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NW Avalance Ctr/Elk Habitat Restoration

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COLLEGE OF THE ENVIRONMENT



Internship Title: Snow Algae and Environmental Education with the Northwest

Avalanche Center/ Elk Habitat Restoration with the U.S. Forest Service in the remote Idaho Wilderness.

Student Name: Ryan Ruklic

Internship Dates: Snow School – 2/11/22 thru 2/12/22

Elk Habitat Restoration – 6/7/22 thru 9/6/21

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STUDENT SIGNATURE

A handwritten signature in black ink, appearing to read "Ryan Ruklic", is written over a horizontal line.

DATE: 9/21/22

Snow Algae and Environmental Education with the Northwest Avalanche Center



Figure 1:View of Mt. Shuksan and the North Cascades

Between February 2022 and April 2022, I took part in Snow School, a program put on by the Northwest Avalanche Center (NWAC) in conjunction with Mt. Baker Ski resort. The goal of the program was to introduce junior high school students to snow science, including avalanche science, snow algae, and climate change in a fun and interactive way. The program sought educate and inspire students on these important topics, and to spur interest in pursuing further education down the line. With my experience in Environmental Science from CENV I was well suited to help educate these students and add my own personal flair to keep them engaged.

Every Thursday and Friday between February and March students from as far away as La Connor, WA would travel by bus up to Heather Meadows Ski Lodge, a part of the Mount Baker Ski Resort. Once the bus arrived volunteers including myself, along with personnel from NWAC, would be there to receive them off the bus. Many of the students attending the program came from less fortunate or even impoverished families, so warm clothes were provided to help keep students comfortable. Lots of kids had never been up in the mountains, or even really seen snow, so oftentimes it was a push to convince them to layer up. We were fortunate to have good luck with the weather all days except one, so we rarely had issues with kids getting cold. Once groups were rallied and prepped with the correct attire we would take them down to the rental shop, where snowshoes were being provided by Mount Baker Ski Resort. The snowshoes were just a way to make traversing the deep snow safer and easier for the students. Mount Baker is an area notorious for its very large snowpack, one of the largest in the world, so keeping students from falling through was very important.

Once we had gathered snowshoes and all students were properly equipped, we began the short hike up into the basin. The basin is just uphill from the lodge, and away from the rest of the resort, so it was a better area to take the kids. We would then proceed with four 30-minute stations, with each station having a different emphasis. There was a station for avalanche science, which went through snow-water equivalency and the recipe for avalanches. Another station focused on snow profiles, teaching students how to read snow and find the layer that would be most susceptible to avalanche hazards. These stations were both lead by NWAC folks, as they were experts on the subject, but my job was to help keep kids focused and help drive the conversation. The next station was the snow algae station, put on by students from Western who specialize in snow algae. This station was a real winner with students because it had them

extracting snow algae from different samples right out of the ground on site. The fourth was a station put on by me, teaching students about watershed science, climate change, and the effects of climate change on the overall snowpack. This was oftentimes student lead, because many students had many questions which I was happy to answer. We were able to build a connection between snow way up in the mountains, and their daily lives down near the oceans.

The knowledge I gained at Western allowed me to teach students about the importance of protecting our environment, especially our watersheds. Through my coursework in Environmental Science, I was able to develop a well-rounded understanding of the world around us, and why it's important to protect it. This program had me passing on some of this knowledge to the next generation, helping to inspire the Environmental scientists of tomorrow, so that we can ensure we have a more prosperous future for everyone.

Elk Habitat Restoration with the U.S. Forest Service in the remote Idaho Wilderness.



Figure 2: Photo looking back towards one of the clones

Between June 2021 and September 2021 while I was working as a wildland firefighter for the U.S. Forest Service, we began taking part in a project spearheaded by the Rocky Mountain Elk Foundation (RMEF) to help restore elk habitat in the highlands of the Nez Perce/Clearwater National Forest in Idaho. This work came about due to a contract from RMEF to improve quaking aspen tree stands at high elevations.

As the Wild West has become increasingly less “Wild” many of the species that call it home have struggled due to pressures like a lack of habitat, overhunting, or invasive species. Elk are one of these species. Over the years their populations have declined due to overhunting, logging, and an uptick in predators such as gray wolves. Where once huge herds of elk would

run wild, many of these herds have become depressed or disappeared completely. RMEF does work across the West to help return elk to their historical numbers and try to make sure this species is managed in a way that ensures healthy herds for years to come.

The North Fork Ranger District, a part of the Nez Perce Clearwater National Forest, was once the mecca of logging for the West. Towns like Pierce and Headquarters were held up by the production of big timber from the North Fork, and they hosted tens of thousands of people to support these operations. Large mills dotted the landscape, and logs were shipped by train, truck, and water to various production centers around the area. Hillsides across the area were laid bare with no real plan of restoration in place. At its peak the North fork was producing a hundred million board feet a year in timber.

This level of industrialization did two main things; dramatically reduced suitable habitat for the massive herds of elk that roamed the area and allowed many non-native trees like Grand fir to take the place of the large, native Western White Pine. Grand fir are large evergreens that grow like a weed in North Idaho. They have little to no timber value and take over forests if given the opportunity. They were historically kept in check by wildfire which allowed white pine to prosper. Wildfire would burn many of the small saplings, and keep the Grand fir from completely taking over, but without fire they outcompete the native species and dominate the environment. Combine this with the blister-rust epidemic which further harmed the native White pine, and you have a forest seriously out of balance. Even as logging has diminished to just a trickle of what it once was today, the problem brought forth by an era of overuse still plagues the North Fork to this day.



Figure 3: Looking out from the clone towards Wallow Lookout

The focus of our project was to help improve and expand elk habitat in the high-country of the North Fork area. Elk are known to thrive around a specific species of tree called Quaking Aspen (*Populus tremuloides*), which is the most widely distributed tree in North America. Aspen is unique in that they grow in groups called clones, which is due to the fact that aspen roots can grow outward and sprout back up from the ground into new trees. So, a group of aspens is usually all the same tree connected through the root structure. One of the largest living organisms in the world is an aspen clone, which allowed to grow and expand can produce thousands of new “trees” all within the same organism.

Elk love aspen for winter and spring rearing habitat. They love to eat the bark off the aspen and will frequent an area with healthy aspen clones very often. Due to this fact RMEF enlisted the United States Forest Service to expand these clones for better elk habitat. To do this

a GIS technician was able to use Landsat imagery to identify clones and their approximate size and boundaries. They did this by scanning the district looking for the distinct white color of aspen trees, which compared to the sea of green conifers made them relatively easy to isolate and identify. This data was passed on to the district ranger who then passed it to the fire management officers.

Once the clones were identified a specification or “treatment” was identified, which outlined the specifics of the work that RMEF wanted done to the clones. They wanted all conifers within the clone, a 100 feet buffer outside the clone in the direction of the prevailing wind, and 50 feet buffer everywhere else cut out with chainsaw. They didn’t want these trees felled due to the fact that some were so large they would take up a large chunk of ground which would inhibit aspen growth. Large tree felling also is very time consuming and very dangerous which contributed to this spec. Instead of tree felling they wanted to have the trees killed while leaving them standing, which would additionally create standing dead trees which make valuable bird and squirrel habitat. We did this using a process called girdling. Girdling is done by taking a chainsaw and cutting two shallow cuts around the entire circumference of the tree twice. By taking a shallow cut you leave enough holding wood to leave the tree standing, while still severing the cambium layer. The cambium layer is a thin layer right inside the bark which transports water and nutrients throughout the tree. Severing this is effectively like suffocating the tree. The cuts needed to be thorough, deep enough to sever the cambium, but not deep enough to fell the tree. Even a small bit of cambium left alive allows the tree to live. Any conifer tree above 8 inches at diameter breast height was girdled, everything below 8 inches was felled.

This work was done on some of the steepest and most aggressive terrain in all of Idaho. These aspen clones all grew at high elevation near the crest of ridges. Hike in time ranged

anywhere from one to six miles one way for access. Traversing within each unit was equally difficult. The brush in many of these units were so thick that visibility was less than 10 feet in any direction. This limited communication to mostly radio traffic, which was spotty at time.



Figure 4:View of the North Fork River Basin

In order to ensure we produced a thorough and complete product, myself plus nine other crew members would line up across the top or bottom side of the unit. We all carried food, chainsaws, extra fuel, and lots of water. Once lined out we would begin hiking up the hill in a grid pattern. Basically, each crewmember would hike a zig zag pattern back and forth, turning back once they found the person next to them, or found work that had already been done by the next person over by tying into the person next to you we made sure no trees were missed and the work was fully complete before moving on. This could be very difficult at times due to the

visibility, the amount of weight on our backs, and the steep and oftentimes rocky terrain. Water was constantly a consideration, as we would burn through at least a gallon and a half a day.

This project took place over several years, with hundreds of acres of aspen clones treated. It was my crew of 10 people, plus another crew of 7 that completed all the work. There are future plans to complete a small, prescribed burn within the units in order to burn off some of the underbrush and open up the forest floor for aspen upstarts. Even within a couple of years the clones have already showed positive growth and outward expansion.

Within the project I gained a greater understanding of forest dynamics and forest ecology. The relationships between historic human impacts and modern-day ecological issues were a primary theme of this project. Elk are a keystone species that are vitally important to a healthy ecosystem, and a species with cultural significance to the local Native American tribes, like the Nez-Perce. Restoring aspen clones and improving elk habitat is a way of trying to restore and mend some of the damage done by historical mining and logging. This project was a great real world example of ecology and wildlife biology, and helped to contribute to my overall success as an environmental scientist.