2023

LEAD Native Plant Restoration Intern

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Western Washington University

COLLEGE OF THE ENVIRONMENT

WESTERN WASHINGTON UNIVERSITY

MAKE WAVES.

Internship Title:

Organization Worked For:

Student Name:

Internship Dates:

Faculty Advisor Name

Department

STUDENT SIGNATURE _____

DATE: _____

On Earth Day, 2023, over 200 volunteers gathered in the northernmost parking lot of Western Washington University's campus. Just beyond the parking lot, across E. Ivy Street, was an area of bare soil, dark with compost and thickly studded with small flags marking where seedlings should be planted. Buckets of plants and shovels were set out along the newly installed gravel trail cutting through the site. Volunteers trooped into the site wearing gloves, and after a brief introduction, set to work planting.

This Earth Day work party was the culmination of seven months of preparation, primarily by Western's LEAD (Learning, Environment, Action, Discovery) program but also involving other local restoration groups. As an intern at LEAD, I had been involved in most of the work, from hours at the worksite removing nonnative plants and some truly baffling trash (including several car parts, an old coffee maker, and a kayak paddle) to early morning meetings debating how many cubic yards of compost we needed to adequately amend the soil. I joined the LEAD team as one of four undergraduate interns hired in September, 2022, by Ava Stone and Brandon McWilliams, the graduate students co-directing the LEAD program. Over the next three quarters, we planned and implemented a large-scale restoration project at a degraded campus site using the Miyawaki Method, a unique approach to afforestation. It has been applied successfully throughout the world to create "mini-forests" but remains relatively unknown in the Pacific Northwest.

LEAD (Learning, Environment, Action, Discovery)

LEAD is a student-run ecological restoration program within WWU's College of the Environment. It seeks to protect and restore native biodiversity in Whatcom County and to educate students to participate in restoration work through regular work parties and a 2-credit

seminar. LEAD volunteers, seminar students, and interns gain hands-on restoration experience and collaborate with a variety of local restoration organizations. The LEAD program has existed for over 25 years but was restructured at the beginning of the 2022-2023 academic year in the wake of the pandemic. Previously, LEAD's main focus was nonnative species removal, and the weekly work parties migrated between multiple sites scattered around campus. This year was the first time LEAD has committed to a sustained and large-scale native ecosystem restoration project at a single site, involving not only nonnative removal, but replanting and ongoing maintenance.

I was initially hesitant to apply to the LEAD internship. I knew that I was interested in restoration but I did not feel qualified for the position. Attending volunteer work parties with other local restoration organizations had given me some familiarity with restoration techniques but not with the behind-the-scenes work that went into restoration projects, and that the LEAD internship would entail. The internship description also said that one of the LEAD intern's roles was to help manage volunteers at work parties, and I did not feel confident taking on a leadership role. However, I ultimately decided to apply to the internship because I realized what a good opportunity it was to gain practical experience in restoration. Since I was graduating at the end of the year, it felt important that I start learning how to apply what I had learned in the classroom to a real-world context.

I had four main learning objectives at the start of the LEAD internship. Firstly, because I was confident that I wanted to remain in the Pacific Northwest area after graduation, I wanted to gain experience applying restoration techniques in a specifically Pacific Northwest context – working with native plants and soils to restore a forest ecosystem typical of this area. Secondly, I wanted to learn more about the logistics of managing an environmental nonprofit – all the work

that was required to make these projects possible beyond the physical restoration work itself. Similarly, I wanted to gain experience working on a long-term project with a group, since I had never been involved in a multi-term project like this before. Finally, I wanted to explore how ecological restoration intersected with my interests in food sovereignty and decolonization.

Role and Responsibilities

I was hired for the "Native Plant Restoration" specialization of the LEAD internship. This position focused on working with the LEAD co-directors and outside partners to create a native ecosystem restoration plan for our chosen site based on the Miyawaki Method. This task encompassed a diverse range of activities. During Fall Quarter, most of my time was spent on research. We used the book *Mini-Forest Revolution: Using the Miyawaki Method to Rapidly Rewild the World* by Hannah Lewis as our primary guide to implementing the Miyawaki Method. However, significant additional research was required to decide how to implement this method in our particular environment. The Miyawaki Method focuses on planting species that match the "potential natural vegetation" of a site – the vegetation that would occur in that specific area without human influence. Because this method has not been widely applied in the Pacific Northwest, we couldn't just search for a list of what other mini-forest projects in the area had planted – we had to compile the list ourselves.

I first assessed the site's microclimate and existing vegetation. Based on this information and the general location, I determined that our goal should be to plant species typical of the Coastal Western Hemlock (CWH) biogeoclimatic zone (a classification system used by the British Columbia Ministry of Forests). Using a combination of research articles, government publications (from both Washington and B.C.), and other native plant sources, I made a list of

species that occurred in this zone. The Miyawaki Method exclusively plants climax species to bypass the initial stages of ecological succession and generate a mature forest more quickly, which helped me narrow the list further. The method also provides specific percentages for how many species from each forest "layer" to plant. For example, 70-80% of plantings should be canopy or subcanopy species, so I focused on researching tall tree species.

Though I found many helpful resources, I still ran into questions that I couldn't solve through research. Sometimes the resources I found contradicted each other, or simply didn't have the information I needed. In these situations, we used our best judgment to make decisions as a team. For example, I struggled to decide whether we should plant Douglas-firs. They do occur in the CWH Zone and I felt confident they would thrive at our site, since it is next to Sehome Arboretum where they are quite common. However, Douglas-firs tend to be more of an early succession species compared to trees like Western redcedar and Western hemlock – they are fast growers and do not regenerate well in shade. We ultimately decided to include them for the sake of biodiversity.

Once we had the list of species to plant, we had to decide whether to buy them in pots or as bare-root plants, which required another round of research. We decided on bare-root plants, which led to yet more research on heeling-in methods (a way of storing bare-root seedlings so that they do not break dormancy before being planted), and planting methods. The Miyawaki Method also involves amending the existing soil (climax species are accustomed to growing in well-developed soil rich in organic matter), which also required research. We decided to use a combination of purchased compost and compost that we produced on site using clippings collected by the WWU gardeners and cow manure donated by a local farmer.

In addition to research, some of my other tasks included assisting with writing a grant proposal to WWU's Sustainability, Equity, & Justice Fund program, using GIS to create a site plan based on drone images of the area, communicating with our partners (including the City of Bellingham Parks Volunteer Program and Whatcom Million Trees Project), and writing content for our website, work party handouts, and the interpretive sign we will be installing at the mini-forest site this fall.

I also attended weekly work parties at the site. In the early stages of the project, I spent time collecting data about the site through measurements, soil tests, and plant identification, but most of our time was spent clearing out the nonnative ivy, holly, blackberry, and clematis growing there. We also spent several workdays at the site building the compost pile, heeling in our bare-root plants, and installing a gravel trail through the middle of the site. Our team alternated who was responsible for taking on a leadership role at each work party, so during several of these events I was in charge of explaining the work we were doing or leading small groups of volunteers.

Photos of Eva (another LEAD intern, on left) and I (on right), at the back of the worksite. Left photo shows the area in the fall, before we began clearing away the ivy. Right photo, taken several months later, shows the area partially cleared and the compost pile we built. We eventually used that area to store the bare-root seedlings we planted on Earth Day.

Earth Day 2023

All this work culminated in our Earth Day planting event, during which I was responsible for co-leading a group of about thirty volunteers. We began with an introduction that included a land acknowledgement, an explanation of the Miyawaki Method, a planting demonstration, and a safety overview, after which we circulated around the group answering questions and distributing seedlings to be planted. In the end, we were able to plant and mulch all of our seedlings (about 1000 in total) and install a fence to protect them from deer. Additional small groups led by the City of Bellingham Parks Volunteer Program and the Washington Conservation Corps continued to clear out nonnatives from the surrounding area.

I was exhausted by the end of the day, but also incredibly happy and satisfied with all the work we had gotten done. I also felt proud of myself – at the beginning of this internship, the thought of speaking to and managing such a large group of people would have been very intimidating. I think the reason I felt much more comfortable taking on a leadership role during this event was that not only had I had practice doing so at earlier work parties, I had also been so immersed in research on the plants and method we were using that I felt confident about my ability to talk about them.

I have never worked on such a long-term and large-scale project that has an actual tangible impact in the way this project does, and I have come to care about it a lot. After the months of preparation, it was wonderful to open it to the community and see how eager the volunteers were to contribute. There is still more work to do – the forest will need regular watering and weeding for the next two to three years until the canopy fills in and it becomes self-sustaining – but this event was a major milestone that I was grateful to experience.

Photo taken at the end of the afternoon Earth Day work party, showing the planted and mulched seedlings, the deer fence, and many happy volunteers!

Learning Objectives

At the beginning of the LEAD internship, I identified four learning objectives – to gain practical experience in Pacific Northwest ecosystem restoration, to learn about what is involved in running an environmental nonprofit, to work on a long-term group project, and to explore the intersections between restoration, food sovereignty, and decolonization. I certainly met the first three, and I feel that I am in a good position to continue working on the fourth.

In terms of practical experience, I learned and practiced techniques at every stage of restoration – removing nonnative species, heeling in bare root plants, composting, trail building, planting seedlings, and mulching. I learned about a unique restoration method that has not been

widely applied in this area and had the opportunity to implement it on native plants and soils. I also learned more about volunteer management, which is an important skill for many restoration projects. During our work parties, I had to practice clearly communicating instructions in a way that welcomed and encouraged volunteers while also prioritizing safety. Our Earth Day planting event in particular was a lesson in all the additional details one needs to consider in hosting a large volunteering event. Our weekly LEAD work parties were generally around fifteen people, but for our large Earth Day work party we had to plan for parking, restrooms, a sign-in booth, food, and additional information booths.

In addition to the hands-on restoration work, I gained experience in the "behind the scenes" work of managing an environmental organization, including grant writing, project planning, and outreach. This included outreach with students and community members through written materials such as flyers and through face-to-face interactions. It also included communicating with the alphabet soup of restoration organizations we partnered with (CoB PVP, WMTP, WCD, WCC, and so on) to share information about the project and coordinate our preparations for the planting event. If nothing else, I have mastered the art of the politely professional email!

Similarly, this internship was an opportunity to work on a long-term project with a group. I typically have mixed feelings about group projects, and this was the first time I had participated in a group project that lasted longer than a single quarter, so I was unsure what to expect. However, I think we found a structure and team dynamic that was both effective and fun, and it has helped me develop my vision of the type of professional environment I want to work in after graduation. I liked that though the co-directors were clear leaders who could give advice and effectively lead team meetings, there wasn't a sense of rigid hierarchy. I also liked that though

my specific internship position was meant to specialize in native plants, I had a lot of flexibility regarding what work I took on. I was not assigned specific tasks during our weekly team meetings – rather, we discussed as a group what needed to get done and then people volunteered based on their availability and whether it made sense given their experience and skill set. This meant that I had to manage my own hours and be realistic about how much work I could take on. I often had multiple projects going on at once and had to prioritize which was more urgent.

I would not say I fully met my final objective, to connect ecological restoration to my interest in food sovereignty and decolonization, because so much of my time was spent on the mini-forest project that there were not a lot of chances to focus on other things. The Miyawaki Method might sound like a similar concept to a food forest, but because it emphasizes planting native, climax species, it excludes a lot of common edible plants that are either nonnative or early-succession. However, I did have some opportunities to begin to explore areas of overlap between these three interests – for example, we invited a representative from the Whatcom Conservation District to one of our work parties to help us build a compost pile, which taught me a lot about compost and soil health that is applicable to food sovereignty and regenerative agriculture. I also took responsibility for writing a page for the LEAD website on the relationship between restoration and decolonization, which will hopefully provide visitors to the site with some useful resources to begin thinking critically about how restoration work can both reproduce and challenge settler-colonial attitudes and relationships.

Contextualizing LEAD in my Experience at Western

This internship has both added to my knowledge of restoration and been an opportunity to apply knowledge from my classes. I have not taken many classes that focus on restoration – I

took the LEAD seminar in my junior year and have taken classes on relevant topics like ecology, soil science, and GIS - so for this internship I had to learn a lot on my own. Through my research, I have learned about native plant identification, planting techniques, and other important skills that have helped prepare me to work in a Pacific Northwest setting. I also had to learn *how* to learn about restoration. I had to assess what resources were relevant and accurate (the B.C. government ended up being an incredibly helpful source of information on native plants), which in some cases meant reaching out to Western professors or local professionals for advice.

The place-based knowledge I gained through this project was especially important to me because the Environmental Studies major has such a broad focus. I did complete the Salish Sea Studies minor, which is much more place-based, but it does not have many opportunities for hands-on engagement with local ecosystems. This project was an opportunity to apply general knowledge from my coursework to a particular context.

This project was also an opportunity to create knowledge. I have been thinking recently about how there are many kinds of knowledge that aren't often incorporated into coursework – physical and emotional and spiritual, in addition to intellectual. I often noticed at work parties how we were embodying knowledge about how to do the work we were doing – the kind of intelligence that we could never have learned in a classroom because it had to be physically expressed. People often acted more as individuals at the start of the work party, but eventually – and often without explicit directions - we would develop an efficient system in which everyone had a role and worked together. I saw this during our trail building workshop – without a huge amount of verbal communication, we quickly fell into a system of filling and hauling buckets of gravel and digging out the trail, all in a relatively tight space. Each time we were at the site, we

were creating workflows and organization that we could not have prepared beforehand. It certainly made me appreciate the difference between practicing restoration and studying restoration – there's a lot of knowledge that gets filtered out if you are only engaging with something theoretically.

Looking to the Future

I am glad that I participated in this internship during my senior year because I think it has helped me feel more prepared to transition out of Western's academic setting and into a professional work environment. I have learned a lot – about specific restoration techniques and project management in general – and I have gained confidence in my ability to contribute to large projects like the one LEAD completed this year.

I have also made many connections within the Bellingham restoration community, particularly with the City of Bellingham's Parks Volunteer Program and Whatcom Million Trees Project. I am hopeful that these resources could help me find work in restoration – perhaps even doing similar projects in Bellingham based on the Miyawaki Method. Prior to our Earth Day planting event, I and three other members of the LEAD team attended a luncheon at City Hall with the mayor of Bellingham, Hannah Lewis (the author of the book that we used as our main resource on the Miyawaki Method), and representatives of other organizations and City departments involved in restoration work. The goal was to raise awareness about the Miyawaki Method and its value for restoring small, degraded urban sites. I am not sure whether anything will come of it, but it did seem that several of the attendees were interested in implementing this method on a wider scale throughout Bellingham. I think that between the connections I have

made through this project and my experience in working with this method, I do have something to contribute to that work.

As I wrap up my time as a LEAD intern and approach graduation, I have been reflecting on how I will continue building on the knowledge I have gained. Even if I end up involved in more Miyawaki mini-forest projects in the future, I think it is important that I learn about and gain practical experience in other types of restoration. One of the most important things I have learned about restoration is that there is not a one-size-fits-all approach – it depends on the characteristics of the site and the community's needs and values. The Miyawaki Method has a lot of potential value because it quickly regenerates self-sustaining forests that provide a host of benefits, including carbon sequestration, habitat, water and air filtration, and protection from heat, wind, and noise. However, I do not think it should be applied to all degraded sites throughout Bellingham – not only are there practical limitations such as the upfront costs of the many seedlings required to achieve the high planting density, but it is also intended to create a specific type of native climax ecosystem that isn't suitable for all situations.

This is where my interest in food sovereignty and decolonization comes in – I would like to see more of Bellingham's unused and degraded areas of land transformed into food forests and urban agriculture operations. I would particularly like to see more land made available to Indigenous communities to engage in resurgence by applying traditional land management practices to steward edible native plants such as berry bushes and camas. I envision a diverse patchwork of restoration techniques being applied – and an expansion of what kind of practices we consider "restorative" to our landscapes, and what types of ecosystems we consider desirable. Too often, Western approaches to restoration assume that the ideal landscapes to restore are those where humans are absent.

As I continue learning and practicing restoration, I want to do so critically. I want to be mindful of the assumptions I am bringing to the work – especially when those assumptions replicate Western, colonial attitudes towards nature. I am inspired by Robin Wall Kimmerer, who writes in *Braiding Sweetgrass* that restoring ecosystems must also be a process of restoring relationships. I want to orient my future involvement in restoration around forming and maintaining good relationships with the plants and people I am working with, the Indigenous communities whose land I am working on, and the land itself.

The LEAD mini-forest project has been an opportunity to begin to build those relationships. Over the three quarters I participated in this internship, I developed relationships with the other interns and the co-directors, with the volunteers at our work parties, and with members of other restoration organizations. I also spent many hours at our worksite coming to know and care for that area of land and learning about the plants there – both native and nonnative. I stand by our work to remove the nonnative plants, but I feel that I have a greater respect for their tenacity now – I certainly don't see them as enemies. Going forward, I want to focus on building relationships with local Indigenous communities and orienting my work in restoration around their priorities. I certainly have a lot more to learn and to work on, but I think the LEAD internship has prepared and motivated me well.

Photo taken several weeks after the Earth Day work party. The deciduous seedlings are beginning to leaf out and the conifers are showing new growth.

Appendix I – Log of Hours

	Fall (1 credit)			Winter (2 credits)			Spring (2 credits)	
Date	Hours	Activity	Date	Hours	Activity	Date	Hours	Activity
5-Oct	2.5	work party, team meeting	9-Jan	0.75	team meeting	3/18/23	2	drafting language for interpretive sign
10-Oct	0.75	team meeting	11-Jan	2.75	work party, team meeting	3/31/23	1	Zoom meeting about sign
11-Oct	1	native plant research	16-Jan	1	emails	4/2/23	1	planting day planning
12-Oct	2.5	work party, team meeting	17-Jan	2	bare root research, planting day planning	4/3/23	4.5	team meeting, educational materials, website content
13-Oct	2	native plant research	18-Jan	2.5	work party, CoB and WMTP meeting	4/4/23	0.75	website content meeting
14-Oct	2.5	site visit, reading Mini-Fore	23-Jan	1	team meeting	4/5/23	2	work party
15-Oct	1	reading Mini-Forest Revolu	25-Jan	2.5	work party	4/6/23	2.5	Zoom meeting about sign, soil amendment
16-Oct	2	grant writing	29-Jan	2	bare root research, website content	4/7/23	0.5	Zoom meeting about sign
17-Oct	2	meeting, grant writing	30-Jan	3.5	team meeting, website content	4/9/23	3	sign content, emails
22-Oct	3	research	1-Feb	3	GIS work, work party	4/10/23	2.5	team meeting, emails
23-Oct	5.5	research, site survey	3-Feb	0.5	CoB site visit	4/11/23	1	Zoom with CoB
24-Oct	1	team meeting	4-Feb	5	CoB and LEAD joint work party	12-Apr	2.5	work party
26-Oct	2.75	work party, team meeting	6-Feb	4	team meeting, GIS	14-Apr	1	planting day educational materials
30-Oct	2	research	7-Feb	1.5	GIS, t-shirt design	16-Apr	2	planting day educational materials
31-Oct	1	team meeting	8-Feb	4	compost maintenance, GIS, work party	17-Apr	1	team meeting
2-Nov	2	work party	12-Feb	2	compost tea research	18-Apr	2	trail building work party
4-Nov	1	site survey	13-Feb	1	team meeting	19-Apr	2	CoB small group training
7-Nov	2	research	15-Feb	2	work party	20-Apr	1	Hannah Lewis presentation
9-Nov	3	work party, team meeting	23-Feb	3	t-shirt design, website content	21-Apr	6	City Hall luncheon and planting day site prep
14-Nov	2	research, team meeting	27-Feb	7.5	team meeting, GIS, website content, t-shirts	22-Apr	9	Planting day!
16-Nov	3.75	research, work party, team	1-Mar	2	work party	24-Apr	1.5	Interpretive sign meeting
19-Nov	1	research	3-Mar	1	GIS work	26-Apr	1.5	work party
27-Nov	1	research	5-Mar	2	heeling in plants	3-May	1.5	work party
28-Nov	1	team meeting	6-Mar	3.5	team meeting, GIS	10-May	1.5	work party
30-Nov	2	work party	8-Mar	2	work party	16-May	1	Zoom meeting about sign
			13-Mar	4	website content, interpretive sign	17-May	1.5	work party
			15-Mar	1	team meeting	19-May	3	Zoom meeting about sign, drafting language
			16-Mar	1.5	team meeting	23-May	1.5	work party
						25-May	1	Zoom meeting about sign
						31-May	1.5	work party
						1-Jun	2	cleaning tools
Total	**50.25**			**68.5**			**64.75**	