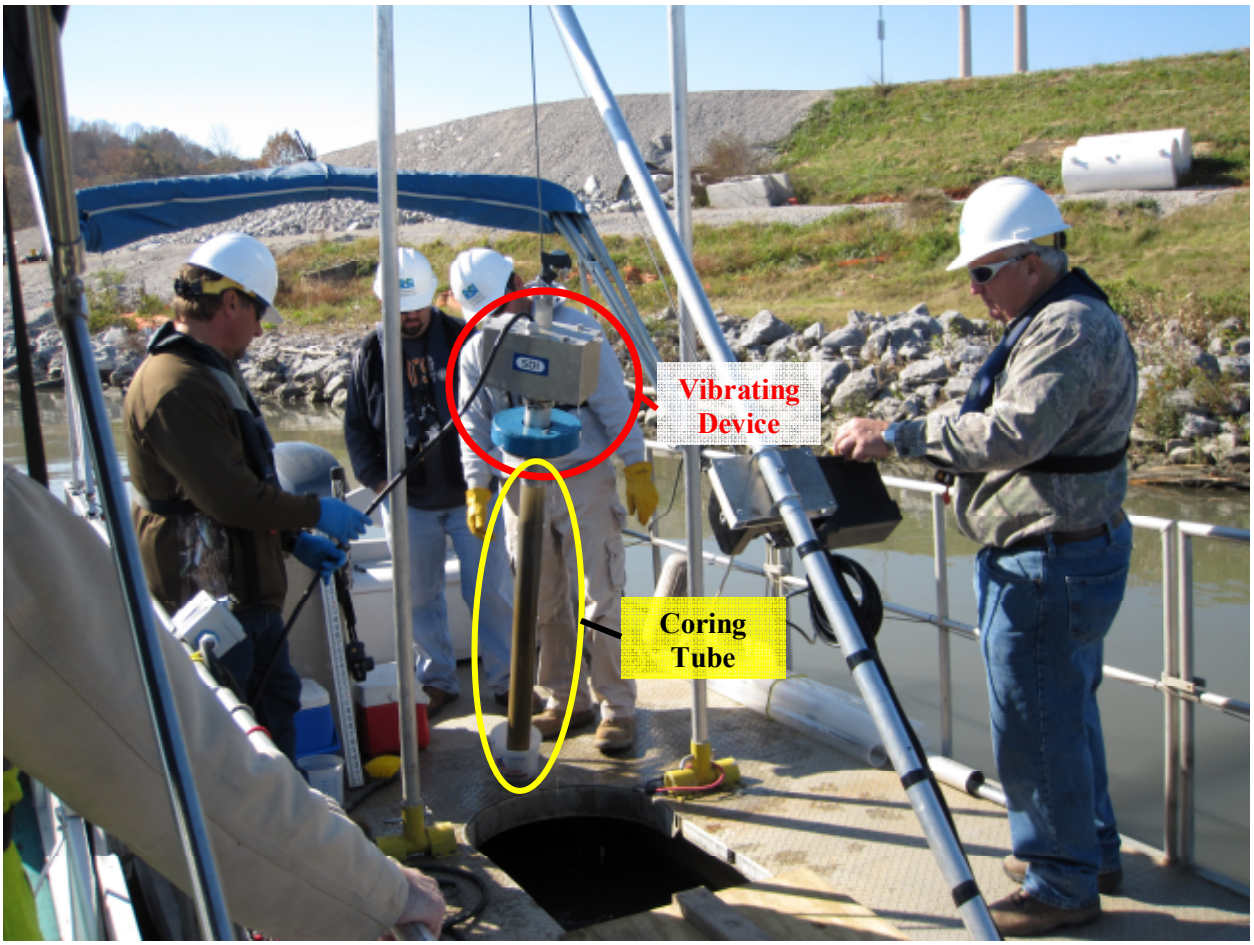
TVA KINGSTON ASH RECOVERY PROJECT
ROANE COUNTY EDUCATION INITIATIVE

"GIS & Mapping"

Abstract: Data collected during the Ash Recovery project are displayed on many types of maps. Geographic Information Systems (GIS) and AutoCad are used in daily operations to track the status of removal, and demonstrate activities that have occurred in the area. Specifically TVA's Geographical Information and Engineering Team and partners have created maps to calculate the volume of ash in the river, track dredging, and monitor daily river conditions.

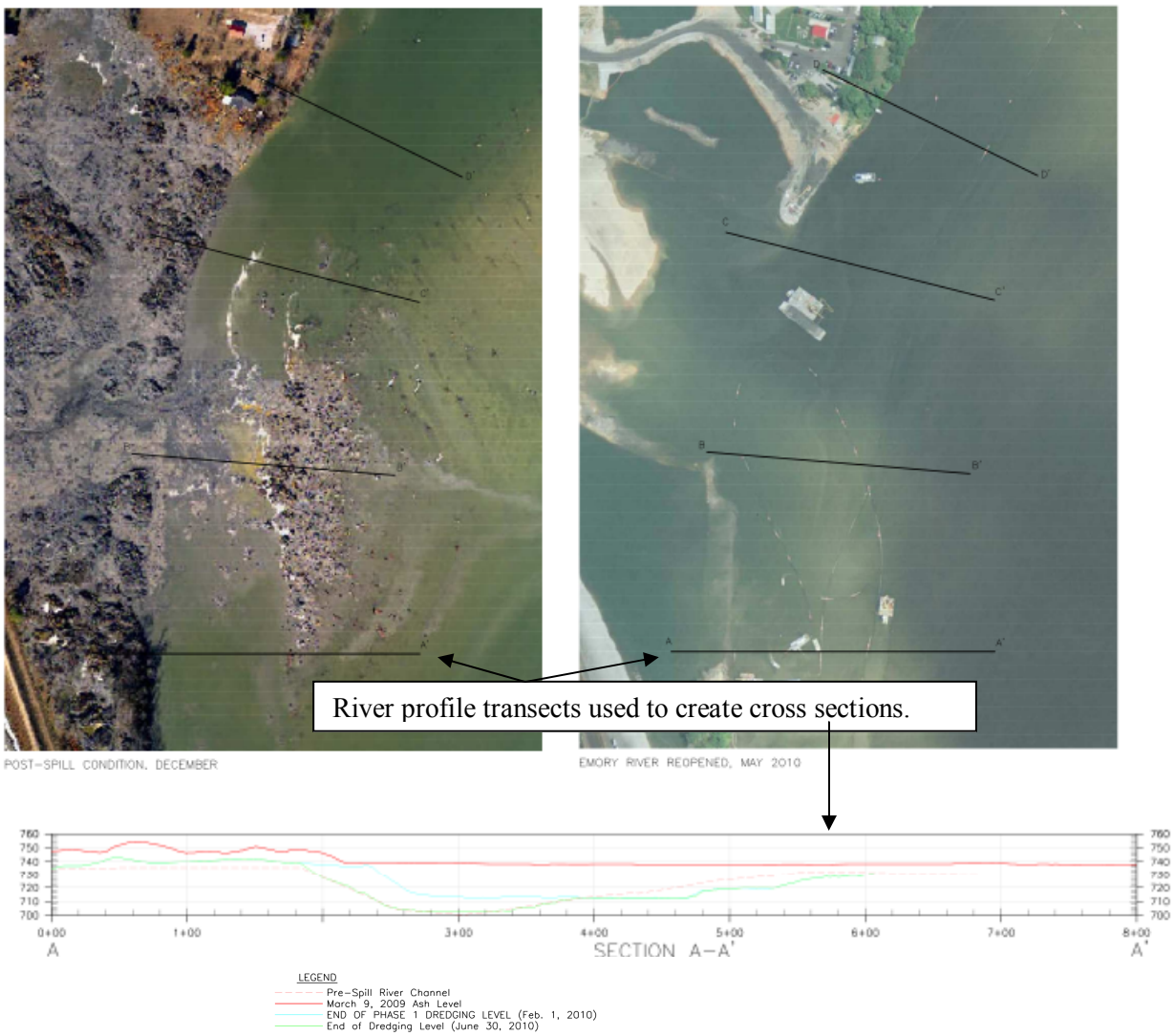
Vibecore Locations

Vibecore is a process used to sample sediment throughout the river channel. A coring tube is sent to the bottom of the river by attaching a weight, and once the tube hits the bottom of the channel, a vibrating mechanism is activated to allow the tube to further penetrate into the river substrate. This process allows for samplers to determine if ash is present in the river at select locations, what the thickness of the ash may be, and if it is feasible to remove the ash through dredging.



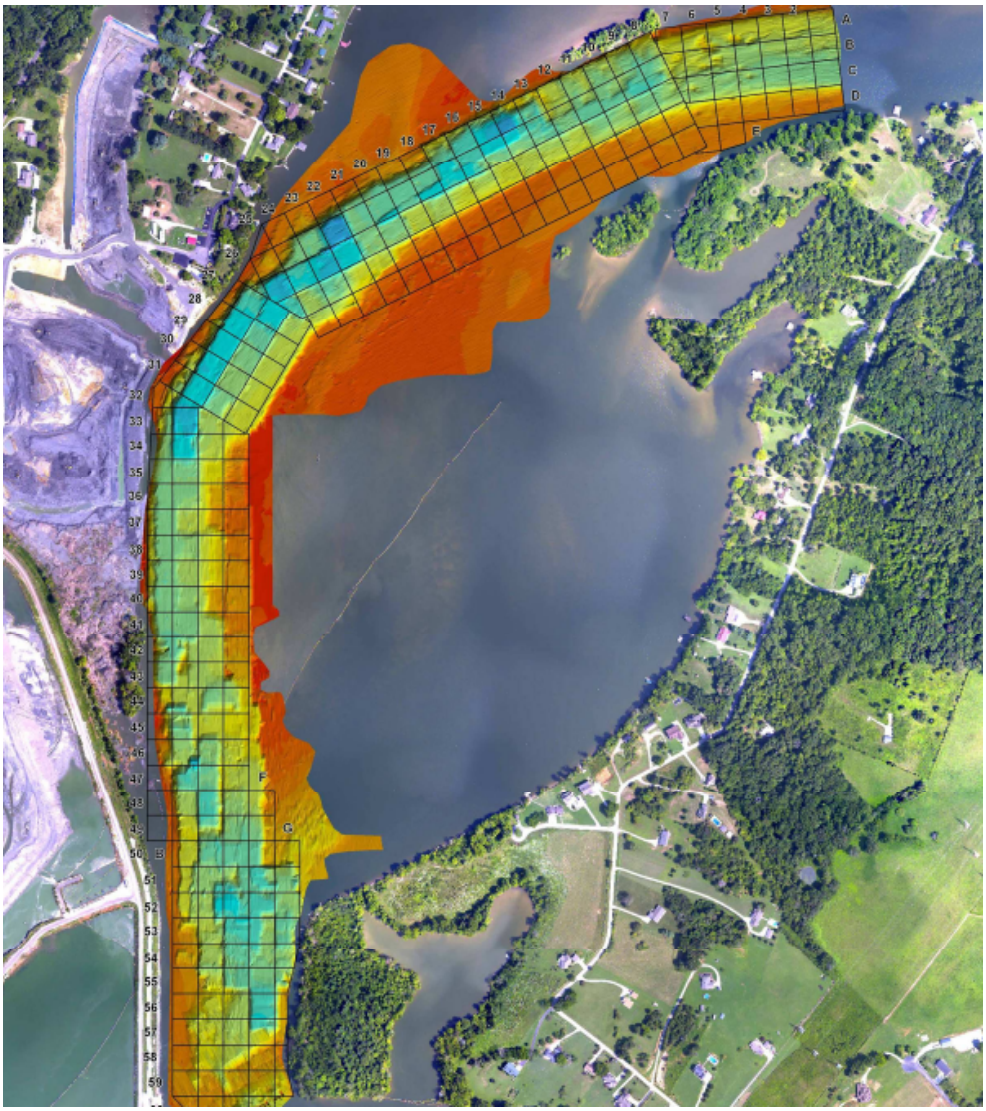
River Profiles

Once the cores are collected and analyzed, the ash measurements are joined with the boat's X-Y-Z coordinates from a Global Positioning System (GPS) unit. This data recorded in a database. This data can then be used to generate two-dimensional (2D) and three-dimensional (3D) views of the area. There are two types of 2D figures generated – plan view maps and profiles. River profiles are created by capturing a series of data points along a line perpendicular to the river channel. Then the elevation data are plotted along that line as on a graph. The resulting plot allows the engineers to see the conditions at specific points in time, as well as track changes.



Bathymetry and Volume Estimates

Bathymetry is the process of measuring the elevation of the surface below the surface of water. Bathymetry and other advanced analysis can also be completed using the GIS system. After data has been collected and processed, river bottom surfaces can be created and overlain. These computers can be used to easily calculate the change in the river channel elevation, thus allowing for calculation of a volume estimate. This is crucial for planning for dredging operations and removal resources.



Rainbow colored areas represent bathymetric surface of Emory River Channel

GIS and Practical Application

After introduction to these concepts, the students will participate in using a GIS system in 2D and 3D views. In the 2D environment, they will be able to turn layers on/off, zoom to areas of interest, access select vibecore core images, and use queries to identify points in the river where ash was present. In the 3D view, they will be able to maneuver through the site and river channel in 3D – viewing the spatial relationship of the vibecore locations, and will use a query to illustrate locations that contained ash of a certain thickness.

They will also be provided a short exercise on plotting a vibecore sample point on a graph, and calculating the elevation of the river channel surface.