Working Together

Institute promotes shared projects that can save coast, marshes

ALTHOUGH THEY ARE IN DIFFERENT fields, Dr. Don Hayes and Dr. Jenneke Visser have a common professional interest. They want to bring researchers in many disciplines together to find ways to protect and restore Louisiana's rapidly eroding coast and to rehabilitate its damaged marshes.

Hayes and Visser are co-directors of the University of Louisiana at Lafayette's new Institute for Coastal Ecology and Engineering.

Hayes is an engineer who specializes in sediment, particles of soil that settle at the bottom of bodies of water. More specifically, he concentrates on dredging sediment and using it to form land. Visser's areas of expertise include coastal restoration, wetland vegetation and seabirds.

Through the ICEE, they plan to integrate engineering and science into coastal restoration efforts.

"There's no single answer and the answers are different for different parts of the coast, as well," Visser said. "We are interested in getting as many faculty involved as possible."

Their primary goals for the ICEE's first

DOUG DUGAS

Dr. Don Hayes and Dr. Jenneke Visser, co-directors of a new center at UL Lafayette, examine plants in a marsh in Iberia Parish.

year are to settle into an office on campus, identify and coordinate university resources, and explore funding opportunities.

Louisiana lost 1,900 square miles of coastal land, mostly coastal marshes, during the 20th century, according to the Louisiana Coastal Wetlands Conservation and Restoration Task Force. U.S. Geological Survey data shows the state lost about 24 square miles per year from 1990 to 2000.

Some of the causes of coastal erosion and wetlands damage are natural, such as wave erosion, a rising sea level and subsidence. Others are caused by humans. Some wetlands have been drained to make more land available for agricultural use, for example.

Dr. Bob Stewart, vice president of Research and Graduate Studies at UL Lafayette, said the complexity of coastal restoration requires the skills of many professionals, such as sociologists, engineers, mathematicians, biologists, geologists and chemists. He estimates that 15-20 UL Lafayette faculty are working on research projects related to coastal erosion.

"Restoration of coastal Louisiana can be done, but it's going to require great engineering. It's going to require great science. It has to have federal, as well as state, involvement. And, I think that every university in the state should step up to the plate. When we formed the institute, we did it in a way that enables us to work with other universities, not just within the university," he said.

Stewart noted that many funding agencies, such as the National Science Foundation, stress an interdisciplinary approach to research. "If you don't have an interdisciplinary or multidisciplinary approach to something, you're dead on arrival – and in some cases, if you don't have an inter-university approach."

Hurricanes Katrina and Rita, which battered south Louisiana in 2005, boosted public awareness of the important role that barrier islands and marshes play by protecting inland populations.

"I think it's pretty clear now that the federal government and state government are going to invest substantially in restoring south Louisiana," Hayes said.

In mid-August, for example, Louisiana Gov. Bobby Jindal announced that the state's allocation for coastal restoration and levee work will top $1 billion over the next few years. The governor estimated that the state spent $10 million to $15 million annually on coastal restoration before 2005.

LOUISIANA DEPARTMENT OF TOURISM

"Louisiana has lost up to 40 square miles of marsh per year for several decades – that's 80 percent of the nation's annual coastal wetland loss. To date, Louisiana has already lost coastal land area equal to the size of the state of Delaware. This loss is at an average rate of an acre every 38 minutes. If the current rate of loss is not slowed by the year 2040, an additional 800,000 acres of wetlands will disappear, and the Louisiana shoreline will advance inland as much as 33 miles in some areas."

Source: www.lacoast.gov

In late September, Louisiana Public Broadcasting aired "Harvest to Restore", a 30-minute documentary about rebuilding the coast using sediment transfer.

Here's how it works:

A mixture of sediment and water, called slurry, is transported by pipeline to areas where land has washed away. The slurry spews from the open end of the pipeline. Land is formed as sediments collect and water from the slurry drains away. Scientists can then introduce plants, birds and mammals there.

Hayes said sediment transfer on Louisiana's coast presents some challenges. For example, many coastal areas that need to be rebuilt are remote, so slurry must be transported several miles from its source. Underlying sediments are soft, which makes it difficult to build retaining structures. Also, since sediments transferred by pipe are soft, "they are very susceptible for re-erosion and re-transport," he said.

Despite those challenges, about 3,000 acres have been added to Louisiana's coast through sediment transfer since 1994. It's one of the fastest ways to replace land.

Visser and Dr. Mark Hester, an associate professor of biology at UL Lafayette, together with researchers at LSU, are working on a restoration project that doesn't rely on sediment.

"We are trying to create floating marshes," she said. "A lot of the freshwater marshes in Louisiana are floating. So, they don't have a solid soil under them. They are a floating organic net of roots and grasses that are all kind of tangled together. They move up and down with the water, so they are not susceptible to subsidence. They are, however, very susceptible to salinity."

Mandalay National Wildlife Refuge near Houma, La., is one of the testing areas. Floating plants there were doing well, but the area "got hit pretty hard by Hurricane Gustav," Visser said. Saltwater from the nearby Houma Navigation Canal entered the refuge. "But the plants are still alive, so we're hoping we will have one more year to observe them," she said.

In addition to replacing land that has eroded along Louisiana's border with the Gulf of Mexico, scientists are trying to find ways to heal ailing inland marshes. These wetlands were once sustained by annual flooding each spring when melting snow and ice would cause rivers to overflow. Floodwaters carried nutrients and particles of land that the marshes needed to thrive.

As Louisiana became more populated, levees were built to prevent flooding and to prohibit rivers from naturally changing their courses. That has starved some marshes.

"One idea that we really haven't tested much is creating land with pipeline dredge sediment and then reintroducing the river to those areas, so that the marsh can be sustained with nutrients and a little bit of sediment," Visser said. "Louisiana will keep sinking as sediments compact and the sea level keeps rising. But marshes have this really amazing ability to sustain themselves by capturing sediments and by their biological production of organic material."

Stewart said research conducted by faculty members such as Visser, Hayes and Hester is especially important because it has the potential to solve specific, pressing problems in Louisiana.

"I'm a fervent believer that we need to have some of our focus be on issues that are important to the state and the region that we live in," he said.