



# University of North Carolina Sea Grant Program

## NEWSLETTER

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1235 Burlington Laboratories  
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## The eternal battle against erosion

**PAMLICO BEACH**—Ed Miller stomped through the tall grass to the edge of his river-front property north of this coastal community where the Pungo and Pamlico Rivers roll together. He trained an eye on the ground to look out for rattlers some of the boys said they'd seen.

But it wasn't the fear of a sudden, unexpected snake bite that had Miller worried that hot afternoon. What bothered him was more subtle and more deceptive than the hollow sound of a rattle or an ugly head poised for strike. Ed Miller, you see, has anguished for years as he watched his land crumble little-by-little into the Pungo River. Ironically, the River's sparkling waters—the very attraction that is bringing more vacationers and second-home seekers to North Carolina's mainland shores—are chiseling away at the real estate, and the dreams, that belong to Miller and hundreds like him.

Erosion is one of those forces with which people everywhere must deal. But for Pamlico Beach property owners—and others along the state's mainland shores—erosion is literally rapping at their back doors. In fact, East Carolina University scientists studying and mapping erosion in northeastern North Carolina with UNC Sea Grant funding say that erosion lops off an average two to three feet per year along the estuarine shores. In some places it can be more than 10 feet per year, they say.

*One way to slow erosion: Pile tons of concrete slabs on river-front banks. Note the tree in the water that used to be on land.*



It's nothing new. Mrs. Mary Sawyer, a 58-year resident of Pamlico Beach, pointed a finger toward the Pamlico River. "I can remember when the road was way out yonder. And I used to pick corn where that cottage is," she said, nodding toward a summer home that stands only about 50 yards from the water's edge. The hard-top state road that runs by her mobile home now is the third built since she came here, she said. Today, the River fills the forgotten tracks of the other two.

While they don't like what erosion is doing, those who have lived here most of their lives have accepted it. James Daniels summed up local philosophy about the community's future between swigs of soft drink. "It's like so many things. It'll be gone someday," he said.

### Fighting Back

In spite of their acceptance, Pamlico Beach property owners aren't willing to let erosion run roughshod over them. They and newcomers, who soon come to the rude awakening that their lots are slipping into the river, are fighting back—mainly with bulkheads, walls that slow the water's erosive power against the loose bank soils. In the long

*(See "Scientists," page 3)*

## The why's and where's of getting permits

Mention erosion in Pamlico Beach and Masceo Daniels will tell you you're talking about a sore subject.

But it doesn't take long to find out that what really makes Daniels and his neighbors hot under the collar is the red tape a man has to go through to get government permission to protect his land with a bulkhead.

"The government just seems to want to let it all wash away," Daniels said, referring to the land his community perches on. "You can lose 10 to 15 feet while you're waiting to get a permit," he said.

Ed Miller marched to a swatch of his river-front property that jutted out between two eroded coves. Several tons of rock were piled not far from the edge. "I'm afraid to do anything," he said, pointing to the rocks he'd like to use for bulkheading his land. "They (the government) want you to get all kinds of permits," he said.

Miller is right. Both the state and federal governments require that a man have a permit in hand before he excavates or fills his waterfront property. And both state and federal officials agree with Daniels that getting a permit can be a lengthy process.

Three laws make getting a permit necessary. They are the 1899 Rivers and Harbors Act, the Water Pollution Control Act Amendments of 1972 and the North Carolina dredge and fill law passed in 1969. The 1899 law was enacted to prevent the creation of hazards to navigation. But courts have used the law to cover environmental as well as navigational concerns, according to Dr. Wayne Wright of the U.S. Army Corps of Engineers Wilmington District Office.

Both the 1972 amendments and North Carolina's dredge and fill law were designed to protect habitat of marine species. Both require a permit for filling in any area that is subject to regular or occasional flooding by waters due to anything other than winds of gale or hurricane force.

### Permits protect habitat

For the individual who merely wants to rebuild the few feet of his lot lost to erosion by bulkheading and filling, it might be hard to see how his small action could substantially harm habitat. But according to Wright, permit requirements are aimed

at regulating and minimizing the total environmental impact of hundreds of individuals who would like to stabilize and restore lands.

The requirement for permits isn't intended to discourage a landowner from protecting his shoreline from erosion. Both state and federal permitting agencies encourage bulkheading and backfilling to protect shorelines—if the intention is simply to stop erosion and not to reclaim large areas of land. State policy is that land can be reclaimed only to the extent lost at the annual erosion rate or no more than has eroded in the past 12 months, according to Jim Brown, chief of the Estuarine

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**Individuals wishing to bulkhead or dredge and fill in marsh may call on a free consulting service at the N.C. Division of Marine fisheries for planning advice. Call that agency at (919) 726-7021 for details.**

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Studies Section of the N.C. Division of Marine Fisheries.

Having to get a permit probably wouldn't be so bad if it didn't take so long. North Carolina land owners are saved time by needing to submit only one application for both state and federal permits. But when an application arrives at the N.C. Division of Marine Fisheries in Morehead City, government red tape just begins.

Before state and federal permits arrive in your mailbox, your application is reviewed by a dozen state agencies, almost as many federal agencies, the folks who own land next to yours and others alerted to your plans by a public notice that the Corps of Engineers issues.

That's why it can easily take months to get the required permission.

According to Wright, the Corps attempts to expedite all applications within a reasonable amount of time. "We recommend that applicants not expect a permit in less than 60 days," he said, adding that applications out of the routine can take much longer. State permits are usually issued from six to nine weeks after application, according to Brown. But both state and federal permits must be in hand before work can begin.

### Provide complete info early

Wright advised that applicants can speed the process by providing complete information from the beginning. "Property owners should plan ahead and apply as soon as plans are complete," he said.

The Division of Marine Fisheries offers North Carolinians a free consulting service to advise on bulkheading and dredge and fill activities. The consultants are available to help potential developers make plans that fit their needs and are likely to be accepted by review agencies. A call for assistance to the Estuarine Studies Section of the Division of Marine Fisheries in Morehead City at (919) 726-7021 could save time and headaches.

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# Scientists map erosion in northeastern counties

*(Continued from page 1)*

term, erosion will probably prevail over the treated wood bulkheads and the thousands of tons of concrete slabs, rock, old cars, kitchen sinks, worn-out tires, old fish nets and dead tree stumps people have piled along the waterfront, desperately trying to hang onto their land.

According to ECU geologist Mike O'Connor and biologist Vince Bellis, bulkheading is one way people deal with erosion. Another is to set lot lines back and "let 'er rip," Bellis explained. Both methods have advantages and disadvantages, he said.



**Compare the bulkheaded stretch with that not bulkheaded. Bulkheading holds waters back, slows erosion and saves land. But with bulkheading sandy beaches are lost.**

Bulkheading is expensive, now running about \$15 per linear foot. Although erosion behind the wall is slowed, stronger wave action where waves crash into the bulkhead destroys any trace of a sandy beach. By choosing not to bulkhead, you save money and your sandy beach, but erosion will continue its rapid nibbling, according to Bellis.

## The secret is planning

The secret to living peaceably with erosion appears to lie in well-thought-out planning that crosses individual lot lines and encompasses stretches of beach that are part of the same "natural unit," the researchers say. According to O'Connor and Bellis, planning should be based on the specific geological and biological characteristics and erosion rates of a particular stretch of shoreline.

But before such planning can take place, information on which shores are eroding rapidly, which are eroding slowly and why they erode at different rates is a must. That is just the kind of information O'Connor, Bellis and Stan Riggs, also an ECU geologist, are seeking in their current Sea Grant-sponsored research.

In their study, the scientists are seeking causes, effects and possible solutions to erosion along North Carolina's estuaries. Information on average shoreline erosion in coastal counties is available from a recent USDA Soil Conservation Service study. But average rates provide no insight into what factors govern erosion and how to manage it. And average rates are of little help to the individual whose short stretch of beach may be undergoing more rapid erosion than average figures indicate. To determine erosion for short stretches of shoreline, the researchers are supplementing the SCS information with boat trips to collect first-hand data on geological processes along the state's shores. So far they have covered some 280 miles as they mapped Bertie, Chowan, Washington, Tyrrell and Beaufort County shores.

O'Connor, Bellis and Riggs have found that the mainland shoreline is a series of natural units. Within each, erosion rates are fairly similar, but erosion among neighboring units may vary widely. For example, lands between points A and B may be washing away at five feet per year. But between points B and C, erosion may be taking only one foot annually. The research team, noting differences between the two units, study such factors as vegetative growth, water depth, the lay of the land, current and wave direction and winds to come up with possible explanations for the erosion. A difference in any of these factors could cause vastly different erosion rates, they say.

A second step in their research is to come up with recommendations on how to best live with and combat erosion in specific areas.

## Maps of eroding areas

A third, extremely essential step is to put their findings into a form that county planners and property owners can easily understand and use. Their goal is to provide a series of maps of northeastern North Carolina estuarine shorelines on which even small land owners can locate their property, learn what forces are acting upon it and determine the likely annual erosion rate.

Eventually scientists hope to provide similar  
*(See "A series," page 4)*

ECU scientists studying erosion in northeastern North Carolina are putting their findings into a series of maps for property owners. The maps will show how fast your land is eroding, why it erodes as it does and what you might do to live with it at least expense over the long-term.

## Workshops on insect control set for November



*Sand fly or biting gnat*

Fall sessions of the Training Course in Mosquito and Biting Fly Control begun last spring will be held as follows:

November 5-6 —New Hanover County Health Department, 2029 S. 17th Street, Wilmington;

November 12-13—Carteret Marine Resources Center, Bridge Street, Pine Knoll Shores;

November 19-20—Dare County Administrative Building, Manteo.

Beginning at 9 a.m. and adjourning around 3:30 p.m. daily, the fall sessions will expand on material covered in the spring training courses.

Emphasis will be on mosquito survey, identification and biology, ULV chemical control and equipment maintenance and control of mosquito larvae with chemicals and other methods.

Insect pest control operators who participated in spring workshops are urged to return for the fall sessions, conducted by North Carolina State University entomologists. Sponsors of the training course are UNC Sea Grant and the N.C. Agricultural Experiment Station in cooperation with the N.C. Department of Human Resources.

For further information, contact:

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## A series of maps to help property owners

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maps for other sections of North Carolina. But before such maps can be compiled, county officials and citizens may be able to use information gathered in the state's northeast section. According to the researchers, many shoreline areas from Virginia to South Carolina have similar characteristics and problems which can be dealt with in similar ways.

So how might a man like Ed Miller benefit from the maps O'Connor, Bellis and Riggs are prepar-

ing? Simply, the maps will supply him with information he needs for planning how he will use his land in the future. When he sees at a glance what areas are eroding rapidly and why, he will be able to make sound decisions on whether to invest further in his property for one use or another. And because the maps will show what's happening erosion-wise in a "natural unit," he'll be able to work with his neighbors in developing a sound plan for living with erosion.

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