



2022

City of Bellingham - Aquatic Invasive Boat Inspection Intern

Lewis Rowlen
Western Washington University

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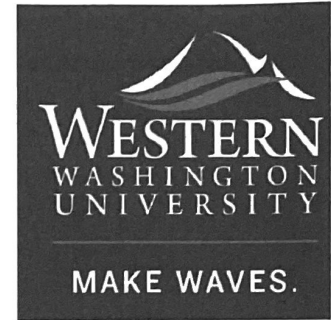
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COLLEGE OF THE ENVIRONMENT



Internship Title: Aquatic Invasive Species Boat Inspection - City of Bellingham

Student Name: Lewis Rowlen


Internship Dates: April 25th 2022 - September 8th 2022

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STUDENT SIGNATURE 

DATE: 11.06.22

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Abstract

During the spring and summer of 2022, I worked for the City of Bellingham's Public Works department as an aquatic invasive species boat inspector. I chose to take part in this work due to its close alignment with my area of study at Western Washington University; Environmental Science with an emphasis in Freshwater and Terrestrial Ecology. Invasive species pose threats to ecosystems worldwide, which are often exacerbated by anthropogenic activities. As an aquatic invasive species boat inspector, I worked in an effort to prevent the spread of these harmful plants and animals into Bellingham's local lakes. During the 2022 season, the Aquatic Invasive Species (AIS) team and I successfully intercepted many high-risk vessels set to enter local lakes. After these vessels were identified as a high risk of harboring aquatic invasive species, the vessels were decontaminated using a high-pressure hot-wash unit. The AIS program had a successful season in preventing the spread aquatic invasive species. Along with this success in preventing the spread of aquatic invasive species, I was able to educate many people on the importance of keeping a cleaned, drained, and dry boat.

Introduction

As described in Executive order 13112 signed by President William Clinton on February 3, 1999, an aquatic invasive species is "A species that is: 1) non-native (or alien) to the ecosystem under consideration and 2) whose introduction causes or is likely to cause economic or environmental harm or harm to human health." The prevention of the spread of these aquatic invasive species into local water bodies served as the fundamental framework for the internship I completed over the spring and summer of 2022. Beginning in the early 2000s, aquatic invasive species boat inspection programs have been implemented in many of the western states.

Washington, more specifically Bellingham, was no exception. In 2011 the City of Bellingham in conjunction with Whatcom County came forward with an Aquatic Invasive Species Action Plan for the Lake Whatcom reservoir through the Lake Whatcom Management Program. This multifaceted plan aimed to serve as a guide for the implementation of activities to prevent the spread of aquatic invasive species into the lake, educate the public on the issue through various forms of outreach, and monitor the watershed. Although there are many forms of aquatic invasive species to be concerned about, Zebra and Quagga mussels are considered to be the highest risk to Lake Whatcom and Lake Samish. This is due to their fast reproduction rates, detrimental effects to ecosystems and infrastructure, and ability to be transported long distances to new waterbodies via vessels. A map depicting the distribution of Zebra and Quagga mussels in the United States can be seen below in Figure 1.

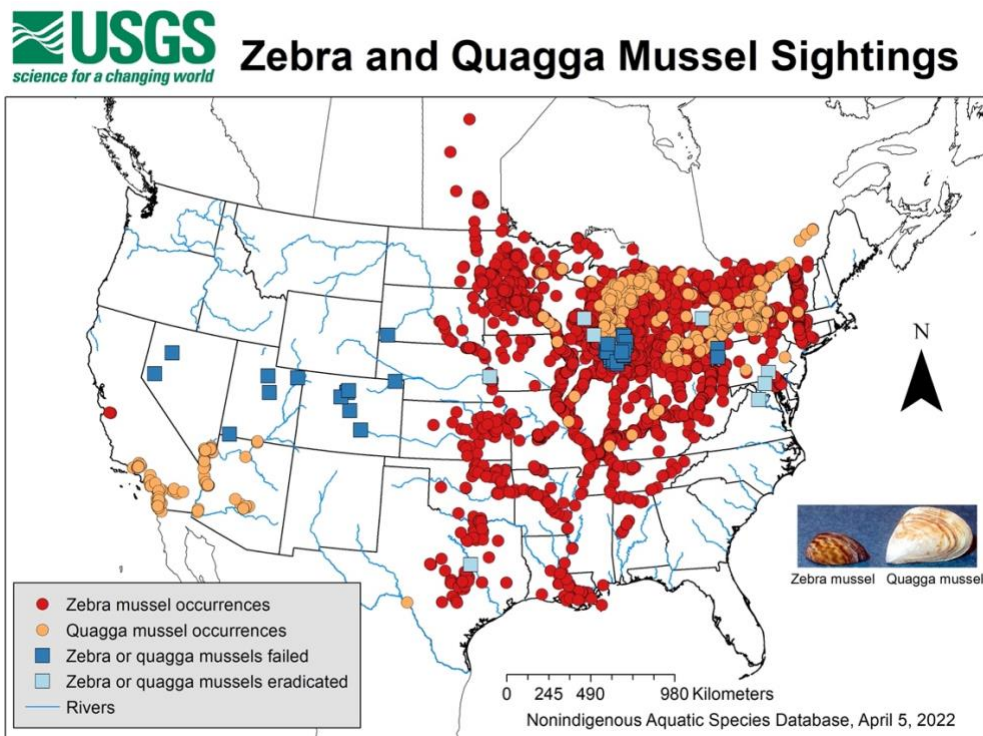


Figure 1. Invasive Zebra and Quagga mussel occurrences and eradication efforts in the contiguous U.S. and parts of Canada. Map courtesy of USGS.

At the beginning of this internship I set goals for what I hoped to learn from my time as an aquatic invasive species boat inspector. I hoped to merge the knowledge I was learning in my environmental science classes with the internship position in way that would aid me down the line in other post-graduation positions. I also hoped to become more proficient in data collection and analysis through the use of the AIS database. Finally, I was interested in becoming more effective in environmental education through interface with the public at the job sites.

Internship Activities

During my time working for the City of Bellingham on the AIS team, I did a variety of work in an effort to prevent the spread of aquatic invasive species to our local lakes. The foremost activity I did was conduct boat inspections on vessels entering Lake Whatcom or Lake Samish. This meant traveling to either one of three boat launch sites on Lake Whatcom or to the boat launch on Lake Samish. Once on-site, every vessel from kayaks to wakeboard boats were inspected upon entry to the lakes. All the inspections I performed were logged and saved into the AIS database should future referral be necessary. All incoming boaters were required to have a profile in this database created for their vessel. The creation of this profile was important because it logged some of the boater's personal information, their vessels waterbody history, and past inspections conducted on their vessel through the AIS program. When assessing risk during boat inspections, a variety of factors were taken into account. Factors like vessel type, origin, past waterbody history, vessel complexity, and the dryness and cleanliness of the vessel were among the host of factors considered.

In order to operate on Lake Whatcom or Lake Samish an AIS permit is required for all watercraft. With different price tiers for different vessel types, it was also my duty to sell and

issue boaters AIS permits should they not have a current permit already. This permit was then linked to the boater's profile in the database. The permitting system was an integral piece to the entire program, as it helped in risk assessment to see the presence or absence of an AIS permit on the vessel upon entry to the check station. The permit also allowed inspectors to quickly find the boaters profile in the database when doing inspections. On busy days, this often meant working a point of sale while simultaneously communicating with a boater and inspecting their vessel.

I also took part in field monitoring during this internship. Field monitoring entailed traveling out to various locations around Lake Whatcom and Lake Samish in an effort to better understand the current state of the lakes in relation to aquatic invasive species. More specifically, I used throw rakes to bring aquatic plants up from the lake floor for inspection. I also conducted Asian Clam counts at both Lake Whatcom and Lake Samish using a quadrat sampling method. I then compared Asian Clam population densities from different areas of the lakes. I also recorded and identified any other species present in the area including native mussels, worms, and aquatic plants. The quadrat sampling method is pictured below in Figure 2.



Figure 2. A coworker (left), and I (right), using a quadrat sampling method for aquatic species monitoring on Lake Samish. Photo courtesy of Teagan Ward.

Internship Achievements

The activities I conducted throughout this internship were largely successful in nature. Working as part of the AIS inspection team, over 14,000 boat inspections were conducted in 2022. We also identified and decontaminated more than 20 boats with a high risk of transmitting aquatic invasive species to our local lakes. I was personally a part of a few of these high-risk boat interceptions throughout my time in the internship. For example, during one of my shifts there was a large wakeboard boat that arrived at the Bloedel Donovan boat launch on Lake Whatcom with a Minnesota registration. Seeing this registration was an immediate red flag. Upon further communication with the boater, we learned that they had recently purchased the boat from a seller in Minnesota and had driven it west to Lake Whatcom. Due to the complex structural nature of wakeboard boats and the presence of potentially AIS harboring ballast bags,

we identified this boat as one needing a decontamination prior to launching. For these decontaminations to occur, a trailer containing a generator and water tanks was brought in from off-site. The water was heated to a temperature necessary to kill and remove any aquatic invasive species without damaging the vessel. This hot water was sprayed at a high pressure to thoroughly clean the trailer, exterior of the vessel, and any internal areas of the vessel that could harbor AIS. A vessel decontamination is depicted below in Figure 3. After this decontamination process was completed, the vessel was permitted to launch. The identification, documentation, and decontamination of high-risk vessels prior to launching was one of the most important aspects of this internship as just one mussel-fouled vessel has the potential to decimate the entire Lake Whatcom ecosystem.



Figure 3. AIS boat inspector conducting a decontamination of a high-risk vessel at the Bloedel Donovan boat launch on Lake Whatcom. Photo courtesy of Teagan Ward.

Discussion

All things considered; aquatic invasive species boat inspection programs have been successful in reducing the spread of AIS since their implementation in the west decades ago. The 2022 Lake Whatcom and Lake Samish AIS boat inspection season was no exception. During my time working this internship, the AIS program identified and decontaminated more than 20 high risk boats arriving at local waterbodies. This internship undoubtedly moved me closer to the goals I set for myself at the beginning of my work on the AIS team. I hoped to be able to merge the knowledge I was learning in my classes at Western Washington University with my work on the AIS team. The material I learned in classes relating to biology, chemistry, and ecology undoubtedly aided me in my boat inspections and public outreach effectiveness. Having a strong base of knowledge in these areas of study made me better able to answer the range of questions that the public would ask me on the job.

I also hoped to become more proficient in data collection and analysis through use of the AIS database. Collecting and analyzing data was a recurring part of the boat inspections I took part in. I was able to assess the risk of vessels entering Lake Whatcom and Lake Samish through both the collection of new data, and the analysis of preexisting data on the boater's profile. With the ample database and data collection practice I received throughout my time on the job, I believe I accomplished this goal and gained valuable experience that will aid me in future occupations. My attention to detail also improved through the many boat inspections I conducted during the season.

Not all inspections went smoothly during my time in the internship. One challenging aspect of this work was communicating with boaters who didn't agree with the premise of the AIS program. While working this internship, I took part in a fair number of challenging

interactions with boaters who were resistant to the science this work is based upon. I view these interactions as beneficial because they gave me a chance to work on valuable communication strategies like conflict de-escalation. Going into the internship, I didn't expect dealing with such resistance as often as I did. Nevertheless, this adversity reinforced valuable lessons about the importance of treating people with respect that will stick with me for years to come.

Overall, I believe the experience I gained from this internship will assist me in future career endeavors within the field of environmental science. I would recommend this internship to any undergraduate pursuing a degree in environmental science or related fields of study.

Acknowledgement

I would like to give my thanks and acknowledgement to my Internship Site Supervisor, Teagan Ward. As the Aquatic Invasive Species Program Coordinator, Teagan has put in tireless hours to keep our local waterbodies clean and healthy.

Works Cited

Executive Order. No. 13112, 1999, pp. 6183–6186.

Ward, T. (2022). *Monitoring Day* [Photograph]. Lake Samish, Washington, United States.

Ward, T. (2022). *Vessel Decontamination* [Photograph]. Bloedel Donovan Park, Bellingham, WA, United States.

“Zebra and Quagga Mussel Sightings.” *Nonindigenous Aquatic Species Database*, USGS. Accessed 12 Nov. 2022.

Appendices

Internship Timeline Work Log			
Date (week)	Anticipated Hours Worked	Actual Hours Worked	Credits
Spring Qrt			3
4/25 - 5/1	x	22.5	
5/2 - 5/8	x	23	
5/9 - 5/15	23	23.2	
5/16 - 5/22	23	23.2	
5/23 - 5/29	23	8.1	
5/30 - 6/5	8	3	
6/6 - 6/12	23	24.2	
Intersession			
6/13- 6/19	30	40.4	
Summer Qrt			2
6/20 - 6/26	30	41	
6/27 - 7/3	30	41.6	
7/4 - 7/10	30	16.3	
7/11 - 7/17	30	41.7	
7/18 - 7/24	7.5	16.2	
7/25 - 7/31	30	33	
8/1 - 8/7	30	41.1	
8/8 - 8/14	30	40.5	
8/15 - 8/21	30	40.6	
8/22 - 8/28	30	38.4	
8/29 - 9/4	30	38.3	
9/5 - 9/11	30	30.4	
9/12 - 9/18	30	x	
Total Hours Worked		586.7	

COLLEGE OF THE ENVIRONMENT



Section 1 – Student Identification

Last Name, First Name:	Rowlen, Lewis	Western ID:	W01397271
Email Address	rowlenl@wwu.edu	Major/PreMajor	ESCI

Section 2 – Registration Information

Total Credits:	9	Faculty Advisor:	Alia Khan
Internship Start Date:	04/21/2022	Internship End Date:	09/2022
Number Credits Per Quarter (F/W/S/Sum)	spring 3	summer 6	

*Note: You must be registered for credits during quarters you perform **any part** of the internship work (Including Summer Session) to include writing of reports...this can be spread over multiple quarters. You are expected to register an appropriate number of credits based on anticipated hours worked BY Quarter (Example: Working 120 hours during Summer = 4 Credits Summer Enrollment)*

Section 3 – Organization for Internship

Organization Name:	Public Works - Natural Resources City of Bellingham
Intern Supervisor Name:	Teagan E. Ward
Mailing Address:	104 W Magnolia Street, Suite 109
Email Address:	teward@cob.org
Phone Number:	(360) 778-7972

Description of Duties (Or Attach Job Description):

Section 4 – Learning Objectives

What do I intend to learn from this experience:

I hope to apply and integrate knowledge I am learning at WWU into this position. By doing this I will be able to ~~fulfill~~ fulfill the duties of the job in a way that merges both academic and career interests to create a strong foundational skillset I can apply to future positions. From this experience I hope to become more proficient in data collection and analysis through the use of the AIS database. I also intend to become more proficient in environmental education during this position through public interface surrounding aquatic invasive species and the risks they pose to our ecosystem.

How does this experience contribute to my educational goals:

As an Environmental Science - Terrestrial & Freshwater ecology major, I believe working to prevent the spread of aquatic invasive species into our local lakes works directly in conjunction with my academic goals. Working this position will give me valuable experience relating to my field of study that has potential to increase my chances of employment doing work in the environmental science field.

If Faculty require any additional Learning Objectives, they should be listed here:

Section 5 - Deadlines, Evaluation, and Assessment (Completed by faculty advisor)

	Yes	No
Meet with Advisor: _____	<input type="radio"/>	<input type="radio"/>
First Draft Due: _____	<input type="radio"/>	<input type="radio"/>
Final Draft Due: _____	<input type="radio"/>	<input type="radio"/>
Additional Learning Objectives (as assigned by faculty)	<input type="radio"/>	<input type="radio"/>
Oral Presentation Required	<input type="radio"/>	<input type="radio"/>
Daily/Weekly Log Require	<input type="radio"/>	<input type="radio"/>

Section 6 – Students Certification

I certify that I have read the University Policy on Risk Management Considerations for Student Internships and I will report any injuries suffered while performing internship promptly to WWU.

[http://www.wvu.edu/bfa/Risk_Mgmt/documents/Internship%20Considerations%20\(14\).pdf](http://www.wvu.edu/bfa/Risk_Mgmt/documents/Internship%20Considerations%20(14).pdf)

I will endeavor to represent myself and my college well and will abide by the relevant policies, procedures and ethical standards of the university and the internship organization.

I understand that **30-hours of work per credit earned is expected** for an internship. I understand that I am expected to enroll in a number of credits commensurate with hours worked each quarter.

Student's
Signature/Date



05.05.22

Section 7 – Internship Site Supervisor Certification

I have reviewed the student's indicated learning objectives and on behalf of my organization agree:

- To enrich the Student's knowledge by orienting him/her to the occupation, the work setting, and the responsibilities relating to the assignment
- To regularly evaluate/provide feedback to student on progress, projects and areas of growth
- At or near the completion of the assignment to provide an evaluation of the student's performance
- To review and approve the Student's Learning Plan and communicate with the college if areas are not going to be met.
- To supply the student with, and abide by the organization's policy against discrimination and/or harassment in the workplace
- To contact the instructor or the College of the Environment Internship Coordinator (360) 650-3646, ed.weber@wvu.edu should any problems arise

Internship Site
Supervisor
Signature/Date



5/9/2022

Section 8 – Faculty Advisor Certification

I certify that the student intern and I have reached agreement on the learning objectives and academic expectations for this experience. These objectives are challenging and enriching to the student's academic and/or career goals. I will award grades after satisfactory completion of all learning objectives/tasks/reports assigned.

Faculty Advisor's
Signature/Date

Section 9 – College of the Environment Internship Coordinator

Actions:

1. Review Agreement
2. Update Course Override
3. File Agreement in Student Records
4. Communicate with Employers as necessary during internship

Registering and Completing ENVS/ESCI/UEPP 498B Credits

YOU MUST BE REGISTERED FOR INTERNSHIP CREDITS WHENEVER YOU ARE PERFORMING WORK RELATED TO THE INTERNSHIP TO RECEIVE ACADEMIC CREDIT

- This **INCLUDES** Summer Sessions

REQUEST FACULTY MEMBER TO OVERSEE 498B CREDITS

- The CRNs for ENVS/ESCI/UEPP 498B credits are linked to specific faculty members
- Students need to speak with the faculty member for these credits
 - If possible, students should have a draft of an Internship/Learning Agreement completed before they approach a faculty member to supervise the internship.
 - Most students use their faculty academic advisor as their faculty internship supervisor
 - During Summer Sessions, your faculty advisor may not be available. If not, then register for internship credits with Ed Weber, CENV Internship Coordinator
- Environmental Science students register for ESCI 498B and all others for ENVS/UEPP 498B
- Registration for 498B (Internship Credits) requires an override, which is normally given by the CENV Internship Coordinator (Ed Weber, ES545)
 - You must have a completed/signed Learning/Internship Agreement signed **before** the override will be input

CRNS FOR ENVS/ESCI/UEPP 498B

- See Classfinder for the CRNs for ENVS/ESCI/UEPP 498B Internship credits
 - During Summer Sessions, if your faculty advisor is not listed, please register for credits with Ed Weber, College of the Environment Internship Coordinator

VARIABLE CREDIT REGISTRATION ON WEB

- Initially you can only register for one credit.
- Return to the registration menu after registering. Then go to Change Variable Credits to change the 1 credit to the number of credits desired. (Instructions for Changing Variable Credits are included on the Add/Drop page for registering.) 30-hrs work = 1 academic credit. Register in good faith based on anticipated hours for the whole quarter.

RESOLVING K GRADES

- To graduate, you must receive a passing grade for any credits listed on your major evaluation.
- (For Internship, students must receive a Satisfactory (S) for S/U grading. **Incomplete grades not completed and graded after a year from the quarter of registration automatically become a U (Unsatisfactory) or a Z (equivalent to an F). Incompletes can impact financial aid standing.**

REPORT SUBMISSION

- Final report will be submitted to your faculty advisor using the E-SIGN Form available on the CENV webpage.
- Always consult with the faculty advisor **in advance** about how much time he/she will need to read and grade the report by the end of the graduation quarter.
 - The most difficult time to get a grade on a report is for summer quarter graduation because faculty are generally not available during this time.
 - Spring graduation is a close second in difficulty because many faculty leave campus for extended periods after their last final.



CITY OF BELLINGHAM
invites applications for the position of:

Aquatic Invasive Species Prevention Program Staff - Seasonal

SALARY:	\$16.32 Hourly
OPENING DATE:	01/31/22
CLOSING DATE:	Continuous
NATURE OF WORK:	

Seasonal Positions are available in the Public Works Aquatic Invasive Species Program. Length of season will vary depending on position, but will fall within the 2022 season which runs April through the end of September. These positions are open until filled and may be closed at any time.

Starting hourly rate is at Step 1 (\$16.32/hour). The current full salary range for this position is \$16.32/hour - \$19.85/hour. This position is required to work a varied schedule at multiple sites including weekends, holidays, early mornings and evenings.

Mayor Seth Fleetwood announced on September 21, 2021 that obtaining full COVID-19 vaccination will be a condition of employment for all City employees. You can read the full announcement [here](#).

The Public Works Department currently has several vacancies for the 2022 Aquatic Invasive Species season:

Aquatic Invasive Species Program Staff
15 positions - 6 Month Season
5 positions - 3 Month Season

NATURE OF WORK:

This position fulfills seasonal Aquatic Invasive Species Prevention Program objectives by providing education and watercraft inspection and basic decontamination services to recreational boaters. The position will interact with members of the public, collect and track survey information, provide boat inspection and decontamination training and communicate with other state and local government staff.

This position becomes represented by a union after the completion of 1040 hours working an average of at least 12 hours per week, on an annual basis.

ESSENTIAL FUNCTIONS OF THE JOB:

1. Provides information to the public on aquatic invasive species prevention and management activities.
2. Performs detailed watercraft inspections and basic decontaminations for the prevention of the spread and establishment of aquatic invasive species in Lake Whatcom, Lake Samish and other area lakes.
3. Conducts vessel history surveys with recreational boaters.
4. Maintains accurate and detailed records of work performed.
5. Collects permit fees and maintains accurate sale and receipt records for each shift.

6. Inputs vessel, inspection and permit data using smart phones in the field.
7. Communicates logistical needs to Supervisor.
8. Provides written and verbal reports as requested.
9. Represents the Aquatic Invasive Species Prevention Program at various educational booth exhibits, displays and fairs.
10. Maintains a professional presence and demeanor at all times.

ADDITIONAL DUTIES:

1. Performs other tasks and related duties as assigned.

WORKING ENVIRONMENT:

Work is performed primarily outdoors near water bodies at both rural and urban locations for the duration of seasonal employment. Involves working independently outdoors for long hours in all types of weather. Stands or walks for extended periods of time over rough terrain when performing inspections and conducting vessel screening surveys. Some exposure to conditions such as dust, fumes, noise or odors may occur. Work is intermittently performed in an office setting which may require prolonged periods of sitting. Requires flexible working hours; including evenings, weekends and holidays. Employees are required to wear personal protective equipment, use appropriate safety equipment and follow standard safety practices.

Physical ability to perform the essential functions of the job including:

- Stand for long periods of time during inclement hot and cold weather;
- Bend, squat, climb and reach on a frequent basis to inspect all internal compartments and surfaces of boats and trailers;
- Fine finger dexterity to manipulate computer keyboard, mouse and inspection equipment;
- Travel on foot to remote areas with uneven ground;
- Travel and movement on a boat;
- Collect and input monitoring and inspection data during inclement weather; and
- Occasionally lift and carry up to 50 lbs.

EXPERIENCE AND TRAINING:

- Experience working with the public on a daily basis in public outreach, customer service or similar.
- Course work in environmental science or knowledge of lake aquatic ecology preferred.
- Experience working with watercraft or basic knowledge of watercraft design and operation preferred.
- High level of comfort using smart phones to collect and process data preferred.

An equivalent combination of education and experience sufficient to provide the applicant with the knowledge, skills and ability to successfully perform the essential functions of the job will be considered.

NECESSARY SPECIAL REQUIREMENTS:

- Valid Washington State driver's license and satisfactory driving record. Must provide a three-year driver's abstract prior to hire.
- Must be at least 18 years of age.
- Employment contingent upon passing a Washington State Adult/Child Abuse records check, criminal conviction and local background check (*see Fair Hiring Practices below*).
- All City Employees are expected to follow COVID related mandates and requirements.