Scientists turn to coconuts to save the New Jersey coastline

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Ecologist Shane Godshall tromps in waders through two feet of mud in Thompsons Beach marsh on the Delaware Bay in Heislerville, in New Jersey's Cumberland County.

He pauses, then sticks his hand in the ooze and pulls out a piece of the secret weapon scientists have been deploying to fight erosion from climate change and to save America's coastline: the coconut.

More accurately, it's the fibrous outer husk of the coconut shell called coir (pronounced koy-uh, but often referred to as core). Typically, coir is packed into 10-foot logs tied together by biodegradable twine.

Many of the $80 to $169 logs of varying diameters that are used in this region arrive after three-month boat rides from India and Sri Lanka. A large percentage are distributed by EcoDepot, a Maryland company owned by Mutual Industries of North Philadelphia.

Displaying his dripping prize, Godshall, habitat restoration project manager for the American Littoral Society, said the logs had been placed five years ago as part of a pilot project to restore and protect the marsh.

The society is a 62-year-old coastal-conservation nonprofit whose name refers to the littoral zone, or "nearshore," which is the part of an ocean, lake, or river that's close to the shore. The organization dubs itself "a voice for the coast."

Explaining the mission, Godshall said simply, "We're working to raise this portion of the marsh to help sustain it."

Coir logs will be used in other area projects in the coming months, including one scheduled for Earth Day, according to Quinn Whitesall, habitat restoration coordinator for the American Littoral Society, headquartered in Sandy Hook, New Jersey.

Agriculture from years past damaged the Thompsons Beach marsh, when farmers built dykes and drained much of the area, Godshall said. But climate change threatens marshes even more, because it causes sea

levels to rise, research shows.

Marsh grass can't live through prolonged submergence in water because it absorbs oxygen from its roots, scientists say.

The National Oceanic and Atmospheric Administration estimates that the U.S. loses 80,000 acres of coastal wetlands, including salt marshes, each year, mostly due to development and sea-level rise.

"Climate change is the No. 1 killer of marshes, because plants drown," said Capt. Al Modjeski, Habitat Restoration program director for the American Littoral Society. He's also a licensed operator of small boats.

Without grass, a marsh becomes nothing more than a mudflat.

"The whole idea of raising the marsh is to grow the grass and keep the marsh from eroding away," Godshall said.

And coir logs aid the effort.

Society personnel arranged, then staked in, 350 coir logs weighing around 70 pounds to create a one-acre containment area filled with a slurry of 3,500 cubic yards of mud and brackish water that was pumped in from a nearby creek. The part of the marsh that has been contained by coir logs has risen about 2 ½ feet, Godshall said.

So far, he said, the program is working well, with grasses flourishing.

That's imperative, said Modjeski, because the marsh attracts fish and birds, like egrets and herons. And marsh grass also removes carbon dioxide from the air.

During storms, marshes absorb flood waters and wave energy from

coastal waters, decreasing property damage in adjacent communities by up to 20%, according to the NOAA.

The Pew Charitable Trusts report that marshes provide $695,000 of value per square mile by reducing the impacts of storm surge and flooding, according to a University of California, San Diego study.

Marshes also filter the toxic flow of septic system runoff and animal waste into the bay, researchers say.

It's important to keep the bay as pristine as possible for numerous reasons, not the least of which is that it has "the highest population of horseshoe crabs in the known universe," according to Godshall.

Better than rocks

Along coastlines and river banks around the world, coir logs are vital because they're natural material that grass and trees can grow in, said Brian Resch, operations manager of EcoDepot in Finksburg, Md., an hour south of York, Pa.

"We found in the Chesapeake Bay that buttressing coasts and embankments with stone was detrimental because crabs and fish couldn't reproduce amidst rocks," he said.

But they flourished, and erosion was stalled, with coir logs, Resch said.

Eventually, coir logs rot away, but established grasses remain to protect embankments, he explained.

To continue its battle against erosion, the Littoral Society will use volunteers to place coir logs as well as used, natural Christmas trees into Beaverdam Creek in Point Pleasant, Ocean County, on Earth Day, April

22.

The materials will be part of breakwaters that control erosion to slow currents and capture sediment being carried in the water, allowing the nearby marsh to build back up, according to a Society blog.

Later in the spring, the Society plans to place 2,600 feet of coir logs into the mouth of the Maurice River in Cumberland County to augment breakwaters in the river, Modjeski said.

"We intend to continue using coir logs in our restoration work," he added. "And there's lots more work to do."