SURFACE COAL MINING IN CENTRAL APPALACHIA: IS BIOACCUMULATION OCCURRING IN THE HEADWATER STREAMS?
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Background

• Strip mining removes the upper layer of soil and rock from a mountaintop to allow access to coal
• Material removed from mountaintop is usually deposited in nearby valley, known as a valley fill
• Headwater streams can be affected by unearthed elements now leaching into headwater streams

Elemental Data Graphs

Chromium

Copper

Strontium

Zinc

Statistical Analysis

Before being able to test for bioaccumulation, it must be determined if each of the three categories (reference, low salinity, high salinity) are normally distributed. If so, then a one-way ANOVA is run to determine if there is a significant difference between the three. If the three are not normally distributed, then a Kruskal Wallis H Test is used.

Objectives and Methods

• Figure 1: 6 locations where samples were collected
  • 2 non-mined reference streams
  • 2 low salinity streams
  • 2 high salinity streams
• Figure 2: A stream where data was collected
• Media type collected: water, particulate matter, primary consumers, predators, salamanders, and fish
• Elements tested from media types: arsenic, cadmium, chromium, cobalt, copper, nickel, selenium, strontium, and zinc

Conclusions and Future Work

Excel was used to analyze data and help determine one-way Analysis of Variance and Kruskal Wallis H tests, but a more powerful program such as R should be used to finish comparing data relationships to look for bioaccumulation.

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