Diatom and geochemical results indicate the holding pond is contaminated with heavy metals and nutrients. The diatom flora indicated high nutrient taxa and deformations from the heavy metal concentrations. The geochemical results and the fossil diatom assemblage and geochemical analyses in the future are being analyzed using a combination of water quality of these ponds through the last century and periodically overflows the shallow bank that separates the holding ponds from the river including recorded events in the 1970's, 1990's, 2008, and just this past spring (2013).

In June 2013, a 68-cm sediment core was collected from one of the IP holding ponds to explore the potential impacts of these numerous sources on the water quality of these ponds through the last century. The core is being analyzed using a combination of fossil diatom assemblage and geochemical analyses in order to isolate potential sources of pollution.

In June 2013, a 68-cm sediment core was collected from one of the IP holding ponds to explore the potential impacts of these numerous sources on the water quality of these ponds through the last century. The core is being analyzed using a combination of fossil diatom assemblage and geochemical analyses in order to isolate potential sources of pollution.

**SITE DESCRIPTION**

International Paper (IP) came to Terre Haute, Indiana in 1917 and produced corrugated packaging products until 2005. IP built five storage ponds in the mid 1950’s for excess paper pulp. Even though the IP site is currently abandoned, the ponds remain and are located directly adjacent to both the Wabash River and Terre Haute’s old industrial park. The ponds are positioned between Interstate 70, Tangent Rail Works, where railroad ties were injected with creosote from 1906 to 2010, and an illegal dumping site that was once owned by Sugar Creek Scrap. The Wabash River, which drains over 32,000 square miles of farmland, has a long and checkered history of environmental pollution from construction sites, shoreline industries and wastewater treatment plants. The Wabash River periodically overflows the shallow bank that separates the holding ponds from the river including recorded events in the 1970’s, 1990’s, 2008, and just this past spring (2013).

**METHODS**

The core was collected using a Griffith coring device in June 2013 and was a length of 68-cm and extruded at half centimeter intervals for the potential of high resolution analysis. Diatom samples were processed by drying and weighing between 0.05 and 0.2 of a gram and were then bathed in hydrogen peroxide for three weeks and then mounted in Naphrax and 500 µL of microsphere solution. Slides were then analyzed using diatom to microsphere ratios or weighted averages. A minimum of 300 diatoms were counted for each slide.

Geochemical processing was done alongside diatom processing by collectively drying and crushing the core samples. The samples were then analyzed using an X-Ray Fluorescence (XRF) Spectrometer to identify heavy metal concentrations on dry samples and after the samples had been ashed to remove organic materials (loss on ignition – LOI). Samples will be analyzed via ICP-OES in the future.

**RESULTS**

**TERATOLOGICAL DEFORMATIONS**

Left to right: Navicula, Pinnularia, Eunotia.

**SUMMARY**

- Diatom and geochemical results indicate the holding pond is contaminated with heavy metals and nutrients.
- The diatom flora indicated high nutrient taxa and deformations from the heavy metal concentrations.
- The geochemical results and the diatom results agree.
- Future plans include increasing sample resolution for both diatom counts and geochemistry.
- Ashed samples will also be analyzed via Inductively Coupled Plasma-Optical Emission Spectroscopy (ICP-OES) and detailed phosphorous geochemistry.

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