2022

Lake Whatcom Management Program

PROGRESS REPORT

Prepared by the Lake Whatcom Interjurisdictional Coordinating Team

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Front Cover: Calm day at Lake Whatcom | Photo by T. Ward, 2022
Back Cover: View from Bloedel Donovan Park | Photo by T. Ward, 2022

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Introduction

This 2022 Annual Progress Report presents a summary of accomplishments for the fourth year of the *Lake Whatcom Management Program (LWMP) 2020-2024 Work Plan.*

This report, in keeping with the established format for past annual reports, is organized around 10 program areas. For each program area, the report includes summaries of 2022 activities, accomplishments, reporting metrics, and expenditures. Continued implementation of tasks in a few key program areas—Land Preservation, Stormwater, Aquatic Invasive Species, and Education and Engagement—account for many of the accomplishments in this report.

The jurisdictions that comprise the Lake Whatcom Management Program—the City of Bellingham, Whatcom County, and the Lake Whatcom Water and Sewer District—each assign staff to the Interjurisdictional Coordinating Team. Team members strive to implement the annual work plan, recommend changes or additional tasks, and contribute to the annual report.

As with previous work plans, tasks included in the current five-year plan continue to reflect the strategies and goals of the original Lake Whatcom Management Program adopted in 1998. The series of work plans developed since then provide the framework and means for meeting community expectations to protect Lake Whatcom's water quality.

Bloedel Donovan | Photo by T. Ward, 2022

Phosphorus and Lake Whatcom

Phosphorus generated from forested areas, residential and other land use practices is conveyed to Lake Whatcom by streams, public stormwater infrastructure, and direct runoff. Over the past 50 years, this excess phosphorus has caused a decline in the lake's water quality including a significant decrease in dissolved oxygen deep in the water column as well as seasonal algal blooms on the surface. These impacts affect the lake's ecology and the City of Bellingham's water treatment process.

Since the early 1990s, the City of Bellingham, Whatcom County, and the Lake Whatcom Water and Sewer District have been:

- Adopting land use and stormwater regulations to reduce phosphorus loading
- Constructing, operating, and maintaining stormwater treatment facilities
- Constructing, operating, and maintaining sewage conveyance and treatment systems
- Implementing residential stormwater retrofit programs to reduce phosphorus loading from developed lots
- Purchasing and protecting land in the watershed that might otherwise be susceptible to development or other land disturbance activities

In April 2016, the Environmental Protection Agency finalized the Lake Whatcom Total Maximum Daily Load study, which has set in motion a 50-year cleanup effort focused on reducing phosphorus inputs to Lake Whatcom.

Efforts to date have resulted in an annual reduction of over 200 pounds of phosphorus entering Lake Whatcom.

2022 Highlights

The City of Bellingham removed a fish passage barrier and planted native plants to improve habitat on Agate Creek in the Agate Creek Preserve property.

Whatcom County completed the Marigold Drive Stormwater Improvement Project in Sudden Valley. The new stormwater treatment vault removes pollutants from water flowing into Lake Louise.

The City of Bellingham completed rebuilding the Park Place Stormwater Treatment Facility which utilizes the new Phosphorus Optimized Stormwater Treatment (POST) system best management practice (BMP).

700 5th grade students attended Water School and learned about Lake Whatcom, its watershed, stormwater pollution prevention, and the City of Bellingham's water and wastewater treatment systems.

Aquatic Invasive Species (AIS) staff decontaminated 24 high-risk boats in 2022, more than the past two seasons combined. The high number was driven by an increase in purchases of used boats that came from out of state.

In 2022, the LWMP outreach and engagement staff shared the quarterly Lake Whatcom Lowdown E-Newsletter to over 600 subscribers. This newsletter contains information ranging from AIS program updates, Lake Whatcom Policy Group Meeting information and more.

Program Areas and Objectives

The Lake Whatcom Management Program (LWMP) focuses efforts in 10 program areas. The 2020-2024 Work Plan uses the same program areas as the previous five-year plan. 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, Washington State University Whatcom County Extension, Watershed Advisory Board members, Western Washington University Institute for Watershed Studies, Whatcom Conservation District, and Whatcom Land Trust.

1. Land Preservation

Preserve and restore land that might otherwise be susceptible to development or other land disturbance to protect water quality, fish and wildlife habitat, and forest health.

2. Stormwater

Protect and restore water quality in Lake Whatcom and its tributaries by using best management practices to collect, treat, and manage stormwater runoff.

3. Land Use

Prevent water quality and quantity impacts from new development, redevelopment, and forest practices.

4. Monitoring & Data

Collect and manage data to increase our understanding of water quality and pollution sources, reduce uncertainty in the Lake Whatcom loading and response models, and guide management decisions.

5. Hazardous Materials

Prevent water quality impacts associated with 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 water quality goals.

7. Aquatic Invasive Species

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

8. Utilities & Transportation

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

9. Education & Engagement

Educate and engage watershed residents and visitors to promote and facilitate the adoption of behaviors that protect water quality.

10. Administration

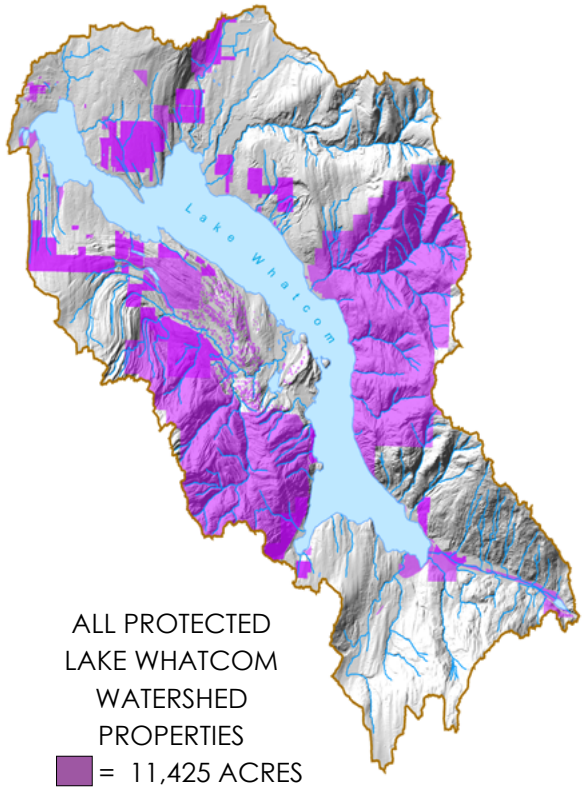
Implement the Lake Whatcom Management Program Work Plan and provide opportunities for public input.

PROGRAM AREA

Land Preservation

OBJECTIVE: *Preserve and restore land that might otherwise be susceptible to development or other land disturbance to protect water quality, fish and wildlife habitat, and forest health.*

Land Preservation actions implemented in the Lake Whatcom watershed to protect water quality include: land acquisition, conservation easements, and other incentive programs. Over 11,400 acres have been protected in the Lake Whatcom watershed to date, including approximately 7,800 acres reconveyed to Whatcom County in 2014.



Map by M. Parelskin, 2022

In 2022, the City of Bellingham completed the purchase of seven separate transactions, with the highest number of title acquisitions in a single year to date. Total acquisition in 2022 included 134 acres, reducing development potential by 9 units.

The City of Bellingham completed a fish passage barrier removal project in Agate Creek in 2022. Staff removed a 42-foot long derelict culvert on the Agate Creek Preserve. The city also removed 10,000 square feet of impermeable surface with the demolition of a commercial dairy that once operated on a property in the Agate Creek drainage. Restoration of that site included planting 400 native trees.

Other management activities completed on city acquisition properties in 2022 included regular property inspections, removal of invasive species and planting of native species, and the mitigation of multiple encroachments with letters, gates, and signage. Improvements to the land acquisition model and maps were also completed.

COB Property management accomplishments included:

- 118 acres managed for invasive species and restoration
- 2,500 native plants installed
- 1 Home Ignition Zone treatment project completed on City of Bellingham land adjacent to private property
- Agate Creek culvert removal

HIGHLIGHTED METRICS

11,425 Acres protected (to date)

134 Acres added to protected total (2022)

2022 Expenditures: **$1,880,198**

- 1 new trail permitted and constructed to manage recreation access, reduce erosion and improve user safety
- 42 linear feet of culvert removed to improve fish passage and reduce sedimentation

Agate Creek Culvert Removal | Photo by COB, 2022

PROGRAM AREA

Stormwater

OBJECTIVE: *Protect and restore water quality in Lake Whatcom and its tributaries by using best management practices to collect, treat, and manage stormwater runoff from developed areas throughout the watershed.*

Stormwater program activities continue to be an area of emphasis for the City of Bellingham and Whatcom County to help meet Total Maximum Daily Load (TMDL) requirements to reduce phosphorus pollution in Lake Whatcom and fecal coliform pollution in streams.

Stormwater capital improvement project planning and construction continued in 2022. The city completed construction of their most impactful stormwater treatment system to date. The rebuilt Park Place stormwater facility treats runoff from 156 acres of development in the Silver Beach Creek neighborhood. Using the city-developed Phosphorus Optimized Stormwater Treatment (POST) system best management practice (BMP), this facility is able to treat more area and remove phosphorus at a lower cost than any other treatment system currently in place in the city watershed.

The city also advanced projects to replace costly filter vaults with POST media systems in the coming years, securing a grant from the Washington State Department of Ecology (Ecology) to reconstruct three priority filter vault systems. In addition, a separate grant from Ecology was secured to rebuild the Donald Avenue stormwater facility, located directly on the shoreline.

The county completed a stormwater improvement project along Marigold Drive in Sudden Valley. This project consisted of installing 750 feet of new pipe, 15 catch basins, and a stormwater treatment vault. The new treatment system is designed to reduce stormwater pollutants like heavy metals, suspended solids, and phosphorus that previously entered Lake Louise with little to no treatment.

The county also completed four small works projects in the Geneva and Hillsdale neighborhoods. These projects include catch basin replacements, culvert installations, and other neighborhood drainage improvements to minimize flooding and stream and ditch erosion.

Marigold Dr Construction | Photo by Whatcom County, 2022

HIGHLIGHTED METRICS

208 Lbs of phosphorus reduced per year (through 2022)

2022 Expenditures: **$2,156,449**
(Including Capital Projects)

over
1 MILLION square feet improved through HIP (to date)


Neighborhood Native Landscaping Planting | Photo by WCD 2022

Stormwater

With ongoing assistance through contracts with the Whatcom Conservation District (WCD), the city and county continued to help homeowners make voluntary water quality improvements to their property through the Lake Whatcom Homeowner Incentive Program (HIP). The WCD provided one-on-one technical assistance to HIP participants.

In 2022, 44 property owners within city limits received HIP assistance and the city reached two major HIP milestones: (1) over one million square feet improved and (2) providing on-site service to more than 50% of the properties within the city's portion of the watershed.

With the expansion of the program to include Basin 3 in 2021, interest in HIP from county homeowners exceeded staff capacity in 2022. The county put a pause on new sign-ups to focus on helping homeowners engaged in HIP complete projects.

Whatcom County provided qualified Sudden Valley HIP participants an opportunity to pilot a new Neighborhood Native Landscaping Program (NNLP) in 2022. The NNLP provides a cluster of neighbors with plants and mulch, and the homeowners plant their native landscaping during a fall work party. Four households installed 14,000 square feet of native landscaping in 2022.

The county continued to provide virtual trainings for the Private Stormwater System (PSS) Maintenance Program in 2022. These trainings help homeowners understand the maintenance needs of their stormwater systems. Upon request, technical assistance and a free inspection report is provided to assist homeowners with the specific maintenance needs of their system.

The county and city own and operate a large number of stormwater treatment facilities throughout the watershed. Annual inspection and maintenance of these facilities ensures they function as designed to protect water quality. Collectively in 2022, the city and county managed 89 treatment facilities, replaced 454 filter cartridges, and inspected and maintained about 1,400 catch basins plus bioswales, ditches, and culverts in the public right-of-way.

WCC Crew Member Helping at Planting Party | Photo by WCD, 2022

Marigold Dr. Construction | Photo by WC 2022

Native Plants Ready for Neighborhood Planting Party | Photo by WCD, 2022

Land Use

OBJECTIVE: *Prevent water quality and quantity impacts from new development, redevelopment, and forest practices.*

The City of Bellingham and Whatcom County continue to implement development regulations aimed at preventing water quality and quantity impacts to Lake Whatcom.

In 2022, County Council amended the Lake Whatcom Overlay District to lower the threshold of how much new hard surface area is exempt from installing a permanent stormwater management system, from 501 to 201 square feet, and to reduce the amount of tree canopy that can be removed. The county issued 100 development permits in the watershed in 2022. Phosphorus-neutral development regulations were applied through these permits.

In 2022, there were four new single-family developments in the city portion of the watershed. Each new and redeveloped home is required to provide a forested condition on 30% of the lot as a Native Vegetation Protection Areas (NVPA). The NVPAs are protected by a conservation easement, and the city ensures that each NVPA is well established with monitoring during the required five-year monitoring period. Since 2009, over 13 acres of developed residential properties meet city phosphorus –neutral code requirements.

In March 2022, the city released the Lake Whatcom Watershed Annual Build-out Analysis Report updating the number of existing dwelling units to 7,224 (+31 units compared to 2021) and the number of potential units on vacant lands to 1,395 (-32 units compared to 2021).

New property owners received the Stewards of the Lake Guidebook in May 2022 with an insert notifying them of special Lake Whatcom watershed regulations and where to get information on permit requirements for home improvement projects. Watershed work window opening and closing dates were promoted through social media, websites, and the Lake Whatcom Lowdown e-newsletter.

In 2022, the city and county continued to work on their Shoreline Management Program periodic updates. Whatcom County approved its updates in 2022 and is waiting for Washington State Department of Ecology approval. Both county and city anticipate adoption in 2023.

The Lake Whatcom Policy Group initiated discussions with the State Department of Natural Resources (DNR) on forest practice regulations in the Lake Whatcom watershed in early 2022. DNR staff hosted field trips with city and county council members and provided a comprehensive overview of the evolution in forest practice regulations in the Lake Whatcom watershed. Discussion and information sharing in 2022 will set the stage for follow up policy discussions in 2023.

HIGHLIGHTED METRICS

13 Acres of phosphorus-neutral properties developed or re-developed in accordance with city regulations—Since 2009

5 Acres of native vegetation protected as forest in perpetuity as a result of land use regulations -- Since 2009

2022 Expenditures: **$343,750**

Native Vegetation Protection Area | Photo by Noah Booker, Shelterbelt LLC

PROGRAM AREA

Monitoring and Data

OBJECTIVE: *Collect and manage data to increase our understanding of water quality and pollution sources, reduce uncertainty in the Lake Whatcom loading and response models, and guide management decisions.*

The Lake Whatcom Data Management Team (Data Team) coordinates water quality monitoring efforts in the watershed. The team continued to meet monthly in 2022, focusing on: coordination of hydrologic modeling efforts on the lake and its tributaries, review of tributary monitoring results and determining appropriate locations for storm-driven tributary monitoring, inter-agency updates on stormwater treatment and Total Maximum Daily Load (TMDL) activities, fecal coliform to E. coli comparative monitoring, and Lake Whatcom monitoring conducted by Western Washington University's Institute for Watershed Studies (IWS).

The city continued to contract with the IWS for routine monitoring of Lake Whatcom and its streams. Long-term water quality data are collected for temperature, pH, dissolved oxygen, chlorophyll, nutrients, total organic carbon, algae, E. coli and fecal coliform. These data are used to identify water quality trends in the lake and serve as an indicator of the effectiveness of our water quality improvement efforts.

Storm event tributary monitoring continued, with the IWS changing their sampling location focus in 2022 from Austin, Silver Beach and Euclid creeks to Carpenter, Olsen and Smith creeks. This information is input into a hydrological simulation model to better delineate lake phosphorus loading sources.

This loading data is then incorporated into the lake response model to refine the phosphorus loading reduction targets needed to improve water quality. Support of both models—loading and lake response—continues as part of the city and county's TMDL response effort. Modelers have been coordinating and sharing data and information.

The lake response model update and calibration was completed in 2022 with a draft modeling report and Lake Whatcom TMDL Reassessment completed by Brown and Caldwell and Portland State University staff. Whatcom County is leading the effort to determine potential scenarios to include in upcoming lake response model runs.

The city and county continue to conduct stormwater sampling to assess both the effectiveness of constructed stormwater treatment systems and to determine the contributions of contaminants from major tributaries to Lake Whatcom. In addition to on-going projects, the city completed a review of fecal coliform data from 2004 to 2021 in eight Lake Whatcom tributaries. The annual geometric mean was calculated for the wet season (November to April) and dry season (May to October) and compared to TMDL targets. This analysis provides a new tool for Data Team members to evaluate progress made meeting TMDL bacteria targets.

HIGHLIGHTED METRICS

1,170 Lake water quality samples collected in 2022

128 Tributary water quality samples collected in 2022

2022 Expenditures: **$516,884**

Monitoring for Asian Clams | Photo by IWS

PROGRAM AREA

Hazardous Materials

OBJECTIVE: *Prevent water quality impacts associated with improper storage and handling of hazardous materials and ensure that spill prevention and response programs adequately protect water quality.*

Whatcom County and City of Bellingham field staff are trained in pollution prevention, illicit discharge identification, investigation, and response. Trained staff are responsible for responding to spills city and county-wide. In 2022, 28 new city staff received this training.

County and city staff received and responded to nine reports of illicit discharges or stormwater pollution within the Lake Whatcom watershed in 2022.

The Pollution Prevention Assistance (PPA) programs, in partnership with the Washington State Department of Ecology, continued to help local businesses reduce and eliminate dangerous waste. While providing assistance to a business, PPA program staff evaluate and address potential sources of pollution which may enter stormwater, wastewater, or the air.

City staff who respond to stormwater hotline calls and city stormwater code violations refer businesses to the PPA program for free technical assistance and advice.

The county initiated a pilot project to develop an outreach program to foster behavior changes related to the proper disposal of moderate-risk hazardous waste, such as paint, oil, and yard chemicals. The Lake Whatcom watershed is one focus area for this new community-based social marketing pilot project. In 2022, a survey was distributed through the mail, at in-person events, and through e-newsletters to learn about current knowledge and behaviors with 328 residents completing the survey. Survey results were used to design the outreach program and outreach materials. The pilot will start in early 2023.

Paint Cans | Photo by Pexels

HIGHLIGHTED METRICS

28 New staff trained in spill prevention and response

9 Spills/Incidents reported

2022 Expenditures: **$35,813**

PROGRAM AREA

Recreation

OBJECTIVE: *Provide access to recreational opportunities that are consistent with water quality goals.*

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 stormwater facilities, educating park visitors, and maintaining trails.

Bloedel Donovan Park continues to be a very busy recreation area with record numbers of visitors from May through September. The Lifeguard Program provided safe swimming opportunities for all ages. 2022 was the second year with traffic control and flagging by a private contractor to ease parking congestion. The city also provided unarmed daytime park security officers during a July heat wave to address an uptick in illegal activity and unruly behavior. Park Ambassadors work at this location to help with public safety and address overcrowding.

COB Park Ambassadors at Bloedel Donovan | Photo by Madeline Mahler, 2022

Over the summer, these staff educated visitors on park rules, conducted light maintenance, and held three outreach events focusing on dog etiquette and the impacts of dog waste.

The city made right-of-way improvements at the Silver Beach Recreation Lake Access Area in June. Staff removed wooden barriers and installed large rocks to restrict illegal parking. An additional dog waste station, park regulations sign, and garbage can were installed to help keep this popular beach access area clean and maintained.

Whatcom County Parks and Recreation manages more than 9,500 acres of land in the Lake Whatcom watershed. In 2022, the county approved funding and initiated the process to develop a forest management plan for these properties. Management goals include reducing phosphorus loading, reducing wildlife risk, and improving habitat.

This summer, construction began on a trail in Lake Whatcom Park that connects the Hertz shoreline trail to the higher elevation Chanterelle Trail. The new trail will be 4.25 miles in length and gain 2,200 feet. It is located atop an unauthorized user-built trail that did not meet recommended trail specifications. Approximately 2.5 miles of trail was built in 2022. The remaining construction will be completed during the 2023 watershed work window.

HIGHLIGHTED METRICS

2.5 Miles of new trail built

18 Miles of trail maintained

29 Pet waste stations maintained in watershed

2022 Expenditures: **$722,311**

New Trail Construction In Lake Whatcom Park | Photo by WC 2022

PROGRAM AREA

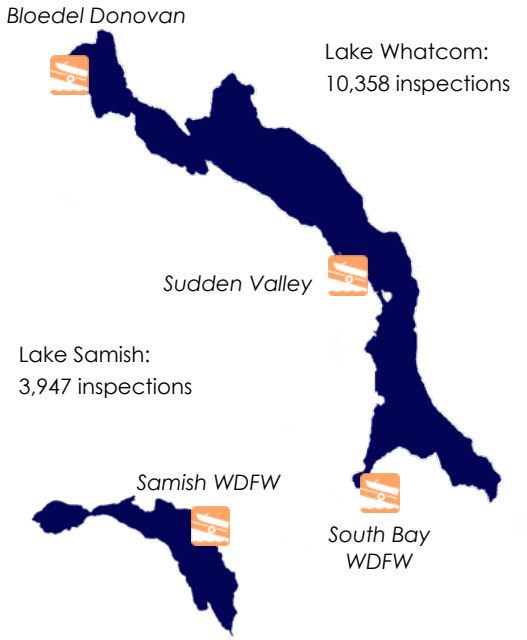
Aquatic Invasive Species

OBJECTIVE: *Prevent new aquatic invasive species (AIS) introductions to Lake Whatcom and minimize impacts associated with established invasive species.*

Twenty-one inspectors conducted 14,305 watercraft inspections in 2022—a slight decrease compared to the 2021 season. Inspectors sold 2,768 annual permits, 325 small vessel permits, 57 three-day passes, 653 one-day passes, and 3,775 non-motorized permits resulting in a fee revenue of $152,000.

A total of 10,358 watercraft inspections were conducted at Lake Whatcom with the 3,947 inspections occurring at Lake Samish. Watercrafts last visited 321 different water bodies in 26 different states/provinces prior to launching at Lake Whatcom or Lake Samish, including 22 water bodies infested with invasive mussels.

2022 AIS Inspectors | Photo by T. Ward, 2022



Aquatic invasive species program staff continued to monitor Whatcom County lakes to detect the presence/absence of new aquatic invasive species infestations and to monitor the spread of existing aquatic invasive species with assistance from Whatcom County, the Washington Department of Fish and Wildlife, and the Washington State Department of Ecology. No new aquatic invasive species infestations were discovered in Lake Whatcom or Lake Samish in 2022 as a result of this effort. One new infestation of curly-leaf pondweed was discovered in Fazon Lake. This species is already present in Lake Whatcom and Wiser Lake.

HIGHLIGHTED METRICS

14,305 Boats inspected

1,132 Boats with standing water that had to be drained

93 Boats with aquatic plants that had to be removed

24 Boats decontaminated for invasive mussels

0 Known invasive species introductions in Lake Whatcom

PROGRAM AREA

Aquatic Invasive Species

In 2022, 24 boats required full decontamination with hot water prior to being allowed to launch. This marked a large surge in the number of high-risk boats requiring decontamination, more than the past two seasons combined. Most of these boats were recent purchases by Whatcom County residents from Texas and Arizona. All of these boats were considered to be high risk for the potential transport of zebra and/or quagga mussels to Lake Whatcom based on their recent waterbody history.

In 2022, inspectors increased awareness about AIS through small paddling events and bass tournaments at both Lake Whatcom and Lake Samish. The Lake Whatcom AIS Program also met with several rowing clubs from the Seattle area who hosted training events at Lake Samish and provided a tour of the Bloedel Check Station to students from the Bellingham Technical College Fisheries and Aquaculture Sciences Program.

Over 8,000 people visited the Whatcom Boat Inspections website in 2022. The website provides information on program updates, fee information, inspection location details, AIS prevention tips, 2021 inspection results, and access to the AIS Awareness Course. The website can be viewed by visiting: whatcomboatinspections.com

Over 670 people passed the online AIS Awareness Course in 2022. The course takes approximately 30 minutes to complete and aims to educate the participants about AIS prevention and boat inspection practices to help stop the spread of AIS to Whatcom County waters. The course has been passed over 14,000 times since it was launched in 2014.

HIGHLIGHTED METRICS

8,019 People visited Whatcom Boat Inspections website

1,206 Visitors at check stations

672 People completed online AIS Awareness Course

2022 Expenditures: **$619,738**

On-site at Lake Whatcom | Photo by COB, 2022

Monitoring for Asian clams at Lake Whatcom | Photo by COB, 2022

Decontaminating a boat at Bloedel | Photo by COB, 2022

PROGRAM AREA

Utilities and Transportation

OBJECTIVE: *Prevent water quality and quantity impacts from water, sewer, and transportation systems.*

Lake Whatcom is the drinking water supply for over 100,000 people. As water utility providers, the City of Bellingham and Lake Whatcom Water and Sewer District have programs in place to conserve this important drinking water source.

Water use demand peaks every summer. The district's highest water use in 2022 occurred on August 1 with 773,500 gallons used during a 24-hour period. This was a significant reduction from the 2021 maximum day demand of 928,300 gallons in June 2021 during a record-setting heat wave. The city's average summer peak daily demand in 2022 was 15.9 million gallons per day (mgd), also down from the 2021 peak of 16.5 mgd.

Both the city and district have water conservation programs. In 2022, the district continued implementing actions identified in its 2021 Water Use Efficiency Plan, and the city continued conservation efforts outlined in its Water Use Efficiency 2020-2025 Work Plan. The district increased engagement in the Whatcom Water Alliance (WWA), whose mission is to promote coordination and collaboration on water conservation throughout Whatcom County. City outreach and information campaigns to promote residential water conservation practices were enhanced with county-wide water conservation outreach through the WWA.

Residential water use efficiency rebate programs for high efficiency toilets, washers, and irrigation controllers were offered by the city directly and the district through the WWA. Rebates and water saving practices like letting lawns go dormant, finding and fixing leaks, and following the voluntary outdoor watering schedule were promoted via social media, utility bill inserts, the Lake Whatcom Low-down, and radio ads.

The city's Water School program continued in 2022 with 700 students participating. Water School teaches 5th graders about Lake Whatcom and its watershed, storm-water pollution and prevention, and the city's water and wastewater treatment systems. The program led tours to the water treatment plant for all classes and 28 class-rooms completed additional stormwater action projects. In addition to 5th graders, the city led tours of the water and wastewater treatment plants for over 220 community members.

Both the city and district maintain sanitary sewer systems in the watershed. Maintenance includes replacing older infrastructure, following capital improvement plans to re-duce sewer overflows, and finding and fixing leaks within sewer lines. City of Bellingham Utility Maintenance crews fulfilled 1,569 work orders in the Lake Whatcom watershed in 2022. These projects help to ensure that the utility sys-tems for water, sewer, and drainage infrastructure are in good working order to prevent spills, leaks, and flooding.

HIGHLIGHTED METRICS

over **5 MILLION** Gallons conserved with water use efficiency measures

130 Community members attended water treatment plant tours

26 Households participated in the residential rebate program (City and Whatcom Water Alliance)

Water School Tour of the Water Treatment Plant | Photo by COB, 2022

PROGRAM AREA

Utilities and Transportation

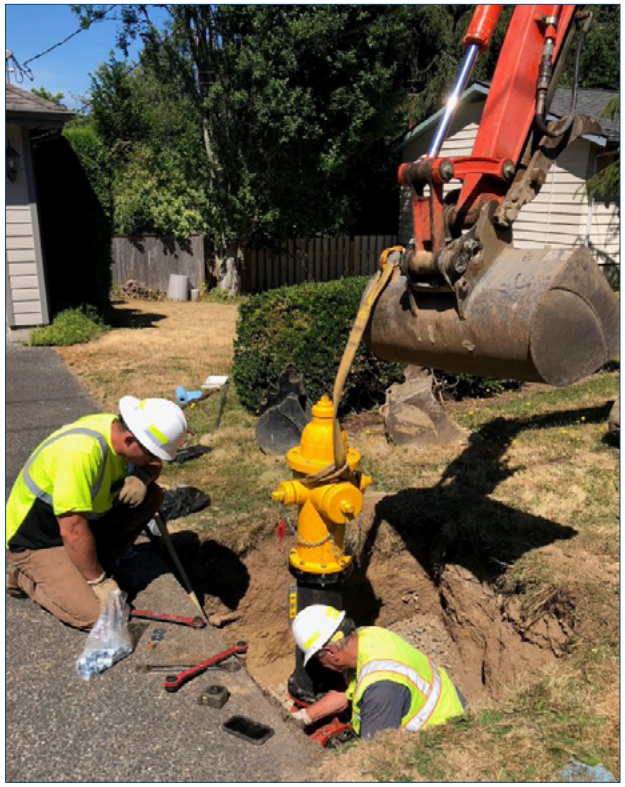
The district operates and maintains 28 sewer pump stations, replacing and/or renewing one to two stations every year. Significant 2022 projects included: initiating upgrades to the Euclid sewer pump station (anticipated completion in 2023), advancing design for replacement of the Lakewood and Rocky Ridge sewer pump stations (anticipated completion 2024), and the rehabilitation of sewer conveyance lines. Twenty-five new connections were made within 200 feet of the sewer line in 2022.

There are 783 septic systems in the Lake Whatcom watershed. County programs help septic system owners keep their systems in good working order. The Health Department offers a free septic system maintenance training workshop. Homeowners who complete the training are eligible to receive a rebate to offset maintenance costs. Five rebates were issued to watershed homeowners in 2022.

The Health Department also enforces septic system evaluation and maintenance requirements and mails letters to septic system owners who are out of compliance. In 2022, 57% of owners were in compliance with these regulations and six systems failures were reported.

Graphic by Whatcom Water Alliance, 2022

The city and county continued their on-going enhanced road maintenance program, which includes street sweeping and catch basin cleaning to remove pollutants from stormwater runoff entering the lake. The city and county also aim to prevent water quality impacts by employing road design standards with stormwater best management practices and by making bike and pedestrian mobility improvements. In 2022, road maintenance also included repairs from November 2021 flood damage.



Geneva Hydrant Replacement | LWWSD, 2022

HIGHLIGHTED METRICS

1,455 Sewer system preventative maintenance actions taken by LWWSD

5 Septic system rebates issued in 2022

0 Sewer overflows in the watershed in 2022

2022 Expenditures: **$2,146,902**
(Including Capital Projects)

Water Treatment Plant Tour | Photo by COB 2022

PROGRAM AREA

Education and Engagement

OBJECTIVE: *Educate and engage watershed residents and visitors to promote and facilitate the adoption of behaviors that protect water quality.*

The Lake Whatcom Management Program continues to educate and engage members of the community in lake protection and pollution prevention by providing information, offering incentives, and removing barriers to help people take action. Education and engagement activities are cited in both this section of the report as well as other related sections.

2022 Lake Whatcom outreach highlights include:

- Sending six issues of the Lake Whatcom Lowdown e-newsletter with updates on watershed programs and stewardship opportunities. The Lowdown currently reaches 390 subscribers.
- Mailing the *Stewards of the Lake: A Guide to Living in the Lake Whatcom Watershed* to over 600 new watershed homeowners.
- Mailing *Our Watershed*, a newsletter for the county's Lake Whatcom Stormwater Utility, to over 5,000 county utility rate payers.
- Maintaining the Lake Whatcom Management Program website as a resource to share information about the watershed, management activities, programs, and stewardship practices.
- Placing Lake Whatcom Self-Guided Tour signs along the trails in the Lookout Mountain Forest Preserve during Whatcom Water Week with fun watershed facts and stewardship tips.
- Distributing outreach materials to boaters explaining clean engine, speed limit, and wake zone rules.

2022 Program Area-Specific outreach highlights include:

- Land Preservation: The city continued partnering with the Whatcom Conservation District (WCD) to provide Wildfire Risk Assessments on 15 properties in the Lake Whatcom watershed. Wildfire risk reduction outreach targeted Lake Whatcom watershed homeowners. The WCD promoted Wildfire Awareness through social media and held a virtual workshop in collaboration with WSU Whatcom County Extension titled "How to make your home and landscape Firewise & ten tips for drought tolerant landscaping."
- Stormwater: Outreach to engage new Homeowner Incentive Program (HIP) participants included targeted mailings to eligible city property owners, a spring social media campaign, working with HIP homeowner ambassadors, and yard and street signs.

We Scoop Program Flyer | Graphic By Whatcom County 2022

HIGHLIGHTED METRICS

6,359 Unique visitors to website

5,000 Watershed residents received *Our Watershed* newsletter

390 People subscribed to *The Lake Whatcom Lowdown* e-newsletter


Parkstone Storm Drain Marking Event | Photo by Whatcom County 2022

Education and Engagement

2022 Program Area-Specific outreach highlights continued:

- Stormwater: Worked with the Parkstone Homeowners Association and WCD to install storm drain markers with reminders to "Protect Our Water" and "Only Rain Down the Drain" and provide information to residents about the importance of pollution prevention.
- Aquatic Invasive Species (AIS): Permit and inspection requirements were promoted using social media, print and bus ads, and utility bill inserts. In addition, 388 letters were mailed to Lake Whatcom shoreline property owners with a reminder on permit requirements for boats at private docks.
- Aquatic Invasive Species (AIS): The Whatcom County Sheriff's Office conducted summer boat patrols on Lake Whatcom and Lake Samish. Deputies contacted almost 400 boaters checking for AIS permits. Additional compliance outreach occurred at boat launches.
- Utilities and Transit: Residential water use efficiency rebate programs were offered by the city and the Whatcom Water Alliance (WWA).

Community Wide Outreach Highlights Include:

- We Scoop Campaign had 469 Lake Whatcom Watershed dog owners pledge to scoop the poop every time, at home and on walks, and put it in the trash. Additionally, the county gained 28 neighborhood pet waste ambassadors.

Community-wide outreach highlights include:

- Two successful community events promoted pet waste pickup. The "Find Fido" scavenger hunt had 71 participating teams, and the annual "We Scoop" photo contest had 180+ entries county-wide.
- Promoted scooping pet waste throughout the year through mailers, social media, bus ads, and events.
- Over 700 5th grade students, teachers and chaperones learned about Bellingham's water resources in Water School this year.
- Coordinated efforts to promote offsite yard waste disposal in the Lake Whatcom watershed through mailers, newsletter articles, website and social media posts, and radio ads.
- Supported the Puget Sound Starts Here Car Care campaign, promoting car care practices that reduce pollution. Three in-person events were hosted during Whatcom Water Week.
- Additional education and engagement accomplishments can be found under their respective program areas

"Scoop It Bag It Trash It" Bus Ad | Photo by Lamar Transit, 2022

HIGHLIGHTED METRICS

over **700** Students participated in the *Water School Program*

400 Watershed storm drains labeled with "Only Rain in the Drain" markers

85 Residents attended Lake Whatcom Wildfire Risk Reduction workshops

2022 Expenditures: $ **132,150**

Stormwater Outreach Booth | Photo by Whatcom County, 2022

PROGRAM AREA

Administration

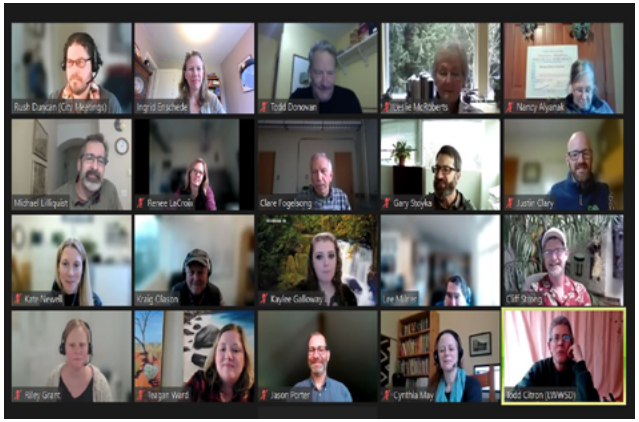
OBJECTIVE: *Coordinate and support implementation of the Lake Whatcom Management Program Work Plan.*

In 2022, Lake Whatcom Management Program administrators continued to coordinate the Interjurisdictional Coordinating Team (ICT) and Program Area activities to support the successful implementation of the 2020-2024 Lake Whatcom Management Program Work Plan.

The annual joint meeting of the City and County Councils and the Lake Whatcom Water and Sewer District Commission was held virtually on March 23. Information was shared on the Lake Whatcom water quality monitoring program, 2021 work plan accomplishments, and a preview of 2022 work planned.

ICT work in 2022 focused on completing the 2021 Work Plan Accomplishments Report, coordinating 2022 work plan activities, and preparing topics for Lake Whatcom Policy Group meetings. Lake Whatcom Policy Group meetings were held in February, June, and December to discuss work plan activities and policy issues with elected representatives from each jurisdiction and the Sudden Valley Community Association. These meetings are open to the public. Information on all public meetings and opportunities for public involvement are posted on the Lake Whatcom Management Program website at www.lakewhatcom.whatcomcounty.org

The county continues to develop and manage the new Lake Whatcom Stormwater Utility (LWSU), which provides supplemental funding for efforts to protect Lake Whatcom. The utility fees are assessed on developed lots with impervious surfaces in the watershed outside of city limits. A five-year work plan outlining activities within the six LWSU program areas (Administration, Capital Improvement Projects, Maintenance & Small Works, Monitoring & Research, Education & Outreach, and Homeowner Improvement Program), as well as a budget forecast, were developed in 2022. Quarterly and year-end financial reports, as well as annual reports and newsletters, were uploaded to the LWSU and LWMP websites for public review. A presentation about LWSU projects and future plans was provided to the Lake Whatcom Policy Group on June 1, 2022. For more information visit https://whatcomcounty.us/2830.



HIGHLIGHTED METRICS

3 Lake Whatcom Policy Group meetings held

11 ICT meetings held

2022 Expenditures: $ **145,515**

Morning Beach at Lake Whatcom | Photo by T. Ward, 2022

Climate Action

Climate Impacts to Lake Whatcom

Climate models indicate that the Pacific Northwest is projected to warm significantly by 2100, a result of greenhouse gases emitted from human activities. Higher average annual temperatures, higher average summer temperatures, and longer and more frequent extreme heat events will impact water quality and forest health of the Lake Whatcom watershed. Lake Whatcom and its watershed will be impacted by increasing ambient air temperatures and changes in precipitation cycles. These impacts will have wide-ranging effects including drinking water treatment, fish mortality, tree species distribution, and stormwater system design, among others. Because of these significant impacts, this new section has been added to the annual report to highlight ways in which climate change adaptation and mitigation is being addressed in the current program and how they might be addressed in the future.

Ways to more prominently incorporate climate action into the Lake Whatcom Management Program will be explored during the preparation of the next five-year work plan (2025-2029). A Lake Whatcom Climate Vulnerability Assessment will be initiated under the next work plan which will evaluate the impacts of climate change on lake water quality, watershed forests and the built environment of the watershed. This work will also lead to a review of current management actions and discussion of adjustments or additions to management actions that will be incorporated into the next work plan.

The following section details the how climate change adaptation and mitigation are being addressed in the Lake Whatcom Work Plan Program Areas, and how the work of the LWMP will change to address climate action.

Program Area 1: Land Preservation

Protecting the health of the watershed's forested areas helps reduce the impacts of climate change on our community. Forests absorb carbon dioxide, create shade that cools streams, and direct rainfall underground for storage and slow release.

Less summer precipitation and increasing temperatures will further stress watershed forests. The combination of changes in temperature and precipitation will cause trees to be more vulnerable to disease and pests and exacerbate conditions that contribute to wildfires. To offset dangerous forest fire conditions caused by the changing climate, the Whatcom Conservation District's Wildfire Risk Reduction Program is working directly with watershed landowners to reduce wildfire risks on private and public property. Also, LWMP staff are continuing active management of acquired forested lands to reduce fire load, decrease disease and pest infestations, and select tree species and varieties that are acclimated to warmer conditions.

Sunsrise on Lake Whatcom | Photo by Scot Sternberg 2022

Kayaker at Lake Whatcom | Photo by T. Ward, 2022

Climate Action

Program Area 2: Stormwater Management

The amount and timing of rainfall is changing as regional climate patterns trend toward longer, drier summers and wetter shoulder seasons. Increases in the intensity, frequency and duration of precipitation events add to winter stream flows, increasing stream bank erosion, destabilizing slopes and transporting additional phosphorus laden-sediment to the lake. Rising temperatures in streams and the lake itself will also contribute to increased growth of bacteria already in the waterways.

Due to these changes in rainfall patterns, LWMP partners are designing stormwater infrastructure using site-based measurements, instead of historical precipitation so systems designed today will be resilient to future shifts in rainfall timing and intensity. Furthermore, stormwater projects that replace lawns and hard surfaces with native plants and natural stormwater systems create carbon sinks that can help balance the carbon budget in our developed areas.

Program Area 3: Land Use

Converting forested land into development and its accompanying roads, lawns, and hard surfaces leads to higher temperatures in the lake and its tributaries. LWMP development regulations requires the addition of native plants and natural stormwater systems to help offset the loss of carbon storage caused by replacing forests with developed areas.

Program Area 4: Monitoring and Data

Climate change affects many of the parameters that lake managers use to assess the health and recovery of Lake Whatcom. The watershed faces increased evaporation due to heat waves, more frequent flooding due to heavy rains, and natural changes in chemistry and biology that occur under warmer temperatures. Monitoring efforts provide baseline data to help understand and evaluate climate related changes. LWMP staff are using recent rainfall patterns, which have changed significantly over the past few decades, in the latest updates of lake loading and response models.

Program Area 6: Recreation

As population in the Pacific Northwest grows, increased pressure will be put on recreational resources around the lake. As summers become warmer and drier, and heat dome events become more common, peak usage of park facilities can result in negative impacts to water quality.

Program Area 7: Aquatic Invasive Species

As a result of warming waters and changing water chemistry, the range of aquatic invasive species may change, leading to new or more resilient infestations. City and County staff participate in regional-level discussions about how to prevent this outcome as our climate becomes more habitable for non-desirable species. In addition, intensive monitoring is conducted annually to characterize invasive species populations and assess potential for new infestations. New program considerations will be needed to address increased risk of new infestations as they are identified and recognized as local concerns.

Sun and Rain on Lake Whatcom | Photo by Kyle Kooy 2022

Kayaking on Lake Whatcom | Photo by Emmeline Kaiser 2022

Climate Action

Program Area 8: Utilities and Transportation

A changing climate can impact the provision of reliable utility service and a robust transportation network for watershed residents. To address these challenges, LWMP partners ensure that climate change is included in the planning and implementation of these services.

Emerging patterns suggest a decrease in overall Cascade Range snowpack over time which, when combined with the retreating Deming Glacier, will influence the ability to augment water supply in the Lake through the Middle Fork Nooksack Diversion. Water conservation, when widely employed, can help offset the effects of drought by preserving the volume of water in surface and groundwater reservoirs. Furthermore, drought patterns increase wildland fire risk. To address this risk, the Lake Whatcom Water and Sewer District is conducting wildfire resilience audits of their facilities and implementing wildfire risk mitigation measures at over 40 water and sewer facilities. Additionally, increasing mass transit options to access the high-use areas of the watershed will reduce the carbon footprint of transportation overall.

Other Program Areas and Activities

Program Area 9: Education and Engagement and Program Area 10: Administrative efforts are vital to support the climate action work across the entire LWMP. The necessary efforts for these program areas will be defined as part of the development of the 2025-2029 LWMP Work Plan.

Many other activities conducted by LWMP staff may have a nexus with climate action that is not described in this document, in most cases because that activity is conducted jurisdiction-wide and not specifically limited to the Lake Whatcom watershed. More information on how the City of Bellingham and Whatcom County intend to address climate change, including work that applies to Lake Whatcom Management, can be found in each agency's Climate Action Plan.

City of Bellingham Climate Protection Action Plan
https://cob.org/wp-content/uploads/Climate-Protection-Action-Plan-2018-Update.pdf
Whatcom County Climate Action Plan –
https://www.whatcomcounty.us/DocumentCenter/View/69472/WC-2021-Climate-Action-Plan---pages

Sunny Day on Lake Whatcom | Photo by COB Staff, 2022

Dock on Lake Whatcom | Photo by T. Ward, 2022

Morning Beach at Lake Whatcom | Photo by T. Ward, 2022

2022 Progress Report – Expenditures

2022 Work Plan Expenditures				
Program Area	**Staff Costs**	**Capital Costs**	**Other Costs***	**Total**
1. Land Preservation	$200,910	$1,588,838	$90,450	$1,880,198
2. Stormwater	$284,586	$1,434,376	$437,487	$2,156,449
3. Land Use	$343,750	$0	$0	$343,750
4. Monitoring & Data	$48,268	$0	$468,616	$516,884
5. Hazardous Materials	$15,813	$0	$20,000	$35,813
6. Recreation	$290,856	$336,243	$95,212	$722,311
7. Aquatic Invasive Species	$528,033	$0	$91,705	$619,738
8. Utilities & Transportation	$466,052	$657,000	$1,023,850	$2,146,902
9. Education & Engagement	$74,427	$0	$57,723	$132,150
10. Administration	$129,721	$0	$15,794	$145,515
LWMP Work Plan Total	**$2,420,919**	**$4,016,458**	**$2,278,342**	**$8,715,718**

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

Resources

Land Preservation

Lake Whatcom Property Acquisition Program
cob.org/services/environment/lake-whatcom/pages/lw-property-acquisition-program.aspx

Whatcom County Parks & Recreation—Reconveyance
whatcomcounty.us/625

Protected Property in the Lake Whatcom Watershed Map
cob.org/documents/pw/lw/acquisition-land-map.pdf

Stormwater

Lake Whatcom Management Program Capital Improvement Projects
lakewhatcom.whatcomcounty.org/our-programs/capital-projects

City of Bellingham 2020 Surface and Stormwater Comprehensive Plan
lakewhatcom.whatcomcounty.org/resources

Whatcom County Lake Whatcom Comprehensive Stormwater Plans
whatcomcounty.us/3788

Whatcom County Private Stormwater System Maintenance Program
whatcomcounty.us/2877

Homeowner Incentive Program
lakewhatcomHIP.org

Land Use

Bellingham Municipal Code (BMC) 16.80 (Lake Whatcom Reservoir Regulatory Chapter), 15.42 (Stormwater Regulations), 16.55 (Critical Areas Ordinance), Title 22 (Shoreline Master Program) codepublishing.com/wa/bellingham/

Whatcom County Code (WCC) 20.51 (Lake Whatcom Watershed Overlay District & Stormwater Regulations), 16.16 (Critical Areas Ordinance), Title 23 (Shoreline Management Program) codepublishing.com/wa/whatcomcounty/

Lake Whatcom Watershed Annual Build-Out Analysis Report
lakewhatcom.whatcomcounty.org/resources

Short-Term Rental Regulations: City of Bellingham
cob.org/services/planning/development/Pages/short-term-rentals.aspx

Monitoring and Data

Lake Whatcom Monitoring Reports
cedar.wwu.edu/lakewhat_annualreps/

Lake Whatcom Reports and Resources
lakewhatcom.whatcomcounty.org/resources

Hazardous Materials

Whatcom County Emergency Management Plan
whatcomcounty.us/DocumentCenter/View/39311

Whatcom County Disposal of Toxics
whatcomcounty.us/3298

Whatcom County Pollution Reporting: (360) 778-6230
whatcomcounty.us/2882

City of Bellingham Pollution Reporting/Stormwater Hotline: (360) 778-7979
cob.org/services/environment/stormwater/hotline

Recreation

Whatcom County Parks and Recreation—Reconveyance
whatcomcounty.us/625

Lookout Mountain Forest Preserve and Lake Whatcom Park Recreational Trail Plan
whatcomcounty.us/DocumentCenter/View/23920

Whatcom County Comprehensive Parks, Recreation and Open Space Plan
whatcomcounty.us/DocumentCenter/View/14547

City of Bellingham Comprehensive Parks, Recreation and Open Space Plan
cob.org/wp-content/uploads/2020-pro-plan.pdf

Resources

Aquatic Invasive Species

Lake Whatcom Aquatic Invasive Species Program Annual Reports
lakewhatcom.whatcomcounty.org/resources

Whatcom Boat Inspections
whatcomboatinspections.com

Aquatic Invasive Species Awareness Course
whatcomboatinspections.com/ais-awareness-course

2021 Inspection Data Story Map
whatcomboatinspections.com/2022-story-map

Whatcom Boat Inspections Hotline: (360) 778-7975

Utilities and Transportation

City of Bellingham Drinking Water Quality Reports
cob.org/services/environment/lake-whatcom/pages/water-quality.aspx

Lake Whatcom Water and Sewer District Consumer Confidence Reports
lwwsd.org/for-customers/quality-consumer-confidence-reports/

City of Bellingham Water Conservation Resources
cob.org/conserve

City of Bellingham 2020-2025 Water Use Efficiency Program Report
cob.org/wp-content/uploads/2020-2025-WUE-Work-Plan-FINAL-2.pdf

Lake Whatcom Water and Sewer District Water Use Efficiency Plan 2021 Update
lwwsd.org/wp-content/uploads/2021/12/2021-Water-Use-Efficiency-Plan-FINAL-W-App.pdf

Lake Whatcom Water and Sewer District 2018 Water System Comprehensive Plan
lwwsd.org/resources/water-system-comprehensive-plan/

Lake Whatcom Water and Sewer District 2020 Sewer Comprehensive Plan
lwwsd.org/resources/comprehensive-sewer-plan/

Whatcom County Septic System Maintenance and Evaluation
whatcomcounty.us/septic

Whatcom Smart Trips
whatcomsmarttrips.org/

Community Energy Challenge
sustainableconnections.org/energy/energychallenge

Education and Engagement

Lake Whatcom Management Program
lakewhatcom.whatcomcounty.org

Stewards of the Lake: A Guide to Living in the Lake Whatcom Watershed
lakewhatcom.whatcomcounty.org/guide

City of Bellingham Lake Whatcom Stewardship
cob.org/services/environment/lake-whatcom/pages/stewardship-solutions.aspx

Bellingham Water School - Water and Me
cob.org/services/environment/education/Pages/5th-grade.aspx

Bellingham's Stormwater Discovery Tours
stormwater.cob.org

WSU Whatcom County Extension Sustainable Landscaping
whatcom.wsu.edu/ch/sustainable.html

Homeowner Incentive Program
lakewhatcomHIP.org

Lake Whatcom Watershed Baseline Survey 2018
https://repository.library.noaa.gov/view/noaa/44130

Whatcom Conservation District: Wildfire Information
whatcomcd.org/wildfire

Administration

1992 Lake Whatcom Joint Resolution

cob.org/wp-content/uploads/1992-joint-resolution.pdf

Lake Whatcom Management Program Work Plans and Progress Reports
lakewhatcom.whatcomcounty.org/resources

Lake Whatcom Meetings and Agendas
lakewhatcom.whatcomcounty.org/news

Lake Whatcom Management Program Contacts
lakewhatcom.whatcomcounty.org/contacts

Lake Whatcom Stormwater Utility
whatcomcounty.us/2830

Lake Whatcom Management Program Contacts:

City of Bellingham Public Works—Natural Resources
Renee LaCroix, (360) 778-7966, rlacroix@cob.org

Whatcom County Public Works
Gary Stoyka, (360) 778-6230, gstoyka@co.whatcom.wa.us

Lake Whatcom Water and Sewer District
Justin Clary, (360) 734-9224, justin.clary@lwwsd.org

LAKE WHATCOM COOPERATIVE MANAGEMENT

www.lakewhatcom.whatcomcounty.org