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Washington Conservation Corps - Marine Debris Removal

Griffin Hemmelgarn
Western Wisconsin Technical College

COLLEGE OF THE ENVIRONMENT

WESTERN WASHINGTON UNIVERSITY
MAKE WAVES.

Internship Title: Washington Conservation Corps - Marine Debris Removal

Student Name: Griffin Hemmelgarn

Internship Dates: 06/13/2022 - 09/08/2022

STUDENT SIGNATURE Griffin Hemmelgarn

DATE: 11/03/202

Washington Conservation Corp

Internship Dates: 06/13/2022 – 09/8/2022

Griffin J. Hemmelgarn

Learning Objectives:

- Integrative approach towards understanding human-environment interactions
    - Critically analyze different approaches to environmental work

In the summer of 2022, I was very fortunate to be able to apply my university education to a state program occupation. My 3-month summer internship with the Washington Conservation Corps' Marine Debris Removal (MDR) crew came to a conclusion in September. This was my first glimpse at opportunities for future careers once I graduate from Western Washington University's School of the Environmental in Spring 2023. My experience working for Washington Conservation Corps (WCC) was incredibly eye-opening.

Entering my internship, I held many preconceptions and expectations which manifested into learning objectives for the purpose of this essay. While working for WCC, I sought to analyze integrative approaches towards understanding socio-ecological interactions and critically examine methods of conducting environmental work. These objectives were achieved as I learnt about the effects of anthropogenic marine debris on the Salish Sea environment. Chemical compounds located in marine waste have long-lasting and fatal effects on the fauna of marine environments. Additionally, I developed a greater understanding of environmental work through collaboration with government and non-governmental organizations.

On the first day of the job, I eagerly arrived at the location of the crew's tools and equipment storage unit. There I was greeted by my supervisor, Andrew Hacker and introduced to the crewmates I would be working alongside. Their names being: Kevin Arthurs, Liv Tsang, Anthony Stock, and Ariel Shiley. I was the fifth addition to the team, my newfound colleagues had each been working for this specific crew for 8 months; with some working for the WCC Program for three years.

The crew guided me around the storage unit, which was located on an open lot next to the Quil Ceda Creek on the Tulalip Tribes' land. Adjacent to our storage unit, which was affectionately named "The Lockup", was the Tulalip Department of Construction site. My

supervisor explained logistics of the organization. Stating that every WCC crew had an organizational sponsor, which enlists the aid of WCC crews to conduct projects for their institution. Our crew was sponsored by the Washington Department of Natural Resources (DNR). Additionally, our program collaborated with the Samish Indian Nation's DNR. The Samish Nation has been a collaborator for 8 years and their mission is to conserve and maintain healthy ecological systems in their traditional territory.

Work days consisted of launching two Munson Landing Craft boats out of Washington Park in Anacortes or Squalicum Harbor in Bellingham. The smaller of the two boats was owned by the DNR and operated by Kristian Tollefson, the DNR MDR project manager. The larger craft was operated by our collaborators the Samish Indian Nation who alternated between seven boat operators. My WCC crew would load our tools, which included chainsaws, a demolition saw, peavies, picaroons, and swede hooks, onto the vessels. Then, the crafts would take off into the channels, navigating the San Juan Islands. Boat operators used an application called MyCoast to locate marine debris. MyCoast allowed citizens to report any marine debris they saw. Using these reports, we could locate large detritus. Many of our notable removals were reported to us by residents of the islands or kayakers.

Our program specialized in removing derelict creosote treated wood. This came in the form of dock pilings, mooring dolphins, and railroad ties. Creosote treated wood is characterized by its greasy, black appearance, milled or pressure lines, lack of organic features i.e., branches, knots, and curves, and most evidently its noxious smell. Creosote is a tar-like substance that consists of various carbonaceous chemicals and fossil fuel byproducts. One of the most harmful components of creosote are polycyclic aromatic hydrocarbons (PAH). PAH are considered carcinogenic, mutagenic, and toxic to both human and aquatic organisms (Smith 2008). In order to apply

creosote into the wood, facilities place the wood in large chambers that remove pressure and inject creosote. The creosote seeps deeply into the wood, the chamber is repressurized and the chemicals are left to cure. Creosote research and regulation presents a particular challenge for researchers since each producer has their own home-brewed mixture making it difficult to determine the implications of the chemical compound. Some of these mixtures can contain over 300 different types of chemicals (Younie 2015).

Creosote serves as a preservative for pieces of infrastructure that face enduring outdoor conditions. Wooden dock pilings must withstand tough marine conditions. Creosote-treated wood is especially effective at deterring shipworms from inhabiting and consuming dock pilings (Johnson & Gutzmer, 1990). The effectiveness of creosote as a preservative was evident in the pieces of debris our crew removed. Most of the treated wood that our crew grabbed were installed 30 or more years ago. The detached debris would survive extended periods of time floating in the water, eventually washing up on beaches, but typically remaining intact. Our crew utilized specialized tools and procedures to remove the creosote, leaving little to no trace and preventing the spread of further chemicals.

When derelict dock pilings interact in the marine environment the harmful chemicals are released. Treated dock pilings wash up on beaches where abrasive beach substrate and repetitive waves act as sandpaper, shredding the wood and releasing toxins. Fish whose fry and juvenile stages occur in the intertidal zone are especially susceptible to creosote impacts. PAH and other chemicals effect the endocrine system of these forage fish, leading to an increased mortality rate in the early development stages. The fish, which are primary and secondary consumers in the food chain, are critical for providing nutrients for the whole ecological system. Reduction in population and presence of chemicals in living forage fish is having a harmful effect on the

ecosystem. The scarcity of food puts high pressure on herring and salmon species who are already facing intense impacts from anthropogenic sources. Bioaccumulation of chemicals is leading to increased exposure for apex predators like the Salish Sea's orca populations as well as posing risk to human health for individuals consuming fish.

Our organization collaborated with EarthCorps; a Seattle based environmental organization. For three weeks EarthCorps provided three different crews of five, one crew per week. During our partnership we tackled locations with high concentrations of debris. Areas like Jackson, Fourth of July, and South Beach on San Juan Island consumed much of our time. While joined with crew members from EarthCorps our production increased and we removed approximately 17,000 pounds of marine debris in those three weeks!

In late August our crew was traversing the southeast islands of the San Juan archipelago. Operating our boat that day was DNR's Aquatic Restoration Manager, Christopher Robertson. We were returning to Washington State Park, our boat was loaded with treated wood, remnants of a plastic rowboat, and miscellaneous trash. As we neared Decatur Island, I noticed a concentration of boats bobbing in the water. Over the radio we hear a transmission telling us two Bigg's Orcas were submerged underwater. We followed proper boating protocol by turning off the engine and radars, limiting the noise pollution for the highly attune whales. In the distance a large black dorsal fin broke through the water followed by a loud plume of water from its blowhole. Then, another, smaller, whale made an appearance alongside its mother. A glance in another direction and the dark silhouette of two more orcas breached from the water. In the following minutes approximately fifteen transient orcas were scattered in all direction around our boat.

Witnessing these extraordinary animals felt incredible and knowing that I played a role in improving their ecosystem was rewarding. Removing creosote mitigated one of the many anthropogenic actions that impacted the apex predators. Orcas were just one of many unique animals that I observed while working with WCC. Our cohort observed a humpback whale, gray whales, harbor dolphins, harbor seals, Stellar Sea lions, bald eagles, jellyfish, squids, octopi, nudibranchs, and countless numbers of sea stars, anemones, and marine birds. These sightings coupled with my supervisor's lessons on aquatic and terrestrial plants allowed me to better understand the inhabitants of the environment that I study.

Conducting conservation environmental work for WCC was unlike any other job I have ever done. One reason for its stark contrast to previous jobs is the work we conducted had no direct patrons. We were not creating or serving a product; instead, we conducted a service, that although difficult to measure, benefited the local ecology. Another surprising factor to me was all the entities involved for operating the Marine Debris Removal Program. I was thrilled to be involved with the Samish Indian Nation, aiding in the preservation of their traditional territory. Other organizations that we had direct contact included the National Parks and Recreation and a multitude of Washington's environmental groups.

The internship for Washington Conservation Corps was an invaluable experience, that aided in my academic understanding of Washington's socio-ecological systems. While working I was able to address learning objectives relating to human-environmental interactions in the Salish Sea's marine ecosystem and evaluate approaches to environmental work. By physically removing harmful toxins from the water system, I learned about the impacts of anthropogenic structures on marine fauna. Bioaccumulation, early forage fish mortality, and mutagenic effects are all threats created by the chemical compound, creosote on the Salish Sea ecology. In futurity,

I know I will be drawing from these experiences to further my personal development in environmental fields.

Works Cited

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