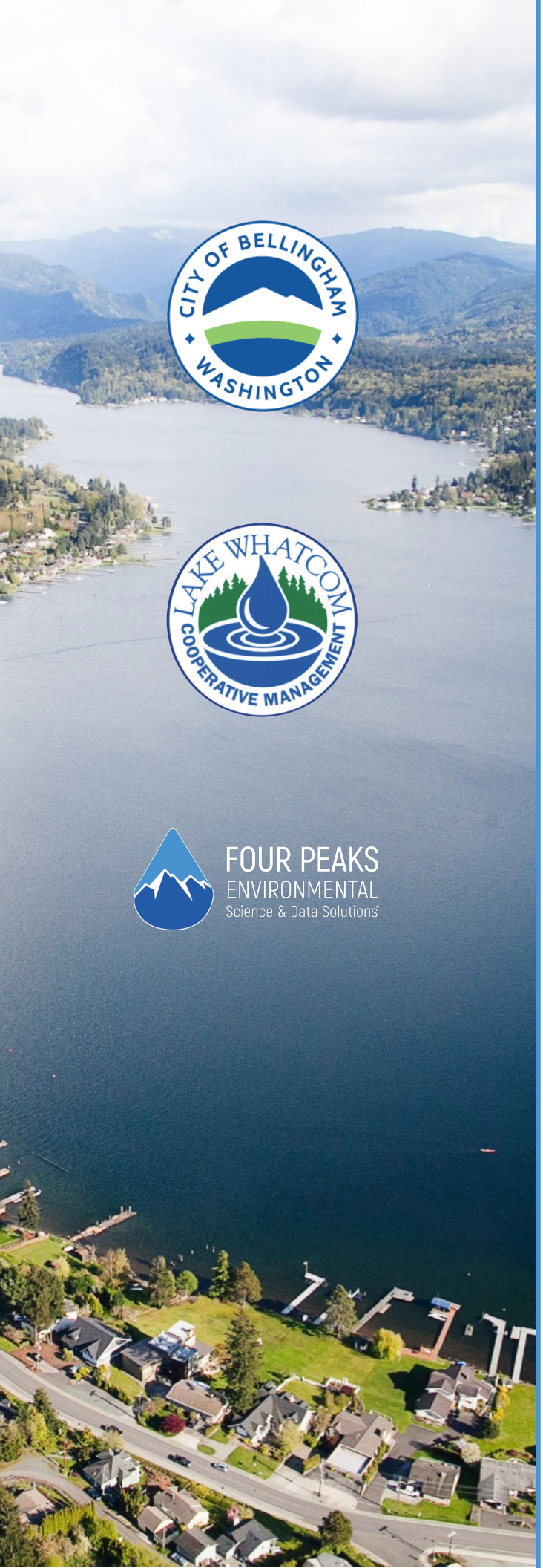

LAKE WHATCOM INVASIVE FRESHWATER MUSSEL RAPID AND EXTENDED RESPONSE PLAN

October 2025

Prepared for
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Abbreviations

Abbreviation	Definition
µS/cm	micro-Siemen per centimeter
AIS	aquatic invasive species
Ecology	Washington Department of Ecology
eDNA	environmental DNA (environmental deoxyribonucleic acid)
ESA	Endangered Species Act
FIFRA	Federal Insecticide Fungicide Rodenticide Act
ICS	Incident Command System
IPaC	Information for Planning and Consultation
LWMP	Lake Whatcom Management Program
LWWSD	Lake Whatcom Water and Sewer District
MAC Group	Multi-Agency Coordination Group
mg/L	milligram per liter
MSA	Magnuson-Stevens Fishery Conservation and Management Act
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
PCR	polymerase chain reaction
Plan	Lake Whatcom Invasive Freshwater Mussel Rapid and Extended Response Plan
POC	point of contact
ppt	part per thousand
RCW	Revised Code of Washington
SEPA	State Environmental Policy Act
Statewide Plan	State of Washington Interagency Zebra and Quagga Mussel Rapid Response Plan
TMDL	Total Maximum Daily Load
USFWS	U.S. Fish and Wildlife Service
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WSDA	Washington State Department of Agriculture

Executive Summary

This plan outlines the strategies and actions required for efficient and effective response to the detection of quagga, zebra, or golden mussels in Lake Whatcom. These invasive freshwater mussels have been detected in nearby states and pose a significant threat to drinking water infrastructure, water quality, the aquatic ecosystem, and recreational activities in Lake Whatcom. The plan assumes that early detection and verification protocols from the *State of Washington Interagency Zebra and Quagga Mussel Rapid Response Plan* have been followed. It is designed to be implemented immediately upon the detection of quagga, zebra, or golden mussels in any waters within the Lake Whatcom Plan Area.

The purpose of the Plan is to support rapid, coordinated decisions to eradicate invasive freshwater mussels if they are detected in Lake Whatcom, thereby protecting the community's ability to deliver clean, safe, and high-quality drinking water at a responsible cost and safeguarding Lake Whatcom's ecological integrity. To fulfill this purpose, the plan includes guidance on establishing incident command and multi-agency coordination groups within 48 hours of a positive detection, rapidly delimiting the range of the detected mussel, gathering information to support the selection of extended response options, and using structured decision-making to determine an extended response strategy. The plan also outlines funding and regulatory considerations for response activities and potential long-term management options.

1 Introduction

This site-specific rapid and extended response plan for Lake Whatcom (Plan) is a coordination document and technical resource intended to enhance the efficiency and effectiveness of response activities within the Plan Area (Section 1.3) for three species of invasive freshwater mussels—quagga *Dreissena rostriformis bugensis*, zebra *D. polymorpha)*, and golden mussel *Limnoperna fortunei* (Section 1.4). The Plan is part of the Whatcom Aquatic Invasive Species (AIS) Program, a comprehensive program designed to guide AIS prevention, monitoring, and response efforts in Lake Whatcom. The Whatcom AIS Program implements a robust AIS prevention framework, including watercraft inspection, public education, enforcement, and monitoring functions. This Plan supplements the AIS Program's prevention and monitoring efforts by establishing a coordinated plan for rapidly responding to a positive detection of invasive freshwater mussels in Lake Whatcom.

Accordingly, this Plan is intended to be implemented as soon as any waters within the Plan Area are classified as positive[1] for quagga, zebra, or golden mussels. It assumes that early detection and verification protocols described in the *State of Washington Interagency Zebra and Quagga Mussel Rapid Response Plan* (Statewide Plan; Four Peaks 2024) were followed leading up to the positive water body classification[2].

Like the Statewide Plan, this site-specific Plan was informed by the Pacific State's Marine Fisheries Commission's Western Basin Invasive Mussel Incident Response Toolkit (https://www.westernqzrr.com/) and the Western AIS Resource Center (https://www.westernais.org/). These resources provide information on regional and state organizational infrastructure that facilitate rapid response, whereas this Plan focuses specifically on information relevant to the Plan Area (Section 1.1).

1.1 Plan Purpose

The City of Bellingham, Whatcom County, the Lake Whatcom Water and Sewer District (LWWSD), and the Washington Department of Fish and Wildlife (WDFW) must be prepared to make rapid, coordinated decisions in the event of a quagga, zebra, or golden mussel detection in Lake Whatcom. The purpose in such a scenario is to eradicate the invasive mussels, thereby protecting the community's ability to deliver clean, safe, and high-quality drinking water at a responsible cost and safeguarding the ecological integrity of the lake. Given the severe economic and ecological consequences associated with the establishment of these invasive species, any response must be timely, effective, and informed by a clear understanding of the response action. The response also must consider potential impacts on municipal and private drinking water infrastructure, natural resources, recreational users, tribal communities, and drinking water customers.

[1] A positive water body classification is defined as multiple (two or more) subsequent sampling events that meet the minimum criteria for detection. Other water body classifications can be found in the Statewide Plan (Four Peaks 2024).

[2] It is assumed that detection, verification, and water body classification protocols will be the same for golden mussels as for quagga and zebra mussels.

1.2 Plan Goals and Objectives

1.2.1 Plan Goals

1. Minimize the probability of quagga, zebra, or golden mussel establishment.
2. Minimize the impact of quagga, zebra, or golden mussels on drinking water quality, aquatic resources, outdoor recreational resources, critical infrastructure, and cultural resources after an initial detection.
3. Maximize response effectiveness by defining site-specific rapid response activities and an efficient framework for assessing, selecting, and implementing extended response activities.

1.2.2 Plan Objectives

1. Set clear communication and reporting guidance to trigger the initiation of an Incident Command System (ICS) and the Multi-Agency Coordination (MAC) Group[3] within 48 hours of any portion of the Plan Area being classified as positive for quagga, zebra, or golden mussels.
2. Provide specific guidance for range delimitation efforts within the Plan Area.
3. Identify available extended response activities and specify information required to assess trade-offs to support decision-making efforts once range delimitation efforts conclude (i.e., no later than 6 weeks after a positive water body classification).
4. Provide guidance for implementing extended response activities within 2 weeks of a decision-making workshop.

1.3 Plan Area

The Plan Area includes the waters of Lake Whatcom, continuing downstream to the control dam at the head of Whatcom Creek, inclusive of dam infrastructure (Figure 1). It does not include the tributaries of Lake Whatcom or Lake Louise.

Lake Whatcom is a large (36,000 acre) lake in Whatcom County that holds approximately 250 billion gallons of water and provides drinking water for the City of Bellingham, LWWSD, several smaller water districts and associations, and homes on the lake. The lake supports a variety of fishes, amphibians, reptiles, birds, and mammals and drains into Whatcom Creek and Bellingham Bay, which support endangered and threatened runs of Coho Salmon *Oncorhynchus kisutch*, Chum Salmon *O. keta*, Chinook Salmon *O. tshawytscha*, and steelhead *O. mykiss*. The lake level is managed by the City of Bellingham using a control dam at the head of Whatcom Creek.

[3] See Statewide Plan (Four Peaks 2024) for definitions.

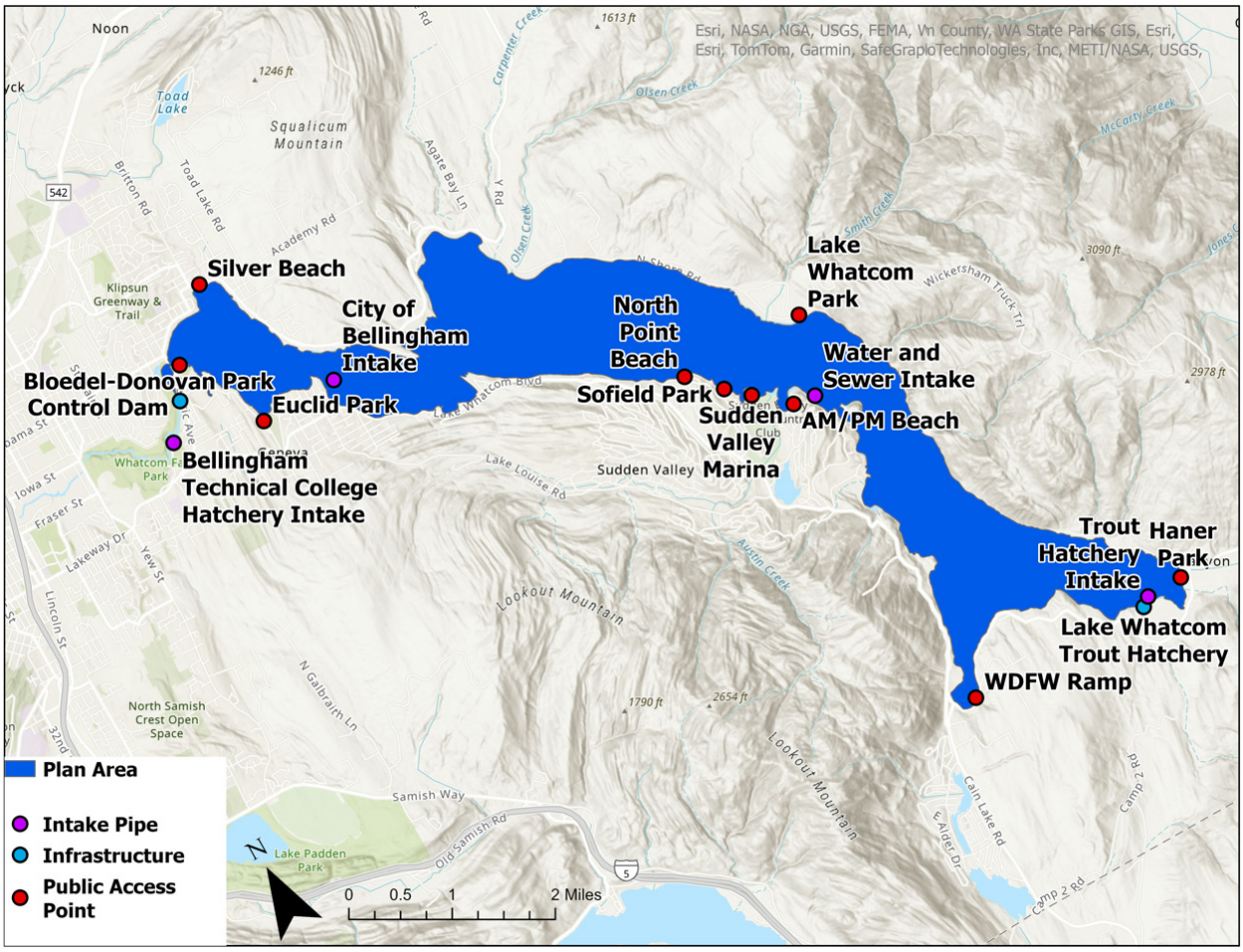


Figure 1. Plan Area

1.3.1 Lake Whatcom Management

The Lake Whatcom Management Program (LWMP) was developed in 1998 by the City of Bellingham, Whatcom County, and the LWWSD to facilitate coordination and develop a shared management strategy. The LWMP includes legislative bodies, a management team, an interjurisdictional coordinating team, agency staff, and advisory committees. This program guides actions to protect Lake Whatcom as a long-term supply of drinking water and meet federal Clean Water Act requirements.

1.3.2 Lake Whatcom Water Quality

In 1998, the Washington Department of Ecology (Ecology) placed Lake Whatcom on Washington's 303(d) list for polluted water bodies because it failed to meet state water quality standards for dissolved oxygen and fecal coliform bacteria. Ecology, the City of Bellingham, and Whatcom County staff worked together to develop a watershed management strategy to enable Lake Whatcom to meet state water quality standards in the future. Ecology continues to work with the City of Bellingham and Whatcom County to implement plans developed through a Total Maximum Daily Load (TMDL) process to meet

state water quality standards for dissolved oxygen and fecal coliform bacteria.[4] The City of Bellingham works closely with the Western Washington University Institute for Watershed Studies to monitor water quality trends in Lake Whatcom. Currently the lake is sampled in five locations with 12 tributaries monitored throughout the year. Detailed annual reports are available at https://cedar.wwu.edu/lakewhat_annualreps/.

The water chemistry of Lake Whatcom is relevant to the probability of invasive mussel establishment (Section 1.4). The water chemistry of Lake Whatcom has been sampled regularly by both the WDFW and Institute for Watershed Studies (Table 1).

Table 1. Water Quality Parameters in Lake Whatcom

Parameter	Mean Value	Range of Observed Values
Dissolved Calcium (mg/L)[1]	5.8	5.5-6.4
Salinity (ppt)[1]	0.03	0-0.07
Temperature (°C)[2]	11.4	3.8-24.2
pH[2]	7.4	6-9.5
Dissolved Oxygen (mg/L)[2]	9.5	0-13
Conductivity (µS/cm)[2]	58.6	54.4-100

Notes:
1. Summary values calculated from data collected by WDFW from 2017-2024.
2. Summary values calculated from data collected by the Institute for Watershed Studies from 2017 and 2019-2024.

1.3.3 Lake Whatcom Infrastructure

Critical infrastructure on Lake Whatcom includes the following (Figure 1):

- City of Bellingham control dam
- City of Bellingham drinking water intake
- Bellingham Technical College Hatchery and hatchery intake
- WDFW Lake Whatcom Trout Hatchery and hatchery intake
- LWWSD drinking water intake
- Private drinking water intakes
- Various private and public boat launches, ramps, and docks

Public access locations include the following, where locations that include public access for motorized boats are indicated by an asterisk (Figure 1):

- AM/PM Beach
- Bloedel Donovan Park*
- Euclid Park
- Haner Park
- Lake Whatcom Park

[4] https://ecology.wa.gov/Water-Shorelines/Water-quality/Water-improvement/Total-Maximum-Daily-Load-process/Directory-of-improvement-projects/Lake-Whatcom-Watershed-multi-parameter-TMDL

- Lake Whatcom Southerly Boat Launch (WDFW launch)*
- North Point Beach
- Silver Beach
- Sofield Park
- Sudden Valley Marina*

Three public access locations accept motorized boats (i.e., Bloedel Donovan Park, WDFW launch, and Sudden Valley Marina). Consequently, these locations are at a higher risk of mussel introduction than other access locations. These three public access locations are currently the only locations regularly monitored for invasive mussels (Section 1.5.2).

1.4 Species Background

1.4.1 Quagga and Zebra Mussels

Quagga and zebra mussels are freshwater mollusks native to Ukraine and Russia that have a long history of invasion and successful establishment outside their native range. Quagga mussels prefer deep, oligotrophic, cold-water, whereas zebra mussels prefer warm, eutrophic, shallow waters (MacIsaac 1994; PSMFC 2025). Both species tolerate a wide range of temperatures and water chemistry but require 10 mg per liter (mg/L) of calcium ions to initiate shell growth (Table 2). While adult quagga and zebra mussels may not readily establish in waters with low dissolved calcium, it is unknown how long veligers may survive in the water column, thus continuing to pose a risk of further spread.

Once established, quagga and zebra mussels can cause catastrophic ecosystem impacts, outcompeting native mussels and other filter feeding invertebrates, altering habitat complexity, changing food web dynamics, and reducing water quality. They can also have direct economic and safety impacts, clogging water intake structures, fish screens, and boat engines; overtaking docks, buoys, boat hulls, anchors, and beaches; and contributing to disease outbreaks in species that consume them. (Herbert et al. 2014; PSMFC 2025).

Quagga and zebra mussels were first discovered in the United States in the Great Lakes region in the 1980s and are thought to have been transported in ballast waters of trans-oceanic ships. Since the late 2000s, they have been spreading throughout the western United States (Nevada [2007], California [2008], and Montana[5] [2016]), with the most recent detection in the Snake River in Idaho in 2023. While a comprehensive eradication effort continues in the Snake River, the presence of invasive mussels in the Columbia River Basin presents an imminent threat. Washington classifies quagga and zebra mussels as prohibited level 1 AIS (Washington Administrative Code [WAC] 220-640-030(1)).

Table 2. Environmental parameters for quagga, zebra, and golden mussels

Parameter	Quagga/Zebra Mussels	Golden Mussels	References
Calcium	10-25 mg/L	1-50 mg/L	PSMFC 2025; Darrigran 2008
Salinity	≤ 4 ppt (Zebra mussels), 30 (Quagga mussels)	0-2 ppt; up to 23 ppt w/ freshwater pulses	Spidle et al. 1995; Sylvester et al. 2013

[5] Quagga and zebra mussels did not ultimately establish in Montana despite having positive veliger detections.

Parameter	Quagga/Zebra Mussels	Golden Mussels	References
Temperature (adult survival)	0-30°C (32-86°F)	8-35°C (46-95°F)	Darrigran 2008; PSMFC 2025
Temperature (spawning)	>12°C (54°F) (Zebra mussels), >5°C (41°F) (Quagga mussels)	16-28°C (61-82°F)	Darrigran 2008; Yang et al. 2024; PSMFC 2025
pH	7.4-8.4	5-10	Yang et al. 2024; PSMFC 2025
Dissolved Oxygen	>2 mg/L	3.7-11.2 mg/L	Mackie and Brinsmead 2017; McMahon 1996
Depth	≤ 50 m (164 ft)	0.5-40 m (1.5-131 ft), 10 m* (33 ft)	Darrigran 2008; Benson et al. 2023; Benson et al. 2025
Sexual Maturity (shell size)	5-12 mm (~1/4-1/2 in)	6-8 mm (~1/4-1/3 in)	Delmott and Edds 2014; Darrigran 2008

Note:
* Optimum depth

1.4.2 Golden Mussels

The Golden mussel is an invasive, fresh/brackish water bivalve native to the Pearl basin in China and Southeastern Asia. They prefer shallow (< 10 m) aquatic environments, although they have been shown to survive in depths up to 40 m (Table 2). Golden mussels are similar in appearance, biology, and impacts to quagga and zebra mussels. Like quagga and zebra mussels, golden mussels also tolerate wide ranges of water quality parameters but have higher water temperature and lower calcium level tolerances (PSMFC 2025; Table 2).

The first documented appearance of golden mussels in North America occurred in the Sacramento-San Joaquin Delta in October 2024, posing a new threat to aquatic ecosystems in the United States. Given that they are newly introduced to the United States, golden mussels are not currently listed as a prohibited AIS in Washington State, which is an important consideration for rapid response actions. It is assumed that if golden mussels are not classified as prohibited level 1 AIS and are detected in Lake Whatcom, the City of Bellingham on behalf of the LWMP will immediately request that WDFW initiate an emergency rule prohibiting the species and request that the WDFW Director take emergency measures and rapid response actions (Revised Code of Washington [RCW] 34.05.350). The remainder of the Plan assumes that this request is successful and that golden mussels will be treated as a prohibited level 1 AIS.

1.5 Site-Specific Plan Context

This section addresses site-specific considerations for rapid and extended response actions in the Lake Whatcom Plan Area. This site-specific Plan assumes that early detection and verification protocols delineated in the Statewide Plan were followed leading up to a positive classification for quagga, zebra, or golden mussels. The Plan also assumes that, if quagga, zebra, or golden mussels are detected in Lake Whatcom, the City of Bellingham on behalf of the LWMP will immediately request that the WDFW Director take emergency measures and rapid response actions (RCW 77.135.090).

1.5.1 Species Context in Plan Area

The Plan Area has many factors that put it at risk of quagga, zebra, or golden mussel introduction and establishment, including the extent and types of usage (e.g., total day use, presence of boat ramps and marinas, usage by sea planes, motorized boating, and fishing), the number of private residences with

boat docks, its proximity to a waterbody with a recent quagga mussel introduction (upper Snake River, Idaho), and its proximity to the Port of Bellingham, which may receive shipping vessels from mussel infested waters. Calcium concentrations in Lake Whatcom are on average less than 6 mg/L and are thus assessed to be too low to support the widespread establishment of quagga or zebra mussels (Table 2). However, it is not known how long veligers survive in the water column, thus even if permanent establishment probability is low, there remains a risk of additional spread. By contrast, golden mussels are not limited by calcium concentrations and pose a higher risk of invasion, particularly in shallow habitat (Figure 2).

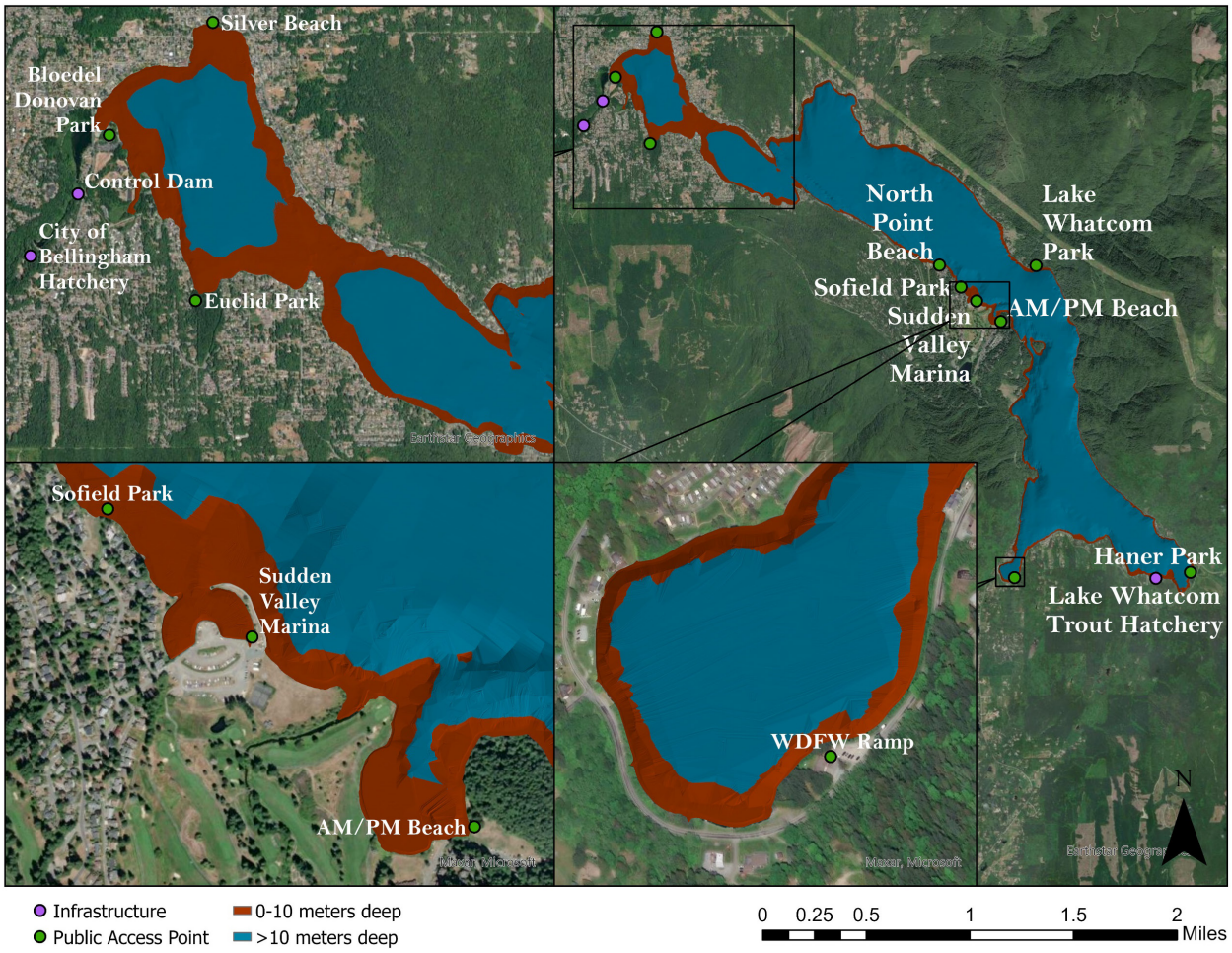


Figure 2. A depiction of the habitat most at risk of a golden mussel invasion in Lake Whatcom based on water depth

1.5.2 Prevention and Routine Monitoring

The LWMP has established a comprehensive AIS prevention and monitoring program, combining watercraft inspections, public education, enforcement, and monitoring (LWICT 2024). Watercraft inspection and decontamination stations exist at Bloedel Donovan Park, Sudden Valley Marina, and the WDFW launch. Inspections are required for all watercraft operating on Lake Whatcom, including non-motorized craft such as canoes and kayaks. The program's public education and outreach includes providing educational resources at local events, maintaining a regularly updated website with

information relevant to boaters, and offering an online AIS awareness course. The Whatcom County Sheriff's Office supplements these efforts with on-water enforcement to ensure compliance with inspection requirements.

Monitoring is conducted by WDFW, the City of Bellingham, and other state and local entities. WDFW monitors Bloedel Donovan Park, Sudden Valley Marina, and the WDFW launch three times per year at a frequency of once every 2 months. The City of Bellingham supplements these monitoring efforts by monitoring three times per year at alternating months from WDFW such that monitoring occurs monthly from April through October. Additional prevention and routine monitoring efforts by the LWMP are documented at https://www.lakewhatcom.whatcomcounty.org.

1.5.3 Invasive Freshwater Mussel Vulnerability Assessments

Facility managers that manage raw water infrastructure, such as water systems for drinking and agriculture or industrial facilities, may wish to conduct vulnerability assessments of their infrastructure. A vulnerability assessment guide is now available (Claudi and Littley 2024). Vulnerability assessments provide advanced insight into the risks and costs of invasive mussels to help plan and prepare for anticipated increases in costs and maintenance. Additionally, preventative treatment measures may be available to mitigate risks and adapt systems to minimize impact.

1.6 Plan Overview

The Plan is divided into two general activity classifications: 1) rapid response activities, and 2) extended response activities. It is organized sequentially to address the following topics (Figure 3):

- Rapid Response Activities (Section 4)
  - Requesting ICS (Section 4.1)
  - ICS Staff and MAC Group Establishment (Section 4.2)
  - Notification (Section 4.3)
  - Range Delimitation (Section 4.4)
  - Minimize Additional Spread (Section 4.5)
  - Data Collation (Section 4.6)
  - MAC Group Decision-Making Workshop Preparation (Section 4.6.1)
- Extended Response Activities (Section 5)
  - MAC Group Decision-Making Workshop (Section 5.1)
  - Extended Response Activity Options (Section 5.2)
  - Decision-Making Support (Section 5.3)
  - Extended Response Activity Implementation (Section 5.4)
- Long-Term Management (Section 6)

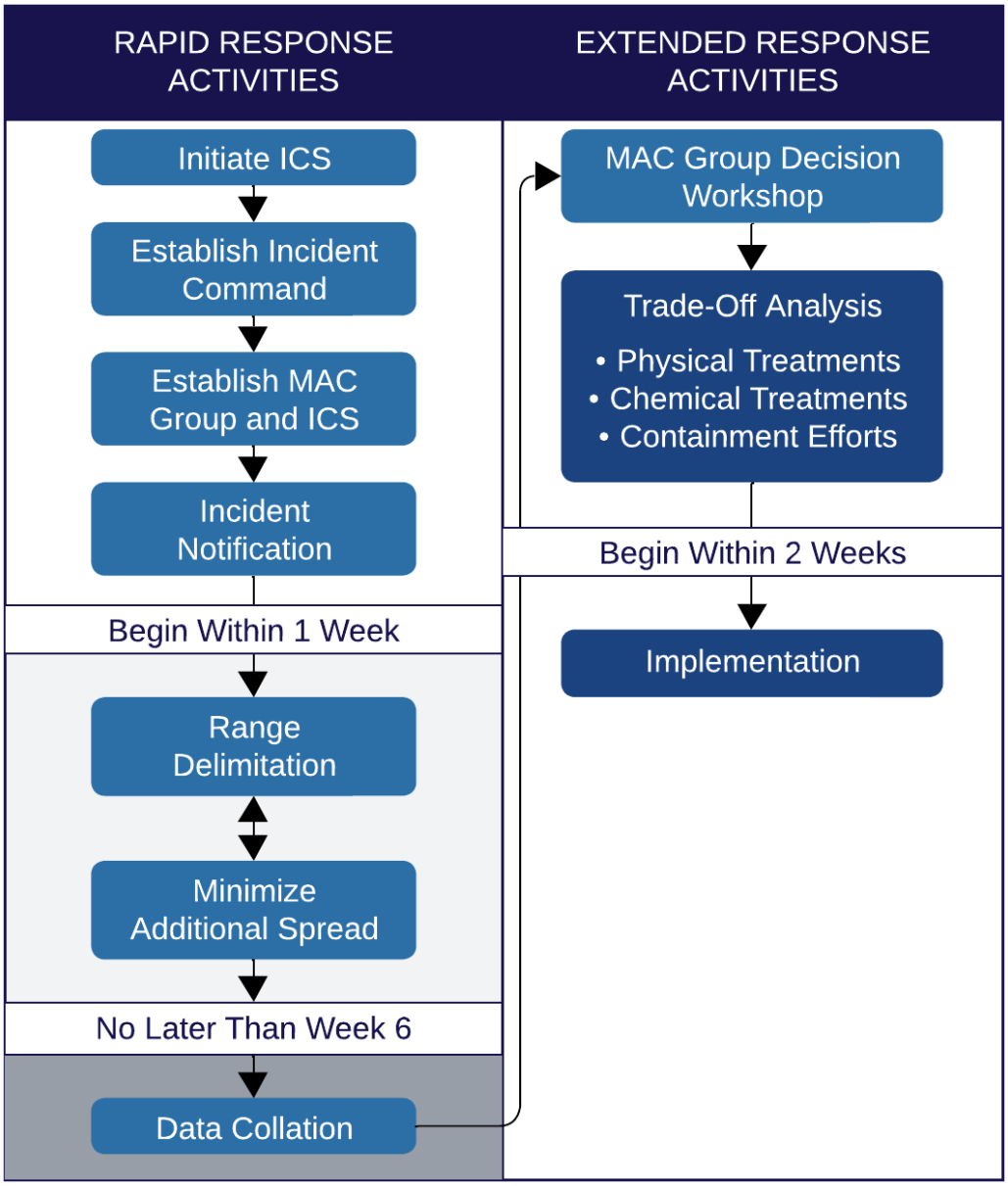


Figure 3. Overview of the Lake Whatcom quagga, zebra, and golden mussel rapid response plan process

2 Rapid Response Oversight

If any portion of the Plan Area becomes classified as positive for quagga, zebra, or golden mussels (assuming a rule to prohibit golden mussels has been made), an ICS[6] will be established by WDFW. The ICS will remain in place for all rapid and extended response activities until the Unified Command terminates ICS. The decision to terminate ICS generally occurs once no further management actions are required (e.g., successful eradication) or long-term monitoring and suppression activities are established. For additional information on ICS, reference the Statewide Plan (Four Peaks 2024).

The advanced establishment of agreements between entities that are likely to be involved in a response is highly encouraged to expedite response efforts. Agreements that are being considered, negotiated, or currently exist include those between the WDFW AIS Division and the WDFW Lake and Stream Rehabilitation Program to support chemical and bacterial treatments, between the WDFW AIS Division and chemical application contractors to support chemical treatments, between WDFW and vendors to support containment system deployment, and between WDFW and laboratories to process samples associated with a rapid response. In addition, agreements with specific dive teams are recommended to facilitate rapid response measures.

2.1 Unified Command

For ICS in the Plan Area, Unified Command will be comprised of designated leaders from WDFW and the City of Bellingham, Whatcom County, and LWWSD to facilitate fast decision-making for response activities. WDFW will be the primary implementer of rapid response and extended rapid response activities. The primary role of the City of Bellingham, Whatcom County, and LWWSD will be to support WDFW and ensure access to sites within the Plan Area for rapid and extended response activities. However, if quagga, zebra, or golden mussels are detected on the control dam at the head of Whatcom Creek, the City of Bellingham will be the primary implementer of rapid response and extended rapid response activities for the dam infrastructure.

2.2 Multi-Agency Coordination Group

Per the Statewide Plan (Four Peaks 2024), a non-field-based MAC Group will be convened by the Unified Command to implement ICS protocols together. The MAC Group acts as a policy-level body supporting the Unified Command with resource prioritization and allocation while enabling decision-making among elected and appointed officials with the Unified Command. Specifically, a MAC Group allows for input from other local, state, tribal, regional, and federal agencies that have legal responsibility to establish priorities among multiple competing incidents, provide coordinated decision-making for resource allocation, harmonize agency policies, and offer strategic guidance and direction to support rapid response and extended response activities. The MAC Group should consist of administrators or executives, or their designee, who are authorized to commit agency resources and funds.

[6] Incident Command System is a standardized approach to incident management developed by the Federal Emergency Management Agency Emergency Management Institute. It is assumed ICS will be established for golden mussels even though it is not currently on Washington's prohibited species list.

MAC Group membership is by invitation, and participants must meet one or more of the following requirements:

- Legal jurisdiction
- Available tangible resources to support incident response
- Ability to provide critical intangible resources such as species biological and management expertise (can be regional)
- Representation of people, cultures, or industries directly affected by quagga, zebra, or golden mussels in Washington State

Membership often evolves through rapid and extended response activities as new information becomes available and as available response options evolve. Currently, identified potential MAC Group members include the following in alphabetical order:

- City of Bellingham Mayor's Office
- City of Bellingham Parks and Recreation
- City of Bellingham Public Works, Natural Resources
- Confederated Tribes of the Colville Reservation
- Ecology
- Institute for Watershed Studies
- Lummi Nation
- LWWSD
- National Oceanographic and Atmospheric Administration National Marine Fisheries Service (NMFS)
- Nooksack Indian Tribe
- Office of the Governor
- Pacific Northwest Waterways Association
- Pacific States Marine Fisheries Commission
- Port of Bellingham
- Samish Indian Nation
- Sauk-Suiattle Indian Tribe
- Snoqualmie Indian Tribe
- Sudden Valley Property Manager
- Swinomish Indian Tribe
- U.S. Fish and Wildlife Service (USFWS)
- U.S. Geological Survey
- Upper Skagit Indian Tribe
- Washington Department of Natural Resources
- Washington Invasive Species Council
- Washington State Department of Agriculture (WSDA)
- Washington State Department of Archaeology and Historic Preservation
- WDFW
- Whatcom County
- Whatcom County Executive's Office
- Whatcom County Health and Community Services Department

- Whatcom County Public Works Department, Natural Resources Division

Specific roles or organizations within these entities will be determined based on the specific detection scenario.

2.3 Incident Command System Staff

Once ICS has been approved and Unified Command established, other staff will be activated as needed (Figure 4). Only one person should be designated to lead each Staff position except for Unified Command, which will have four Incident Commanders. Other positions may be filled by qualified persons from any agency or jurisdiction, and a recommended list of personnel to staff these positions is provided in Table 3. Additional information about specific tasks associated with each Staff position can be found in the ICS Review Document (FEMA 2019).

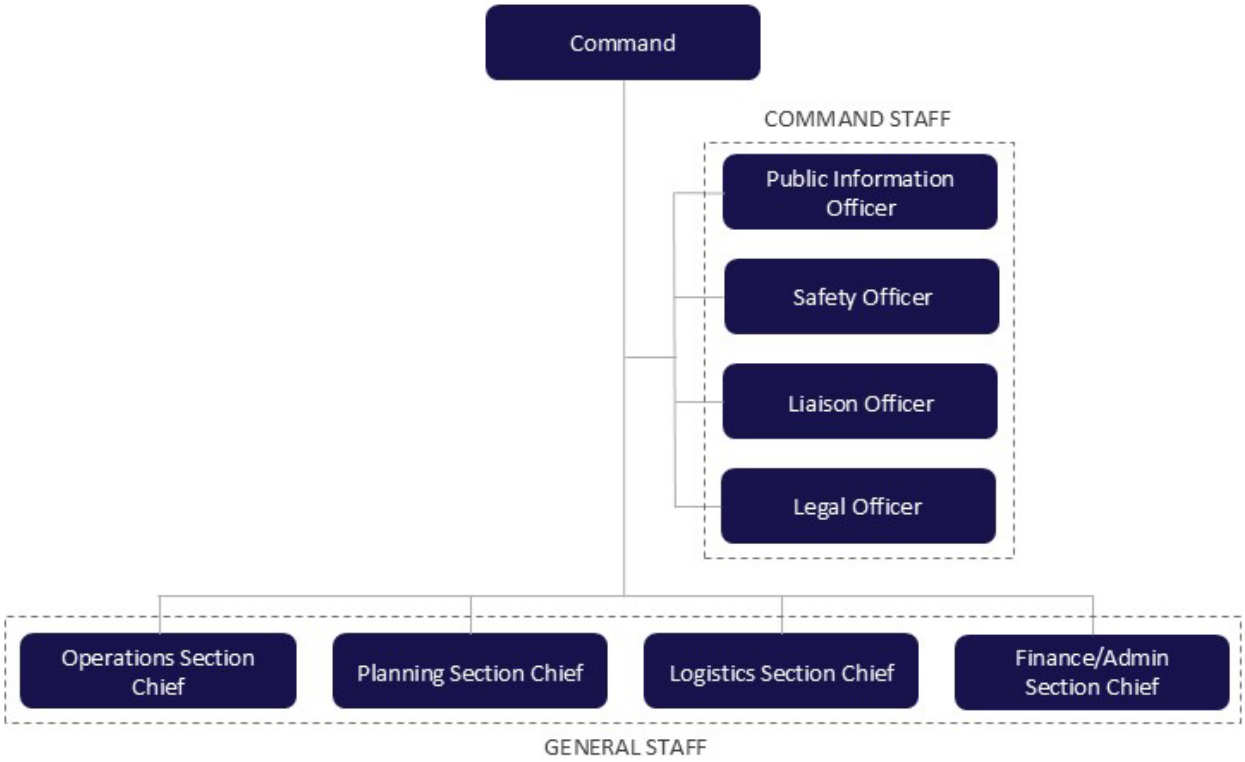


Figure 4. Incident Command System staff organizational structure

Table 3. Recommended personnel for Incident Command System staff assignments and role descriptions

ICS Role	Role Description	WDFW	Other Entities
Incident Command	Sets the incident objectives, strategies, and priorities and has overall responsibility for the incident	AIS Division Manager or AIS Management Coordinator	City of Bellingham Natural Resource Superintendent, Whatcom County Natural Resources Program Manager, LWWSD General Manager
Deputy Incident Command	Sets the incident objectives, strategies, and priorities and has overall responsibility for the incident	AIS Management Coordinator or Region 4 Director	--
Operations Section Chief	Develops tactical organization and directs all resources to carry out the rapid response activities	AIS Prevention Unit Leader	--
Deputy Operations Section Chief	Develops tactical organization and directs all resources to carry out the rapid response activities	Watercraft Inspection and Decontamination Unit Leader	--
Local Operations POCs	Develops tactical organization and directs all resources to carry out the rapid response activities	--	City of Bellingham Natural Resource Superintendent, Whatcom County Natural Resources Program Manager
Planning Section Chief	Supports the incident action planning process by tracking resources, collecting/ analyzing information, and maintaining documentation	AIS Research Scientist	--
Deputy Planning Chief	Supports the incident action planning process by tracking resources, collecting/ analyzing information, and maintaining documentation	--	City of Bellingham Water Quality Technical Supervisor
Logistics Section Chief	Arranges for resources (e.g., personnel, equipment, teams, supplies, and facilities) and needed services to support the achievement of the incident objectives	Region 4 Administrative Assistant	--
Deputy Logistics Section Chief	Arranges for resources (e.g., personnel, equipment, teams, supplies, and facilities) and needed services to support the achievement of the incident objectives	AIS Administrative Assistant	--
Local Logistics POCs	Arranges for resources (e.g., personnel, equipment, teams, supplies, and facilities) and needed services to support the achievement of the incident objectives	--	City of Bellingham AIS Coordinator or Whatcom County Natural Resources Program Manager
Finance/Administration Section Chief	Monitors costs related to the incident and provides accounting, procurement, time recording, and cost analyses	Fish Program Budget Manager	--

ICS Role	Role Description	WDFW	Other Entities
Deputy Finance/ Administration Section Chief	Monitors costs related to the incident and provides accounting, procurement, time recording, and cost analyses	Fish Program Deputy Budget Manager	--
Local Finance/ Administration POCs	Monitors costs related to the incident and provides accounting, procurement, time recording, and cost analyses	--	City of Bellingham Public Works Financial Manager
Public Information Officer	Releases information to the community and the media	AIS Communications Specialist	--
Deputy Public Information Officer	Releases information to the community and the media	Enforcement Program Communications Manager	Whatcom County Public Information Officer
Local Public Information Officer POCs	Releases information to the community and the media	--	City of Bellingham Public Works Outreach and Communications Manager and Whatcom County Public Information Officer
Safety Officer	Manages safety by identifying and mitigating hazards	Region 4 Safety Officer	--
Local Safety Officer POCs	Manages safety by identifying and mitigating hazards	--	City of Bellingham Safety Officer, Whatcom County Safety Officer
Liaison Officer	Acts as a point of contact for agency representatives and assists in setting up and coordinating interagency contacts	AIS Division Manager or Region 4 Director	--
Deputy Liaison Officer	Acts as a point of contact for agency representatives and assists in setting up and coordinating interagency contacts	Washington Invasive Species Council Executive Coordinator	--
Local Liaison POCs	Acts as a point of contact for agency representatives and assists in setting up and coordinating interagency contacts	--	City of Bellingham Natural Resource Superintendent
Legal Officer	Provides legal advice to the Unified Command related to emergency response actions	Liaison Officer or Region 4 Enforcement Captain	--
Deputy Legal Officer	Provides legal advice to the Unified Command related to emergency response actions	Assistant Attorney General, Public Lands & Conservation Division	--
Local Legal Officers	Provides legal advice to the Unified Command related to emergency response actions	--	City of Bellingham Assistant City Attorney

Note:
The Unified Command will designate one person for each role using this list for guidance.

2.4 Responding Entities

Responding entities report to the Operations Sections Chief and are tasked with implementing all tactical operations for rapid and extended response including oversight of all staging areas. During the rapid response activities (Section 4), this will include conducting the delimitation sampling (Section 4.4), watercraft decontamination (Section 4.5), and other field related tasks. During extended response activities (Section 5.2), additional entities may be assigned to activities such as containment and treatment of the water body. Responding entities must have a combination of one or more of the following attributes:

- Fisheries management authority[7]
- Proximity to the affected water body
- Capability to provide staff, equipment, and other resources to support rapid response activities

The WDFW and City of Bellingham are designated responding entities for all detection scenarios within the Plan Area. Additional responding entities able to provide field support may be requested by Unified Command based on potential detection locations and planned extended response activities (Table 4).

[7] A fisheries management authority is an entity given the mandate by the WDFW to manage the fisheries of a water body. The Statewide Plan includes a full list of authorities for water bodies throughout Washington State.

Table 4. Responding entities based on detection scenario, associated point of contact, and support entities may provide

Responding Entity	Scenario	Responsible Position and Point of Contact[1]	Support
WDFW	All	Region 4 Fish Program Manager (Edward Eleazer), Region 4 Assistant Regional Wildlife Program Manager (Robert Wingard), and AIS Prevention Unit Lead (Jesse Schultz)	Boat, sampling gear, containment curtains, decontamination equipment, chemical or bacterial treatment equipment
City of Bellingham	All	Natural Resource Superintendent (Mike Parelskin)	Boat, sampling gear, decontamination equipment
City of Bellingham	Bloedel Donovan Park adult detection	Park Operations Manager (Steve Janiszewski)	Boat
LWWSD	Detection involving Sudden Valley water treatment plant and associated infrastructure	LWWSD General Manager (Justin Clary)	Dive team point of contact
Sheriff's Office	Boat ramps	Whatcom County Sheriff's Office (Deputy M. King)	Enforcement of closures
Sudden Valley	Detection at Sudden Valley marina or boat ramp, AM/PM beach, North Point Beach, Sofield Park	Sudden Valley Community Association General Manager (Michael Bennett)	Provide access
Whatcom County Natural Resources	Detections outside City of Bellingham limits (e.g., Euclid Park, Lake Whatcom Park)	Noxious Weed Coordinator (Laurel Baldwin)	Boat, some sampling gear
Dive Team Contractor	Physical removal treatment options	To be determined	Scuba equipment

Note:
1. This table lists the individuals serving in the responsible positions as of October 2025.

3 Response Operations

3.1 Funding Considerations

Resources to support rapid response activities (initial 6 weeks of response) in the Plan Area will be drawn from dedicated and general state funds. Additionally, governor-ordered emergency measures to prevent or abate the prohibited species under RCW 77.135.090 may make available associated emergency funding to support these efforts.

Extended response activities (i.e., containment, treatments, additional monitoring, and mitigation and recovery) are expected to require additional funding, including funds through grants and agreements. ICS staff should lead the funding request process with the MAC Group and other participating partners reviewing and supporting the requests.

3.2 Regulatory Compliance Considerations

Steps must be taken to ensure that extended response activities in the Plan Area meet applicable regulatory compliance requirements, including permits, environmental compliance processes, and other approvals associated with a potential response option. The Unified Command should consult with the ICS Legal Officer and regulatory agencies early in the response process to identify required permits, authorizations, and process steps. To avoid delay and streamline this aspect of a response, it is also recommended that responding entities engage with their legal counsel before a detection to develop a regulatory compliance strategy for likely response activities in the Plan Area. Such a strategy could include identifying necessary permitting and environmental compliance processes, exploring options for expediting those processes, and developing information necessary to complete necessary applications and documentation.

3.2.1 Permitting Considerations

The federal Clean Water Act and state laws regulate placement of material and the application of chemical or bacterial treatments in or adjacent to waterbodies. Permits are typically required before such activities may begin, and the activities must be conducted in compliance with the permit. In addition, the State of Washington regulates the handling of AIS. Additional details about these regulatory requirements are presented in Sections 3.2.1.1 through 3.2.1.3.

3.2.1.1 Placement of Material

Response actions that involve placement of materials in or adjacent to Lake Whatcom, such as benthic mats and containment curtains, may require state and federal permits. These permitting processes are administered by the U.S. Army Corps of Engineers, Ecology, WDFW, and Washington Department of Natural Resources. Early coordination with these agencies will facilitate identification of the necessary permits and the appropriate application processes. For example, the Joint Aquatic Resource Permit Application (JARPA) may offer a streamlined way to apply for permits from each of these agencies through a single application.

3.2.1.2 Chemical or Bacterial Treatments

Response actions that employ chemical or bacterial treatments in Lake Whatcom would require authorization under state and federal law. Ecology administers both the waste discharge permit and federal National Pollutant Discharge Elimination System permitting programs in Washington and offers a

variety of permits for activities involving application of pesticides to surface water.[8] For example, Ecology offers a general permit for AIS control activities using pesticides or other products.[9] When selecting a chemical or bacterial treatment, the Unified Command should consult with Ecology to determine the appropriate permit and applicable requirements for the proposed treatment. Treatments with potential to negatively impact water quality parameters addressed by the Lake Whatcom TMDL—i.e., dissolved oxygen, phosphorus, or fecal coliform—may have stricter permit requirements to prevent further impairment.

In addition to limitations imposed by the permit, chemical or bacterial treatments implicate the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). FIFRA directs the U.S. Environmental Protection Agency to regulate the distribution, sale, and use of pesticides. Under FIFRA, most pesticides distributed or sold in the United States must be registered by the U.S. Environmental Protection Agency and used in accordance with instructions on the pesticide's label. If a "New Use" of a currently registered pesticide is necessary, permitting would be required.[10] For new uses of currently registered pesticides, a registrant must apply to WSDA for a FIFRA Section 24(c) Special Local Need pesticide registration.[11] Alternatively, if it is determined that a currently unregistered pesticide is needed to address the incident, an application for a FIFRA Section 18 emergency exemption from federal registration may be submitted to WSDA.[12]

3.2.1.3 Aquatic Invasive Species Handling Authorization

Washington law prohibits certain activities involving prohibited or regulated AIS without authorization from WDFW (RCW 77.135.040). For example, there are criminal penalties for possession of a prohibited level 1 species, such as quagga or zebra mussels, without WDFW authorization, a permit, or as otherwise provided by rule (RCW 77.15.809). WDFW has a process for authorizing the capture, possession, and destruction of prohibited level 1, 2, or 3 species by persons working within the scope of an invasive species control program (WAC 220-640-100) and with an AIS Permit issued by WDFW. The Unified Command should consult with WDFW to determine and obtain necessary authorizations before initiating response actions that would require handling regulated AIS.

3.2.2 Environmental Compliance Processes

Additional environmental compliance processes may apply to an AIS response in Lake Whatcom. The necessary processes will depend on the circumstances and entities involved in the response action. For example, the federal compliance processes (Section 3.2.2.2) may or may not apply, depending on whether the response involves a federal action agency, requires a federal permit or other authorization, is federally funded, or involves a federally-listed species or designated critical habitat. The Unified

[8] https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Aquatic-pesticide-permits
[9] https://ecology.wa.gov/regulations-permits/permits-certifications/aquatic-pesticide-permits/aquatic-invasive-species-control
[10] As of October 2025, Potassium Chloride ("Potash") is undergoing review to become labeled for use as a molluscicide.
[11] https://agr.wa.gov/services/licenses-permits-and-certificates/summary-descriptions/special-local-need; https://www.epa.gov/pesticide-registration/guidance-fifra-24c-registrations
[12] https://agr.wa.gov/departments/pesticides-and-fertilizers/pesticides/pesticide-registration/product-registration/special-registrations/section-18-emergency-exemption

Command should consult with the ICS Legal Officer and any federal agencies participating in the response to determine applicable requirements.

3.2.2.1 State Environmental Policy Act

Washington's State Environmental Policy Act (SEPA) establishes a process for identifying and analyzing environmental impacts associated with state and local government actions that are not categorically exempt (RCW 43.21C). SEPA requires state and local agencies to use all practicable means to improve and coordinate plans, functions, programs, and resources to preserve historic, cultural, and natural resources and contribute to the preservation and enhancement of the environment. Ecology is empowered to create categorical exceptions by rule under RCW 43.21C. Categorical exceptions include actions that must be taken immediately or within a time too short to allow full compliance, to avoid an imminent threat to public health or safety, to prevent an imminent danger to the public or private property, or to prevent an immediate threat of serious environmental degradation (WAC 197-11-880). During invasive species emergency measures, response actions would be exempt from SEPA (WAC 197-11-880). SEPA compliance may be necessary for non-emergency actions such as response and contingency planning or long-term management. Because several state and local government agencies may be involved in an AIS response at Lake Whatcom, it will be important to determine the lead agency for any aspects of the response that require SEPA compliance.

3.2.2.2 Federal Environmental Compliance Processes

Federal environmental compliance requirements may apply if, for example, an AIS response includes a federal agency action, requires a federal permit or other authorization, uses federal funding, or affects federally listed species or critical habitat. Any federal agency partners or permitting authorities involved in the response should be consulted to determine the applicability and scope of federal environmental compliance processes.

3.2.2.2.1 National Environmental Policy Act

The National Environmental Policy Act (NEPA) is a federal law that requires federal agencies to consider the environmental effects of proposed federal actions. In general, NEPA applies to major federal actions,[13] such as actions performed, significantly funded, or authorized by a federal agency. When NEPA applies, required level of review depends on whether the proposed action will significantly affect the quality of the human environment. NEPA review may be limited or streamlined when the proposed action is covered by an existing NEPA review or qualifies for a categorical exclusion. Emergency NEPA review procedures may also be available. As noted above, consultation with federal agencies involved in the response action will be essential for determining necessary steps for NEPA compliance.

[13] NEPA defines "major Federal action" as "an action that the agency carrying out such action determines is subject to substantial Federal control and responsibility." 42 U.S.C. § 4336e(10)(A). NEPA excludes several types of actions from the definition of "major Federal action"—for example, "a non-Federal action… with no or minimal Federal funding; or… with no or minimal Federal involvement where a Federal agency cannot control the outcome of the project." 42 U.S.C. § 4336e(10)(B).

3.2.2.2.2 Endangered Species Act

The federal Endangered Species Act (ESA) protects threatened and endangered species and the habitats critical to their survival. The ESA prohibits the take[14] of listed species and establishes processes to ensure that federal and non-federal actions protect listed species. ESA Section 7 requires federal agencies to consult with the USFWS or NMFS to ensure their actions do not jeopardize listed species or adversely modify their critical habitat. Non-federal entities may obtain permits for take incidental to otherwise lawful activities under ESA Section 10.

At the time of writing this plan, no ESA-listed species or designated critical habitat were present in Lake Whatcom. However, once an ICS is established, the Unified Command should obtain current information on the presence or absence of listed species and critical habitat from both USFWS and NMFS. Online tools such as the USFWS's Information for Planning and Consultation (IPaC)[15] tool and NMFS Species and Habitat App[16] are available to assist planning for ESA compliance.

3.2.2.2.3 Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) governs marine fisheries management in United States federal waters. The designation and protection of essential fish habitat is one element of the management program under the MSA. Lake Whatcom and Whatcom Creek are included in the designated essential fish habitat for Chinook Salmon, Coho Salmon, and Puget Sound Pink Salmon *Oncorhynchus gorbuscha*.[17] The MSA requires federal agencies to consult with NMFS regarding federal actions authorized, funded, undertaken, or proposed to be authorized, funded, or undertaken that may adversely affect essential fish habitat. It is recommended that the Unified Command consult with the ICS Legal Officer and any federal agencies involved in a response to determine essential fish habitat consultation requirements.

3.2.2.2.4 National Historic Preservation Act

The National Historic Preservation Act (NHPA) requires federal agencies to determine if a proposed federal undertaking could affect historic properties, archeological sites, and cultural resources. The NHPA would not apply to an AIS response in Lake Whatcom unless the response involved a federal undertaking. If proposed activities to facilitate response action require NHPA review, it would be necessary to consult with the Washington State Department of Archaeology & Historic Preservation or appropriate Tribal Historic Preservation Officers to identify and avoid or mitigate impacts.

[14] "Take" means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." 16 U.S.C. § 1532(19).
[15] https://ipac.ecosphere.fws.gov/
[16] https://www.fisheries.noaa.gov/resource/map/species-and-habitat-app
[17] 50 C.F.R. § 660.412; 50 C.F.R. Part 660, Subpart H Table 1 (Strait of Georgia, HUC 17110002). An interactive map of essential fish habitat in the Pacific Fishery Management Council's jurisdiction is available at: https://www.habitat.noaa.gov/apps/efhmapper/?page=Pacific-Map

4 Rapid Response Activities

Rapid response activities include initiating ICS, delimiting the quagga, zebra, or golden mussel colonization event, and providing the ICS Staff and MAC Group with the data required to inform decisions about extended response activities. The Rapid Response phase should be initiated within 48 hours of any portion of the Plan Area being classified as positive for quagga, zebra, or golden mussels. Rapid response activities should be completed within 6 weeks of a positive waterbody classification. It is expected that daily MAC Group briefings will occur via email throughout the Rapid Response phase.

The 6-week rapid response activities include the following steps:

1. Week 1
    a. Initiate ICS and Establish Unified Command (Section 4.1)
    b. Establish ICS Staff and MAC Group (Section 4.2)
    c. Begin ICS Staff Initial Actions (Section 4.2.1)
    d. Send a Notification of Rapid Response (Section 4.3)
2. Begin Within 1 Week
    a. Delimit Range While Minimizing Additional Spread (Sections 4.4, 4.5)
3. No Later Than Week 6 (or as soon as laboratory results are available)
    a. Data Collation (Section 4.6)
    b. MAC Group Decision Making Workshop Preparation (Section 4.6.1)

4.1 Requesting Incident Command System and Designating Rapid Response Leadership

If waters within the Plan Area are designated as positive for quagga, zebra, or golden mussels[18], the WDFW AIS Coordinator will request ICS via the WDFW Fish Program Director and WDFW Director. If ICS is approved by the WDFW Director, a Unified Command (Section 2.1) will be established. Additionally, the WDFW Director will, in accordance with RCW 77.135.090, request that the governor order "emergency measures to prevent or abate the prohibited species" under RCW 43.06.010(14). In response, a declaration of emergency[19] may be issued by the Governor's office and WDFW may consult the Washington Invasive Species Council to advise the governor regarding necessary emergency measures.

[18] This assumes that golden mussels receive an emergency classification as a prohibited AIS.
[19] A sample Declaration of Emergency is available at https://www.westernqzrr.com/potential-response-steps under step 5. Notifications and Communication: Sample Declaration of Emergency.

4.2 Incident Command System Staff and Multi-Agency Coordination Group Establishment

Once ICS has been approved and Unified Command established, Unified Command will notify ICS staff and MAC Group entities of a Rapid Response, at which time ICS staff will be designated and appropriate entities invited to join the MAC Group (Sections 2.2 and 2.3).

4.2.1 Incident Command System Staff Initial Actions

The specific tasks associated with each ICS staff role will continue to evolve with the event. However, Table 5 provides an overview of immediate focus areas for key staff members.

Table 5. Incident Command System staff initial tasks

ICS Staff Role	Task
Unified Command	• Host MAC Group decision-making workshop (Section 5.1).
Operations Section Chief	• Oversee implementation of range delimitation efforts (Section 4.4).
Planning Section Chief	• Collect the required information for the MAC Group decision-making workshop (Section 4.6).
Logistics Section Chief	• Coordinate personnel, equipment, teams, supplies, and facilities required for range delimitation (Section 4.4) and minimize additional spread efforts (Section 4.5).
Finance/Administration Section Chief	• Develop accounting framework, including available funding, planned equipment and procurement costs, and planned labor costs.
Public Information Officer	• Send out Rapid Response media release and other public outreach messaging (Section 4.3).
Safety Officer	• Identify hazards, ensure personal protective equipment is available, and provide safety briefings and trainings.
Liaison Officer	• Set up and lead daily briefings with the MAC Group.
Legal Officer	• Ensure all applicable laws are known and followed during the response.

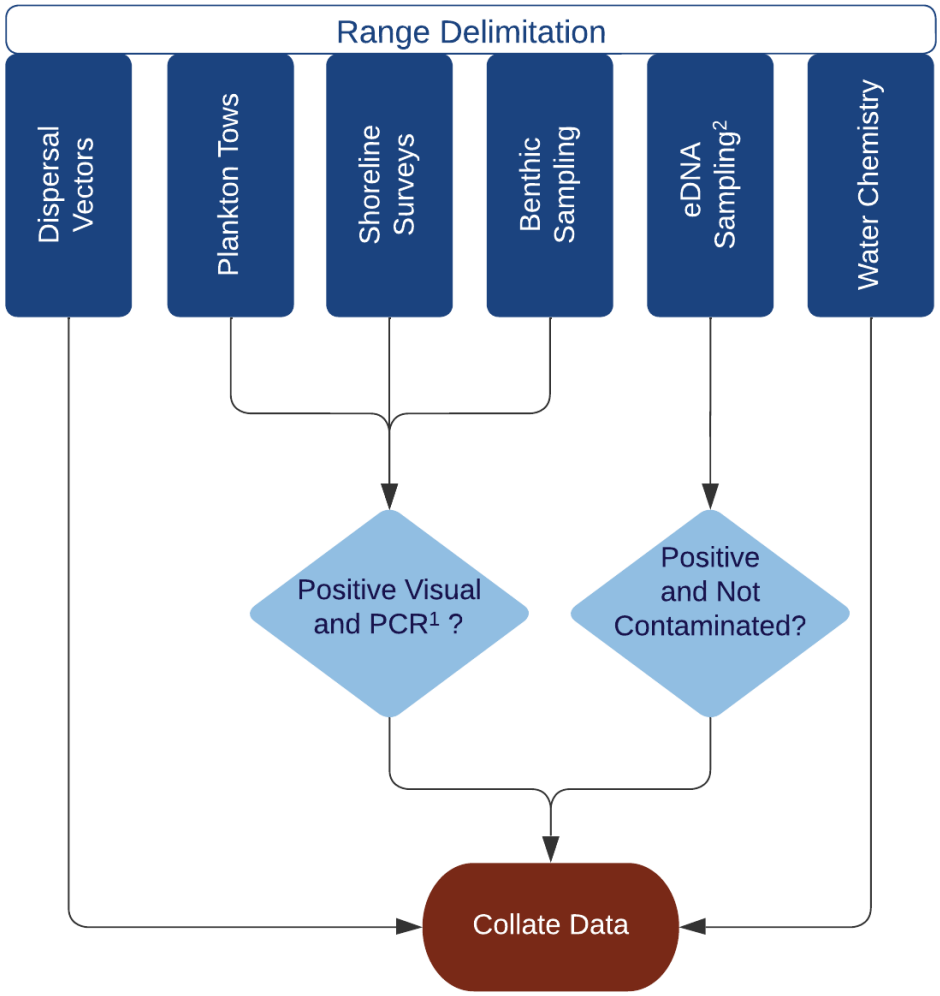
4.3 Public Notification of Rapid Response

Once ICS staff and the MAC Group are established but prior to delimitation efforts beginning, the ICS Public Information Officers will implement a strategic communications plan to notify all entities and the public of quagga, zebra, or golden mussel presence, the initiation of rapid response activities, and other associated information (APPENDIX A). It is assumed that the WDFW will provide statewide messaging whereas local Public Information Officers will provide media content tailored to their constituents. The following includes typical information provided to the public regarding the nature and status of a new invasion:

- Information about quagga, zebra, or golden mussels
- Current understanding of the distribution
- Time of first detection in the affected water body
- Likely origin, if known
- Risks it poses to local industries or services, including drinking water treatment
- Overview of planned rapid response activities
- Potential interruptions to public access and local recreation or fisheries

4.4 Range Delimitation

The Unified Command will be responsible for designating ICS staff to determine the range of the infestation. This effort should begin immediately upon ICS initiation and continue, as necessary, through Week 6, for a maximum of 5 weeks of sampling (Figure 5). This timeline was developed to garner a general understanding of the geographic limits of the invasion and relative abundance (i.e., new introduction versus established population with confirmed reproduction) while minimizing the cost and burden to the entities involved prior to implementing extended response activities. Efforts to delimit the range may be discontinued sooner than Week 6 if the limits of the invasion are determined earlier.



Notes:
1. PCR stands for polymerase chain reaction and represents the process by which a laboratory amplifies DNA sequences of physical specimens collected during delimitation sampling efforts to identify quagga, zebra, or golden mussels.
2. The results of eDNA samples do not provide definitive confirmation of quagga, zebra, or golden mussel presence or absence but can be used as additional information to aid the decision-making process.

Figure 5. Process flow for defining the extent of an invasion

Sampling should occur as early as feasible by the responding entities to allow for laboratory processing time. In the event of a Rapid Response, physical samples will be processed by Aquaticus LLC, Civil &

Environmental Consultants Inc., or KASF Consulting LLC with additional laboratory processing support requested from the U.S. Bureau of Reclamation Ecologic Research Laboratory. By contrast, eDNA samples will be processed by the WDFW Molecular Genetics Laboratory. The WDFW may request additional laboratory processing support from qualified laboratories (https://www.westernais.org/mussel-labs), if they are contracted for such purposes. All results will be provided to ICS General Staff (Section 2.3). Sampling activities include the following (Figure 5):

- Conduct plankton tow sampling, collecting a minimum of two (i.e., duplicate) samples per site
- Conduct shoreline surveys, including:
  - Rocks, wood, vegetation, and other debris
  - Exposed infrastructure (e.g., moored boats, piers, docks, buoys)
  - Employ canine survey teams
- Conduct benthic sampling, including:
  - Petite Ponar grab
  - Plant rake
  - Remotely operated vehicle video samples
  - SCUBA or snorkeler surveys of hard substrate
  - Existing substrate samplers in region
- Conduct eDNA sampling, collecting a minimum of two (i.e., duplicate) samples per site
- Conduct water chemistry sampling

The sampling associated with delimitation efforts will be the same whether the initial detection involves adult mussels or veligers, but may be adapted, if required, at the discretion of the Unified Command. Sampling sites have been determined based on public access locations, which include Bloedel-Donovan Park, Sudden Valley Marina, the WDFW Ramp, Silver Beach, Euclid Park, North Point Beach, Sofield Park, AM/PM Beach, Lake Whatcom Park, and Haner Park (Figure 6). If a detection occurs at a different location, additional sampling sites should be added. The delimitation area should be expanded with each positive detection until there is a clear understanding of the invasion extent or the 6-week Rapid Response Activity window is reached. The Operations Section Chief will provide additional direction to responding entities regarding sampling locations. Further guidance on recommended sampling protocols is provided in WRP 2020, and sample processing should follow the same protocols as discussed in the Statewide Plan. Recommended equipment and example data collection sheets are available in APPENDIX B.

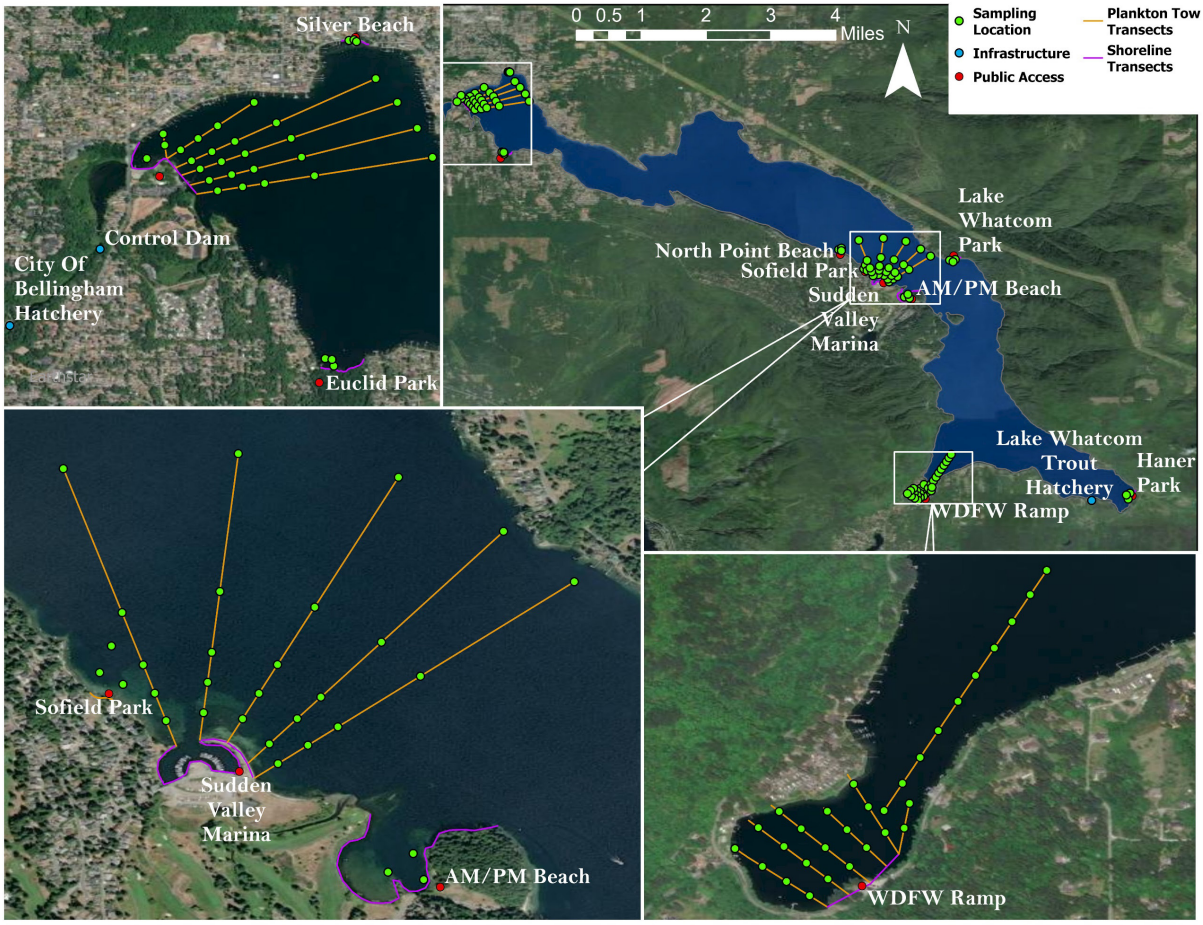


Figure 6. Conceptual delimitation sampling plan based on public access locations on Lake Whatcom

4.4.1 Plankton Tow Sampling Locations

At Silver Beach, Euclid Park, North Point Beach, Sofield Park, AM/PM Beach, Lake Whatcom Park, and Haner Park, there will be a minimum of three sampling sites at each location that represent both open water and near shore habitats. At Bloedel-Donovan Park, Sudden Valley Marina, and the WDFW Ramp, sampling will be conducted along transects perpendicular to the shore spaced approximately 50 m apart. Along those transects, samples will be collected at 100 m, 200 m, 300 m, 500 m, and 1,000 m from shore, as applicable (Figure 6). At the Bloedel-Donovan Park, there will be six transects comprising 27 sites. At the Sudden Valley Marina, there will be five transects comprising 25 sites. At WDFW Ramp, there will be seven transects comprising 30 sites. At least two samples (i.e., duplicates) should be collected at each site, resulting in a total of 206 samples. The number of plankton tows required for each sample depends on the plankton tow net diameter and the depth of each tow, with the goal of a minimum total volume of 1,000 liters per site filtered through the net (WRP 2020).

4.4.2 Benthic and Shoreline Sampling Locations

The habitat at each veliger sampling site should be assessed to determine if it is suitable for a benthic sample, aquatic plant rakes, remotely operated vehicles, or diver surveys. All sites with water depths < 6 meters and a substrate of gravel, small cobble, sand, and/or mud should be sampled with a Ponar grab (WRP 2020). The control dam and all boat docks, boat launch ramps, swim docks, and underwater debris fields within the delimitation area should be inspected for adults by either remotely operated vehicle or divers. In addition, shoreline surveys should be conducted at all ten public access locations (Figure 6). Finally, Bellingham Hatchery and Lake Whatcom Trout Hatchery infrastructure should be inspected for adults.

4.4.3 Water Chemistry and eDNA Sampling Location Guidance

Water chemistry and eDNA sampling should be conducted at every third sample of all 10 public access points for a total of 34 samples (Figure 6).

4.5 Minimize Additional Spread

During delimitation efforts, it is critical to minimize additional spread from affected waterbodies. Specific actions planned to be taken should there be a detection of quagga, zebra, or golden mussels in Lake Whatcom include:

1. Alert waterbody users of the presence of quagga, zebra, or golden mussels
2. Close the detection location access point (likely one of the public boat ramps, including Bloedel-Donovan Park, Sudden Valley Marina, or the WDFW Ramp), and consider other access point closures to support response actions
3. Consider removing and decontaminating watercraft and infrastructure including docks, swimming structures, or sunken objects
4. Deploy a containment curtain around detection location access point
5. Establish additional mandatory check stations
6. Deploy mobile decontamination units to the public boat ramps not closed
7. Consider alternative containment strategies (e.g., filtration, chlorination) to be implemented at the Lake Whatcom control dam and all intake structures to prevent spread
8. Consider issuing a quarantine on the hatcheries if detection location is near hatchery intakes
9. Collect data on Lake Whatcom boater origin and destination

Table 6 provides actions that require close coordination among entities with management authority, which should be overseen by the Liaison Officer.

Table 6. Actions taken to minimize additional spread.

ICS Staff Responsible	Action
Unified Command	• Initiate closure[1] at the detection location and other access point, as feasible. • Initiate mandatory inspections and decontaminations at Bloedel-Donovan Park, Sudden Valley Marina, and the WDFW Ramp (if not closed). • Remove and decontaminate watercraft and infrastructure including docks, swimming structures, or sunken objects, as feasible.
Operations Section Chief	• Oversee mobile decontamination teams. • Close area access points to non-ICS personnel. • Establish staging areas at area access point. •

ICS Staff Responsible	Action
Operations Section Chief (cont.)	• Decontaminate[2] all watercraft, equipment, tools, and gear used in sampling Plan Area waters during delimitation efforts prior to sampling other waterbodies. • Deploy containment curtain. • Deploy quagga, zebra, or golden mussel alert signs.
Logistics Section Chief	• Mobilize mobile decontamination response team and unit to the identified locations and coordinate with WDFW Enforcement Officers and the Whatcom County Sheriff's Office to establish public compliance with watercraft decontamination procedures.
Planning Section Chief	• Identify dispersal vectors other than water flow such as movement by humans, fish and wildlife, hatchery or aquaculture operations, water traffic, and other processes and determine whether containment strategies are available to minimize spread. • Identify dispersal vectors via water supply infrastructure and determine whether alternative containment strategies (e.g., filtration, chlorination) can be implemented at the discharge point to prevent spread. • Coordinate logistics for containment curtain deployment.
Public Information Officer	• Inform water body users of the presence of quagga, zebra, or golden mussels. • Develop quagga, zebra, or golden mussel alert signs. • Alert prior users of the affected waterbodies of the risks their boats and equipment create for other waterbodies.

Notes:
1. Under RCW 77.135.050, WDFW is authorized to implement a quarantine against a water body, property, or region within the state. Hatcheries and aquaculture may be considered for quarantine as well.
2. https://wdfw.wa.gov/sites/default/files/publications/01490/wdfw01490.pdf
https://www.fws.gov/course/hazard-analysis-and-critical-control-point-planning-prevent-spread-invasive-species

4.6 Data Collation

As results from Rapid Response delimitation sampling become available, data collection worksheets and laboratory reports should be provided to the General Staff. The Operations Section Chief will make recommendations for additional sampling, whereas the Planning Section Chief should evaluate the results and prepare for the MAC Group decision-making workshop.

4.6.1 Decision Making Workshop Preparation

Prior to the MAC Group decision-making workshop, relevant documentation should be collected or updated and distributed to the MAC Group by the ICS Planning Section Chief. The following items should be accomplished prior to the workshop:

- Define the Action Area in IPaC (ipac.ecosphere.fws.gov/) based on the detection scenario
- Obtain an Official Species List from IPaC and the NMFS Species and Habitat App (https://www.fisheries.noaa.gov/resource/map/species-and-habitat-app)
- Check for Programmatic Biological Opinions and Determination Keys within the delimitation area
- Obtain available bathymetry, hydrology, turbidity, water temperature, water chemistry (i.e., calcium, pH, salinity, dissolved oxygen), and detailed species (animal and vegetation) distribution and density data for the delimitation area
- Obtain a list of cultural resource locations
- Obtain a list of entities (e.g., water users, businesses, parks) in the delimitation area, their potential role in extended response activities, and known concerns quagga, zebra, or golden mussels pose to their operations

- Obtain a list of public access points within the delimitation area
- Obtain a list of water extraction infrastructure (e.g., irrigation infrastructure, hatchery intakes) and where the water goes outside the Plan Area
- Investigate opportunities to conduct species salvage operations to aid in post-treatment recovery
- Compile a summary of initial detection and verification activities and all sampling conducted during range delimitation with associated detection results
  - Initial detection date
  - Dates, gear, and effort of each sampling event
  - Results of each sampling event, including which life histories were discovered
- Develop a map depicting sampling and detection information, public access points, connected waterbodies or hatcheries, and critical infrastructure
- Obtain information on decontamination units and associated staff available
- Obtain the status of the Emergency Declaration Request
- Obtain information on available containment gear[20]
- Obtain information on chemical or bacterial suppliers' availability and current costs[21]
- Investigate regulatory and permitting requirements within the delimitation area, including working through the SEPA Checklist[22]

If key information is missing, the Planning Section Chief should inform the Unified Command immediately who will investigate whether the data gap can be filled.

[20] WDFW currently owns a heavy-duty Type II containment curtain with a reefing system that is 550-feet long and 15 feet deep (one 100-foot section plus nine 50-feet sections).
[21] https://www.westernqzrr.com/response-resources
[22] The SEPA Environmental Checklist will help determine if the environmental impacts of the selected response option are significant, and may also help identify measures to avoid, minimize, or mitigate any probable significant impacts. The checklist and related guidance are available from Ecology: https://ecology.wa.gov/Regulations-Permits/SEPA/Environmental-review/SEPA-guidance/SEPA-checklist-guidance

5 Extended Response Activities

Extended response activities are initiated by the MAC Group decision-making workshop and include the implementation of response options. The Unified Command should determine the appropriate response and designate ICS staff to implement it within 2 weeks of the MAC Group decision-making workshop.

5.1 Multi-Agency Coordination Group Decision-Making Workshop

A facilitated MAC Group decision-making workshop should be convened and hosted by Unified Command no later than 6 weeks after the initiation of rapid response activities or as soon as laboratory results are available and workshop preparation is completed. The workshop should be designed to guide decision-makers through a structured, collaborative process to determine the most effective response option for addressing the detection scenario. This meeting will serve three key purposes: 1) to provide an overview of the problem to the MAC Group, 2) to evaluate response options using a consequences and tradeoffs analysis resulting in a decision of the optimal response plan, and 3) to coordinate next steps for extended response activities, specifically identifying roles and responsibilities moving forward. Of note, the Unified Command holds the ultimate decision authority should consensus on a response option not be achieved during the workshop.

5.1.1 Agenda

1. **Problem Overview and Context Setting:** The MAC Group will receive a high-level overview of the problem, including a summary of the detection, its current and projected extent, and potential impacts on aquatic, economic, ecological, and social systems. This phase will establish a shared understanding of the situation and set the stage for informed decision-making.
2. **Trade-offs Analysis for Response Options:** The Unified Command will walk participants through an evaluation of potential response options against a set of pre-defined desired outcomes. A workshop was held in June 2025 to decide on priorities for response actions, which were defined as follows, with high-level outcomes and underlying metrics:

   – Maximize the ability to provide reliable, clean, and safe drinking water

      · Maximize flow to users (cfs)
      · Minimize taste and odor complaints (number of complaints)
      · Minimize the number of days use is curtailed (number of days curtailed)
      · Minimize ongoing maintenance cost to infrastructure ($)
      · Minimize the cost of a treatment ($)
      · Minimize the need for capital improvements ($)

   – Maximize the ecological integrity of Lake Whatcom

      · Maximize native species presence (number of species)
      · Maximize water quality (appropriate dissolved oxygen levels)
      · Minimize harmful algal blooms (number of harmful algal blooms)
      · Minimize impacts to hatchery operations (number of kokanee produced)

   – Maximize recreational opportunities for the public

      · Minimize the number of days a boat launch or beach is closed (number of days)

- Minimize the cost of removing mussels from recreational areas ($)

– Minimize the spread of invasive mussels to other water bodies

- Minimize the number of nearby water bodies invaded (number of water bodies)
- Minimize the cost of inspections and decontaminations ($)

These desired outcomes should be revisited in the decision-making workshop and can be adjusted to ensure they are current and reflect the values of the decision-makers (see Section 5.3.1). The MAC Group will consider the consequences of each response option; trade-offs among the various options, uncertainties, and risks; and will ultimately work toward an optimal response option that balances multiple competing priorities while addressing the need to respond to detections.

3. **Coordination of Extended Response Activities:** Once a response option is decided upon, the group will begin planning the next steps for extended response activities. This will include the applicable regulatory compliance steps, and identifying key roles, responsibilities, funding resources, available gear and procurement requirements, timelines, and coordination needs to ensure timely and efficient implementation of the chosen response option.

5.1.2 Workshop Follow-Up

Following the meeting, the Unified Command will provide a detailed report that outlines the decision-making process. The report will include the following information:

- Meeting notes, including attendance
- Consequences and tradeoffs analysis
- Decisions
- Identified funders
- Roles and responsibilities

5.2 Overview of Extended Response Activity Options

Potential treatments for the Plan Area may include physical treatments, chemical or bacterial treatments,[23] and/or containment measures, which are described in more detail at Pacific States Marine Fisheries Commission's Western Basin Invasive Mussel Incident Response Toolkit (https://www.westernqzrr.com/control-methods) and APPENDIX C.

- Physical treatments include removing mussels by hand and/or the deployment of physical structures such as benthic mats that deprive mussels of oxygen and nutrients.
- Chemical or bacterial treatments entail application of molluscicides directly to the water in controlled concentrations.

[23] Products or formulations for quagga or zebra mussel control currently include Potash (KCl, KH_2PO_4, KOH), EarthTec® QZ, Natrix®, and Zequanox®. Note, Zequanox® is a biopesticide, but is grouped with chemical treatments because it is applied similarly to chemicals. It was determined in the June 2025 decision-making workshop that copper-based products would be considered last after Potash or Zequanox due to its long-term non-target species and water quality impacts.

- Containment efforts can be accomplished through installing physical barriers (e.g., containment curtain or benthic mat) or implementing alternative outflow management strategies at water intake infrastructure (e.g., filtration, chlorination) to prevent spread.

5.3 Decision Support for Extended Response Activities

The detection scenario will dictate which response options are available for consideration. Table 7 provides an overview of which response options may be available given specific information about the detection scenario. In the June 2025 decision-making workshop, it was decided that all invasive mussel species would be treated the same even though the risk of establishment for quagga or zebra mussels is lower based on Lake Whatcom's dissolved calcium levels. Additionally, it was decided that containment curtains would be installed, if feasible, as part of minimizing additional spread (Section 4.5). This step is retained in this section for completeness. Table 8 summarizes the feasibility requirements for each of the additional response options.

Table 7. Response options for a quagga, zebra, or golden mussel detection to consider in tradeoff analysis, in addition to minimize additional spread options, according to detection and containment scenarios

Detection Scenarios	Containment Scenario	Response Options
Adults only	Either	• Check containment curtain feasibility – If feasible, deploy containment curtain • Evaluate whether preventative treatment options should be considered for infrastructure • Check physical treatment feasibility – If feasible, consider diver removal – If feasible, consider benthic mat • Check chemical or bacterial treatment feasibility – If feasible, consider containment curtain or benthic mat with chemical treatment option
Veligers only	Cannot be contained with containment curtain	• Evaluate whether preventative treatment options should be considered for infrastructure • Deploy divers to search for adults • Check chemical or bacterial treatment feasibility – If feasible, conduct immediate veliger sampling to ensure detection scenario has not changed and consider chemical or bacterial treatment
Veligers only	Can be contained with containment curtain	• Deploy containment curtain • Evaluate whether preventative treatment options should be considered for infrastructure • Deploy divers to search for adults • Check chemical or bacterial treatment feasibility – If feasible, consider containment curtain with chemical or bacterial treatment
Veligers and adults	Cannot be contained with containment curtain	Evaluate whether preventative treatment options should be considered for infrastructure • Deploy divers to search for adults • Check physical treatment feasibility – If feasible, consider diver removal – If feasible, consider benthic mat • Check chemical or bacterial treatment feasibility – If feasible, conduct immediate veliger sampling to ensure detection scenario has not changed and consider chemical or bacterial treatment

Detection Scenarios	Containment Scenario	Response Options
Veligers and adults	Can be contained with containment curtain	• Deploy containment curtain • Evaluate whether preventative treatment options should be considered for infrastructure • Deploy divers to search for adults • Check physical treatment feasibility – If feasible, consider diver removal – If feasible, consider benthic mat • Check chemical or bacterial treatment feasibility – If feasible, consider containment curtain or benthic mat with chemical treatment option

Table 8. Feasibility requirements for response options

Treatment	Requirements
Containment curtain[1]	• Quagga, zebra, or golden mussel distribution is restricted to habitat that is conducive to deploying a containment curtain that will prevent water exchange with the rest of the water body • Curtain of correct length and depth is available for deployment • Water depth, substrate, water velocity is amenable for curtain deployment • Permits[2] are obtained
Chemical or bacterial treatment[3]	• Product, applicators, and equipment are available[2] • Permits[2] are obtained
Diver removal[1]	• Water depth, water velocity, visibility, and habitat complexity are conducive to dive operations • Dive team is available • Permits[2] are obtained
Benthic mat[1]	• Water depth, water velocity, visibility, substrate, and habitat complexity are conducive to installation of benthic mat • Dive team is available • Equipment is available • Permits[2] are obtained

Notes:
1. Eradication success of physical treatments is contingent upon being able to map and target the entire distribution of adults plus having no successful reproduction during treatment period.
2. Permitting considerations include impacts to non-target species and cultural resources.
3. Eradication success of chemical or bacterial treatments is contingent upon maintenance of sufficient product concentrations throughout the treatment area for the necessary period for the current environmental conditions to result in 100% mortality of the target organism.

5.3.1 Treatment Effectiveness Considerations

Eradication success of physical treatments is contingent upon being able to map and target the entire distribution of adults plus having no successful reproduction during the treatment period. Specifically, the treatment area must have visibility, water depth, and water velocity to allow dive operations and sufficiently simple habitat to confidently find and remove or contain all mussels. Physical treatments may be considered to augment chemical or bacterial treatment plans when adults are also present or in developing long-term suppression strategies.

Eradication success of chemical or bacterial treatments is contingent upon maintenance of sufficient product concentrations throughout the treatment area for the necessary period for the current

environmental conditions to result in 100% mortality of the target organism. Because the volume of Lake Whatcom is so large and because of the primary objective to provide reliable, clean, and safe drinking water, chemical or bacterial treatments must be conducted in concert with containment curtains or benthic mats. These will ensure requisite product concentrations are maintained and minimize impact to drinking water customers.

If eradication is not feasible, alternative outflow management and efforts to minimize additional spread (Section 4.5) should be pursued while long-term management strategies are developed.

5.3.2 Known Factors that Influence Response Option Decisions

The following factors were identified as key elements that will influence decisions. These factors were derived from conversations had while developing this plan but should be revisited during the MAC Group decision-making workshop to ensure they accurately reflect what is most important to the entities when deciding on a response plan. Factors are divided into treatment-specific factors and long-term factors should quagga, zebra, or golden mussels not get eradicated.

Treatment-specific factors:

- **Protection of Water Quality**: The likelihood that the treatment efforts will impact drinking water for consumers.
- **Effectiveness of Treatment**: The likelihood that the treatment efforts will eradicate or minimize the long-term impact of quagga, zebra, or golden mussels in the affected area or limit the spread of quagga, zebra, or golden mussels to other waterbodies.
- **Response Impacts on Non-Target Species**: The likelihood of negative ecological impacts of treatment efforts, including impacts on non-target mussel species, non-target fish species, and the broader aquatic ecosystem.
- **Response Impacts on Cultural Resources**: The likelihood that the treatment will destroy or degrade first foods or important historical and cultural information tied to a specific place or community.
- **Operational Feasibility**: The number of days required to implement the option when considering regulatory permitting, interested party engagement, product labeling, contact time required to conduct treatment, and resource availability (e.g., personnel, funding, equipment, product).
- **Response Economic and Social Impact**: The number of days that the water body closure and treatment efforts cause disruption to public access, local economies (e.g., recreation, fisheries, agriculture), and compliance with water service agreements.
- **Cost**: The comparative cost among treatment options including product, equipment, labor, permits, and maintenance per treatment acre, which includes considerations for the time a treatment takes.

Long-term factors if quagga, zebra, or golden mussels are not eradicated:

- **Impacts on Water Quality**: The likelihood of degraded water quality in response to mussel establishment.
- **Impacts on Non-Target Species**: The likelihood of negative ecological impacts on non-target mussel species, non-target fish species, and the broader aquatic ecosystem.

- **Impacts on Cultural Resources**: The likelihood of losing or degrading first foods or important historical and cultural information tied to a specific place or community.
- **Economic Impact:** Lost revenue to recreational or fisheries industries.
- **Social Impact**: The likelihood of human health risk or disruption to public access, local economies (e.g., recreation or fisheries), and water service agreements.
- **Management Cost:** Cost of monitoring, decontamination, and suppression efforts.

Each of these values should be captured in the set of desired outcomes.

5.3.3 Description of Tradeoff Analysis Process

Once the desired outcomes and available response options are determined, the Unified Command should develop and use a consequences table to assist with the MAC Group decision-making workshop process. A consequences table can be built by listing the desired outcomes on one axis of a table and the potential response options on the other (APPENDIX D). Within each cell of the table, the consequences (positive or negative) that each response option would have on each outcome should be evaluated either qualitatively or quantitatively to clearly illustrate the trade-offs among options. When conducting the trade-off analysis, qualitative consequences should be translated into quantitative terms and weights may be assigned to outcomes to reflect their relative importance in the decision-making process. Using this tool, participants will consider the consequences of each response option, trade-offs among the various response options, uncertainties, and risks, ultimately working toward a decision that balances multiple competing priorities while addressing the need to eradicate or reduce the spread.

5.4 Extended Response Activity Implementation

Table 9 describes the general procedures to follow when employing any response option(s).

Table 9. Extended response activity procedures for any response option

ICS Staff Role	Responsibility
Unified Command	• Convene an expert panel for consultation on physical treatment, chemical or bacterial treatment, and containment options. • Make the final response determination.
Operations Section Chief	• Manage operations groups to implement decided-upon response option plans properly and safely.
Planning Section Chief	• Compile data required to evaluate which response options may be viable (Sections 4.6.1 and 5.2). • Evaluate complicating factors involved with each viable response option (water movement, subsurface flow, water volume, ESA species, water use; Section 4.6.1).
Liaison Officer	• Engage all regulatory authorities to obtain permitting and regulatory approval. • Draft cooperative agreements with entities participating in response, as needed.
Logistics Officer	• Work with Liaison Officer to obtain permitting approval. • Evaluate the timing of the response. • Determine the availability and lead time to obtain equipment, permits, personnel, food and lodging, and communications.
Public Information Officer	• Engage interested parties on details and anticipated impacts of response options.
Responding Entity	• Evaluate water movement and subsurface flow in the treatment area in preparation for the response options. • After treatment(s), evaluate treatment efficacy and continue to monitor for evidence of surviving mussels.

Table 10 describes the additional general procedures to follow when employing chemical or bacterial treatment response options.

Table 10. Additional extended response activity procedures for chemical or bacterial treatment response options

ICS Staff Role	Responsibility
Logistics Section Chief	• Identify a lead for pesticide application and contract, as necessary, with a pesticide applicator to conduct treatment, following applicable purchasing and contracting laws. • Determine the lead time needed to mobilize the contractor to conduct the application. • Facilitate information exchange between responding entity and Operations Officer.
Responding Entity	• Calculate area, volume, and flow for the chemical treatment to determine the amount of product required. • Evaluate in-water target concentration rates during and following treatment.

6 Long-Term Management

If a water body is classified as positive for quagga, zebra, or golden mussels, the preferred response outcome is eradication. However, eradication will not always be feasible or successful given the circumstances. If that occurs, ICS staff and the MAC Group will need to determine which outcomes are attainable and cost effective. Management outcomes other than eradication will include minimizing additional spread (i.e., decontamination, mandatory inspections, alternative outflow management) and suppression (i.e., reduction of population densities to reduce negative impacts and slow the rate of spread). Suppression techniques include (but are not limited to) manual scraping, abrasive blast cleaning, hydraulically activated pipeline pigging, low-dose chemical treatments, mussel repellent technology, and biological control. Long-term management plans that include monitoring, mitigation, and recovery strategies should be developed at the same time as plans for suppression.

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APPENDIX A Strategic Communications Plan: Invasive Mussel Rapid Response

1. Purpose

The purpose of this Strategic Communications Plan is to ensure timely, transparent, and accurate communication to all jurisdictions and stakeholders—including tribes and tribal organizations, agency staff, local governments, industry partners, and Whatcom County community members—following the detection of quagga, zebra, or golden mussels in Lake Whatcom, the drinking water source for more than 120,000 residents.

2. Communications Objectives

- Provide consistent, factual, and accessible information to all audiences.
- Maintain public trust through timely and transparent updates.
- Support incident response by reducing misinformation and establishing clear expectations for how and when updates will be provided.
- Coordinate messaging among agencies with legal jurisdiction.
  - As the lead state agency, the Washington State Department of Fish and Wildlife (WDFW) will provide statewide messaging.
  - The City of Bellingham, Whatcom County, and Lake Whatcom Water and Sewer District (LWWSD) will provide communications to their local constituents.

3. Audiences

Internal Audiences

- Incident Command System (ICS) personnel from WDFW, City of Bellingham, LWWSD, Whatcom County
- Multi-Agency Coordination (MAC) Group members, as identified in Section 2.2 of the Plan
- Unified Command member leadership
- Other partner local, state, or federal agency staff (e.g., Washington Invasive Species Council, Washington State Department of Agriculture, Washington Military Department, Ecology, U.S. Fish and Wildlife Service)
- Field crews and response contractors

External Audiences

A contact list is being developed that can be referred to in the event of an invasive mussel detection. Audiences to contact include:

- Lake Whatcom watershed residents
- Recreational water users and facilities that use Lake Whatcom, including:
  - Individual boaters registered through the Whatcom Boat Inspections Program
  - Fishing clubs that host tournaments on Lake Whatcom:
    - American Bass Association

        - Borderline Bassin' Contenders
        - Kayak Fishing Northwest
        - Washington Bass Association
        - Washington State Pond Jumperz
    - Boating groups:
        - Rikkole Cree Canoe Club
        - Bellingham Bay Outrigger Paddlers
    - Private boat launches:
        - Western Washington University Lakewood
        - Wildwood
        - The Firs
- City of Bellingham and LWWSD drinking water customers
- Media outlets, including:
    - Bellingham Herald
    - Cascadia Daily News
    - The Northern Light
    - Salish Current
    - My Bellingham Now/ KGMI Radio
    - King 5
- Elected officials, including:
    - City of Bellingham City Council and Mayor
    - Whatcom County Council and Executive
    - LWWSD Board of Commissioners
    - Sudden Valley Community Association Board
    - State Legislative and Congressional Delegates
- Governments, agencies, and community members throughout Washington State

4. Key Messages

These messages are to be shared by the Public Information Officers, with tailored messaging at the local level.

Initial Response (within 1 week of detection)

- **What happened**: Confirmation of mussel detection
- **Where and when**: First detection, location, and timeline
- **What it means**: Potential risk to water infrastructure, environment, recreation, shoreline properties
- **What is being done**: Overview of rapid response activities, including establishment of ICS and MAC and immediate containment measures (range delimitation)

- **How people could be affected**: Recreation restrictions, potential changes in drinking water access or quality, etc.
- **What is next**: Next steps in response, when and how to receive updates on progress
- **How to help**: Ensure boats are inspected and cleaned, drained, and dried before entering water bodies; limit non-essential traffic in affected areas; follow posted signs; report mussel sightings
- **Where to find more information**: Public information phone numbers, email addresses, and websites

Ongoing Updates

- **Response activities**: What steps continue to be taken to address the detection
- **Lake access:** Continued or new recreation restrictions
- **Treatment plan and implementation:** Treatment options and trade-offs; logistics for implementing the treatment options
- **Monitoring**: Results of data collection, changes in mussel populations or spread over time

5. Potential Communications Channels

The following communications channels could be used to share information about the detection depending on the severity of the situation and the resources available.

Internal Audience Channels

Internal and partner staff will generally be kept informed on the response through the following channels:

- **ICS briefings and situation reports**
- **Email notifications**
- **Internal FAQ and talking points document**
- **Briefings with relevant staff**
- **Command and general staff meetings**

External Audience Channels

- **Press release(s)** (via local and state agencies)
- **Website and social media updates** (through agency channels, including targeted community resources such as NextDoor)
- **Public meetings or webinars** (including public elected official meetings)
- **FAQs added to website** (translated into commonly spoken languages)
- **On-site signage** (at all affected access points)
- **Emails to specific audiences** (including neighborhood associations, Whatcom Boat Inspection Program participants, drinking water customers)
- **Email updates to self-selected list** (provide option for people to sign up to receive updates via email)
- **Printed mailer** (work with local print company to generate a mailing list of Lake Whatcom watershed residents)

The table below provides a detailed look at how these communication channels will be used to inform specific external audiences, as well as which key messages will be emphasized.

External Audience	Key Messages to Emphasize	Potential Communications Channels
Lake Whatcom watershed residents	• Impacts to boat access on lake, including from private docks • Impacts to shoreline properties, if applicable • How to help (avoid non-essential traffic in affected area)	• Emails to neighborhood groups, including Sudden Valley, Silver Beach, Geneva • NextDoor posts • Mailer sent to watershed residents • Lake Whatcom Lowdown email (joint City/County newsletter) • Neighborhood meetings or webinars, if needed • WDFW website, with links from the Lake Whatcom Management Program and Whatcom Boat Inspections websites
Recreational water users, including boaters, swimmers, and recreation groups.	• Impacts to recreational access on lake, including which access points or areas of the lake are restricted • Potential impacts of chosen treatment option on water quality and human health • How to help (have boats inspected and always clean, drain, dry)	• Signs posted at public access locations, including AM/PM Beach, Bloedel Donovan Park, Euclid Park, Haner Park, Lake Whatcom Park, Lake Whatcom Southerly Boat Launch (WDFW launch), North Point Beach, Silver Beach, Sofield Park, Sudden Valley Marina • Emails sent to boaters registered through the Whatcom Boat Inspections program • Bellingham and Whatcom County Parks Departments social media posts • Announcement on the Whatcom Boat Inspections program website and on webpages for parks in Lake Whatcom watershed • Announcements to private boat launch managers, including Lakewood, Wildwood, Camp Firwood, and the Firs
City of Bellingham and LWWSD water customers	• Governments and agencies are working as quickly and effectively as possible to prevent or limit drinking water impacts • Chosen treatment option will not impact quality of drinking water	• Communications through utility bill emails, if possible • Social media posts on City and LWWSD channels • Press release • Inside Bellingham Weekly news releases • Banner on City of Bellingham homepage • Information and FAQs posted on Lake Whatcom Management Program, City, and LWWSD websites
Media outlets	• Impacts to recreational access, drinking water, natural resources	• Press release sent to local media outlets • Media inquiry responses

External Audience	Key Messages to Emphasize	Potential Communications Channels
Elected officials	• Our pre-approved Rapid Response Plan will help guide our response, with WDFW, the City, LWWSD, and Whatcom County leading the efforts	• Emails • Updates at elected official meetings • Lake Whatcom Policy Group meeting updates
Governments, agencies, and community members throughout Washington State	• Mussel detection has occurred in a Washington State water body, which can have implications for other nearby water bodies	• WDFW social media and website • News release

6. Communication Roles and Responsibilities

Role	Responsibility
ICS Public Information Officers	Draft and distribute messaging; coordinate with local Public Information Officers
Local Public Information Officers	Tailor messages to local context, distribute via local channels
MAC Group Liaison	Coordinate with relevant organization staff and leadership
Field Supervisors	Disseminate key information to on-site personnel and contractors
Non-Incident Command Agency Communications Leads	Amplify messaging through agency networks

7. Timeline and Triggers

Anticipated Timeframe	Action
Day 0 (Confirmation)	Internal alert to ICS and MAC Group (once established); draft initial messaging and signage
Day 1 (Public Notification)	Issue press release; update websites and social channels; share key messages and talking points with relevant staff; place signage if there are closures
Day 2-3	Add FAQs to website; send mailer to watershed residents
Week 1+	Ongoing updates based on delimitation findings, response efforts (posted on websites and shared in emails and newsletters)

8. Evaluation

- Track public engagement (web traffic, calls, social metrics)
- Monitor media coverage
- Conduct post-incident communications debrief (identify strengths, gaps, areas for improvement)

9. Draft Communication Materials

Communication materials must be drafted and distributed quickly after the detection of invasive mussels. The draft materials below can be used as a starting place.

Draft Press Release

Invasive Mussels Detected in Lake Whatcom: Rapid Response Underway

Bellingham, WA — State and local officials have confirmed the presence of [invasive] mussels in Lake Whatcom, the drinking water source for more than 120,000 people. This detection marks a serious ecological and infrastructure threat, and agencies have launched a coordinated rapid response effort to assess and contain the infestation as quickly as possible. This response includes [identify immediate response actions – i.e., closing boat launches or beaches].

"[Invasive] mussels pose a major risk to our region's drinking water infrastructure, natural ecosystems, and recreational access, which is why many measures are already in place to prevent and detect their presence," said [Official Name, Title]. "We are moving quickly with state, local, and federal partners to contain the threat and protect our community's water resources. Fortunately, we worked with our partners to develop a comprehensive and coordinated plan for responding to an invasive mussel detection in 2025, so we are well-prepared to address this issue quickly and efficiently."

Response efforts are being led by the Washington Department of Fish and Wildlife (WDFW) in coordination with the City of Bellingham, Whatcom County, Lake Whatcom Water and Sewer District, and other organizations.

The mussels were first detected on [date], during routine monitoring conducted by [organization name], which has been monitoring Lake Whatcom for invasive species for [#] of years. Follow-up testing confirmed their presence on [confirmation date]. Invasive mussels can spread rapidly, clogging drinking water intake systems and harming aquatic habitat, water quality, and recreation areas.

"At this time, there is no immediate threat to our drinking water," said [Official Name, Title]. "However, a quick response offers the best chance at limiting spread and reducing potential long-term impacts."

This is a rapidly evolving situation and information may change quickly. Information is available on the WDFW website [insert hyperlink here] with an option to sign up for email updates.

How the Community Can Help

- **Follow all posted signs** at recreation areas along Lake Whatcom.
- **Limit non-essential traffic** in affected areas to help response crews work quickly and safely.
- **Clean, Drain, and Dry** all boats and gear after visiting any water body.
- **Report suspected mussel sightings** to [Insert Hotline or Online Reporting Portal].
- Follow updates at [website link].

Draft FAQ

This will be updated with more accurate and relevant information once the detection occurs.

1. What are quagga mussels?

[Invasive] mussels [Scientific Name] are invasive freshwater invasive species that rapidly attach to surfaces including boats, docks and other solid structures, ropes, and aquatic plants – outcompeting native species for space and resources. They can clog pipes and damage water infrastructure.

2. Where were they found?

They were confirmed in [Water Body Name] on [Date] during routine monitoring. The exact extent of the infestation is currently being assessed.

3. How did they get here?

They are often introduced by boats, trailers, or gear that has not been properly cleaned after use in infested waters. The exact origin is under investigation but may never be known.

4. Is our drinking water safe?

Yes. At this time, there is no immediate threat to drinking water quality. However, infrastructure impacts may occur if the infestation spreads, which is why rapid response is critical.

5. Will recreation or water access be affected?

Before restrictions are determined: Possibly. Temporary closures or restrictions may be put in place to support containment efforts and prevent further spread.

Once restrictions are determined: Yes. [Closed facility] is temporarily closed to support containment efforts and prevent further spread. Additional temporary closures or restrictions may be put in place. We are working as quickly as possible to contain and eradicate the invasive mussels to prevent long-term impacts to drinking water treatment equipment, recreation access, and water quality. Your cooperation will help us be efficient and effective in our response actions. Thank you for your understanding.

Please check [website or social media] for updates before visiting the area.

6. What are the risks?

- Clogging of drinking water treatment equipment, including water intakes and pipes in the lake
- Harm to native aquatic species and ecosystems
- Reduced water quality and increased maintenance costs
- Restricted water access and damage to boat launches, docks, and shorelines

7. What is being done about it?

A multi-agency Incident Command response team is conducting surveys to determine how far the species has spread, is determining how to contain the threat and prevent further spread, analyzing management actions to remove the species, and sharing information with the public on how they can help.

8. What can I do to help?

- Always **Clean, Drain, and Dry** boats and equipment.
- Avoid launching in restricted areas.
- Report sightings via [hotline or website].
- Share information with other water users.

9. How will you keep the public updated?

Updates will be provided through [Website], social media, and press releases. A public meeting or webinar will be announced soon to share response progress and answer community questions.

Draft Mailer for Lake Whatcom Watershed Residents:

PUBLIC NOTICE: INVASIVE MUSSELS FOUND IN LAKE WHATCOM

Invasive [species name] mussels were confirmed in Lake Whatcom on [date]

- Invasive mussels can spread rapidly, clogging drinking water intake systems and harming aquatic habitat, water quality, and recreation areas
- There is no immediate threat to our drinking water, but a quick response offers the best chance at limiting spread

We are responding quickly to limit long-term impacts to our drinking water source and recreation

- [Describe immediate actions here, such as closing boat launches or beaches]
- Response efforts are led by the Washington State Department of Fish and Wildlife with support from the City of Bellingham, Whatcom County, and Lake Whatcom Water and Sewer District, who have a response plan in place

Insert map here that shows detection location and any beach or boat launch closures

For more information and updates:

This is a rapidly evolving situation. Visit [WDFW website] or scan the QR code below for the latest updates.

Información del proyecto:
Thông tin dự án:
Информация о проекте:
ਪ੍ਰੋਜੈਕਟ ਜਾਣਕਾਰੀ:
项目信息:

Insert QR code here

How you can help:

- Follow all posted signs at recreation areas
- Limit non-essential traffic in affected areas
- Clean, Drain, Dry all boats and gear after visiting any water body
- Report suspected mussel sightings to [hotline or online reporting portal]

City of Bellingham
Public Works
2221 Pacific Street
Bellingham, WA 98229

Draft Sign to be Posted at Closed Recreation Areas

[beach/trail/launch] CLOSED DUE TO INVASIVE MUSSELS

Invasive [species name] mussels were confirmed in Lake Whatcom on [date]. For your safety and to support efforts to quickly remove mussels and prevent their spread, this [site] is temporarily CLOSED.

Insert QR code here

For updates, visit: [insert link here]

APPENDIX B Example Rapid Response Data Collection Worksheets

Quagga, Zebra, and Golden Mussel Monitoring Datasheet 2024

Team:	Samplers:			
Date (M/D/YY):	Site #:	Site Name:	Latitude (N):	Longitude (W):

Artificial Substrate		
Attached To:	Total Water Depth (m):	Substrate Depth (m):

Substrate: Present Absent	Condition: Intact Damaged Out of Water	Redeployed: Yes No 1st Deployment

Quagga Zebra Golden: Present Absent Contact DFW Now if Present

Organisms Present: Algae Bryozoans Chironomids Eggs Isopods Limpets Periphytons Snails Sponges

Trichoptera Worms	Other:

Horizontal and Vertical Plankton Tow	
Vertical Depth (m):	Plankton Sample #:

Visual Shoreline

Surveyed: Boat Ramp Boulders Buoys Chains Concrete Structs Docks LWD Lines

Quagga Zebra Golden: Present Absent Contact DFW Now if Present

Organisms Present: Asian Clams Chinese Mystery Snails New Zealand Mudsnails Nonnative Crayfish

Other:

Petite Ponar Grab Sampler	
Vertical Depth (m):	Quagga Zebra Golden: Present Absent Contact DFW Now if Present

Organisms Present: Asian Clams Chinese Mystery Snails New Zealand Mudsnails Nonnative Crayfish

Other:

Water Quality					
Calcium: Yes No	Calcium Sample #:	Salinity (ppt):	pH:	Temp ©:	Secchi Depth (m):

eDNA

Sample Method: Smith-Root Sampler Peristaltic Pump Other_____

eDNA Sample #:	eDNA Negative Control #:
Sample Water Filtered (L):	Negative Control Water Filtered (L):

AIS Signs	
AIS Boat Ramp Sign Deployed: Yes No	AIS PP Supplemental Sign Deployed: Yes No

Comments

Quagga, Zebra, and Golden Mussel Field Monitoring Equipment List

Created: 03/15/2024, NP

Signage						
Item	**Item #**	**Size**	**Units**	**Cost**	**Vendor**	**Vendor Phone #**
AIS motorized boat ramp sign	_	18" x 24"	Each	_	WDFW	_
AIS PP supplemental sign	_	9" x 9"	Each	_	WDFW	_
AIS WA Northern pike sign	_	18" x 24"	Each	_	WDFW	_
AIS non-motorized boat ramp sign	_	18" x 24"	Each	_	WDFW	_
Bolts and nuts	_	_	Pack	_	_	_
Camera (phone)	_	_	Each	_	_	_
Drill	_	_	Each	_	_	_
Drill bits	_	_	Each	_	_	_
Drill charger	_	_	Each	_	_	_
Level	_	_	Each	_	_	_
Magnet	_	_	Each	_	_	_
Screws	_	1 in., 1.5 in.	Pack	_	_	_
Zip Lock bags	_	_	Box	_	_	_

Surface visual shoreline						
Item	**Item #**	**Size**	**Units**	**Cost**	**Vendor**	**Vendor Phone #**
Camera (phone)	_	_	Each	_	_	_
Extended mirror	_	_	Each	_	_	_
Flashlight	_	_	Each	_	_	_
Sample bottle (unknown organisms)	16155-548	250 ml	Case	$550.00	Avantor VWR	(800) 932- 5000
Zip lock bags	_	_	Box	_	_	_

Artificial substrate						
Item	**Item #**	**Size**	**Units**	**Cost**	**Vendor**	**Vendor Phone #**
Completed artifical substrate	_	_	Each	_	WDFW	_
PVC sheet (to build artificial substrates)	PVCGRAY0.187EXT48X96	48" X 96"	Each	$151.41	Plastic Sheets, Rod, Tube & Fabrication Services Since 1914 | ePlastics®	800-474-3688
Camera (phone)	_	_	Each	_	_	_
Hole punch	_	_	Each	_	_	_
Knife	_	_	Each	_	_	_
Lighter	_	_	Each	_	_	_
Para cord	_	Roll	Each	_	_	_

Quagga, Zebra, and Golden Mussel Field Monitoring Equipment List

Created: 03/15/2024, NP

Item	Item #	Size	Units	Cost	Vendor	Vendor Phone #
WDFW identification tag/label	_	_	Each	_	WDFW	_
Zip lock bags	_	_	Box	_	_	_
Zip ties	_	8 inch	Each	_	_	_
Dissolved Calcium						
Item	**Item #**	**Size**	**Units**	**Cost**	**Vendor**	**Vendor Phone #**
Black sharpie	_	_	Each	_	_	_
Calcium bar code labels	_	Sheet	Each	_	WDFW	_
Calcium sample bottles	16155-546	60 ml	Case	$96.35	Avantor VWR	(800) 932 - 5000
Cooler for samples	_	30 qt	Each	_	_	_
Deionized water Type 1	CW-DW1-55G	55 gallon drum	Drum	$480.00	https://www.chemworld.com/	800-768-5810
Ice	_	_	Each	_	_	_
Nitric Acid Ultrex II	JT6901-5	500 ml	ml	$407.08	Avantor VWR	(800) 932- 5000
Disposable transfer pipet	10754-270	5 ml	Case	$705.21	Avantor VWR	(800) 932- 5000
Salinity label	_	Sheet	Each	_	WDFW	_
BD Syringe Luer-Lok	BD309653	60 ml	Pack	$27.35	Avantor VWR	(800) 932- 5000
Syringe filter 25 mm - 0.45uM STERILE	76479-020	25 mm -0.45 uM	Case	$1,425.58	Avantor VWR	(800) 932- 5000
Water quality						
Item	**Item #**	**Size**	**Units**	**Cost**	**Vendor**	**Vendor Phone #**
Batteries (4)	_	AA	Each	_	_	_
Cleaning solution	HI 70671	0.5 L	L	$37.00	Hanna Instruments	(800) 426-6287
Conductivity Standard 1413 uS/cm	HI7031/1L	1 L	L		Hanna Instruments	(800) 426-6287
Multiparameter Portable Meter	HI 98194	_	Each	$1,624.00	Hanna Instruments	(800) 426-6287
pH 5.0 buffer solution	HI 5005	1 L	L	$47.00	Hanna Instruments	(800) 426-6287
pH 7.01 buffer solution	HI 7007	0.5 L	L	$24.00	Hanna Instruments	(800) 426-6287
pH 9.18 buffer solution	HI 5091	0.5 L	L	$33.00	Hanna Instruments	(800) 426-6287
Quick calibration solution	HI 9828-27	1 Gal	Gal	$185.00	Hanna Instruments	(800) 426-6287
Secchi disk - Limnological 8 Globe	470101-430	8 inch	Each	$46.35	Avantor VWR	(800) 932- 5000
Secchi disk Calibrated Line	470004-364	(25 ft./7.75 m)	Each	$91.65	Avantor VWR	(800) 932- 5000
Storage solution	HI 70300	0.5 L	L	$18.00	Hanna Instruments	(800) 426-6287

Quagga, Zebra, and Golden Mussel Field Monitoring Equipment List

Created: 03/15/2024, NP

Item	Item #	Size	Units	Cost	Vendor	Vendor Phone #
Transparent protective cap for pH sensor	HI740211	__	Each	$19.00	Hanna Instruments	(800) 426-6287
Plankton tows						
Item	**Item #**	**Size**	**Units**	**Cost**	**Vendor**	**Vendor Phone #**
70% Isopropyl alcohol	_	1 Gal	Gal	_	_	_
Baking soda	_	1 lb	Each	_	_	_
Black sharpie	_	_	Each	_	_	_
Bucket/tote (for holding line)	_	5 gal	Each	_	_	_
Plankton bar code labels	_	Sheet	Each	_	WDFW	_
Plankton net assembly (3:1 #60/63 micron mesh, 30cm. Diameter). Stainless steel ring/towing brindle & 903.5-CB6 Cod End Bucket	90-30x3-60-AB6	30 cm., 3:1, #60/63	Each	$380.00	Sea-Gear Corporation	(321) 728-9116
Plankton sample bottle	16155-548	250 ml	Case	$550.00	Avantor VWR	(800) 932- 5000
Spoon (for baking soda)	_	10 ml	Each	_	_	_
Squirt bottle	_	500 ml	Each	_	_	_
Tow line	_	(325 ft/100 m)	Feet	_	_	_
Weight with clip	_	3 lbs.	Each	_	_	_
Zip ties	_	8 inch	Each	_	_	_
Ponar						
Item	**Item #**	**Size**	**Units**	**Cost**	**Vendor**	**Vendor Phone #**
Bucket/tote (for holding line)	_	5 gal	Each	_	_	_
Camera (phone)	_	_	Each	_	_	_
Main lead line (1/2 in. diameter) *AVOID PARACORD*	_	(325 ft/100 m)	Feet	_	_	_
Wildco. Petite Ponar grab sampler	77928	_	Each	$1,534.00	Forestry Supplier Inc.	(800) 647-5368
Safety line (1/2 in. diameter) *AVOID PARACORD*	_	(325 ft/100 m)	Feet	_	_	_
VWR Sieve 8 in. 710 um	57334-454	710 um	Each	$230.76	Avantor VWR	(800) 932- 5000
WHITE tupperware		12 qt/11 L	Each	_	_	_
eDNA						
Item	**Item #**	**Size**	**Units**	**Cost**	**Vendor**	**Vendor Phone #**
10% bleach (make solution)	_	1 L	L			

Quagga, Zebra, and Golden Mussel Field Monitoring Equipment List

Created: 03/15/2024, NP

Item	Item #	Size	Units	Cost	Vendor	Vendor Phone #
Black sharpie	_	_	Each	_	_	_
Bleach wipes	_	_	Each	_	_	_
Car battery inverter	_	_	Each	_	_	_
Charger for eDNA backpack (Lithium)	12034	_	Each	$299.00	Smith-Root inc.	360-573-0202
Deionized water Type 1	CW-DW1-55G	55 gallon drum	Drum	$480.00	https://www.chemworld.com/	800-768-5810
eDNA barcode labels (sample and negative)	_	Sheet	Each		WDFW	
Garbage bags	_	_	Each	_	_	_
Nitrile gloves	_	1 box	Each	_	_	_
Self preserving filters	11580-25	5 um	Case	$423.75	Smith-Root inc.	360-573-0202
Smith-Root inc. eDNA Sampler (Lithium)	12063	_	Each	$7,995.00	Smith-Root inc.	360-573-0202
Tap water	_	3 L	L	_	_	_
Zip lock bags FOR FILTERS	_	_	Each	_	_	_
Zip lock bags for nitrile gloves	_	_	Each	_	_	_

Decontamination

Item	Item #	Size	Units	Cost	Vendor	Vendor Phone #
10% bleach (make solution)	_	1 L	L	_	_	
5% acetic acid (make solution)	_	2 gal	Gal	_	_	
Absorbent cloths	_	_	Each	_	_	_
Bleach wipes	_	_	Each	_	_	_
Boot picks	_	_	Each	_	_	_
Brush	_	_	Each	_	_	_
Household bleach	_	1 gal	Gal	_	_	_
Nitrile gloves	_	1 box	Box	_	_	_
Paper towels	_	_	Each	_	_	_
Potable water in weed sprayer	_	2 gal	Gal	_	_	_
Tap water	_	1 L	L	_	_	_
Two buckets w/ lid	_	5 gal	Gal	_	_	_

Quagga, Zebra, and Golden Mussel Field Monitoring Equipment List

Created: 03/15/2024, NP

General						
Item	**Item #**	**Size**	**Units**	**Cost**	**Vendor**	**Vendor Phone #**
Batteries	_	AA	Pack			
Clipbopard	_	_	Each			
Cooler for drinking water	_	_	Each			
Drinking water	_	Case	Each			
Flashlights	_	_	Each			
Ice packs	_	_	Each			
iPhone	_	_	Each			
iPhone charger	_	_	Each			
Laser Tough-Tags	TTGP-1050	1.50 x 0.75 in	Each	$72.75	Diversified Biotech	(800) 769 9199
Leatherman	_	_	Each	_	_	_
Lighter	_	_	Each	_	_	_
Paracord	_	Roll	Each	_	_	_
Pencils	_	_	Each	_	_	_
Pens	_	_	Each	_	_	_
Scissors	_	_	Each	_	_	_
Sharpies	_	_	Each	_	_	_
Vehicle power inverter	_	_	Each	_	_	_
Vinagreen 20%	919840TD	55 Gal	Drum	$350.00	Cascade Columbia Distribution	(206) 282-6334
Zip lock bags 2 mm thick	_	12 x 15 inch	Each	_	_	_
Zip lock bags 2 mm thick	_	12x12 inch	Each	_	_	_
Zip lock bags 4 mm thick	_	12 x 15 inch	Each	_	_	_
Zip lock bags 4 mm thick	_	6 x 6 inch	Each	_	_	_
Zip lock bags 4 mm thick	_	4 X 6 inch	Each	_	_	_
Zip Ties	_	8 inch	Each	_	_	_

Quagga, Zebra, and Golden Mussel Monitoring Equipment Checklist 2024

General	Size	Units	Quantity	Check
Clipboard	_	Each	2	_
Cooler for drinking water	30 quart	Each	1	_
Cooler for samples	30 quart	Each	1	_
Drinking water	Case	Each	1	_
Ice packs	_	Each	4	_
iPhone	_	Each	2	_
iPhone charger	_	Each	2	_
Leatherman	_	Each	2	_
Lighter	_	Each	4	_
Pencils	_	Each	6	_
Pens	_	Each	6	_
Scissors	_	Each	2	_
Sharpies	_	Each	6	_
Vehicle power inverter	_	Each	2	_
Zip lock bags 4 mm thick	12 x 15 inch	Each	100	_
Zip lock bags 4 mm thick	6 x 6 inch	Each	100	_
Zip Ties	8 inch	Each	100	_

Artificial Substrates	Size	Units	Quantity	Check
Artificial substrates	_	Each	40	_
Paracord	Roll	Each	1	_
Plastic scrapers	3 inch	Each	2	_

Plankton Net Tows	Size	Units	Quantity	Check
Baking soda	1 lb	Each	2	_
Bucket (hold line)	5 gal	Each	1	_
Isopropyl alcohol 70%	2 gal carboy	Each	1	_
Plankton sample bottles	250 ml	Each	50	_
Plankton net barcode labels	sheet	Each	2	_
Line	325 ft/100 m	Each	1	_
Plankton net including cod end	_	Each	10	_
Spoons for baking soda	10 ml	Each	4	_
Squirt bottle filled with potable water	500 ml	Each	1	_
Weights with clips	3 lbs	Each	2	_

Visual and Tactile Shoreline	Size	Units	Quantity	Check
Batteries	AA	Each	2	_
Flashlights	_	Each	2	_
Retractable mirror	_	Each	2	_

Quagga, Zebra, and Golden Mussel Monitoring Equipment Checklist 2024

Petite Ponar Grab	Size	Units	Quantity	Check
Bucket (hold line)	_	_	_	_
Main lead line 1/2 diameter	325 ft/100 m	Each	1	_
Petite Ponar grab sampler	_	Each	2	_
Safety line (use paracord)	325 ft/100 m	Each	100	_
Sieve 8 inch with lanyard	750 um	Each	1	_
White Tupperware	12 quart/11 L	Each	1	_

Water Quality	Size	Units	Quantity	Check
Clear protective cap for pH sensor	_	Each	2	_
HI 5005 pH 5.0 buffer solution	_	Each	1	_
HI 7007 pH 7.01 buffer solution	_	Each	1	_
HI 5091 pH 9.18 buffer solution	_	Each	1	_
HI 70300 pH sensor storage solution	_	Each	1	_
HI 70671 cleaning solution	_	Each	1	_
HI 9828 quick calibration solution	_	Each	1	_
Hydro lab	_	Each	1	_
Rechargeable batteries	AA	Each	4	_
Hydro lab car charger	_	Each	1	_
Hydro lab house outlet charger	_	Each	1	_
Secchi disk with line marked every meter	25 ft/7.5 m	Each	1	_

Dissolved Calcium	Size	Units	Quantity	Check
Deionized water for blanks	1 L	Each	1	_
Calcium sample bottles	60 ml	Each	60	_
Calcium barcode labels	sheet	Each	2	_
Nitric ultra solution preservative 50%	60 ml	ml	1	_
Pipette	50	Each	50	_
Syringe filters	0.45 um	Each	100	_
Syringes	60 ml	Each	60	_

Environmental DNA	Size	Units	Quantity	Check
eDNA sampler car charger	_	Each	1	_
Self preserving eDNA filters	5 um	Each	100	_
eDNA barcode labels	sheet	Each	2	_
Batteries for remote	AA	Each	8	_
Bleach solution wipes 50%	_	Each	100	_
Deionized water for control sample	1 L	Each	50	_
Deionized water for rinse	1 L	Each	10	_
Smith-Root eDNA sampler	_	Each	1	_
eDNA sampler input and output covers	_	Each	4	_

Quagga, Zebra, and Golden Mussel Monitoring Equipment Checklist 2024

Signage	Size	Units	Quantity	Check
AIS motorized boat launch signs	_	Each	50	_
AIS prevention permit supplemental signs	_	Each	50	_
Specific species signs	_	Each	50	_
Drill	_	Each	1	_
Screws	1 1/4 inch	Each	200	_

Personal Protective Equipment (PPE)	Size	Units	Quantity	Check
Nitrile gloves	What crew needs	Box	1	_
Protective eye ware	_	Each	2	_
Sun block	_	Each	2	_
Hearing protection	_	Each	10	_
N95	1	Each	2	_
KN95	1	Each	2	_

Decontamination	Size	Units	Quantity	Check
Absorbent drying cloths	Rolls	Each	1	_
Bleach solution in squirt bottle 10%	32 oz	Each	1	_
Bleach wipes	Packages	Each	2	_
Boot picks	_	Each	4	_
Buckets and lid	5 gal	Each	2	_
Household bleach	1 gal	Each	1	_
Household vinegar (5% acetic acid)	2 gal	Each	1	_
Paper towels	Rolls	Each	2	_
Potable water in weed sprayer	2 gal	Each	1	_

Watercraft	Size	Units	Quantity	Check
Anchor	_	Each	1	_
Anchor line	100 ft/30 m	Each	1	_
Boat keys	_	Each	2	_
Carbon monoxide sticker by engine	_	Each	1	_
Engine kill switch	_	Each	2	_
Fenders	_	Each	2	_
Fire extinguisher	_	Each	1	_
First aid kit	_	Each	1	_
Flares	_	Each	3	_
Oars	_	Each	2	_
PFD type V (mesh)	_	Each	2	_
PFD type IV (throwable)	_	Each	1	_
Sound horn	_	Each	1	_
Sounder/GPS	_	Each	1	_
Trailer keys	_	Each	2	_
Whistle on ignition kill switch	_	Each	1	_

Quagga, Zebra, and Golden Mussel Monitoring Equipment Checklist 2024

Watercraft	Size	Units	Quantity	Check
Whistle on PFD type V's	_	Each	2	_
Stabil	Bottle	Each	1	_

APPENDIX C Extended Response Activity Options Overview

Chemical Treatments Overview

At the time of writing this plan, there are three main chemical treatments considered as deployable within the Plan Area. More detailed information about each treatment type can be found at https://www.westerninvasivemussel.org/control-methods.

Potassium Chloride (KCl)

Potassium chloride (KCL), also called muriate of potash, is a salt-based treatment effective at disrupting ionic balance in invasive species such as quagga, zebra, and golden mussels. While it has proven efficacy, it may have non-target toxicity for freshwater organisms and the potential for ion accumulation in water bodies. Additionally, it is not yet labelled for use as a pesticide by the U.S. Environmental Protection Agency, although emergency permits for its use have been obtained in certain situations and the process to get it labeled for use has been initiated.

Chelated Copper (e.g., EarthTec ZQ, Natrix)

Chelated copper (e.g., EarthTec ZQ, Natrix) uses copper ions stabilized by chelating agents, enhancing bioavailability to target invasive species while reducing free copper's toxicity. However, the potential for copper accumulation in sediments and long-term effects on non-target species, including sensitive fish such as salmonids and macroinvertebrates, are significant concerns.

Zequanox (Pseudomonas fluorescens CL145A)

Zequanox (*Pseudomonas fluorescens* CL145A) is a biopesticide derived from a naturally occurring bacterium. It selectively targets invasive mussels with minimal reported effects on non-target species. However, its effectiveness can be influenced by water conditions (e.g., temperature, turbidity), and its application may require repeated treatments, raising logistical and cost considerations.

Physical Treatments Overview

Physical treatments include removal by hand and/or the deployment of physical structures that kill mussels. Physical treatments are an appealing option because they can allow precise targeting of mussel removal but are only effective as eradication strategies for scenarios where only adults have been detected (i.e., no veliger detections). Physical treatments often have increased labor costs and are not feasible in areas of high flow, high turbidity, and high turbulence either pragmatically or in terms of human safety. Two widely used physical treatment methods for managing aquatic invasive species are manual removal and benthic mats.

Manual Removal

Trained divers can be employed to manually remove invasive species from within the delineated range. This method is highly targeted and allows for selective removal of invasive organisms while minimizing disturbance to non-target species. However, it is labor-intensive and typically limited to small-scale infestations or high-priority sites. Effective long-term use often depends on consistent monitoring and repeated interventions to prevent re-establishment.

Benthic Mats

Benthic mats are durable, synthetic coverings placed on the substrate to smother invasive species and prevent their attachment and growth. They are effective for reducing populations in localized areas, particularly for sessile organisms like mussels or aquatic plants. However, the mats can also impact native benthic organisms and disrupt natural substrate dynamics. Proper installation, maintenance, and removal are critical to minimize non-target impacts and ensure effectiveness. Benthic mats may be used in combination with chemical treatments, where chemicals are inserted underneath the benthic mat to facilitate eradication.

Containment Overview

Containment Curtains

Containment curtains create a physical barrier in a water body, restricting water exchange between the contained and non-contained zones. All containment curtain options for the Plan Area will be short-term efforts to support localized treatment efforts. The U.S. Army Corps of Engineers and Washington Department of Fish and Wildlife are engaging with private entities that develop containment curtains to be used in potential future rapid response efforts.

Alternative Outflow Management

Alternative outflow management strategies include adding filtration, chlorination, or ultraviolet light systems at water intake infrastructure to prevent spread to connected waterbodies. Coordination with municipalities, water rights holders, and entities responsible for public and industrial runoff is essential to ensure comprehensive containment.

Summary of Extended Response Options

Appendix Table C-1 provides a summary of the extended response activity options detailed above. Appendix Table C-2 provides an overview of considerations of those treatments.

Appendix Table C-1. Treatment Options

Treatment	Description	Permitting[1]	Mechanism	Treatment Time Per Concentration
Do Nothing	Mussel invasion in the water column	NA	NA	NA
Potash (KCL)	Biocide	NPDES; FIFRA registration or emergency exemption	Prevents mussels from breathing	21 days at 95-115 ppm
EarthTec QZ (copper ions)	EPA-registered molluscicide; contains copper	NPDES; drinking water regulations	Copper on surfaces prevents settlement; lethal to mussels when ingested	4-30 days at ~1 ppm
Zequanox (dead bacteria cells)	The dead cells of a naturally occurring soil organism (Pseudomonas fluorescens)	NPDES	Bacteria lethally deteriorates the mussels' digestive lining	1-2 weeks at 150 ppm
Benthic Mats	Large, dark tarps that are anchored to the bottom of the lake	See Section 3.2.1.1	Suffocates organisms under mat by depriving the area of oxygen, light, and food	9 weeks

Treatment	Description	Permitting[1]	Mechanism	Treatment Time Per Concentration
Divers	Divers scrape off mussels and remove shells	AIS prohibited species permit	Physical removal of mussels by hand	276 dive hours per acre
Containment Curtain	Curtain that quarantines an area of a water body, likely used in tandem with a chemical treatment	See Section 3.2.1.1	Quarantine a shoreline area with surface to bottom curtains	Time based on partnered product treatment
Desiccation/Water Drawdowns	Drawing lake levels down to expose the mussels to air	Not viable in Lake Whatcom	Suffocates mussels	2-10 days at 25-10°C

Note:
1. Responsibility for complying with all applicable laws lies with the agencies leading and conducting the treatment. This table presents general information about permitting considerations for various treatment options and is not a substitute for professional legal advice. Responding agencies should consult with legal counsel to evaluate compliance risks and permitting strategies for potential treatment options.

Appendix Table C-2. Treatment considerations

Treatment	Persistence Time	Water Quality Impacts	Risks	Cost (per acre)
Do Nothing	In perpetuity if ecologically viable	Increased water clarity, water contamination from increased chance of harmful algal blooms, oxygen depletion, contaminated sediments on lake floor	Damaged drinking water, hatchery, and recreation infrastructure; decreased recreation	Long-term control efforts could be incredibly expensive
Potash (KCL)	Days depending on water quality conditions	Unpleasant salty taste; very unlikely to impact water quality significantly	Lethal to all mussels	$7,000-$30,416
EarthTec QZ (copper ions)	Days in the water column depending on water quality conditions, years in soils	Bitter/metallic taste; high levels of copper can lead to gastrointestinal issues	Lethal and sublethal effects on salmonids; lethal for gastropods and mollusks	$150-250
Zequanox (dead bacteria cells)	Hours depending on water quality conditions	None	No impacts to non-target species	$10,000-$100,000
Benthic Mats	NA	Low dissolved oxygen near mats	Can be lethal to non-target organisms under the mat	$30,000
Divers	None	None	No impacts to non-target species	$27,600-$55,200
Containment Curtain	NA	None	Could quarantine non-target species	$1,948 per 100 ft. long x 15 ft. skirt
Desiccation/Water Drawdowns	NA	NA	Impacts to non-target species that are exposed to air	Could impact single home water intake pipes or shallow draw pipes

APPENDIX D Example Consequences Table

NORMALIZED VALUES (best =1, worst = 0)

			Objectives						
			Total treat cost	Water quality cost	Ecological impacts	Short impacts to drink water	Long impacts to drink water	Total time	
		Measurable attribute	*$ total*	*$ total*	*1 = no impacts*	*1 = no impacts*	*1 = no impacts*	*# days*	*Higher scores = better alternatives*
	Treatment type	*Objective weight*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	**Score**
	No treatment	NA	1.000	0.000	0	1	0	1.000	3.0000
Alternatives	Chemical	Potash (KCL)	0.655	1.000	0	0	1	0.422	3.0767
	Chemical	Copper ions (EarthTec QZ)	0.811	1.000	0	0	0	0.461	2.2720
	Chemical	Bacterial toxin (Zequanox)	0.349	1.000	1	1	1	0.018	4.3668
	Physical	Benthic mat only	0.831	1.000	0	0	1	0.568	3.3993
	Physical + chemical	Benthic mat + Potash	0.674	1.000	0	0	1	0.422	3.0957
	Physical + chemical	Benthic mat + Copper ions	0.830	1.000	0	0	0	0.461	2.2910
	Physical + chemical	Benthic mat + Bactieral toxin	0.368	1.000	1	1	1	0.517	4.8852
	Physical	Manual removal	0.651	1.000	1	1	1	0.982	5.6332
	Physical + chemical	Manual removal + Potash	0.306	1.000	0	0	1	0.357	2.6633
	Physical + chemical	Manual removal + Copper ions	0.462	1.000	0	0	0	0.443	1.9052
	Physical + chemical	Manual removal + Bacterial toxin	0.000	1.000	1	1	1	0.000	4.0000

Inputs and scores are for example purposes only