

WATER RESOURCE ANALYSIS, MODELING, AND MANAGEMENT

Water and Environmental Quality

RPI has conducted a broad range of field studies to characterize point and non-point pollution of water, sediments, and aquatic organisms. Selected examples of experience in this area included:

- Since 2000, RPI has been under contract with SC DHEC (South Carolina Department of Health and Environmental Control) through a federally funded cost-sharing program to address issues in water quality in two local watersheds. The goal of the projects that RPI is managing is to reduce fecal coliform bacteria loading into the Rocky Creek watershed in Chester and Fairfield counties and the Little Saluda River watershed in Saluda County. The targeted watersheds violated the fecal coliform water quality standard.
- Delineation of the distribution of PCB contamination for 60 miles of the Mud River, Kentucky downstream of a die-casting facility. RPI scientists developed a sediment and contaminant budget for the river, modeled the rate of contaminant transport downstream with and without different remediation options, and evaluated risks to aquatic organisms with and without remediation.
- Baseline environmental assessment of the Niger River, Nigeria. This study was conducted for the Petroleum Inspectorate, to assist them in the development of criteria and standards for oil industry activities in the Niger River Delta region. We conducted a three-year baseline assessment of water and sediment quality, habitat types (including mapping), and biological characterization of the entire delta system. We developed water classifications and mapped them for the Niger River system. In the course of this study, we set up 633 field stations, 2,000 separate field chemistry measurements were taken, 7,029 laboratory analyses of water and sediments were performed, 1,379 biological field samples were collected, and 3,202 replicate samples were processed in the laboratory.
- In 1994, RPI prepared a manual on protocols and methodologies for oil spill damage

inventory and assessment for the State of Florida. These protocols were developed to meet the State's requirements for data quality assurance and control.

- RPI developed a water and sediment quality model to evaluate the fate and persistence of contaminants from point sources into 18 estuaries in the Gulf of Mexico. This work required characterization of the pollutants from a wide range of industrial discharges, for the following priority pollutant groupings: pesticides, halogenated aliphatic hydrocarbons, monocyclic aromatics, phthalate esters, polycyclic aromatic hydrocarbons, nitrosamine and other N-containing chemicals, and inorganics. Estuaries were ranked according to the amount of point source pollutants being deposited in the estuarine areas by pollutant type and persistence categories.

Flood Plain Management

In approaching watershed management issues, RPI investigates land use, surface and groundwater, wetlands monitoring and socioeconomic factors including forecasted population growth. Only through this multidisciplinary approach, which includes analyses of numerous data sources incorporated in a GIS, can effective watershed management be achieved.

RPI is under a five-year contract with the Damage Assessment Center of NOAA to provide expertise in natural resource damage assessment and restoration. RPI has developed restoration plans for damaged habitats with an emphasis on the restoration and enhancement of wetlands. RPI is also under another five-year contract with the Office of Pipeline Safety to provide expertise on resource mapping, damage assessment, and habitat restoration.

Geomorphology and Sediment Transport

RPI scientists have extensive experience in the coastal plain geology of the southeastern United States. Project capabilities include riverine, estuarine, and marine geomorphology; sediment transport, erosion and deposition modeling; data collection methods including photointerpretation, aerial reconnaissance, and ground surveying; and lake sedimentation.

