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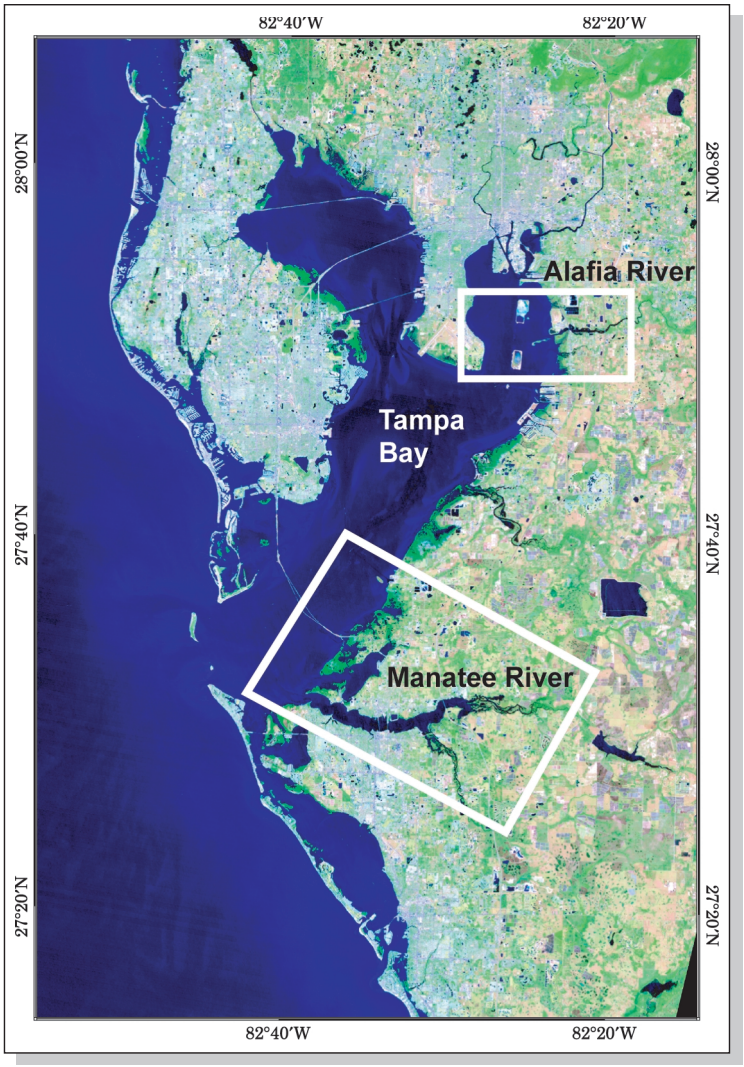
# Tampa Bay Integrated Science Pilot Study

The Tampa Bay Pilot Study is an integrated science effort by the USGS that combines the expertise of federal, state, and local partners to address some of the most pressing societal and ecological problems of Tampa Bay Estuary. As a pilot study, the project will serve to develop a template for application of integrated research projects in other bays and estuaries in the Gulf of Mexico. The USGS has designed the Tampa Bay Pilot Study with the following four major components to focus on the identified scientific needs of the bay:

- establish baseline maps and bathymetry,
- identify sources and quality of ground water seeping into the bay,
- establish current, historical, and pre-historical wetland conditions to document trends in ecosystem health and status,
- provide a web-based clearinghouse of information for scientists and the public, including a prototype Tampa Bay Decision Support and Query System for decision makers.



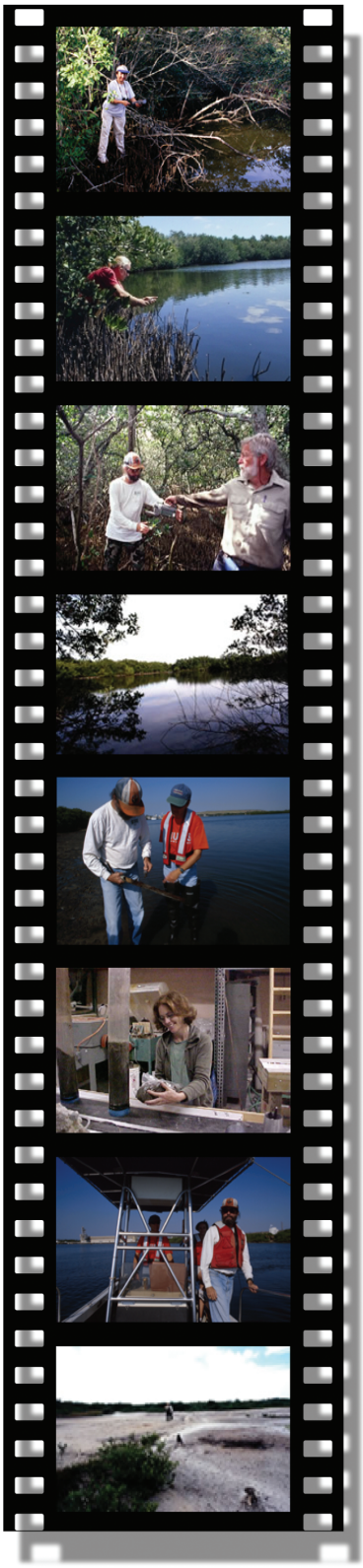

Satellite image of Tampa Bay indicating demonstration study sites near the Alafia River and Terra Ceia area (near the Manatee River). Colors are near natural; healthy plants are green, agricultural fields are pink or beige, and highways are purple.

## Tampa Bay: A Resource for the Present and the Future

Tampa Bay, possibly one of the Gulf of Mexico's largest estuaries, exemplifies the environmental stresses that our nation's bays and estuaries face in general. More than 2 million people live in the Tampa Bay watershed, and the population continues to grow. Increased development demands more fresh water, and creates greater air and water pollution. Despite the changing quality and quantity of water entering the bay and dramatic alteration of sensitive coastal environments, the scientific baseline controls documenting these changes have not yet been established.

## Maps for the Future: Baseline and Bathymetric Maps

Tampa Bay has undergone an increased rate of urbanization and has experienced significant land-use changes over the last 50 years. Scientists are documenting these changes by compiling and digitizing historical maps showing land use changes, patterns of historical wetlands growth and loss, water, chemical, and biological data. These data will be entered into a Geographic Information System (GIS) format for interactive display by digital overlays of various databases. The need for these baseline and bathymetric maps at broad and fine scales has been identified as a priority item by interested agencies and ecosystem managers in the bay area. Fine-scale maps will initially focus on two locations in Tampa Bay, the Alafia River area and Terra Ceia area (see above). These two sites represent potential end members with respect to urbanization, water quality, and estuarine health.



## Our Most Precious Resource: Quality and Quantity of Fresh Water to Tampa Bay

Freshwater discharge into Tampa Bay is a critical issue in maintaining the salinity and water quality required for maintaining the health of a variety of habitats. Surface runoff into the bay has been well documented, but little is known about the quality and quantity of ground water seeping into the bay from local aquifers. In order to evaluate watershed influence on wetland and bay ecosystems, scientists within the USGS, partner agencies, and institutions will be:

- creating shallow seismic and resistivity maps that will aid in locating point sources of ground water flow into the bay,
- measuring a suite of isotopes to quantify ground water/surface-water exchange rates,
- quantifying the flux of ground water into the bay,
- determining nutrient levels and elements in surface runoff and ground water to assess quality,
- analyzing 20 years of fresh water inflow, salinity, and nutrient patterns in the bay to aid in reconstructing historical conditions of wetlands.

## The Evolution of Tampa Bay: A Look into the Past to Predict the Future

The coastal wetlands around Tampa Bay are a critical interface between land and sea, providing habitat and nursery for a wide variety of plants and animals. Therefore, the wetlands reflect the health of the bay and the quality of the water that flows into it. Documentation of the formation and evolution of the wetlands and their plants and animals provides the basis for predicting the future for wetlands in Tampa Bay and is fundamental for future restoration by establishing a scientific baseline. Cores of sediment taken from the wetlands provide a window to the past, when the wetlands existed prior to historic records. The earliest reliable historic records of the nature of the wetlands can be derived from maps made during the late nineteenth and early twentieth centuries. Aerial photographs are available since the middle of the twentieth century and for the last 20 years, satellite imagery has provided frequent and accurate accounts of wetland change.

## Science of Tampa Bay in the Information Age

Scientific information needs to be easily accessed by managers at all levels, from city planners to state and federal legislators. All of the scientific information from Tampa Bay that is being acquired in this project as well as the decades of pertinent data that have been collected by agencies and partners throughout Tampa Bay will be accessible in a web-based format. Specifically in collaboration with our partners at the Tampa Bay Estuary Program and Florida Marine Research Institute, the USGS will:

- develop a clearinghouse of relevant Tampa Bay data,
- develop a prototype Tampa Bay Decision Support and Query System.

## Federal and Non-Federal Partners

The USGS scientists will be conducting research with partners from 10 federal agencies, 11 state agencies and academic institutions, and 11 local organizations.

**For more information, please contact:**

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