Delphinium Leucophaeum Project Summary

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Project Overview

My internship with the Oswego Lake Watershed began in the beginning of 2025. I collaborated with Jack Halsey in brainstorming projects I could help with. After various meetings and discussion, we both narrowed it down to the endangered flower, *Delphinium Leucopaheum*, commonly known as the white rock larkspur. My interest piped in understanding if lithologies correlated with growth. Initially my project objective was to survey multiple counties, including Clackamas, Marion, Multnomah, Yamhill and Washington counties. I collaborated with Keith Karoly, Jack Halsey, Rio Hybert, Nora Dunkirk, and Kaleb Simpson throughout the project.

Delphinium became the point of interest for myself because it is an endangered species, with only 27 occurrences in Oregon. According to the Oregon Department of Agriculture (ODA), The white rock larkspur is vulnerable to external factors such as habitat loss, degradation, invasive species and climate change. In my process of becoming familiar with the White rock Larkspur, I spoke with Keith Karoly and learned that delphinium may have existed after the ice age, though because of the lack of protectings for delphinium, along with an evolving landscape, the flowers were displaced and slowly became smaller in number. According to the ODA, these plants grow in warm conditions, adapting in the winter by storing their energy in their root structures

Objective

The objective of my research was to understand the effects of lithologies on delphinium seed count and distribution. I wanted to understand the environmental factors that affect delphinium distribution. Initially I had planned to explore delphinium distribution in Clackamas, Marion, Multnomah, Yamhill and Washington counties, though I narrowed it down to only Lake Oswego. I also saw this as an opportunity to develop my skills in geology, Another goal I had set for myself was to understand the biology of the plant.

Methods

During my research, I was focused on knowing the geologic history of Lake Oswego, and I worked with Keith Karoly, to understand overall more about delphinium. I conducted background research on the relationship between basalt and soil. Luchese et al. found that applying basalt rock powder and limestone improved soil fertility and increased shoot phosphorus (P) and potassium (K) concentrations. I also did frequent visits to Lake Oswego with Jack Halsey, Rio Hybert, and Nora Dunkirk, along with 5 volunteers who came along with her. I read through various articles on the geologic history of Lake Oswego to better get an understanding of the landscape.

Key Findings

The Lake Oswego sites where White Rock Larkspur grows are primarily composed of basalt, a type of volcanic rock, with formations ranging from the pre-Miocene to younger Miocene periods. At the base of the hill is the Ortley Unit, composed of fine-grained, aphyric basalt (lacking visible crystals). Above that, layers like the Winter Water Unit and Sentential Bluff Unit contain fine- to medium-grained basalt, sometimes showing radial or spoke-shaped plagioclase crystals, and occasionally forming blocky or columnar joints (vertical fractures that create column-like shapes). The uppermost layers, including the Basalt of Ginkgo, are medium-grained, plagioclase-microphyric basalt (containing small, visible plagioclase crystals), often displaying columnar jointing with abundant plagioclase phenocrysts (larger crystals). Thin sedimentary layers, including sandstone and paleosol (ancient soils), are sometimes interspersed between basalt flows. These layered geologic units create varied soil and drainage conditions, which influence where Delphinium leucophaeum can grow.

Figure (1) Project site at low elevations.

Figure(2). Here are two photos demonstrating project site at a higher elevation.

As I worked with Keith Karoly (Reed University), I discovered more about anatomy. Delphiniums survive through the winter with their root structures, called tubers. They are root structures that store all of their energy there. Delphinums are also more inclined to warmer conditions, and forested habitats, Delphiums also grow on the south sides of hills, which makes them receive more warmth, so it makes sense. While I was out surveying the area with Norma, and her team, I discovered that the plant is growing more and more every year, increasing in numbers.

Figure (4). Delphinium Leuchopaheum in its pre-bloom stage.

Figure(5). Delphinium leucophaeum in peak blooming season.

Conclusion

My experience interning with the Oswego Lake Watershed Council was extremely positive. My shift from Internship position was rough, though the team made the transition smooth and welcoming. I was able to connect my passion for geology into this project by connecting the plants soil and the surrounding geology to better understand and learn more about the ecology of delphinium leucophaeum. Through my experience, I found that Basalt does help provide more nutrients to soil health, which in turn helps delphinium leocuphaeum bloom and most likely contributes to the growing population in Lake Oswego.

Apart from doing this project, I had the chance to shadow with the volunteers who were teaching children about water quality. While I couldn't take time to volunteer officially due to time constraints and scheduling, I had a positive experience and was very happy to see younger generations learn more about water health and quality. I'd like to thank Jack Halsey, Rio Hybert, Megan Hill, Henry O'dell, Nora Dunkirk, and Keith Karoly for helping me with this project and to deepen my knowledge.

Sources

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