Go With the Flow

USING NATURAL EROSION CONTROLS TO PROTECT OUR SHORELINES

Jim Beaugez


Photo: MDA/Tourism Division


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A catastrophic event such as a hurricane can wreak havoc on coastal shorelines – reshaping beaches, flooding neighborhoods and even slicing paths through barrier islands that protect the mainland from the storm's full force.

But most erosion events are not the results of major disasters, and they occur not only along the Gulf Coast, but throughout a state's beaches, bayous, rivers and lakes.

"Erosion naturally occurs, so there's always a process of erosion and deposits," said Niki Pace, senior research counsel with the Mississippi-Alabama Sea Grant Legal Program, located at the University of Mississippi. "Any time you have a big storm event, that's always going to change shorelines. But boat wakes and waves from jet skis are going to cause some scale of erosion."

Homeowners and businesses with waterfront property have used a variety of structures to protect against the encroaching water line caused by erosion of the shoreline. Bulkheads and seawalls constructed with wood or concrete are common remedies, and riprap – mounds of rock and other materials piled in defense of wave action – is a typical armoring used on shorelines and streambeds and around bridges and pilings.

According to Pace, however, these hard-surface structures that developers and property owners use to protect land from the destructive forces of water-driven erosion can actually make matters worse. Traditional fortifications like bulkheads and seawalls actually cause erosion by reflecting wave energy back onto unprotected shorelines. And as Hurricane Katrina proved, the full force of nature will test any man-made structure.

"After Katrina, everyone's bulkheads were destroyed," said Pace. "That was a good opportunity to rethink how we handle this. If everybody puts up a wall, you lose your transition between your property and the water. It creates a bathtub effect, and eventually it will erode and water will lap up to your bulkhead. Neighboring properties that do not have bulkheads will erode."

The Mississippi-Alabama Sea Grant Legal Program is working to stem the tide of erosion by developing permitting guidelines for natural, alternative erosion controls, such as grass-based living shorelines that are planted below the water line or offshore oyster shell beds that break waves before they reach the shore.

Chris Boyd, associate extension professor of environmental ecology for Mississippi State University and the Mississippi-Alabama Sea Grant Consortium, works with Pace to educate state and federal policymakers and the public on why and how to use these natural alternatives. Together, they have delivered lectures and workshops in coastal Mississippi and Alabama, and published a manual for implementing living shorelines.

"Coastal property in the Mississippi Sound is eroding, so depending on where you live, some type of shoreline erosion protection might have to be used," said Boyd. "Using natural

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Photo: Mississippi Department of Marine Resources

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erosion control structures, such as planting marsh plants, will be ideal in low energy environments. In more moderate wave energy environments, offshore breakwaters and vegetative planting could be used."

Boyd noted that protecting shorelines with seawalls and bulkheads is typical in bays, bayous, coves and inlets that have high rates of coastal development. But these highly armored areas tend to increase local erosion rates due to reflection of waves from these structures to adjacent undefended shores.

"If landscapers and engineers begin using more natural forms of erosion control such as living shorelines, erosion rates can be reduced while protecting our remaining coastal wetlands," said Boyd.

Understanding the regulation of submerged water bottoms is central to knowing what types of structures can be used under permitting guidelines. In Mississippi, the state owns land below the water line, and in the past it was easier to simply build a hard structure like a bulkhead that wasn't in the water rather than go through a lengthy approval process to put natural structures in the water itself.

"The regulations weren't written in a way to embrace the land ownership challenges that it raised," said Pace. Her work with Boyd, she said, is geared toward helping regulatory agencies streamline the permitting process to encourage the use of natural erosion controls.

The U.S. Army Corps of Engineers regional office approved the Mississippi General Permit for Living Shorelines last year, allowing for the installation of native wetland plants and creating a level permit approval process for living shorelines and hard structures.

"This general permit allows for the installation of native wetland plants and breakwaters composed of approved construction material if wave attenuation is needed for project success," said Boyd.

There are other benefits to choosing natural shorelines. A planted grass shoreline, for example, performs the same function as marshlands by holding the shoreline in place and absorbing wave action while allowing the water to move naturally. It also helps sustain those natural marshland habitats and the abundant aquatic life they harbor. Reducing the number of hard surfaces reduces wave reflection back onto marshes.

"If a waterfront owner's property is eroding, the owners should consider using living shorelines because they provide water access, provide habitat for aquatic and terrestrial wildlife, reduce erosion rates and maintain natural shoreline dynamics," said Boyd. "They could also be more economical in low to medium wave energy environments than bulkheads."

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