

April 6, 2015

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To: Dr. Janet DeVlieg Pope and DeVlieg Foundation,

I am writing to thank you for the wonderful opportunity provided to me and so many previous undergraduates through the DeVlieg Undergraduate Research Scholar position, and to provide you with an update on my progress. First of all, my experience last summer was incredibly unique and will forever influence the way that I view wilderness ecological systems. I was afforded the opportunity to spend much of my time at the Taylor Ranch Wilderness Research Station, which was amazing! I also spent a good amount of time working on tributary streams throughout the Big Creek watershed with two graduate students, Matt Schenk (former DeVlieg Undergrad Scholar), and Miriam Schaerer (an exchange M.S. student from the U. of Zurich in Switzerland) on projects that related to my own.

While living at the Taylor Ranch Wilderness Research Station I worked very closely with Matt and Mirijam. We focused on different aspects of how the severity of wildfire and the trajectory of ecosystem recovery over time influenced communities of stream organisms, their productivity and their food web interactions. I was focused on the primary productivity of algae and the composition of the diatom community, which comprised the lowest trophic level of our collaborative research. To better understand how algae and diatom communities changed throughout the summer in streams with different wildfire history, I took bi-weekly rock scrubbing samples on Big Creek, Pioneer Creek, and Cliff Creek. I also deployed instruments ("SONDES", see Figure 1) in these creeks to monitor temperature, dissolved oxygen and conductivity. Back in the lab, I am now using the data collected from the SONDES to estimate rates of photosynthesis and primary production coincident with changes in algae and diatom composition throughout the summer.



Fig 1. Monitoring a SONDE on Cliff Creek.

I also participated in a larger-scale study with Matt and Miriam during which I took rock scrubbing samples on 13 tributaries throughout the Big Creek Basin (see Fig 2). We sampled tributaries which had been burned severely, moderately, or unburned by wildfire. I preserved my rock scrubbing samples in Lugol's Solution which is very similar to iodine. This type of preservative dyes the frustules (outer "shells") of the diatoms so that they become more visible when they are mounted on a microscope slide. I also filtered the water from my rock scrubblings to estimate the total mass of biofilm material the chlorophyll-*a* content to determine how much primary production (photosynthesis) is occurring in the various tributaries. In order to quantify differences between tributaries, we measured stream width, depth, velocity, temperature, light, and riparian vegetation cover. My aim is to provide insight as to how wildfire severity alters diatom community composition and primary production throughout the Big Creek Basin. These findings will also be synergistic with those from the other students' projects. Miriam's work focuses on responses by stream invertebrates and their diets, and Matt's research focuses on responses by the fish, including their diets. Our goal is to combine our results to provide a multi-trophic level perspective on the effects of wildfire and the recovery of streams over time after fire, effects stream food webs.



Fig 2. Scrubbing rocks to collect diatoms at a favorite campground near Beaver Creek.

I am currently analyzing data with my advisor, Dr. Baxter. We have completed the AFDM and chlorophyll analysis, which provide an index of primary production occurring in the stream. We found that burned streams were the most productive throughout the basin and Cliff Creek was the most productive near Taylor Ranch. I am still working on discovering what the diatom communities of the various streams are. I have finished mounting all of the diatom slides (Fig 3). I am excited to see the finished results of my research and plan to present at meetings (e.g., American Fisheries Society) in the coming year.



Fig 3. Example of a mounted diatom slide under the microscope (magnified 100x).

I have included additional photos of my research and time spent at Taylor Ranch below. Thank you again for this life changing experience! I will always remember it, and will be in touch again in the coming months as I complete my analysis and research report.

Sincerely, Adam Eckersell



Miriam and I at the head waters of Big Creek. We had just finished half of our basin wide sampling and we were excited!



Me showing Teyah (Pete and Meg's daughter) how to collect AFDM samples with a filter manifold. We are sampling Pioneer Creek on the ranch near the runway.



My advisor Caldén taking lunch after completing the long term monitoring on Cave Creek.



Caldén, Miriam, and I marveling at the awesome power of the Frank Church Wilderness.



Matt showing Miriam and I a fish he caught snorkeling during the late hours of the night.



Miriam and I sampling invertebrates from Cougar Creek.