



Burton Island Study

Concerns about heavy metals present in coal ash at Indian River Power Plant prompted study.

This study documents the concentrations of potentially toxic trace elements in tested organisms and sediments surrounding Burton Island, adjacent to the Burton Island Ash Disposal Site on Island Creek.

Background

The study was initiated in response to citizen concerns that heavy metals present in coal ash and its potential impact on the health of the Inland Bays.

Project Objective

The purpose of this project was to document whether material (either sediment, ash, and/or trace toxins) eroding off and/or transported from the ash disposal site at Burton's Island into the Indian River, Delaware, is exposing aquatic organisms in the Burton Island area to toxic trace elements that could bio accumulate and cause ecologically detrimental effects.

Timeline

Samples collected in October 2012.

Sample analysis completed by the Smithsonian Institute in May 2013.

Final Report Completed in July 2013.

Project Description

Ten sites were sampled; five on Island Creek, a tributary that flows along the south shore of the Burton Island coal ash site and enters Indian River near its mouth at Indian River Bay; and five sites on nearby Pepper Creek that served as 'reference' or comparison sites.



At each site, sediment samples, and two selected organisms, Mummichogs *Fundulus heteroclitus* and Ribbed Mussels *Geukensia demissa*, were collected, then analyzed to identify the presence of potentially toxic levels of elements, including arsenic, cadmium, copper, chromium, mercury, nickel, lead, selenium, thallium and zinc.

Project Lead:

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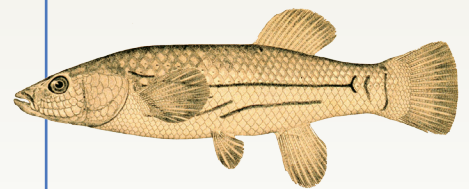
Funding Partners

US Environmental Protection
Agency (EPA)

DE Department of Natural
Resources and Environmental
Control (DNREC)

Interesting Facts

The 144 acre ash disposal site is a former tidal marsh, that was used to disposal of fly and bottom ash from 1957 to 1979.



Female Mummichog *Fundulus heteroclitus*
Credit: Wikimedia Commons

Ribbed mussel *Geukensia demissa*
Credit: Barnegatshellfish.org



"We were pleasantly surprised by the results of the study. The concentrations of toxic trace elements present in the samples tested have ecological risk and do not point to a need for additional studies at this time."

Bartholomew Wilson P.G.
Science Coordinator for the CIB



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Sampling locations along Island Creek and Pepper Creek



This project fulfills objectives in the Comprehensive Conservation Management Plan (CCMP) for the Delaware Inland Bays.

Water Quality Management

Objective 4. Quantify the transport of contaminants from Indian River Power Plant (IRPP) coal ash landfills to receptors in the aquatic environment and examine the effects of sea level rise and severe storms on this transport.

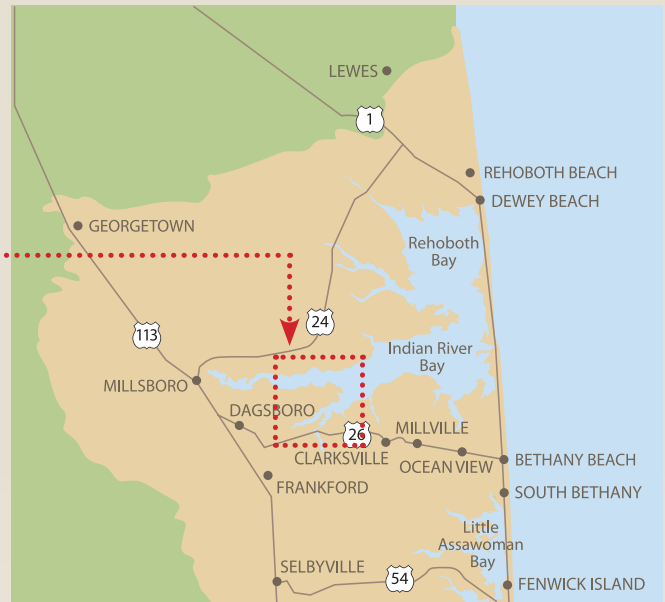
A. Study the transport of contaminants to aquatic life near the IRPP to inform the Voluntary Cleanup and the Natural Resources Damage Assessment Process for the Burton Island coal ash landfill.

Conclusions and Recommendations

This study revealed that there were no differences in the trace elements in the sediments between Pepper Creek and Burton Island. At Burton Island, higher concentrations of Selenium were found in mummichogs and higher concentrations of Arsenic in mussels.

This study documents that there currently is a low ecological risk to the biota surrounding Burton Island from trace elements that have been transported out of the disposal site.

Over time, the conditions on and around the island could change due to rising water levels and/or changes in the rate of groundwater movement. For this reason, it is recommended that tissue and sediment samples are periodically sampled and analyzed (in methods consistent with this study) to evaluate any changes in the prevalence and concentration of trace elements and metals in the surrounding sediments and biota.



Outputs and Outcomes

- This study creates a baseline to which future sampling results can be compared so that changes over time can be assessed.
- The concentrations of selenium in the sampled mummichogs and ribbed mussels are within the expected range of background values, but more importantly, the concentrations are well below the threshold that would have negative effects on reproduction or health in the surrounding biota.
- Arsenic concentration in the mummichogs, are more likely characteristic of the overall arsenic loading within the watershed (both through natural and man-made pathways), rather than elevated concentrations resulting from one particular site within the watershed.
- The higher levels of As in the ribbed mussels samples at Burton Island, are results that should be monitored, but current conditions are not an ecological concern. These concentrations are well below the FDA action levels for total arsenic in clams, oysters, and mussels.



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The Delaware Center for the Inland Bays is a non-profit organization established in 1994 to promote the wise use and enhancement of the Inland Bays and its watershed. With its many partners, the CIB conducts public outreach and education, develops and implements restoration projects, encourages scientific inquiry and sponsors research. To learn how you can get on board with the bays go to inlandbays.org.