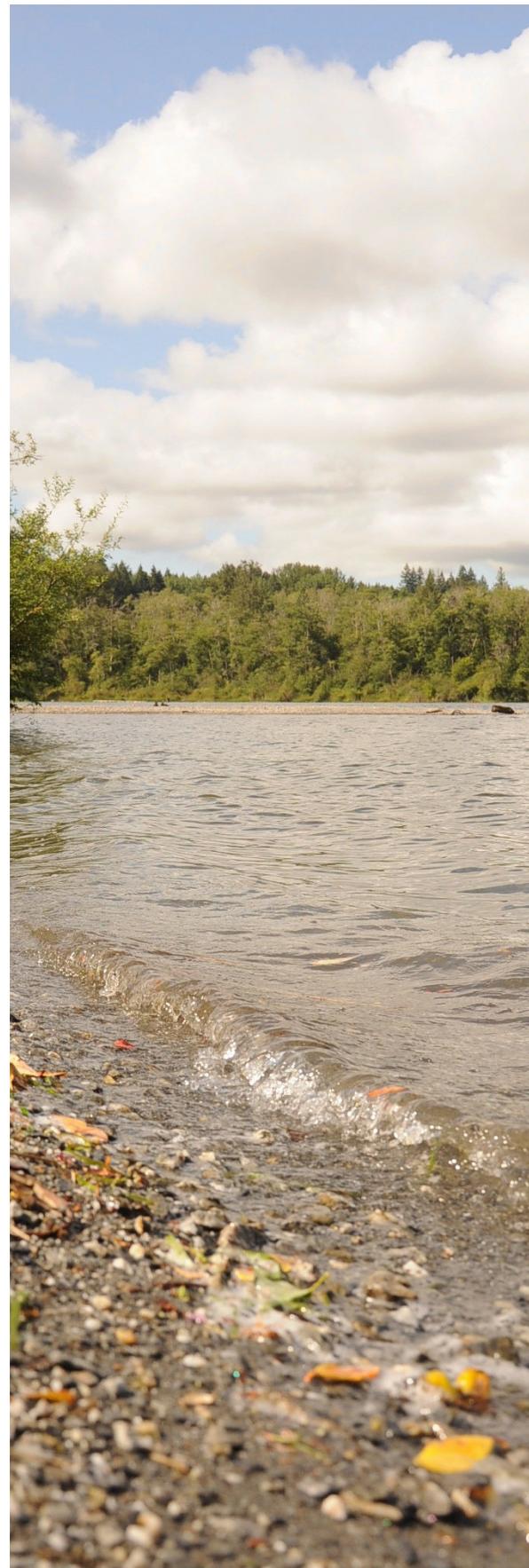
Excess Bacteria Levels

Bacteria levels exceed water quality standards in 11 tributaries to Lake Whatcom. Many of these tributaries flow through developed areas. The Washington Department of Ecology tests for specific types of bacteria that are commonly associated with residential areas, from sources like leaking septic systems, sewer system overflows, and pet and livestock waste left exposed to rainfall.

The TMDL requires that the City and County address the sources of these pollutants to protect public health in and around these streams and their outlets.

Fortunately, many of the practices that we implement to reduce phosphorus also help to reduce bacteria entering the streams or the lake. These include:

- Some stormwater treatment facilities
- Behavior change campaigns about managing animal waste at home and in public spaces
- Education to homeowners about proper maintenance of septic systems
- Land use regulations and forest management strategies that are designed to ensure that land use activities do not further exacerbate these problems



Management Challenges

Additional Challenges

Excess phosphorus and bacteria levels are two of the greatest concerns for the LWMP because of their significant potential to impact water quality. However, there are other challenges that the LWMP responds to as well, including:



Recreation throughout the watershed, from boating to hiking and mountain biking, can damage forests, cause erosion, harm water quality, disturb critical wildlife habitat, and introduce invasive species. The LWMP has program areas focused on both Land Preservation and Recreation with the goal of preserving land that can support passive or low-impact recreation and discouraging high-impact recreational activities.



Aquatic invasive species (AIS) pose a significant long-term risk to all uses of Lake Whatcom. An infestation of AIS such as zebra and quagga mussels would result in significant changes to the lake ecosystem, taste and odor of treated drinking water, and beaches. An infestation would require expensive maintenance of public and private water treatment infrastructure. To prevent the spread of AIS, the LWMP has had a dedicated AIS prevention program since 2012 that includes boat inspections, decontamination, and education.



Climate models indicate that the Pacific Northwest is warming and will continue to do so because of excess greenhouse gas emissions from human activities. Higher average annual temperatures, higher average summer temperatures, drier summers, and longer and more frequent extreme heat events will impact water quality and forest health in the Lake Whatcom watershed. The LWMP will build upon its current work to increase climate mitigation, adaptation, and resilience in the watershed in response to climate impact assessments.



The Lake Whatcom watershed is a desirable place to live and visit because of its beauty and access to recreational opportunities. Impacts that threaten the lake and its watershed can negatively affect quality of life. All the work that the LWMP does to protect watershed health and to encourage residents and visitors to reduce their impact on the lake can improve quality of life for everyone.

PROGRAM OVERVIEW

Five-Year Work Plans

Every five years the LWMP partners work together to develop a work plan that is intended to serve as a broad overview of the work that will be completed to protect Lake Whatcom over the next five-year period. Each work plan identifies priority program areas, objectives, and strategies to help guide the work that we plan to complete.

Although this document outlines many of the efforts that the LWMP partners anticipate over the next five years, it is not a comprehensive list. Many programs have individual internal work plans created each year that include details and timelines for the work. Some of these individual work plans and documents are cited in the resources section of each program area later in this document.

To provide more detail about the work completed in the Lake Whatcom watershed, the LWMP publishes [annual progress reports](#) and five-year accomplishment reports that include reporting metrics. There is also more information about Lake Whatcom programs and projects published on our joint [LWMP website](#) and shared through our [quarterly e-newsletter](#).

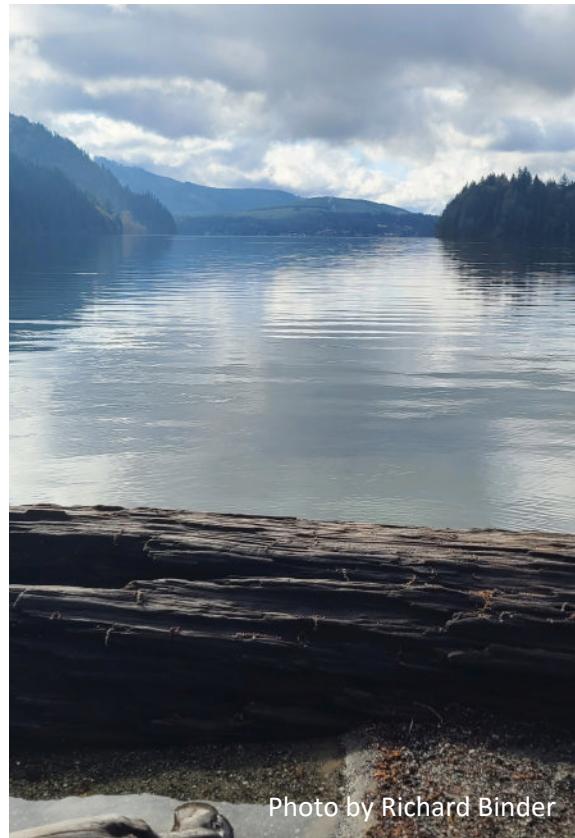


Photo by Richard Binder

Lake
Whatcom
Management
Program

[Home](#)

▼ [About the Lake](#)

[Lake Threats](#)

▼ [Get Involved](#)

▼ [Our Programs](#)

▼ [News & Events](#)

[Resources](#)

[Stewardship Guidebook](#)

[About Us](#)



LWMP Website: lakewhatcom.whatcomcounty.org

Adaptive Management



The development of each new work plan is informed by current information, technology, community priorities, policies, weather patterns, staff capacity, and more. To make sure we are using best available science, the LWMP contracts with the Western Washington University Institute for Watershed Studies to monitor Lake Whatcom water quality and produce annual reports.

These reports help us understand how water quality is changing over time and identify specific concerns to include in our work. Additionally, the City and County utilize the lake loading model (HFAM) and the lake response model (CE-QUAL W2) to determine how much phosphorus is estimated to enter into the lake, and how that affects dissolved oxygen levels. The City and County are required by Ecology through the TMDL to update these models to track what is occurring in the lake and inform potential management options to reduced phosphorus loading in order to meet water quality standards. These management options are developed into tasks in the work plan.



Other information that we use to help inform our work include results from five-year surveys sent to all Lake Whatcom watershed residents, reports of existing residential housing units and potential developable lands in the watershed, annual Aquatic Invasive Species reports and more, which are all available on our website.

Program focus has evolved and expanded over time in response to new threats. As these threats are identified, solutions to address them are incorporated into subsequent work plans. In the 1990s, threats from forest harvest and forest practices were a major concern. In 1998, reducing phosphorus in stormwater entering the lake became a primary focus when Lake Whatcom was placed on Washington State's list of polluted water bodies due to low dissolved oxygen levels. By 2012, concern over threats from invasive mussels led to a new collaborative Aquatic Invasive Species program.



Recently, it has become more apparent that impacts from climate change amplify threats to Lake Whatcom and raise concerns about wildfire risk and climate resilience. Some concerns have also re-emerged about forest practices and ensuring that we are using strategies that reduce water quality impacts and wildfire risk. In response, we have added Climate Action and Forest Management as two new program areas in the 2025-2029 Work Plan. Consequently, current management efforts are now focused in twelve program areas to comprehensively address watershed health.

2025-2029 Work Plan Program Areas

The 2025–2029 LWMP Work Plan is the sixth, five-year plan to date. It will guide actions to reduce the amount of phosphorus reaching the lake and address other watershed issues over the next five years. Consistent with previous plans, this work plan is organized by program areas, each with specific goals and planned activities. The [2020-2024 LWMP Work Plan](#) focused efforts in 10 program areas. This 2025–2029 Work Plan includes those same program areas and adds Climate Action and Forest Management. As LWMP partners, the City of Bellingham, Whatcom County, and the Lake Whatcom Water and Sewer District are the leads responsible for accomplishing the work described in this plan.

Additional partners play important roles to help achieve work plan goals. Key partners include Sudden Valley Community Association, Washington State Departments of Ecology and Natural Resources, Western Washington University's Institute for Watershed Studies, Whatcom Conservation District, and Whatcom Land Trust. Below is a summary of the 12 program areas outlined in this work plan.

1. Land Preservation

Increase the amount of preserved and restored land to reduce development and other land disturbance to protect watershed health and fish and wildlife habitat.

2. Stormwater Management

Reduce the amount of phosphorus and bacteria entering the lake each year by using best management practices to collect, treat, and manage runoff from developed areas in the watershed.

3. Land Use

Prevent and minimize water quality impacts from new development and redevelopment.

4. Monitoring and Data

Collect and analyze sufficient data needed to protect water quality and reduce pollution in Lake Whatcom, reduce uncertainty in loading and response models, and guide management decisions.

5. Hazardous Materials

Prevent water quality impacts from improper storage and handling of hazardous materials and ensure that spill prevention and response programs adequately protect water quality.

6. Recreation

Provide access to recreational opportunities that are consistent with watershed health, water quality, and land management goals.

7. Aquatic Invasive Species

Prevent new aquatic invasive species (AIS) introductions to Lake Whatcom and reduce impacts associated with established invasive species.

8. Utilities & Transportation

Minimize water quality and quantity impacts from water, sewer, and transportation systems.

9. Education & Engagement

Increase awareness of Lake Whatcom challenges and protection efforts among watershed residents and visitors and promote engagement in behaviors that protect water quality.

10. Administration

Implement the LWMP 2025-2029 Work Plan and provide opportunities for public input.

11. Climate Action

Build climate resilience and adaptation within the Lake Whatcom watershed and Lake Whatcom Management Program.

12. Forest Management

Increase forest management strategies that improve forest health, protect lake water quality, and minimize the risk of catastrophic wildfire.

Tracking Progress

Reporting metrics are data that LWMP partners use to track the progress of programs and on-the-ground activities or to measure communication and outreach efforts. Reporting metric updates are provided in [annual progress reports](#) and the five-year accomplishments reports.

Work plan reporting metrics are not intended to provide an overall evaluation of Lake Whatcom watershed health or water quality trends. This type of long-term evaluation occurs separately through efforts such as Western Washington University's Institute for Watershed Studies [Lake Whatcom Monitoring Project](#), which helps inform our work.

Different program areas measure progress in different ways. For example, a comprehensive [Lake Whatcom Watershed Survey](#) was established in 2018 to help evaluate the effectiveness of outreach efforts and to inform future work plan priorities. The survey was repeated in early 2024 and will continue to be repeated every five years. The results provide information on watershed residents' attitudes, knowledge, and behaviors regarding Lake Whatcom protection. When applicable to specific activities included in this work plan, key metrics from this survey are also included as reporting metrics.

In addition, progress made in our stormwater management program area is demonstrated by tracking efforts by the City of Bellingham and Whatcom County to meet [Total Maximum Daily Load \(TMDL\) targets](#) for reducing phosphorus and bacteria loading to the lake.

There are also many other reporting metrics throughout the work plan to help track progress of other efforts.



Photo by David Lucas

Land Preservation



GOAL: Increase the amount of preserved and restored land to reduce development and other land disturbance to protect watershed health and fish and wildlife habitat.

2025-2029
Estimated Investments:
\$28.4 million

Summary

The LWMP acquires lands for the protection of watershed health through reconveyance, the City's Lake Whatcom Land Acquisition and Preservation Program, and other methods, while allowing passive recreation opportunities where appropriate.

Objectives

1.1

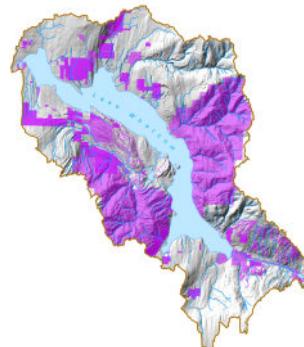
Property Protection

Acquire property using a variety of methods, such as purchase, conservation easements, and donations to prevent development and other land use disturbances that degrade the natural functions of the watershed.

1.1.1 Purchase watershed properties based on evaluation criteria, availability, and seller interest.

1.1.2 Evaluate the use of other programs to augment the watershed acquisition program to purchase watershed properties.

1.1.3 Share information about the acquisition program with watershed property owners to encourage program participation.



ALL PROTECTED
LAKE WHATCOM
WATERSHED PROPERTIES

*Including Reconveyance, City
Acquisitions, and Other*

12,596 acres as of 2024

Reporting Metrics

- Number of new acres acquired or otherwise protected per year
- Number of development units removed from the watershed per year
- Total cumulative acres in protected status updated annually
- Number of property owners contacted per year

Land Preservation



GOAL: Increase the amount of preserved and restored land to reduce development and other land disturbance to protect watershed health and fish and wildlife habitat.

2025-2029
Estimated Investments:
\$28.4 million

1.2 Property Management

Manage acquired watershed properties to improve natural functions that protect water quality and fish and wildlife habitat.

1.2.1 Implement management plans that address restoration needs, passive recreation, and vegetation management needs for all acquired properties.

1.2.2 Update property management and use guidelines to guide the programs and actions taken to manage and protect watershed properties. The new document will clarify City response to requests for recreational development on City-managed properties.



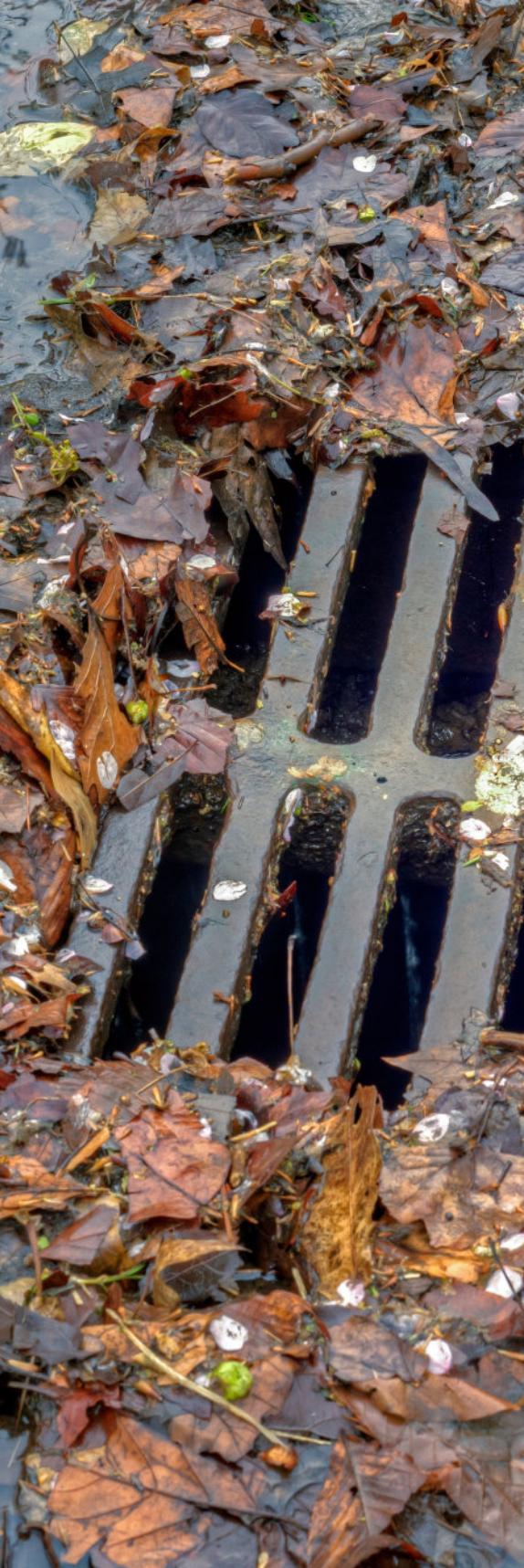
Reporting Metrics

- Number of acres managed per year and type of management activities

Relevant Resources

- [Lake Whatcom Land Acquisition and Preservation Program](#)
- [Interactive Lake Whatcom Watershed Protected Properties Map](#)
- [Whatcom County Parks & Recreation Reconveyance](#)

Stormwater Management



GOAL: Reduce the amount of phosphorus and bacteria entering the lake each year by using best management practices to collect, treat, and manage runoff from developed areas in the watershed.

2025-2029
Estimated Investments: \$14.2 million

Summary

The LWMP addresses stormwater pollution by working with experts in the fields of engineering and water chemistry, as well as landowners throughout the watershed, to develop treatment strategies including preventing pollution at its source, filtering stormwater through native soils and vegetation, and treating it using engineered stormwater facilities and other emerging technologies.



Objectives

2.1 Capital Improvement Projects

Construct and retrofit [capital facilities](#) that treat stormwater runoff to reduce water quality and quantity impacts.

2.1.1 Construct new capital stormwater facilities and rebuild aging facilities and infrastructure in accordance with capital improvement and retrofit plans adopted by the City of Bellingham and Whatcom County.

2.1.2 Pursue funding opportunities, including grants, for projects identified in capital or retrofit plans.

Reporting Metrics

- Pounds of phosphorus reduced per year through phosphorus treatment and flow control capital projects
- Percentage of upland development draining to public outfalls managed by capital stormwater facilities
- Number of publicly-owned outfalls that have best-available capital stormwater treatment within their tributary basin

Stormwater Management



GOAL: Reduce the amount of phosphorus and bacteria entering the lake each year by using best management practices to collect, treat, and manage runoff from developed areas in the watershed.

2025-2029
Estimated Investments: \$14.2 million

2.2 Residential Stormwater Solutions

Work with landowners to address unmanaged runoff and phosphorus from private properties around Lake Whatcom.

2.2.1 Provide technical and/or financial assistance for residential-scale retrofits of private property that result in phosphorus-limiting or flow-limiting projects and encourage voluntary stewardship by landowners.

2.2.2 Encourage the implementation of stormwater treatment practices, including infiltration and media filtration, on private properties through outreach, technical assistance, and barrier removal. Support, through incentives and technical assistance, the proper construction and maintenance of voluntary installations.

2.2.3 Encourage the conversion of non-native landscape and lawn to native forested areas and promote the preservation of forested areas through incentives and permanent conservation agreements with landowners.

2.2.4 Provide inspections and/or technical assistance to owners of private stormwater facilities and document performance toward water quality improvements for properly maintained systems.

2.2.5 Provide resources and staff support to educate owners of private stormwater facilities about system needs and maintenance.

2.2.6 Develop and disseminate Lake Whatcom watershed-specific stormwater education messaging that encourages residents to act to protect water quality, including using phosphorus-free fertilizer.

Reporting Metrics

- Pounds of phosphorus reduced per year through voluntary residential improvements
- Number of properties with completed residential stormwater projects per year
- Number of square feet of private property improved through voluntary residential projects per year
- Number of private stormwater facility inspections completed per year
- Proportion of watershed residents who are knowledgeable about water quality impacts and engage in behaviors to reduce these impacts, as measured every five years through the Lake Whatcom Watershed Survey

Stormwater Management



GOAL: Reduce the amount of phosphorus and bacteria entering the lake each year by using best management practices to collect, treat, and manage runoff from developed areas in the watershed.

2025-2029
Estimated Investments:
\$14.2 million

2.3 Public Stormwater Facilities and Infrastructure

Operate, inspect, and maintain all public stormwater facilities and infrastructure.

2.3.1 Conduct regular inspection and maintenance of public stormwater facilities.

2.3.2 Complete an evaluation of the effectiveness of Operations and Maintenance (O&M) procedures for stormwater flow control and treatment facilities. Develop a list of recommended improvements to O&M practices and procedures to increase phosphorus and bacteria reductions.

2.3.3 Complete an evaluation of the effectiveness of pollutant management activities on public lands throughout the watershed. Develop a list of recommended best practices for public land management for phosphorus and bacteria control.

2.3.4 Adopt an Enhanced Maintenance Plan to maximize phosphorus and bacteria reductions and begin implementation of this plan.

Reporting Metrics

- Pounds of phosphorus reduced per year through operations and maintenance activities



Stormwater Management



GOAL: Reduce the amount of phosphorus and bacteria entering the lake each year by using best management practices to collect, treat, and manage runoff from developed areas in the watershed.

2025-2029
Estimated Investments: \$14.2 million

2.4

Integrate Water Quality Improvements Across Program Areas

Provide assistance to other program areas to achieve water quality improvement goals.

2.4.1 Provide technical assistance and consulting to other program areas and estimate water quality benefits gained through combined efforts and partnerships.

2.4.2 Develop a consistent and understandable way of estimating relative water quality benefits achieved by other relevant program areas.

2.4.3 Develop metrics for phosphorus reductions for mass per unit time (Lbs P/yr).



Relevant Resources

- [Lake Whatcom Management Program Capital Improvement Projects](#)
- [City of Bellingham 2020 Surface and Stormwater Comprehensive Plan](#)
- [Whatcom County Lake Whatcom Comprehensive Stormwater Plan](#)
- [Lake Whatcom Comprehensive Plan: Stormwater Capital Program Update for Whatcom County, 2017](#)
- [Homeowner Incentive Program](#)
- [Neighborhood Native Landscaping Program](#)

Land Use

GOAL: Prevent and minimize water quality impacts from new development and redevelopment.

2025-2029
Estimated Investments: \$1.8 million



Summary

The LWMP utilizes land use regulations and reporting metrics to minimize water quality and quantity impacts from development and redevelopment activities in the Lake Whatcom watershed.

Objectives

3.1 Development

Develop, enforce, and comply with land use goals, policies and development regulations, including [Bellingham Municipal Code 16.80](#) and [Whatcom County Code 20.51](#), in order to protect water quality and quantity.

3.1.1 Coordinate with Lake Whatcom partners when developing or revising development regulations and create consistent development regulations between jurisdictions where feasible.

3.1.2 Track building and development activities in the watershed through a publicly accessible [Buildout Report](#), published every five years, to inform goals, policies, and regulations.

3.1.3 Monitor newly established Native Vegetation Protection Areas (NVPA) for five years to ensure success as required by [City code](#).

3.1.4 Provide outreach to watershed residents to increase understanding of and compliance with land use and stormwater regulations.

3.1.5 Evaluate how effectively changes to development regulations preserve and restore land that is currently available for development or other land disturbance and use this evaluation to inform future revisions to regulations.

Land Use

GOAL: Prevent and minimize water quality impacts from new development and redevelopment.

2025-2029
Estimated Investments: \$1.8 million

Reporting Metrics

- Acres of phosphorus-neutral properties developed or re-developed in accordance with land use regulations.
- Acres of developed surface treated by phosphorus-limiting Best Management Practices (BMPs) installed to meet requirements of land use regulations.
- Acres of newly established Native Vegetation Protection Areas (NVPAs) through new development and redevelopment in the City, and Protective Native Growth Areas (PNGAs) in the County.
- Proportion of watershed residents who are knowledgeable about seasonal construction, special building, and clearing regulations measured every five years through the Lake Whatcom Watershed Survey.

Relevant Resources

- [City of Bellingham watershed regulations:](#)
 - [Bellingham Municipal Code \(BMC\) 16.80 \(Lake Whatcom Reservoir Regulatory Chapter\)](#)
 - [BMC 15.42 \(Stormwater Regulations\)](#)
 - [BMC 16.55 \(Critical Areas Ordinance\)](#)
 - [Title 22 \(Shoreline Master Program\)](#)
- [Whatcom County watershed regulations:](#)
 - [Whatcom County Code \(WCC\) 20.51 \(Lake Whatcom Watershed Overlay District, Stormwater Regulations, and Tree Removal\)](#)
 - [WCC 16.16 \(Critical Areas Ordinance\)](#)
 - [Title 23 \(Shoreline Management Program\)](#)
- [Lake Whatcom Watershed Build-Out Analysis Reports](#)



Monitoring and Data

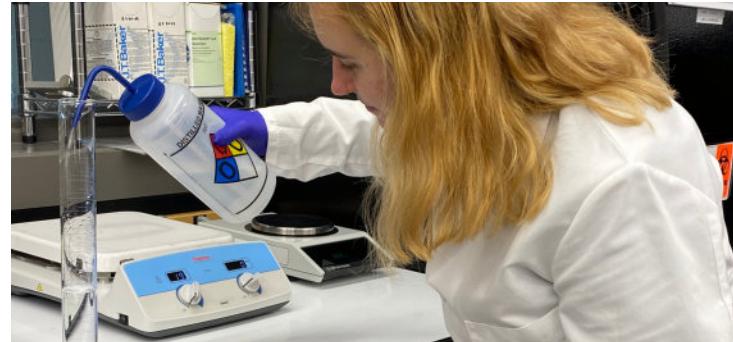


GOAL: Collect and analyze sufficient data needed to protect water quality and reduce pollution in Lake Whatcom, reduce uncertainty in loading and response models, and guide management decisions.

2025-2029
Estimated Investments:
\$3 million

Summary

The LWMP works to implement studies, conduct monitoring, and improve modeling programs to further understand water quality and pollution sources in the Lake Whatcom watershed. Key efforts include lake and tributary monitoring, evaluating effectiveness of existing Best Management Practices (BMPs), updating load and response models, and managing data.



Objectives

4.1 Water Quality Monitoring

Monitor Lake Whatcom and its tributaries to understand long-term changes and inform management decisions.

4.1.1 Contract with Western Washington University Institute for Watershed Studies to collect samples and provide [annual reports](#) regarding water quality and trends in Lake Whatcom and tributaries.

4.1.2 Evaluate monitoring results and trends monthly and determine policy implications.

4.1.3 Conduct Lake Whatcom Climate Vulnerability Assessment.

4.1.4 Provide annual data input for loading and response models.

Reporting Metrics

- Number of lake water quality samples collected per year
- Number of tributary water quality samples collected per year

Monitoring and Data

GOAL: Collect and analyze sufficient data needed to protect water quality and reduce pollution in Lake Whatcom, reduce uncertainty in loading and response models, and guide management decisions.

2025-2029
Estimated Investments:
\$3 million



4.2 Stormwater Monitoring

Conduct monitoring to evaluate stormwater facilities for their effectiveness at removing phosphorus and fecal coliform.

4.2.1 Collect samples from stormwater facilities that measure phosphorus and fecal coliform levels.

4.2.2 Use data to develop recommendations to improve removal of phosphorus and fecal coliform by stormwater facilities; update Best Management Practices (BMPs) as needed.

Reporting Metrics

- Number of stormwater samples collected per year
- Amount of phosphorus and fecal coliform removed by stormwater facilities annually

4.3 Phosphorus Loading and Response Models

Continue to support data collection needed to improve accuracy of phosphorus loading and lake response models.

4.3.1 Collect high quality streamflow, water quality, and weather data.

4.3.2 Evaluate additional data needs and studies regarding phosphorus loading and models (e.g., groundwater inflow, internal loading, etc.).

Reporting Metrics

- Number and types of samples collected per year

Monitoring and Data



GOAL: Collect and analyze sufficient data needed to protect water quality and reduce pollution in Lake Whatcom, reduce uncertainty in loading and response models, and guide management decisions.

2025-2029
Estimated Investments:
\$3 million

4.4 Baseline Data

Manage and develop summaries of monitoring data and reports.

4.4.1 Summarize monitoring studies and reports and make information publicly accessible.

4.4.2 Maintain and update data catalog.

4.4.3 Track the status of Ecology-approved Quality Assurance Project Plans.

Relevant Resources

- [Lake Whatcom Annual Monitoring Reports](#)
- [Lake Whatcom Tributary Monitoring Program Phase 3 Report \(2021\)](#)



Hazardous Materials



GOAL: Prevent water quality impacts from improper storage and handling of hazardous materials and ensure that spill prevention and response programs adequately protect water quality.

**2025-2029
Estimated
Investments:**
\$115,000

Summary

The LWMP promotes the proper management of hazardous materials to prevent pollution from entering stormwater systems. Whatcom County, City of Bellingham, and Lake Whatcom Water and Sewer District field staff are trained in pollution prevention, illicit discharge identification, investigation, and response.

Trained staff are responsible for responding to spills County, City and District-wide. These efforts are especially important in the Lake Whatcom watershed to protect our community's drinking water source.

Objectives

5.1 Hazardous Materials Removal

Facilitate removal of hazardous materials from watershed residences.

5.1.1 Promote and provide education on proper use, storage, and disposal of hazardous materials.

Reporting Metrics

- Proportion of watershed residents who are knowledgeable about proper hazardous materials disposal measured every five years through the Lake Whatcom Watershed Survey.

5.2 Spill Prevention and Response

Protect water quality by providing adequate spill prevention, response, and disposal programs.

5.2.1 Continue to detect and respond to reports of illicit discharges, connections, and improper disposal, including spills into stormwater systems and sewer systems.

Hazardous Materials



GOAL: Prevent water quality impacts from improper storage and handling of hazardous materials and ensure that spill prevention and response programs adequately protect water quality.

2025-2029
Estimated Investments:
\$115,000

5.2 Spill Prevention and Response (continued)

5.2.2 Educate watershed residents and visitors on how to prevent and report spills using Whatcom County Pollution Reporting and the City of Bellingham's Stormwater Hotline or SeeClickFix.

5.2.3 Review spill response procedures and reporting protocols.

5.2.4 Conduct ongoing field staff training regarding spill prevention and response.

Reporting Metrics

- Number and type of spills, illicit discharges, or hazardous material incidents reported in the watershed, and incident specific responses
- Proportion of watershed residents who are knowledgeable about how to report spills, measured every five years through the Lake Whatcom Watershed Survey
- Number of staff trained in spill prevention and response per year

Relevant Resources

- [Whatcom County Emergency Management Plan](#)
- [Whatcom County Disposal of Toxics](#)
- [Whatcom County Pollution Reporting:](#) (360) 778-6230
- [City of Bellingham Pollution Reporting/Stormwater Hotline:](#) (360) 778-7979
- [City of Bellingham SeeClickFix](#)



Recreation

GOAL: Provide access to recreational opportunities that are consistent with watershed health, water quality, and land management goals.

2025-2029
Estimated Investments:
\$6.2 million

Summary

The City of Bellingham and Whatcom County Parks and Recreation Departments continue to manage park usage and facilities in the Lake Whatcom watershed. Both jurisdictions work to limit recreation impacts to water quality through activities like providing pet waste stations, maintaining and retrofitting stormwater facilities, educating park visitors, and maintaining trails.

Objectives

6.1 Recreational Facilities

Manage recreational facilities to reduce impacts to lake water quality while supporting recreational opportunities, where appropriate.

6.1.1 Operate and maintain existing recreational amenities (including boat launch, parking, swimming dock, signage, picnic sites, shelters, community building, park pavilion, information kiosks, trash and dog waste receptacles, and restrooms) with a goal of improving water quality and explore options to provide these additional water quality improvement options at facilities where they do not currently exist.

6.1.2 Implement Integrated Pest Management (IPM) strategies in public parks that are low maintenance and nutrient-free.

6.1.3 Infiltrate or treat stormwater from recreational areas following stormwater Best Management Practices (BMPs).

6.1.4 Ensure recreational opportunities and special events offered through third-party vendors comply with LWMP and water quality goals and land use regulations.

Reporting Metrics

- Number of pet waste stations maintained
- Number of acres of City and County-owned recreational areas managed using IPM strategies
- Number of acres of impervious surface on City and County-owned recreational areas that follow stormwater BMPs



Recreation



GOAL: Provide access to recreational opportunities that are consistent with watershed health, water quality, and land management goals.

2025-2029
Estimated Investments:
\$6.2 million



6.2 Trails

Manage trails and park roads to reduce impacts to water quality.

6.2.1 Build and maintain trails in accordance with approved [Whatcom County](#) and [City of Bellingham](#) plans and trail design standards, appropriate BMPs, and regulatory requirements to prevent erosion and ensure runoff is infiltrated and/or treated before reaching a water body.

6.2.2 Identify, remove, and restore unauthorized trails, prioritizing the most impactful trails to water quality first.

6.2.3 Connect trails to other parks, trails, facilities, and transportation networks if consistent with watershed health, and water quality land management goals.

6.2.4 Provide trailhead amenities such as restrooms, dog waste stations, and information kiosks, where needed to reduce water quality impacts to the lake.

6.2.5 Install directional signs on trails to discourage off-trail usage.

Reporting Metrics

- Miles of trails maintained with an emphasis on minimizing water quality impacts
- Miles of unauthorized, user-built trails decommissioned per year
- Number of trailhead amenities added that minimize water quality impacts
- Number of directional signs installed

Recreation



GOAL: Provide access to recreational opportunities that are consistent with watershed health, water quality, and land management goals.

2025-2029
Estimated
Investments:
\$6.2 million

6.3 Boating

Minimize impacts from boating on Lake Whatcom while maintaining access to the lake. *See Program Area 7 for AIS prevention.*

6.3.1 Educate boaters about water quality.

6.3.2 Educate boaters about boating rules on the lake.

6.3.3 Encourage the use of electric-powered boats.

6.3.4 Educate boaters about use and location of public restrooms.

Reporting Metrics

- Educational materials provided about water quality concerns, AIS, boating rules, electric-powered boats, and public restrooms

6.4 Public Access

Provide low-impact public access opportunities.

6.4.1 Maximize use of existing parks, launches, and trails for public access when possible.

6.4.2 Maintain bike lanes and transit services to provide access to recreational facilities that are consistent with watershed health and land management goals.

6.4.3 Maintain and develop access to key viewpoints in the watershed that are consistent with watershed health and land management goals.

Reporting Metrics

- Estimated number of individuals using parks and trails in the watershed per year

Recreation

GOAL: Provide access to recreational opportunities that are consistent with watershed health, water quality, and land management goals.

2025-2029
Estimated Investments:
\$6.2 million

6.5 Public Information and Stewardship

Provide watershed stewardship information to recreational users.

6.5.1 Educate watershed residents and visitors about recreational practices that protect water quality and those that negatively impact water quality.

6.5.2 Engage recreational user groups (e.g. hikers, mountain bikers, horseback riders, boaters, etc.) in practices that protect water quality and those that negatively impact water quality.

Reporting Metrics

- Number and type of informational materials sent to watershed residents per year (see Program Area 9: Education & Engagement)
- Number of interpretive or informational materials installed, maintained, or distributed per year

Relevant Resources

- [Whatcom County Parks and Recreation - Reconveyance](#)
- [Lookout Mountain Forest Preserve and Lake Whatcom Park Recreational Trail Plan](#)
- [Whatcom County Comprehensive Parks, Recreation and Open Space Plan](#)
- [City of Bellingham Comprehensive Parks, Recreation and Open Space Plan](#)



Aquatic Invasive Species



GOAL: Prevent new aquatic invasive species (AIS) introductions to Lake Whatcom and reduce impacts associated with established invasive species.

2025-2029
Estimated Investments:
\$4.4 million

Summary

The LWMP launched the [AIS Prevention Program](#) in 2012 with the goal of preventing the introduction of zebra and quagga mussels and other aquatic invasive species to Lake Whatcom.

Through the program, all boats must be inspected by trained staff and receive a permit prior to recreating on Lake Whatcom. AIS staff also monitor a few Whatcom County lakes to detect the presence and absence of new AIS infestations.



Objectives

7.1 Prevention

Implement prevention programs to minimize introduction and spread of AIS into Lake Whatcom and nearby waterbodies.

7.1.1. Implement mandatory watercraft inspection and decontamination program at Lake Whatcom and Lake Samish.

7.1.2 Inform watershed residents, boaters, and other lake visitors about AIS issues and engage them in prevention activities through informational materials, [online education tools](#) (including AIS Awareness Course), community events and public meetings, and in-person conversations during inspections.

7.1.3 Increase signage at informal hand launch locations.

7.1.4 Continue regular boat patrols by Whatcom County Sheriff's Office to provide boater and AIS education and enforcement.

Aquatic Invasive Species



GOAL: Prevent new aquatic invasive species (AIS) introductions to Lake Whatcom and reduce impacts associated with established invasive species.

2025-2029
Estimated Investments:
\$4.4 million

7.1 Prevention (continued)

7.1.5 Evaluate operational changes that may decrease risk or increase efficiency and coordinate with other jurisdictions when implementing changes to ensure effective outcomes.

Reporting Metrics

- Number of watercraft inspections conducted per year
- Number of watercraft decontaminations conducted per year
- Number of people who completed the online [AIS Awareness Course](#) per year
- Number of non-boating visitors interacted with at check stations per year
- Proportion of watershed residents who are knowledgeable about AIS and compliance with inspection requirements, measured every five years through the Lake Whatcom Watershed Survey
- Number of sheriff patrols on Lake Whatcom and Lake Samish to enforce AIS compliance

7.2 Early Detection and Monitoring

Implement comprehensive aquatic invasive species monitoring program for Lake Whatcom and nearby waterbodies.

7.2.1 Conduct regular zebra and quagga mussel monitoring events in Whatcom County waters.

7.2.2 Monitor for new introductions and the extent and density of established aquatic invasive species through activities such as aquatic plant surveys, shoreline monitoring events, trapping and water sampling.

7.2.3 Continue to implement a voluntary AIS monitoring and reporting program for Lake Whatcom.

Reporting Metrics

- Number of zebra and quagga mussels identified per year
- Number of new AIS introductions per year
- Number and type of surveys, monitoring events, and sampling completed each year

Aquatic Invasive Species



GOAL: Prevent new aquatic invasive species (AIS) introductions to Lake Whatcom and reduce impacts associated with established invasive species.

2025-2029
Estimated Investments:
\$4.4 million

7.3 Management and Response

Establish effective plans for managing and responding to new infestations in a timely manner.

7.3.1 Develop an AIS Rapid Response Plan for Lake Whatcom.

7.3.2 Identify management tools and Best Management Practices (BMPs) that could be implemented in Lake Whatcom to address potential new invasive species of concern.

7.3.3 Coordinate and collaborate with staff from state and regional agencies and organizations when developing and implementing control and mitigation strategies.

Relevant Resources

- [Lake Whatcom Aquatic Invasive Species Program Annual Reports and Documents](#)
- [Whatcom Boat Inspections](#)
- [Aquatic Invasive Species Awareness Course](#)
- [Inspection Results Story Map](#)
- Whatcom Boat Inspections Hotline: (360) 778-7975
- [Bellingham Municipal Code \(BMC\) 12.12.280 \(Aquatic Invasive Species\)](#)
- [Whatcom County Code \(WCC\) 2.27A \(Aquatic Invasive Species\)](#)



Utilities and Transportation



GOAL: Minimize water quality and quantity impacts from water, sewer, and transportation systems.

2025-2029
Estimated Investments:
\$7.7 million

Summary

The LWMP supports responsible management of public infrastructure that serves watershed residents, which is critical in mitigating impacts to Lake Whatcom's water quality. Proactive maintenance of water, sewer, and road infrastructure within the watershed, coupled with effective water supply management and public education, can reduce water quality impacts.

Save our water, Save your money.

Water deeply, but less frequently. Follow the voluntary watering schedule based on your house number to stay on track this summer.



www.whatcomwateralliance.org

Objectives

8.1 Water Utilities

Manage water supply systems to minimize water quality and quantity impacts.

8.1.1 Conduct water audits to detect and repair water system leaks.

8.1.2 Encourage water-use efficiency through outreach and rebate programs offered by the [City of Bellingham](#) for City residents and [Whatcom Water Alliance](#) for County residents.

Reporting Metrics

- Estimated gallons of water conserved in the City of Bellingham and Lake Whatcom Water and Sewer District service areas per year
- Proportion of watershed residents who are knowledgeable of water conservation concerns related to water supply from Lake Whatcom, measured every five years through the Lake Whatcom Watershed Survey
- Number of households that receive drinking water from Bellingham's Water Treatment Plant, the District's water systems, or directly from Lake Whatcom that participate in residential rebate programs each year

Utilities and Transportation

GOAL: Minimize water quality and quantity impacts from water, sewer, and transportation systems.

2025-2029
Estimated Investments:
\$7.7 million



8.2 Sewage Utilities

Reduce water quality degradation from sanitary sewer and on-site sewage (OSS or septic) systems.

8.2.1 Provide sewer service to areas with OSS systems when appropriate.

8.2.2 Maintain and replace sewer infrastructure to reduce the potential of sewage overflows.

8.2.3 Enforce OSS system operation and maintenance regulations, maintain OSS database, respond to failing systems, and offer financial assistance to repair or replace failing septic systems.

Reporting Metrics

- Average monthly compliance rate (%) of OSS in the Lake Whatcom watershed per year
- Proportion of OSS by evaluation results (satisfactory; maintenance needed; failure) in the Lake Whatcom watershed per year
- Summary of OSS failures in the Lake Whatcom watershed per year
- Number of sewer overflows in the Lake Whatcom watershed per year
- Number of sewer overflows that reach Lake Whatcom per year

8.3 Roads and Transportation

Maintain transportation systems to protect water quality and inform watershed residents and visitors about alternative transportation opportunities.

8.3.1 Employ road design standards and associated stormwater treatment to reduce impacts to water quality.

8.3.2 Perform enhanced maintenance actions (i.e., additional street sweeping, more frequent cleaning of catch basins, etc.) to reduce impacts to water quality.

Utilities and Transportation



GOAL: Minimize water quality and quantity impacts from water, sewer, and transportation systems.

2025-2029
Estimated
Investments:
\$7.7 million

8.3 Roads and Transportation (continued)

8.3.3 Encourage watershed residents and visitors to use alternative transportation in the watershed.

8.3.4 Work with Whatcom Transit Authority to preserve and promote public transit routes.

Reporting Metrics

- Pounds of phosphorus removed by street sweeping
- Number of catch basins cleaned and repaired
- Proportion of watershed residents who have used alternative methods of transportation in the past year, measured every five years through the Lake Whatcom Watershed Survey

Relevant Resources

City of Bellingham Resources

- [Drinking Water Quality Reports](#)
- [Water Conservation Resources](#)
- [Water System Plan](#)
- [Pedestrian Master Plan](#)
- [Bicycle Master Plan](#)

Lake Whatcom Water and Sewer District Resources

- [Consumer Confidence Reports](#)
- [Water System Comprehensive Plan](#)
- [Sewer Comprehensive Plan](#)

Whatcom County Resources

- [Whatcom County Code \(WCC\) 24.05 \(On-Site Sewage System Regulations\)](#)
- [Bicycle/Pedestrian Resources](#)

General Resources

- [Community Energy Challenge](#)
- [Whatcom Smart Trips](#)
- [Whatcom Water Alliance](#)

Education and Engagement



GOAL: Increase awareness of Lake Whatcom challenges and protection efforts among watershed residents and visitors and promote engagement in behaviors that protect water quality.

2025-2029
Estimated Investments:
\$1.3 million

Summary

The LWMP educates and engages community members on lake protection and pollution prevention by providing information, offering incentives, and removing barriers to help people take action. Education and engagement (i.e., outreach) work plan objectives are divided into three types:

- **General Lake Whatcom** outreach activities are designed to reach a general audience and provide a broad array of information about the Lake Whatcom watershed.
- **Program area-specific outreach** activities apply to a specific target audience and often include assistance or incentives to help community members take a specific action to protect Lake Whatcom. Outreach activities are listed both in relevant program areas and in the Education and Engagement section.
- **Community-wide** outreach activities are incorporated into education and engagement efforts that target a broader, community-wide audience, but which also may benefit Lake Whatcom.

Objectives

9.1 General Lake Whatcom Education and Engagement

Provide education about Lake Whatcom and the LWMP programs in place to protect watershed health.

9.1.1 Share informational materials about Lake Whatcom, its watershed, and LWMP activities to watershed residents, property owners, visitors, community members, and elected officials.

9.1.2 Maintain and update information and resources on the jointly managed [LWMP website](#).

Education and Engagement



GOAL: Increase awareness of Lake Whatcom challenges and protection efforts among watershed residents and visitors and promote engagement in behaviors that protect water quality.

2025-2029
Estimated Investments:
\$1.3 million

9.1

General Lake Whatcom Education and Engagement (continued)

9.1.3 Measure watershed residents' understanding of watershed issues and adoption of stewardship practices at least once every five years through the Lake Whatcom Watershed Survey and use the results to adapt programs, direct resources more effectively, and develop programming for topics in program areas where additional education is needed.

9.1.4 Provide education and engagement for program-specific activities included in this work plan, in addition to those specified under 9.2, to increase awareness about these activities.

Reporting Metrics

- Number and type of information materials sent to watershed residents per year
- Number of unique visitors to Lake Whatcom Management Program website per year
- Number of participants in the Lake Whatcom Watershed Survey every five years
- Level of watershed residents' knowledge of and participation in key stewardship practices, measured every five years through the Lake Whatcom Watershed Survey

9.2

Program Area-Specific Education and Engagement

The following program area-specific education and engagement activities are also listed under their respective program areas. Any reporting metrics for these activities can also be found under the respective program areas.

Land Preservation

1.1.3 Share information about the acquisition program with watershed property owners to encourage program participation.

Education and Engagement



GOAL: Increase awareness of Lake Whatcom challenges and protection efforts among watershed residents and visitors and promote engagement in behaviors that protect water quality.

2025-2029
Estimated
Investments:
\$1.3 million

9.2

Program Area-Specific Education and Engagement (continued)

Stormwater Management

2.2.3 Encourage the conversion of non-native landscape and lawn to native forested areas and promote the preservation of forested areas through incentives and permanent conservation agreements with landowners.

2.2.5 Provide resources and staff support to educate owners of private stormwater facilities about system needs and maintenance.

2.2.6 Develop and disseminate Lake Whatcom watershed-specific stormwater education messaging that encourages residents to act to protect water quality, including using phosphorus-free fertilizer.

Land Use

3.1.4 Provide outreach to watershed residents to increase understanding of and compliance with land use and stormwater regulations.

Hazardous Materials

5.1.1 Promote and provide education on proper use, storage, and disposal of hazardous materials.

5.2.2 Educate watershed residents and visitors on how to prevent and report spills through Whatcom County Pollution Reporting and the City of Bellingham's Stormwater Hotline or SeeClickFix.

Recreation

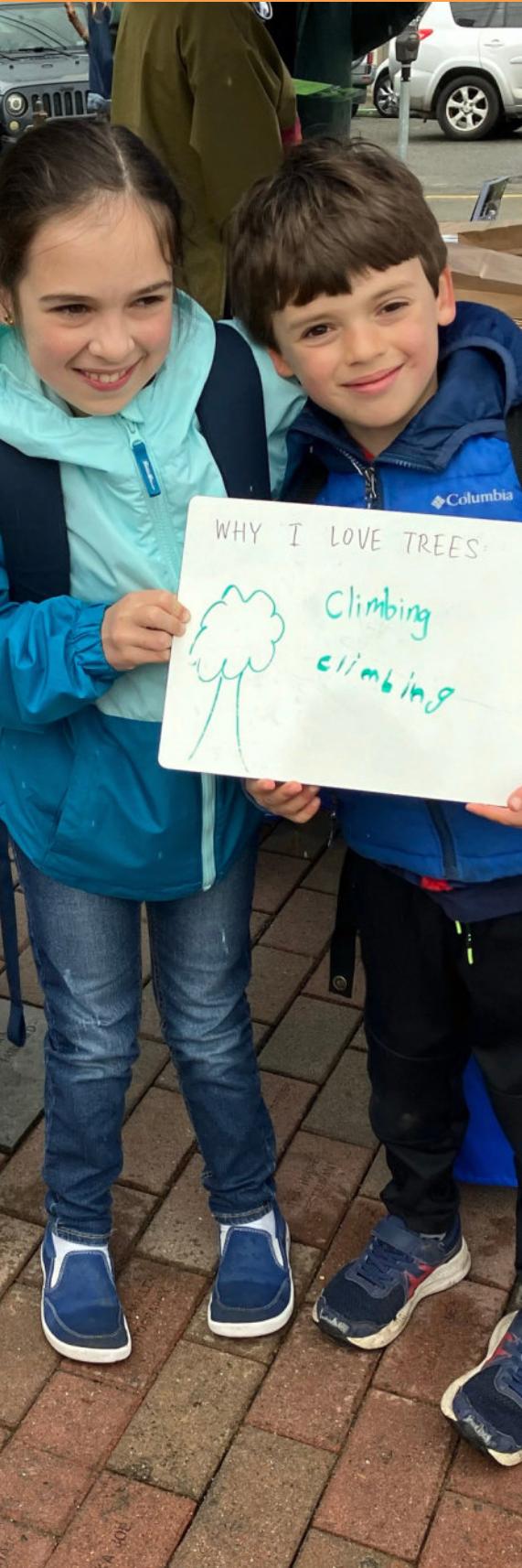
6.3.1 Educate boaters about water quality.

6.3.2 Educate boaters about boating rules on the lake.

6.3.3 Encourage the use of electric-powered boats.

6.3.4 Educate boaters about use and location of public restrooms.

Education and Engagement



GOAL: Increase awareness of Lake Whatcom challenges and protection efforts among watershed residents and visitors and promote engagement in behaviors that protect water quality.

2025-2029
Estimated Investments:
\$1.3 million

9.2

Program Area-Specific Education and Engagement (continued)

Recreation (continued)

6.5.1 Educate watershed residents and visitors about recreational practices that protect water quality and those that negatively impact water quality.

6.5.2 Engage recreational user groups (e.g. hikers, mountain bikers, horseback riders, boaters, etc.) in practices that protect water quality and those that negatively impact water quality.

Aquatic Invasive Species

7.1.2 Inform watershed residents, boaters, and other lake visitors about AIS issues and engage them in prevention activities through informational materials, [online education tools](#) (including AIS Awareness Course), community events and public meetings, and in-person conversations during inspections.

Utilities and Transportation

8.1.2 Encourage water-use efficiency through outreach and rebate programs offered by the [City of Bellingham](#) for City residents and [Whatcom Water Alliance](#) for County residents.

8.3.3 Encourage watershed residents and visitors to use alternative transportation in the watershed.

Administration

10.2.1 Provide notice of public meetings and other opportunities for public involvement on the LWMP website.

Climate Action

11.1.2 Create educational materials based off of results from the Lake Whatcom Climate Vulnerability Assessment.

Forest Management

12.4.1 Engage in partnerships to encourage wildfire risk assessments and mitigation and promote climate resilience on public and private land in the Lake Whatcom watershed.

Education and Engagement



GOAL: Increase awareness of Lake Whatcom challenges and protection efforts among watershed residents and visitors and promote engagement in behaviors that protect water quality.

2025-2029
Estimated Investments:
\$1.3 million

9.2 Program Area-Specific Education and Engagement (continued)

Forest Management (continued)

12.4.2 Engage in partnerships to educate watershed residents about wildfire preparedness.

See Reporting Metrics in respective program areas.

9.3 Community-wide Education and Engagement with Lake Whatcom Benefit

The following community-wide education and engagement activities target a broader, community-wide audience but may also benefit Lake Whatcom.

9.3.1 Pet waste: Programs that support pet waste pick up at home and in parks.

9.3.2 Car care: Awareness efforts to prompt vehicle owners to wash their vehicles at a car wash and regularly check for and promptly fix leaks.

9.3.3 Yard care: Educate and encourage residents to use natural yard care practices.

9.3.4 On-site sewage (OSS) system maintenance: Support proper maintenance of OSS systems (septic systems).

9.3.5 Youth education: Provide youth education about water treatment and water conservation principles.

Reporting Metrics

- Measured every five years through the Lake Whatcom Watershed Survey:
 - Proportion of watershed residents who pick up pet waste on walks and at home
 - Proportion of watershed residents who use watershed-friendly vehicle care practices
 - Proportion of watershed residents who choose not to use chemical weed killers on their yard
 - Proportion of watershed residents who use 0% phosphorus fertilizer
 - Proportion of watershed residents who maintain their septic systems
- Number of students who participate in youth education programs each year, including the [Bellingham Water School Program](#) offered by the City to fifth grade students in the Bellingham School District

Education and Engagement

GOAL: Increase awareness of Lake Whatcom challenges and protection efforts among watershed residents and visitors and promote engagement in behaviors that protect water quality.

**2025-2029
Estimated
Investments:
\$1.3 million**



Relevant Resources

Lake Whatcom Management Program Resources

- [Lake Whatcom Management Program Website](#)
- [Lake Whatcom Watershed Five-Year Survey Findings](#)
- [City of Bellingham Lake Whatcom Stewardship](#)
- [City of Bellingham We Scoop Program](#)
- [Bellingham Water School Program](#)
- [Lake Whatcom Homeowner Incentive Program](#)
- [Neighborhood Native Landscaping Program](#)
- [Whatcom County Scooping Ambassador Program](#)



Administration

GOAL: Implement the LWMP 2025-2029 Work Plan and provide opportunities for public input.

2025-2029
Estimated Investments:
\$1 million

Summary

The City of Bellingham, Whatcom County, Lake Whatcom Water and Sewer District, and other partners collaborate regularly to implement shared LWMP goals to protect Lake Whatcom. Meeting facilitation, reporting, budget development, and other administrative activities are all critical to the success of the program.

Objectives

10.1 Meeting Coordination

Coordinate and provide staff support for LWMP meetings and information-sharing opportunities.

10.1.1 Hold meetings of the Lake Whatcom Joint Policy Group to discuss Lake Whatcom policy topics and provide guidance and direction to staff.

10.1.2 Hold annual Joint Councils and Commission meeting to discuss LWMP Work Plan and accomplishments.

10.1.3 Hold Joint Councils and Commission work sessions as needed to discuss technical policy questions.

10.1.4 Hold monthly meetings of the Lake Whatcom Data Management Team to address issues related to monitoring, modeling, Total Maximum Daily Load (TMDL) requirements, and other data management.

10.1.5 Hold monthly meetings of the Lake Whatcom Interjurisdictional Coordinating Team (ICT) to oversee work plan implementation efforts and work product development.

10.1.6 Hold Lake Whatcom Management Committee (Executive Team) meetings as needed to provide staff with administrative direction.



Administration



GOAL: Implement the LWMP 2025-2029 Work Plan and provide opportunities for public input.

2025-2029
Estimated
Investments:
\$1 million

10.1 Meeting Coordination (continued)

10.1.7 Engage the Bellingham Water Resources Advisory Board as appropriate.

Reporting Metrics

- Number and type of meetings held per year

10.2 Public Information

Coordinate education and engagement efforts by LWMP staff and partners. Inform the community about opportunities for involvement in public meetings, comment periods, and decision-making processes.

10.2.1 Provide notice of public meetings and other opportunities for public involvement on the LWMP website.

10.2.2 Provide periodic updates to the Bellingham City Council, Whatcom County Council, and Lake Whatcom Water and Sewer District Board of Commissioners.

10.2.3 Conduct public presentations as needed.

10.3 Work Plans and Reports

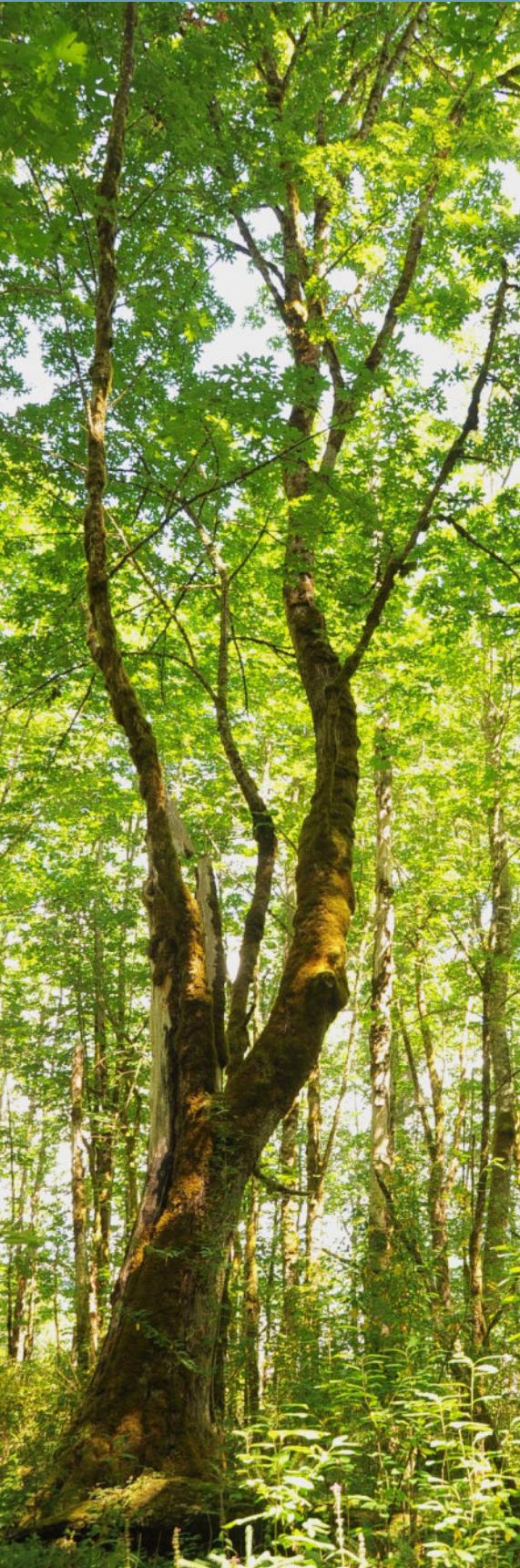
Support development of work plans, presentations, and reports.

10.3.1 Oversee the development of the LWMP five-year work plan and annual LWMP progress and monitoring reports.

10.3.2 Oversee performance measure tracking and reporting and work with the Lake Whatcom Joint Policy Group to gather feedback on performance goals as needed.

10.3.3 Develop 2030-2034 Lake Whatcom TMDL Implementation Tasks.

Administration



GOAL: Implement the LWMP 2025-2029 Work Plan and provide opportunities for public input.

2025-2029
Estimated
Investments:
\$1 million

10.4 Funding

Establish work plan funding needs and strategy to support work plan implementation.

10.4.1 Seek funding necessary to implement LWMP programs.

10.4.2 Identify and pursue grant funding as opportunities arise.

10.4.3 Manage County's stormwater fee rolls and City's Lake Whatcom Property Acquisition Program funds.

10.5 Regulatory Agencies

Support work plan implementation by communicating with agencies.

10.5.1 Communicate with regulatory agencies regarding Lake Whatcom water quality, natural resources, and land use activities in the watershed.

10.6 Contracts

Oversee a variety of consultant and contractor projects, contracts, and work products.

10.6.1 Manage and oversee all contracts with consultants and contractors.

Relevant Resources

- [1992 Lake Whatcom Joint Resolution](#)
- [Lake Whatcom Management Program Work Plans and Progress Reports](#)
- [Lake Whatcom Meeting Announcements and News](#)
- [Lake Whatcom Management Program Contacts](#)
- [Lake Whatcom Stormwater Utility](#)
- [Lake Whatcom Joint Policy Group Meeting Materials](#)

Climate Action



GOAL: Build climate resilience and adaptation within the Lake Whatcom watershed and Lake Whatcom Management Program.

2025-2029
Estimated Investments:
\$675,000

Summary

The LWMP works to build resilience and adapt to negative impacts caused by changes in ecological and environmental parameters associated with a changing climate, including increased temperatures and measurable variations from historical rainfall patterns. The LWMP also supports actions that reduce greenhouse gas emissions and encourages residents and visitors to adopt climate-friendly behaviors.

Climate action work plan components are divided into two types:

- **General Lake Whatcom** activities focus on adaptation and resilience in the Lake Whatcom watershed.
- **Program area-specific** activities are each attached to a specific program area.

The following objectives detail how the work of the LWMP addresses climate action.

Objectives

11.1 General Climate Action

Assess and address climate impacts in the Lake Whatcom watershed.

11.1.1 Conduct a comprehensive Lake Whatcom Climate Vulnerability Assessment to assess the impacts of climate change on the Lake Whatcom watershed and the LWMP.

11.1.2 Create educational materials based off of results from the Lake Whatcom Climate Vulnerability Assessment.

Reporting Metrics

- Complete Lake Whatcom Climate Vulnerability Assessment
- Number and type of educational materials created

Climate Action

GOAL: Build climate resilience and adaptation within the Lake Whatcom watershed and Lake Whatcom Management Programs.

2025-2029
Estimated Investments:
\$675,000

11.2 Program Area-Specific Climate Actions

Integrate climate action into other areas of LWMP work by assessing and addressing climate impacts for applicable program areas.

11.2.1 Land Preservation: Continue to acquire properties and conservation easements for preservation and restoration that can contribute to carbon storage and forest resilience.

11.2.2 Stormwater Management: Adapt stormwater design standards and capital facility planning to accommodate changes in rainfall patterns and increased peak flow events.

11.2.3 Monitoring and Data: Ensure data collection, monitoring, and modeling efforts consider climate change.

11.2.4 Recreation: Address high-use and high-impact uses of recreational lands during extreme temperature events.

11.2.5 Aquatic Invasive Species: Assess potential impacts of infestations from new species that may be facilitated by increasing temperature.

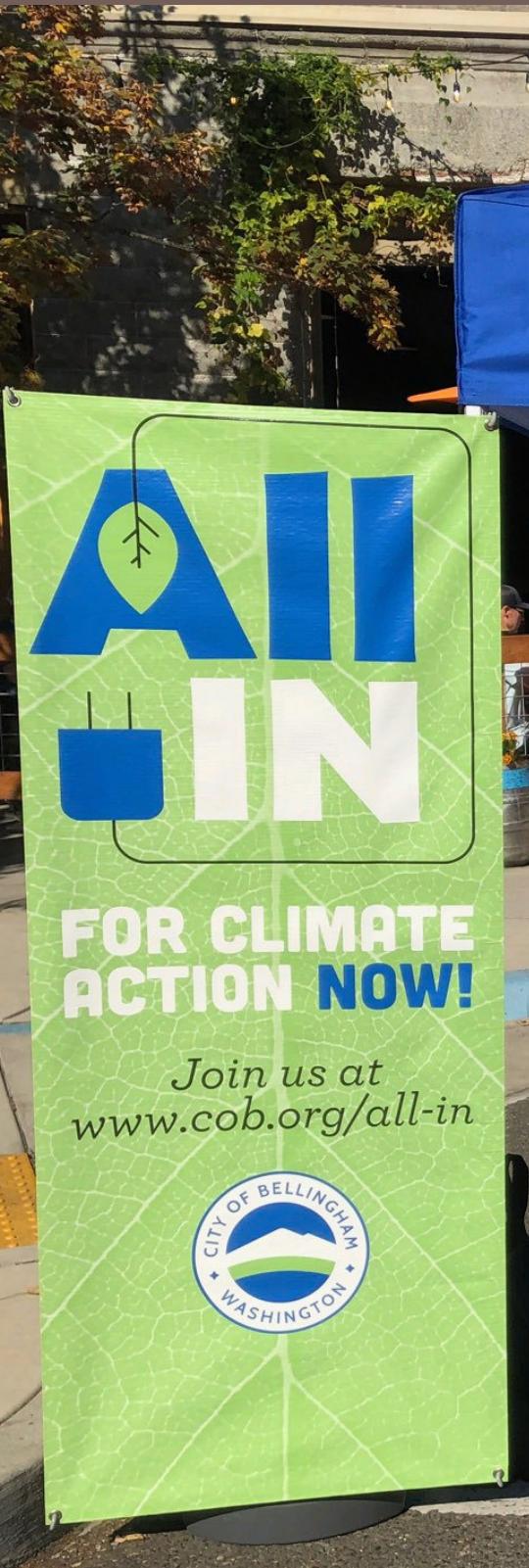
11.2.6 Utilities and Transportation: Encourage use of zero or low-carbon transportation options in the watershed, including public transit, bikeways, pedestrian connections, car sharing programs, EVs, electric-powered boats, and similar.

11.2.7 Forest Management: Assess wildfire risk and implement wildfire risk reduction programs across the watershed.

See Reporting Metrics in respective program areas.

Relevant Resources

- [City of Bellingham Climate Protection Action Plan](#)
- [Whatcom County Climate Action Plan](#)
- [Washington State Climate Resilience Strategy](#)
- [Washington State Department of Natural Resources \(DNR\). Climate Resilience Plan](#)



Forest Management



GOAL: Increase forest management strategies that improve forest health, protect lake water quality, and minimize the risk of catastrophic wildfire.

2025-2029
Estimated
Investments:
\$2.1 million

Summary

The LWMP supports responsible management of public forestland and provides education to private forestland owners about wildfire risks and preparedness.

Objectives

12.1 Forest Management Plans

Support development and implementation of sound forest management plans.

12.1.1 Create and implement Forest Management Plans (FMP) for County and City-owned forestland in the Lake Whatcom watershed.

12.1.2 Implement existing City plans for forest thinning to improve structural diversity and health.

12.2 Forest Practices Review

Review and comment on Washington State Department of Natural Resources (DNR) and private forestry activities to minimize adverse impacts to water quality.

12.2.1 Actively participate in the Interjurisdictional Committee (IJC) and review and comment on DNR forestry activities.

12.2.2 Review and comment on private forest practice applications.

12.2.3 Track and publicly report permitted forest practice activities (including harvests, replanting, road building and abandonment, and herbicide spraying).

Reporting Metrics

- Acres of timber harvested and replanted on forestlands per year
- Acres of land treated with herbicides on forestlands per year

Forest Management



GOAL: Increase forest management strategies that improve forest health, protect lake water quality, and minimize the risk of catastrophic wildfire.

2025-2029
Estimated Investments:
\$2.1 million

12.3 Forest Roads

Manage forest roads on City and County-owned lands to reduce impacts to water quality.

12.3.1 Maintain and abandon City and County-managed forest roads using recommendations from the upcoming Lake Whatcom Forest Management Plan.

Reporting Metrics

- Feet of forest roads maintained
- Feet of forest roads abandoned

12.4 Wildfire Preparedness and Risk Assessments

Inform watershed residents about resources and programs to address wildfire risk.

12.4.1 Engage in partnerships to encourage wildfire risk assessments and mitigation and promote climate resilience on public and private land in the Lake Whatcom Watershed.

12.4.2 Engage in partnerships to educate watershed residents about wildfire preparedness.

Reporting Metrics

- Proportion of watershed residents who are knowledgeable about wildfire risk reduction work, measured every five years through the Lake Whatcom Watershed Survey
- Number of watershed residents who have participated in a wildfire risk assessment

Relevant Resources

- [Whatcom County Wildland Fire Action Plan](#)
- [DNR Lake Whatcom Landscape Plan 2004](#)

2025-2029 Work Plan Cost Estimates

The table below has estimated costs for each program area. This is what the LWMP anticipates spending in 2025-2029. Annual expenditures are reported each year in the LWMP Progress Reports.

Program Area	Staff Costs	Capital Costs	Other Costs	5-Year Total
Land Preservation	\$2,036,115	\$26,000,000	\$387,000	\$28,423,615
Stormwater Management	\$2,463,916	\$8,030,000	\$3,857,000	\$14,350,916
Land Use	\$1,825,000	-	-	\$1,825,000
Monitoring and Data	\$641,550	-	\$2,435,500	\$3,077,050
Hazardous Materials	\$114,850	-	-	\$114,850
Recreation	\$2,612,000	\$3,088,000	\$500,000	\$6,200,000
Aquatic Invasive Species	\$3,826,831	-	\$614,375	\$4,441,206
Utilities and Transportation	\$2,019,768	\$3,460,000	\$2,230,100	\$7,709,868
Education and Engagement	\$735,000	-	\$544,300	\$1,311,800
Administration	\$1,014,360	-	-	\$1,014,360
Climate Action	\$375,000	-	\$300,000	\$675,000
Forest Management	\$568,000	\$270,000	\$1,300,000	\$2,138,900
LWMP Work Plan Total	\$18,265,773*	\$40,848,000	\$12,073,792**	\$71,187,565

*Staff costs include actual budgeted staff costs for each program area (including benefits).

**Other costs include supplies, materials, equipment, consultant fees, interfund charges, taxes, bank charges, and procedural costs.

2025-2029 Work Plan Funding Sources

Program Area	Partner	Funding Sources
Land Preservation	Whatcom County	Conservation Futures Fund
	City of Bellingham	Lake Whatcom Property Acquisition Fees
	Lake Whatcom Water and Sewer District	Not applicable
Stormwater Management	Whatcom County	Real Estate Excise Taxes, Flood Control Zone District Taxes, Stormwater Utility Fees, Road Fund, Grants
	City of Bellingham	Stormwater Utility Fees, Portion of Lake Whatcom Property Acquisition Fees, Grants
	Lake Whatcom Water and Sewer District	Utility Fees
Land Use	Whatcom County	Development Fees, General Fund
	City of Bellingham	Development Fees, General Fund
	Lake Whatcom Water and Sewer District	Not applicable
Monitoring and Data	Whatcom County	Flood Control Zone District Taxes, Stormwater Utility Fees, Road Fund
	City of Bellingham	Stormwater Utility Fees, Water Utility Fees
	Lake Whatcom Water and Sewer District	Utility Fees
Hazardous Materials	Whatcom County	Solid Waste Excise Taxes, Flood Control Zone District, Road Fund, Grants
	City of Bellingham	Stormwater Utility Fees, Water Utility Fees
	Lake Whatcom Water and Sewer District	Not applicable

2025-2029 Work Plan Funding Sources

Continued from previous page

Program Area	Partner	Funding Sources
Recreation	Whatcom County	Conservation Futures Fund, General Fund, Real Estate Excise Taxes, Parks Special Revenue Fund
	City of Bellingham	Greenways Taxes, General Fund
	Lake Whatcom Water and Sewer District	Utility Fees
Aquatic Invasive Species	Whatcom County	Flood Control Zone District Taxes
	City of Bellingham	Water Utility Fees, Boat Inspection Fees
	Lake Whatcom Water and Sewer District	Utility Fees
Utilities and Transportation	Whatcom County	Road Fund
	City of Bellingham	Street Funds, Utility Fees
	Lake Whatcom Water and Sewer District	Utility Fees
Education and Engagement	Whatcom County	Flood Control Zone District Taxes, Stormwater Utility Fees, Road Fund
	City of Bellingham	Stormwater Utility Fees, Water Utility Fees
	Lake Whatcom Water and Sewer District	Utility Fees
Administration	Whatcom County	Flood Control Zone District Taxes, Road Fund, Stormwater Utility Fees
	City of Bellingham	Stormwater Utility Fees, Water Utility Fees
	Lake Whatcom Water and Sewer District	Utility Fees

2025-2029 Work Plan Funding Sources

Continued from previous page

Program Area	Partner	Funding Sources
Climate Action	Whatcom County	General Fund, Flood Control Zone District Taxes
	City of Bellingham	Water Utility Fees
	Lake Whatcom Water and Sewer District	Not applicable
Forest Management	Whatcom County	General Fund, Flood Control Zone District Taxes
	City of Bellingham	Water Utility Fees
	Lake Whatcom Water and Sewer District	Not applicable

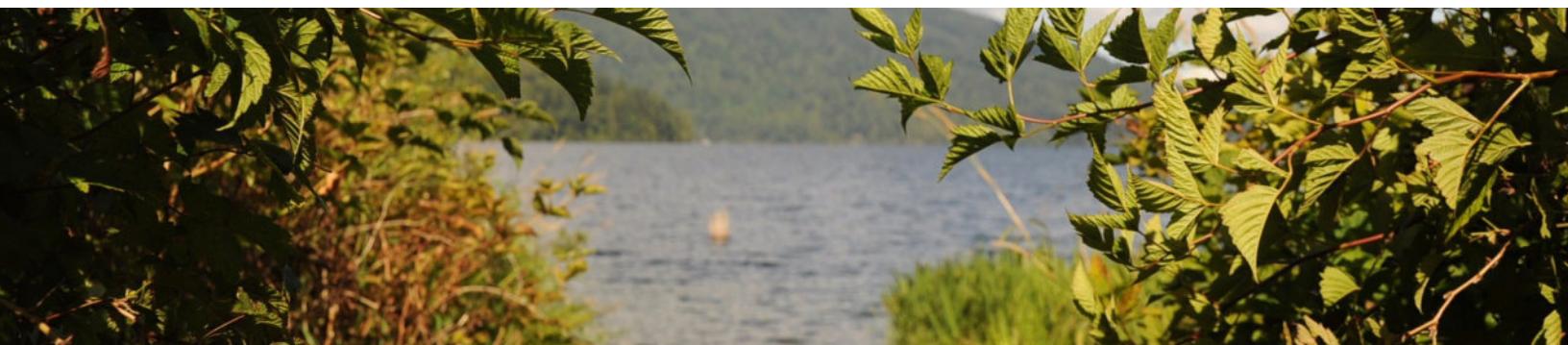
Lake Whatcom Facts

Population and Drinking Water Supply

- Lake Whatcom is the drinking water source for over 100,000 Whatcom County residents, which is about half the county's population.
- Lake Whatcom provides drinking water for the City of Bellingham, Lake Whatcom Water and Sewer District, several smaller water districts and associations, and homes that draw water directly from the lake.
- The City of Bellingham withdraws water from the lake's middle basin through a 1,200-foot wooden pipeline that leads to the water treatment plant in Whatcom Falls Park.
- The Lake Whatcom Water and Sewer District withdraws water from the lake's Basin No. 3 at approximately 70 feet below the water surface and is treated at the water treatment plant in the Sudden Valley Community Association's Morning Beach Park.
- About 19,000 people live in the Lake Whatcom watershed (2020 estimate).
- Approximately 33% of the watershed population lives within the City of Bellingham and approximately 67% live outside city limits in unincorporated Whatcom County.

Physical Characteristics

- Lake Whatcom is about ten miles long and just over one mile wide at its widest point.
- Lake Whatcom's total shoreline is about 30 miles long.
- Lake Whatcom's surface area is about 5,000 acres with 92% outside of city limits.
- Lake Whatcom is made up of three distinct basins that hold about 250 billion gallons of water.
- Lake Whatcom's natural outflow is to Whatcom Creek and Bellingham Bay. The City of Bellingham controls the lake level with a small dam at the outlet draining to Whatcom Creek. When the lake level reaches 314.94 feet above mean sea level, the City is obligated to release water through the control dam.
- Lake Whatcom's watershed covers about 56 square miles (36,000 acres) with 97% outside of city limits.
- Lake Whatcom is fed by 36 streams (many do not flow year-round). Major streams include Silver Beach, Carpenter, Olsen, Smith, Anderson, Brannian, and Austin Creeks. Lake Whatcom also periodically receives water diverted from the Middle Fork Nooksack River by the City of Bellingham to meet water supply needs.
- Lake Whatcom's deepest point is 334 feet below the surface.



Program Development and Accomplishments Timeline

1992

1999

- 1992: [Joint Resolution](#) adopted to establish common goals for Lake Whatcom watershed
- 1992: City stormwater capital improvement program began
- 1993: Sudden Valley Community Association began density reduction program to remove 1,400 potential dwelling units
- 1998: Lake Whatcom Management Program (LWMP) established by Interlocal Agreement
- 1998: Lake Whatcom placed on [Washington's list of polluted water bodies](#) due to low dissolved oxygen levels; Tributary creeks listed for high bacteria levels; Total Maximum Daily Load (TMDL) process began
- 1999: County Water Resource Protection Overlay District and Stormwater Special District established
- 1999: LWMP 1999 Work Plan adopted

2000

2004

- 2000: LWMP 2000-2004 Work Plan adopted
- 2000: City stormwater capital improvement program expands to address phosphorus
- 2000: Interjurisdictional Coordinating Team (ICT) created to coordinate activities and programs between jurisdictions
- 2001: City adopted first land use regulations for new development on properties that drain to Basin 1 (Lake Whatcom Reservoir Regulatory Chapter [BMC 16.80])
- 2001: City stormwater utility established; provides funding for Lake Whatcom protection
- 2001: City Lake Whatcom Watershed Land Acquisition and Preservation Program began
- 2001: City Watershed Advisory Board established
- 2002: County rezone reduced 1,800 potential dwelling units
- 2004: [Lake Whatcom Landscape Plan](#) adopted by State Legislature that provides additional protections for harvesting on Department of Natural Resources lands in the watershed

2005

2009

- 2005: LWMP 2005-2009 Work Plan adopted
- 2005: City and County passed phosphorus fertilizer ban
- 2005: City and County banned boats with carbureted 2-stroke engines
- 2006: County stormwater capital improvement program with focus on phosphorus treatment began
- 2008: Lake Whatcom Joint Policy Group formed
- 2008: City Residential Stormwater Retrofit Program began
- 2009: City amended the Lake Whatcom Reservoir Regulatory Chapter

Program Development and Accomplishments Timeline

Continued from previous page

2010

- 2010: LWMP 2010-2014 Work Plan adopted
- 2011: [Homeowner Incentive Program](#) launched
- 2012: [Aquatic Invasive Species Prevention Program](#) began
- 2013: County amended Title 20 to create the [Lake Whatcom Watershed Overlay District](#) to reduce impacts from development and land use activities
- 2014: Sudden Valley Community Association joined Joint Policy Group
- 2014: Department of Natural Resources (DNR) finalized reconveyance of 7,800 acres in the watershed to Whatcom County Parks

2014

2015

2019

- 2015: LWMP 2015-2019 Work Plan adopted
- 2016: Lake Whatcom TMDL for phosphorus and fecal coliform approved by Environmental Protection Agency (EPA)
- 2016: New phosphorus loading model developed
- 2017: Homeowner Incentive Program revised and expanded
- 2019: Update of lake response model initiated
- 2019: County Lake Whatcom Stormwater Utility established to provide funding for Lake Whatcom protection
- 2019: City and County National Pollutant Discharge Elimination System (NPDES) Municipal Stormwater Permits issued (TMDL response requirements included in the new permit)

2020

2024

- 2020: LWMP 2020-2024 Work Plan adopted
- 2021: City-developed Phosphorus-Optimized Stormwater Treatment (POST) system formally approved for use by the Department of Ecology's Technical Assessment program
- 2021: Whatcom County Sheriff's Office implements regular boat patrols on Lake Whatcom and Lake Samish to enforce compliance with AIS permits and regulations
- 2022: [Neighborhood Native Landscaping Program](#) launches in unincorporated Whatcom County
- 2022: [Park Place Water Quality Facility](#) rebuilt to meet highest-known phosphorus reduction performance using POST media system
- 2023: City of Bellingham [Water Resources Advisory Board](#) established
- 2024: City and County National Pollutant Discharge Elimination System (NPDES) Municipal Stormwater Permits issued