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## We're killing our beaches

*A Duke professor emeritus and world expert on beaches says that in North Carolina's rush to protect oceanfront homes, "renourishment" projects are destroying our beaches.*

BY ORRIN PILKEY

There is a serious problem facing the most precious strip of land in our state. Over the last five years, North Carolina beaches have taken a beating. Our beach nourishment program has gone dreadfully wrong and the various government agencies responsible for keeping our beaches healthy have, without exception, abdicated their responsibility.

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COVER FEATURE

Silence, dead silence, stony silence has met the beach degradation juggernaut. Beaches too full of sharp shells to walk on with bare feet (Emerald Isle, 2003), beaches intended for nesting sea turtles filled with fist-sized cobbles (Oak Island, 2001), beaches with more mud than sand (Atlantic Beach, 2005), beaches made up of sand mined in environmentally damaging fashion (Emerald Isle, 2005) have elicited not a whisper of displeasure, nor a murmur of complaint from officialdom.



Photo By Frank Tursi

**Mudballs stretch across the sand at Atlantic Beach after a renourishment project. Too much mud in the material pumped out of the ocean can kill offshore animals as well as make beaches unpleasant for tourists.**

Instead, town managers praise disastrous beaches, mayors declare no problems exist and army colonels stand on bad beaches, hands on hips, arrogantly declaring victory over nature. One community has proved to be particularly irresponsible and out of control in the care of its beaches. That community is Emerald Isle.

North Carolina's open ocean shorelines are retreating almost everywhere. And on almost every barrier island not in government hands, buildings--mostly seasonal rental cash cows--line the beach. Few vacant ocean lots remain. Since the shoreline is retreating toward these precious buildings, a great deal of effort and money is being expended to halt the landward march of the surf zone.

**There are three ways to respond to a retreating shoreline: Construct seawalls; bring in new sand by truck or dredge and put it on the beach; or retreat by allowing buildings to fall in, demolishing them or moving them back.**

**But each approach has its own problems: Seawalls destroy beaches in a decadal time frame; beach nourishment is very costly and can be environmentally damaging; and retreat is considered by many to be almost un-American.**

**If our state's highest priority is to preserve shorefront buildings, then seawalls--the bigger the better--are the way to go. If our highest priority is to preserve beaches for future generations, retreat is the best way to go. So the question is, Which is more important--beaches or buildings?**

**Considering the fact that global warming is causing the sea level to rise, which will increase rates of shoreline erosion in the future and make both the seawall option and the nourishment option more expensive, I think most people will choose the beach.**

**But in North Carolina, as elsewhere, a relatively small number of wealthy and influential people crowd the beachfront. And as the value of beachfront property skyrockets, the relative value of beaches, treasured by millions, ebbs with the tides and slips slowly down the tube.**

North Carolina, once a coastal management pioneer admired by every other coastal state, passed rules prohibiting the construction of seawalls back in 1985. In 2004, pushed by state Senate President Pro Tem Marc Basnight, the state toughened its anti-seawall stance by making the rules into laws. This move recognized that seawalls eventually result in the loss of the beach in front of them, a lesson learned from New Jersey--a state with more than 150 years of shoreline hardening experience.

Unfortunately, North Carolina left a loophole in its seawall law big enough to drive a Mack truck through. The state allows, as a temporary measure, sandbag seawalls to give property owners time to move threatened buildings back. But beaches are lost just as fast in front of sandbag walls as they are in front of concrete walls.



Photo By Andy Coburn

**The beach at Emerald Isle as it was being pumped-up in 2003. Government officials have begun to see many N.C. beaches as engineering projects.**

Adding fuel to the fire, the state has failed to enforce the two-year limit on sandbag seawalls. Today, hundreds of sandbag seawalls line our shoreline and in some places (e.g. South Nags Head) sandbags have been in place for almost two decades, having been replaced several times. Each time the sandbags wear out or are damaged in storms, the Division of Coastal Management (DCM) dutifully issues a new permit and now the "seawall effect" has taken out the beach in several places in South Nags Head. North Carolina deserves better from its coastal management agency.

Like most coastal states, North Carolina is looking to beach nourishment (also called replenishment but better termed dredge and fill) to solve its coastal management problems. But dredge and fill has its own set of problems. When sand is dumped on the beach, everything is killed and the entire nearshore ecosystem including birds and fish may take years to recover.

Meanwhile, since dredge and fill must be repeated again and again forever (on a two- to four-year basis here in North Carolina), it is not clear whether biological recovery can ever completely occur. In addition, sand must be similar to (compatible with) the native beach sand if turtles are to successfully nest and if parents with children, surfers and swimmers are to enjoy the particular beach they have come to know.

In some ways, nature has dealt us a bad hand. We have, on average, the highest waves along the East Coast, which means that nourished beaches will, on average, disappear faster here than elsewhere. That's not all the bad news. Unlike the southern half of South Carolina and Georgia, where offshore sand abounds, we have relatively little sand on the continental shelf to pump up on beaches. Much of our shelf is rocky, and good beach sand must be sought using sophisticated and costly prospecting techniques. The best sand is often miles away from the beach that needs it. The bottom line: Beach nourishment in North Carolina will be costly.

For 20 years we in the Program for the Study of Developed Shorelines in the Nicholas School of the Environment at Duke have kept close track of the national beach nourishment experience. We believe we have the most complete record of beach nourishment available for all the nation's beaches, including the Great Lakes and the Pacific coast ([www.nicholas.duke.edu/psds](http://www.nicholas.duke.edu/psds) and click on Beach Nourishment).

Our list includes beaches funded by state, local, federal and private sources and many combinations thereof. On the basis of this accumulated knowledge, we believe North Carolina leads the national pack with the most damaging, most irresponsible beach nourishment program in the nation. Leading North Carolina's march of shame is the tiny coastal town of Emerald Isle.

### **The Emerald Isle indictment**

In terms of mismanagement of the public's beaches, the town of Emerald Isle on Bogue Banks has become an outlaw community followed closely by a slew of other N.C. coastal towns. In Emerald Isle, about 1,400 voters speak for 3,600 year-round residents, 6,000 property owners and, at any given moment during the season, 50,000 vacationers. On an annual basis, those who use the beach probably outnumber voters by several hundred thousand. As is the case in most of North Carolina's beach communities, a very small group of people runs the show, and run it badly.

In April 2003, a very poor quality beach was pumped up on Emerald Isle. The "sand" consisted mostly of fragmented oyster shells impossible to walk on with bare feet. In a few months, wind-blown sand quickly covered the beach with a few inches of good sand and a subsequent nourishment project covered some portions. Understandably, many locals and visitors assumed (and still do) that the bad beach had been "repaired" by the thin new sand cover. Like a bad dream that won't go away however, sharp shells will be showing up between the high and low tide lines and just beyond for decades to come. They will be particularly abundant after storms. There are many cut feet in Emerald Isles' future.



Photo By Frank Tursi

**Close-up of the material being pumped onto Emerald Isle in the photo at left. It is impossible to walk on it in bare feet without injury.**

The mind-boggling fact about this beach is that, even before the project started, everyone knew the sand would be bad. They knew because Pine Knoll Shores and Indian Beach, next door to Emerald Isle, used the exact same material the year before. However, since no government agency condemned the Pine Knoll Shores project, Emerald Isle correctly figured they could get away with it, too. And they did.

The sand was bad because these projects were done on the cheap. In order to cut corners, Emerald Isle, Pine Knoll Shores and Indian Beach all obtained sand from as close as 500 yards from the beach (based on our own observations). To put this in the context of good beach management, the Dutch (because too-close dredging causes sand supply and wave pattern problems) require dredges to be so far offshore they cannot be seen from the beach.

Interestingly, the U.S. Army Corps of Engineers pumped a similar too-shelly beach in Jacksonville Beach, Fla., around the same time. But there, the town demanded that the Corps screen the beach sand--a costly exercise that removed the poor quality shell material and greatly reduced the problem.

In September 2003, a few months after Emerald Isle completed its project, Hurricane Isabel paid a visit to the northern Outer Banks. After the storm, Emerald Isle Mayor Art Schools and Town Manager Frank Rush proudly proclaimed the new beach came through the storm scot-free. The town's official newsletter stated in October: "There was no significant beach erosion, and some areas of the beach actually gained sand." The entire town sustained only a paltry \$60,000 in damage (mostly lost shingles). Within weeks, the town had asked for, and would receive, a \$1.7 million grant from the Federal Emergency Management Agency to "replace sand lost during the storm."

In a project completed in May 2005, sand for another Emerald Isle beach stabilization project was mined from the seaward-extending tidal delta at Bogue Inlet. Mining of tidal deltas is always a temptation for the shortsighted and irresponsible because the sand is high quality and cheap. The shape of such deltas is in equilibrium with tides, waves and the supply of sand. When sand is mined from inlets the deltas will reconstitute or rebuild themselves using sand that would normally be transferred across the inlet, from island to island. Tidal delta mining clearly violates the state rules on beach nourishment (which I will discuss later).

In the case of Bogue Inlet, this will create a sand shortage causing increased erosion rates for both Emerald Isle and Hammocks Beach State Park, the adjacent islands, and will eventually lead to the expenditure of more tax money for more beach nourishment in the future--all for the sake of buildings built too close to the shoreline.

Our neighbors in South Carolina have recognized this problem and are smart and responsible enough to prevent inlet mining. Planned mining of Stono Inlet (to nourish

Folly Beach) and North Inlet (to nourish Debidue) was halted by the state's recently rejuvenated coastal zone management agency and an offshore source will be used instead.

The 2005 beach nourishment/inlet mining project almost didn't happen because only one bid was received, and it came in almost \$4 million more than the town expected. So, Emerald Isle did what it promised not to do and turned to the North Carolina taxpayer to bail it out.



But if the town was going to get state tax money, it had to provide "adequate" public access and public parking to the entire beach constructed with public funds. And it didn't. Short on time and in a panic, the town submitted a grant application to the N.C. Division of Water Resources claiming it had more public beach access and parking than it really did.

The application states, and the Emerald Isle town manager confirmed, that it had seven public parking areas along the four-plus mile length of beach to be nourished. But official town and county maps show only six parking areas--four that contain only one handicapped parking space each and another that is a half-mile roundtrip walk to the beach.

The state does not define "adequate," but one significant parking lot for four miles of beach clearly isn't. I can only conclude, after reviewing the grant application, that Emerald Isle knowingly presented false information and that state bureaucrats were either duped by the town's duplicity, or were willing to overlook the facts.

Photo By Rudi Rudolph

Adding to the town's public parking problem is the fact that some of this state taxpayer-funded beach was placed in front of private, gated communities, where no public access to the beach is allowed. In our estimation, at least 80 percent of the four-mile-long artificial beach is effectively inaccessible to North Carolina residents interested in spending a day on the beach we helped pay for.

Compounding Emerald Isle's beach problems is the arrogance and disdain that emanates from the town's elected and appointed leaders. Various statements made by Town Manager Frank Rush, such as his refusal to acknowledge that the bad beach is bad, followed by a veiled threat to use the bad material again in the future, only serves to confirm the designation of Emerald Isle as an outlaw town.

In his unwavering dedication to his employer, Rush ignores possible problems with mining the tidal delta of Bogue Inlet, persistently glosses over public access/parking problems, and convinced the Division of Water Resources that the town provided

adequate public access and parking. We assume his statements and actions reflect the official view of the town council or he surely would have long since been fired.

Bad sand quality, unfortunately, is not restricted to Emerald Isle. Sand full of fist-sized cobbles was pumped up on Oak Island in 2001 and muddy sand was pumped up on Atlantic Beach in 2005. Inlet sand mining in North Carolina has not been restricted to Bogue Inlet, either. Shallotte Inlet, between Ocean Isle Beach and Holden Beach, was mined in 2001 and is now causing accelerated shoreline erosion on adjacent beaches. Some truckloads of muddy sand were dumped on the beach at Kitty Hawk and shelly sand was pumped on the private beach at Figure Eight Island. Where is the recognition of the rare treasure that is our beach?

*Andy Coburn, associate director of the Nicholas School's Program for the Study of Developed Shorelines at Duke University contributed research and writing to this story.*