HEAVY METALS IN SILVER LAKE, DOVER, DE: ENVIRONMENTAL INSIGHTS FROM WATER AND SEDIMENTS FOR FISH AND ECOSYSTEM HEALTH

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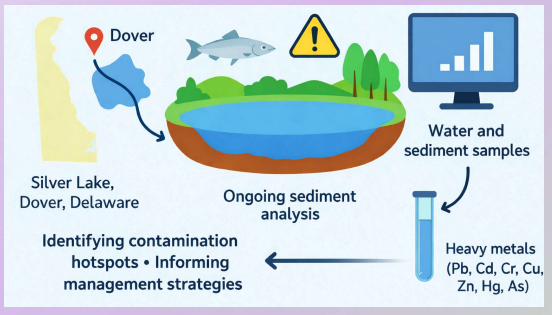


ABSTRACT

Urban freshwater systems are increasingly affected by heavy metal contamination, posing risks to aquatic ecosystems and fisheries. Silver Lake, located in the St. Jones watershed (Dover, Delaware), is under a fish consumption advisory due to concerns over metal bioaccumulation, yet the environmental sources remain poorly understood.

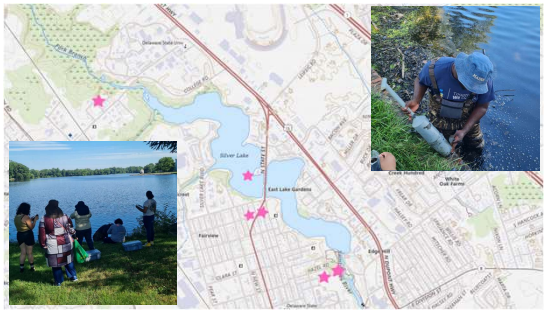
Water and sediment samples were collected from six sites across the lake to assess metals (Pb, Cd, Cr, Cu, As, and Mn) using inductively coupled plasma mass spectrometry (ICP-MS). Preliminary results indicate that multiple metals are present in the water column, but concentrations are below federal guidelines, suggesting sediments may represent the primary long-term reservoir and exposure pathway.

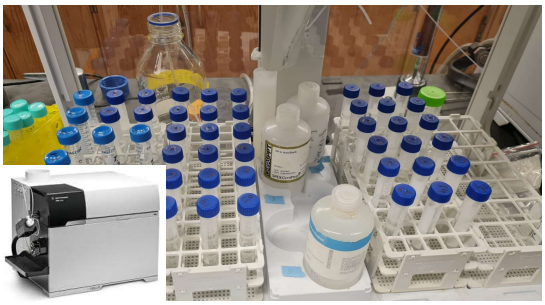
Ongoing sediment analyses will identify contamination hotspots and pathways affecting aquatic life. These findings will support community outreach, policy discussions, and sustainable management of local freshwater and fisheries resources.

OBJECTIVES

- Quantify heavy metal contamination in the water column and sediments of Silver Lake and identify major exposure pathways affecting aquatic organisms.
- Inform community outreach, policy discussions, and sustainable management strategies for protecting local aquatic resources.

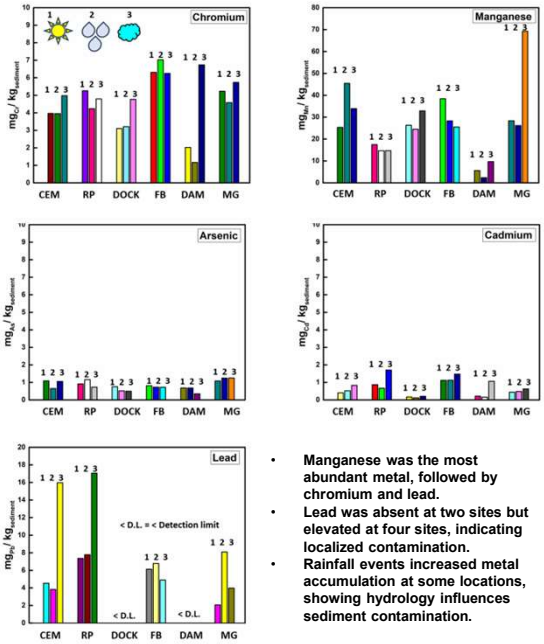
SAMPLE COLLECTION & METHODOLOGY





- Surface water and sediment samples were collected from six representative sites across Silver Lake to capture spatial variability in metal contamination.
- Sediment samples were prepared using microwave-assisted acid digestion to extract total metals.
- Metal identification and concentration were determined using inductively coupled plasma mass spectrometry (ICP-MS).
- Measured metal concentrations were compared with federal water and sediment quality guidelines to evaluate potential ecological risk.

RESULTS & DISCUSSION



- Manganese was the most abundant metal, followed by chromium and lead.
- Lead was absent at two sites but elevated at four sites, indicating localized contamination.
- Rainfall events increased metal accumulation at some locations, showing hydrology influences sediment contamination.

FUTURE WORK

- Study heavy metal concentrations in relation to pH and redox potential.
- Assess bioaccumulation in aquatic organisms to understand ecological and human health impacts.
- Monitor spatial distribution to identify contamination hotspots and sources.

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