



Fieldwork Challenges

This past summer, Kevin Wells, an American studying at Bangor University, United Kingdom, conducted a research project on air pollution in the Colville National Forest, Washington, for his master’s thesis. Baseline lichen sampling by the FS Air Program had uncovered a hot spot of metals on public lands along the upper Columbia River and in the Colville National Forest. The air specialists wondered if the contamination was related to a large smelter just across the border in Canada. Kevin collected soil and lichen samples from 23 different locations in the Forest at different distances from the smelter. He tested their metal levels, mapped the sites to see patterns of elevated metals, and compared soil metal levels to toxicity thresholds for wildlife.

A unique aspect of his project was the remoteness of the places where Kevin chose to collect the samples. “No one had ever sampled most of the specific sites before, which means I was the first one to report on what was happening there.” It took Kevin approximately 12 hours a day to collect samples from only 2 plots due to the large distances between each other. “I had to drive for several hours and then, I had to leave my car in the middle of nowhere and hike for miles in some very challenging terrain. After taking the samples, it took me another several hours to finally get home.”



Figure 1-Steep mountain with a lot of rocks

During his field work, Kevin experienced some moments of fear when he



Figure 2-Kevin crouched down holding a snake in the riverbank

encountered unexpected animals. “One day, I was alone hiking in the middle of the forest, on my way to one of the plots, and I saw two bear cubs. They were very close to me, about 80 feet (25 meters) meters. Mother bears are very protective and territorial and they can run very fast. I started making noises, in case the mother was nearby, so that she would notice me and not be surprised. I didn’t want to provoke an attack!”

Despite the various challenges Kevin faced during his research, he said

that it was worth it due to all he learned and the findings he obtained from his research. “Comparing my results with the toxicity thresholds for soil from the Environmental Protection Agency (EPA) for birds, mammals, soil invertebrates,

and plants, showed that at least one group was being impacted by zinc, cadmium, or lead in every site. Sampling sites that were closer to the smelter typically had higher levels of pollution and the Columbia River Valley seemed to channel the pollution.” More of the soil samples hit the toxicity thresholds than the lichens which may indicate that soil holds pollution longer than lichens; however different criteria were used to create the thresholds for the different sample types. Nonetheless, because pollution from the smelter has decreased in the past few decades, it is understandable that the lichens would show less contamination.

Kevin mentioned that the training and support from the Forest Service Pacific Northwest Region Air Program specialists were crucial for his project. “They did not mind that I was a student from a foreign university. They were more interested in the work that I was going to do, and obtaining data that would help them understand the impacts on the environment. They generously welcomed me into their project, and provided field equipment and assistance with laboratory testing.”

The findings were of significance not only for Kevin. The PNW Air specialists are working with staff from Washington Dept. of Ecology, EPA, and Dr. Alyssa Shiel at Oregon State University to follow up on Kevin’s findings.



Figure 3-Two air quality specialists study lichens samples in a lab