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USGS: Detectives Of The Deep

They're ready to make waves as they embark on a study of Indian Rocks Beach to determine the effectiveness of beach renourishment.

The U.S. Geological Survey scientists are here and they mean business.

**By Deborah Kurelik**

Working from their new headquarters at USF St. Petersburg, the USGS scientists have a serious mission on their hands — studying coastal erosion, pollutants in the sand and underwater mineral resources. They've lost no time in attending to their goal. Their first local project, and one they will work on with USF scientists, is a study of Indian Rocks Beach to determine the effectiveness of beach re-nourishment.

The two-year study, expected to begin in early 1990, will determine the erosion rate of the beach and how waves, wind and currents affect it. "We're trying to get a handle on what kind of energy the beach is subjected to, and understand the processes that cause Indian Rocks Beach to erode, so we can predict future erosion and how re-nourishment will work," said USGS scientist Dr. John Haines.

The scientists have found, for instance, that erosion is eating Louisiana's barrier islands by as much as 70 feet per year, and taking the state's mainland with it. They've also discovered that wetlands there are disappearing at the alarming rate of 60 square miles per year, damaging the state's multimillion dollar fishing industry.

"Louisiana is a special case, and the interesting thing about it is the land is sinking. We don't think Indian Rocks Beach can erode that fast," Haines says. "But these types of things can happen here if the sea level rose quite rapidly due to hurricanes or global warming."

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The USGS is the nation's largest earth science and mapping agency and is responsible for assessing the natural resources and hazards of the country on shore and as far as 200 miles offshore. It has mapped 1.5 million square miles of these offshore areas and will complete the deep-water seafloor mapping of all U.S. coastline by 1991. The USGS also plays a major role in understanding the geologic and hydrologic consequences of global change, such as shoreline and wetland erosion brought on by global warming, sea level change and other factors.

In 1988, the USGS was intent upon finding a headquarters for its expanding coastal geology program. The competition was vigorous — USF was in the running with 22 of the country's top marine science programs. The final cut included four institutions — the University of Rhode Island, a consortium of North Carolina universities, Columbia University's Lamont-Doherty Geologic Observatory in New York, and USF St. Petersburg.

Survey officials were lured to St. Petersburg by city and chamber of commerce representatives and USF officials who hoped to transform St. Petersburg into a nationally known center for marine research. The drawing card was USF, a reputable marine science department led by Dr. Peter Betzer. Betzer, who played a pivotal role in persuading the USGS to relocate to St. Petersburg, enlisted the support of city government and the business community when he learned the USGS wanted to move.

Betzer says his wife had the idea that the Studebaker Building would be a great place to house the USGS. One day he informedly approached Dr. John Haines about it while "hiz hom..."
was at home weeding his yard.

"The Mayor turned to me and said, 'You've got my support on it. Let's go get 'em.' That's the same spirit everyone in the community had — it was unbelievable," Betzer says.

The city offered the USGS the Studebaker Building, an old auto dealership, as a home for the center. St. Petersburg Progress offered to renovate the two-story, 64-year-old building specifically to the scientists' specifications.

"USF was recognized as a major contributor to growth in the downtown because of its economic and cultural influences," says Marty Normile, executive vice president of St. Petersburg Progress Inc., a private, non-profit civic organization.

"We helped provide the necessary accommodations for services to come together to make the USGS project happen. It's an example of direct economic development between the university and the community," Normile says.

USF President Francis T. Borkowski promised to hire five new faculty members for the marine science department. After State University Chancellor Charles Reed, top USF officials and the Florida Legislature put their support behind the proposal, the "circle was closed," Betzer says.

"The USGS really didn't need any more — they could see support on every level and see their program would evolve into a major marine research center."

Survey officials settled on St. Petersburg in the Spring of 1888, and the result is a jewel of a building, a center for coastal research.

"We recognized that Florida as a state is in the forefront of awareness of coastal issues — and that's one of the main reasons we knew Florida was the place to be. St. Petersburg in particular — USF has great expertise in coastal issues, and the marine science department is here," says Dr. Robert Halley, who heads the center.

The USGS collaborates to a large degree with USF's Marine Science Department, designated as a "Center of Excellence" by the Board of Regents. Faculty and graduate students from the department work with USGS scientists regularly and will give lectures as part of the USF curriculum. USGS scientists also will help serve as mentors for graduate students in the marine science and geology departments.

The USGS already is integrated in the educational fabric of the campus, Betzer says.

"They have such excellent credentials and are at the forefront of their particular fields. It's a tremendous thing for our group."

So far nine top government scientists — geophysicists, physical oceanographers and geologists — and 13 support personnel are located at the center. The USGS plans to increase its St. Petersburg staff to 30 within the next five years, including six or seven more scientists.

Halley says he gets flooded with applications from scientists around the country who hope to work at the center. But he is extremely selective about who he hires. "We look for those who have national reputations," Halley says.

Besides the Indian Rocks Beach project, USF and USGS scientists plan to work together on four other major projects in the next year. Two involve seismic surveys, or gathering data that identifies the depth of the ocean floor and the configuration of its sediment and rock layers. One of these surveys will concentrate on the areas around the coral reefs in the Florida Keys, the other on the area along the Florida coastline.

The other two cooperative efforts concern digital mapping (taking old and new data to produce detailed maps that show shoreline erosion of a specific part of the coastline over a period of years) and remote sensing, or satellite-produced imagery of coastlines. USF and USGS scientists will digitally map the Louisiana shoreline, and begin the remote sensing of coastlines in Alabama and Mississippi.

The USGS and USF are sharing equipment and the USGS is upgrading some of the equipment USF uses to conduct research. Because remote sensing is a joint project, for instance, Halley says the USGS will probably invest in improved sensing equipment for USF. And because of money made available to USF as part of the package to attract the USGS, USF was able to buy an X-ray diffractometer, a sophisticated device that determines what minerals lurk in the sediments of rocks.

Betzer says the USGS is "immensely" helpful scientifically as well as financially.

"There's beautiful sharing going on. We're doing things neither one could do separately, and as time goes on, we'll see a very strong, productive relationship evolve."

But USGS scientists are studying a few things on their own, such as the changes in climate over the past few thousand years. Here, coral tells the story of past climates by producing annual growth bands as they grow, much like tree rings. The chemistry of the growth bands reflects the changes that have occurred in climates.

The coral bands tell Halley the winters in Florida have been getting colder in the last few hundred years — an especially curious discovery because some scientists argue that the earth’s atmosphere actually is heating up.

"There still is great question about whether global warming really is taking place," Halley says. "Corals are long-term monitors of environmental conditions, and coral data is valuable because no long-term temperature data exists."

Coral bands also tell Halley that fresh water ecosystems in South Florida have been affected because of development, dredging and the building of canals.

"The amount of fresh water flowing from the Everglades and into Florida Bay and the Keys has been dramatically altered by man in the past 60 years," Halley says. "More fresh water must be released (from water management systems) or the ecosystems will continue to change — some people might say continue to deteriorate."

The survey has an expansive history in Florida, beginning in the early 1880s when USGS geologists helped discover and map important Florida phosphate deposits. The survey has a big budget, too. Congress annually gives some $12 million for USGS studies in Florida, and state and local agencies provide another $5 million in matching funds for work on the state's freshwater resources. Currently, 250 USGS employees work in Florida, from Miami to Tallahassee.

The Center for Coastal Geology's budget in the coming fiscal year will total a cool $6.1 million. The facility is the USGS' national center for coastal research, spanning programs in Alabama, Mississippi, Louisiana and Illinois.

In the short years the USGS has operated for St. Petersburg, the Center has hosted several conferences that brought scientists from around the world to the city. More international conferences are in the works.

Betzer thinks these conferences will accelerate St. Petersburg's revitalization.

"Already, the Center for Coastal Geology is contributing significantly, on scientific, educational and economic fronts," says Betzer. USF