ECOLOGY

Disciplines Team Up to Take The Pulse of Tampa Bay

A team of more than 60 scientists is probing the health of Tampa Bay, reconstructing its ancient environment, and developing a better basis for resource planning. The project may be a pilot for other studies around the gulf

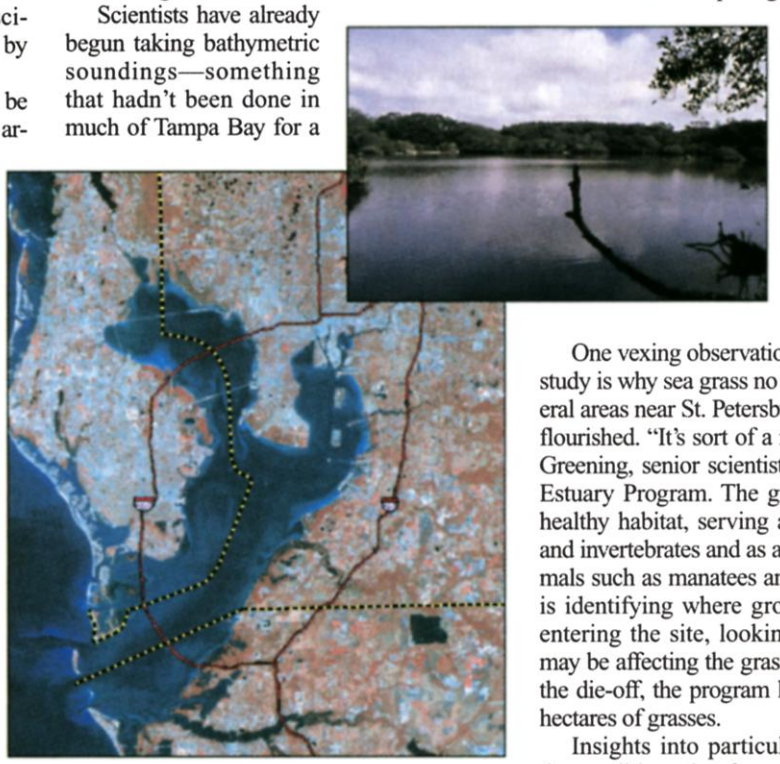
ST. PETERSBURG, FLORIDA—Like ecological SWAT teams, researchers in motorboats have been skittering across Tampa Bay in the past few months. Their mission: examine sea-grass beds, measure water salinity, take core samples, and conduct a host of other studies under the largest multidisciplinary science project ever orchestrated by the U.S. Geological Survey (USGS).

During the next 5 years, Tampa Bay will be among the most intensively studied coastal areas in the United States. Scientists will be drawing up maps of the sea floor, charting habitats, identifying the sources and quality of groundwater seeping into the bay, and reconstructing the region's ancient environment. The goal is to determine human impacts on the bay, a 1000-square-kilometer expanse that is one of the largest estuaries along the Gulf of Mexico. Such information should help managers "make scientifically sound decisions about resources in the bay," says Kim Yates, the USGS project leader.

All this activity may be just a warm-up: USGS hopes to extend the Tampa Bay project to other gulf estuaries, where urbanization comes head to head with recreational demands and the livelihood of commercial fishers. "We're trying to bring together information that decision-makers—federal, state, or local—need in order to make decisions on multiple uses of the land that we live on," says Bonnie McGregor, eastern regional director of USGS.

The project has benefited from friends in high places. USGS's plans to launch the project in 2001 were dealt a temporary setback when the Administration decided it wasn't high enough priority to include initial funding in the president's 2001 budget request. Enter Representative C. W. Bill Young, a powerful Republican who chairs the House Appropriations Committee. Young, whose congressional district includes part of the Tampa Bay area, was instrumental in getting Congress to add $1 million to the 2001 budget and $2 million in 2002 for pilot studies. The White House has now climbed aboard: The 2003 budget proposal unveiled earlier this month would elevate the project to "fully operational" status and requests about the same level of federal funding as in 2002. Local agencies are kicking in an additional $5 million a year to the effort, which now involves more than 60 scientists from 13 agencies and universities.

Scientists have already begun taking bathymetric soundings—something that hadn't been done in much of Tampa Bay for a half-century. This information has been combined with land data to create digital elevation models for the bay and its surroundings. Using charts from the 19th and early 20th centuries, researchers plan to develop historic digital elevation maps as well. That will allow them to gauge changes over time from processes such as erosion and shifts in rainfall patterns. Elevation changes influence the mix of seawater and fresh water in wetlands that fringe the bay and alter the circulation of sediments and contaminants in bay waters.



Bay watch. Two major cities, farming, sinkholes, and wetlands such as Terra Ceia Aquatic Preserve (*inset*) all play a role in the health of Tampa Bay.

Researchers are also tracking the peculiar groundwater flow that characterizes the bay area. Aerial photographs from the 1920s reveal countless sinkholes that make the topography look like Swiss cheese. Landfills, power plants, golf courses, and housing developments have been built atop many sinkholes, which act as conduits to groundwater supplies. No one is quite sure what settles into them and eventually flows into the bay, says Lisa Robbins, the USGS project facilitator. Various techniques—including seismic profiling and light detection and ranging, using NASA aircraft—are being used to locate previously undetected sinkholes. Scientists then monitor isotopes of radium, strontium, and oxygen—which are present at different levels in groundwater, surface water, and seawater—to determine the sources and mix of water at various points around the bay.

To monitor changes in wetlands, researchers are comparing maps from the late 19th and early 20th centuries with recent aerial photographs and satellite images. They are also using sediment cores to probe back in time, tracking changes in sea level, climate, biomass, and geochemistry.

One vexing observation now under intense study is why sea grass no longer grows in several areas near St. Petersburg where beds once flourished. "It's sort of a mystery," says Holly Greening, senior scientist for the Tampa Bay Estuary Program. The grasses are vital to a healthy habitat, serving as nurseries for fish and invertebrates and as a food source for animals such as manatees and sea turtles. USGS is identifying where groundwater might be entering the site, looking for anything that may be affecting the grasses. Besides probing the die-off, the program hopes to restore 800 hectares of grasses.

Insights into particular topics—such as the conditions that favor sea-grass growth—should help researchers understand the ecosystem as a whole. Nutrient levels, changes in elevation, and alterations in water circulation, for instance, all can have a tremendous impact on sea grasses and wetlands. "We can begin to understand the relationships between what are normally individual research focus topics," says Yates.

Data gathered under the project will be freely available at gulfsci.usgs.gov. Researchers working on similar projects will be watching closely. "We are following a lot of what [USGS] is doing as a template," says project coordinator Ernest Estevez, who is coordinating a study in nearby Charlotte Harbor, funded in part by the local Mote Scientific Foundation. **–SUSAN LADIKA**

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CREDITS: USGS