Examination of Pollutants in Trout Species in the San Juan River
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Abstract: The San Juan River is known to be a vital resource for wildlife that inhabit this area and an import resource for human water needs in the desert southwest. This river is currently threatened by several different contaminants. This study examines the bioaccumulation of several pollutants including mercury and chromium in trout species caught in the San Juan River. The Navajo Lake, known to be contaminated with mercury, is up-stream from the study site. This study is in its early stage; however, tissues from trout collected at the study site have tested positive for high levels of chromium and mercury. The study has discovered a difference in bioaccumulation rate between Rainbow, Brown and hybrid trout fishes. The data collected in this study will aid in addressing what contaminates are found in Northern NM waters and contamination sources. Our continued work will result in increased monitoring of contaminate and work towards the prevention of future bioaccumulations of contaminant.

Study Area: The San Juan River starts along the southwestern slopes of the Rocky Mountains in southern Colorado and enters the northwestern corner of New Mexico roughly 34 miles east of Farmington, New Mexico. In CO, the Headwaters of the San Juan are located at an elevation over 14,000 feet. The water feeds into the Navajo Dam Reservoir where it is used for recreation, irrigation, municipal purposes, and for the production of energy resources such as hydro power and natural gas extraction. The San Juan is the second largest tributary feeding into the Colorado River, but is often considered the most vital. The San Juan River is the principle source of water to Lake Powell in Arizona. The Navajo Dam Reservoir was built in 1964 with the primary purpose of water discharge control along the San Juan River. The dam maintains an average water discharge rate throughout the year to accommodate research and recovery efforts of the fish and wildlife that the San Juan River supports.

Methods: Catching Fish
The trout were caught with the use of natural baits (spinners, flies, worm, etc.). After catching the trout, they were immediately put on ice to preserve any pollutants that were in the tissue.

Extracting Fish Tissue Samples
We cut a “V” shape into the tissue (Fig. 5), in front of the dorsal fin located on the dorsal side of the fish, making sure that part of the spine was included in the sample. Two duplicates were also taken between the dorsal fin and the adipose fin, located on the dorsal side to ensure accuracy of sampling methods. After extracting the samples, we placed each sample in a sterile vial with distilled water to hydrolyze the pollutants in the tissue, labeling them accordingly.

Analyzing Fish Tissue Samples
Each vial of the tissue samples were tested and data was collected using the 14-in-1 drinking water testing kit which tested the pH, Total Hardness, Iron, Copper, Lead, Fluoride, Mercury, Nitrate, Nitrite, Chromium, Bromine, Residual Chlorine, and Sulfates.

Results: The results of this experiment indicate that the fish tissue samples were contaminated with Chromium, Sulfates, and Mercury. Chromium was the highest recorded contaminate. The hybrid trout contained higher concentrations of contaminates in the tissue compared to the rainbow trout. However, the concentration of mercury in rainbow species was higher than in hybrid species. Additionally, in hybrid species, there were higher accumulations of sulfates within the fish tissue.

Conclusion: Past studies on the San Juan River have shown high levels of mercury, along with E-Coli and fecal matter. Conducting our research with this knowledge, we wanted to see if there were different pollutants found in the river. Upon further observation of results and hands-on field work, we found that chromium, sulfates, and mercury were found in the river. Our current goals are to find harmful pollutants, the cause of them, and who is being affected. Our long term goals are to control the problem and further prevent future bioaccumulations of contaminant.

Future Work: Currently we are testing fish recently caught at the San Juan River. Along with the tissue, we will test and gallbladder in order to determine whether the concentrations of the toxins are dependent on fish species or related to any type of diseases or pathogens. By obtaining the results, we can determine what pollutants are affecting the fish, the source or cause, and work towards finding solutions to limit the impact of these pollutants on fish in our rivers.