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SEA GRANT COLLEGE

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Looking out for Cape Lookout



An aerial view of Cape Lookout Lighthouse

The Cape Lookout Lighthouse, with its diamond-shaped pattern, has stood watch over treacherous waters near Core Banks since 1859. But if nature is allowed to follow its natural course, the days of this well-known landmark are numbered.

The culprit is Barden Inlet. It was during a 1933 hurricane that this inlet cut through the junction of Core and Shackleford Banks. Ever since, it has been gradually eating away at the sandy shore in front of the lighthouse.

In 1975 the erosion rate at the lighthouse site began to accelerate greatly, reaching an alarming rate of 23.4 feet per month in 1977. At that rate, the lighthouse would be in the water by May of 1981. Since 1940, however, the overall rate of erosion has been 2.8 feet per month. Using that rate, scientists figure that the lighthouse could last until 1993. As of December, 1978, the lighthouse stood 310 feet from the inlet and the lighthouse keeper's quarters, only 125 feet.

Proposals to develop the Cape Lookout National Seashore Park brought official discussion of the lighthouse's plight to a peak last year. The issue is complicated by the fact that there are a lot of fingers in the lighthouse pie. The lighthouse itself, 200 feet of property surrounding it and a nearby cement block oil house are owned by the U.S. Coast Guard. The lighthouse is still used as a navigation aid.

The rest of the structures in the lighthouse complex—a keeper's house, a summer kitchen, a generator house and a coal and wood shed—all belong to the National Park Service. The Park Service also has acquired most of the privately owned property on Core Banks in preparation for the development of the national seashore. The U.S. Army Corps of Engineers is responsible for dredging the Barden Inlet channels.

Lastly, the State Division of Archives and History is involved because the lighthouse complex is listed on the National Register of Historic Places. That agency is authorized to see that proper measures are taken to preserve the lighthouse and attendant buildings.



All these agencies are now working together to find answers to two basic questions: Should the lighthouse be saved? If so, what's the best way to do it? Plans now being considered run the gamut from moving the lighthouse to moving the inlet channel. Preston Riddel, Superintendent of the Cape Lookout National Seashore, predicts that a decision will be made by early spring.

Local opinions

Naturally, the perilous position of the lighthouse has not gone unnoticed by residents of the area. Harkers Islanders and fishermen who use the inlet have been speculating about it for years. And some of them have strong opinions.

Take Paul Hodges, for instance. From his Harkers Island marina, Calico Jacks, he has a good view of the lighthouse. Like many of his fellow islanders, he would hate to see the historic landmark disappear into the inlet. The lighthouse, he contends, is too

much a part of the history of that section of the Outer Banks. It speaks of an era when the Outer Banks were the rugged domain of seasoned sailors and commercial fishermen. To say nothing of the fact that the lighthouse has become a prime tourist attraction.

Like many of his friends, Hodges has some ideas about what's causing the erosion at the cape. "I don't have a degree in engineering, but I've got a teeny weeny bit of common sense," he says. "You can take all the engineers and all the pencils and paper you want, but you can't convince me that the Corps isn't partly to blame for that erosion."

Hodges is referring to the fact that, since 1938, the Corps of Engineers has periodically done maintenance dredging of channels in the 2200-foot wide inlet. For the past 15 years, the Corps has used a side-caster dredge to move about 34,000 cubic yards of sediment annually in the inlet. Dredging is usually done once a year and takes between one and three weeks.

Over the years, severe shoaling has caused the channel to migrate closer to the Core Banks side of the inlet. Hodges believes that the Corps' continued dredging of Core Banks can have only one effect: increased erosion near the lighthouse.

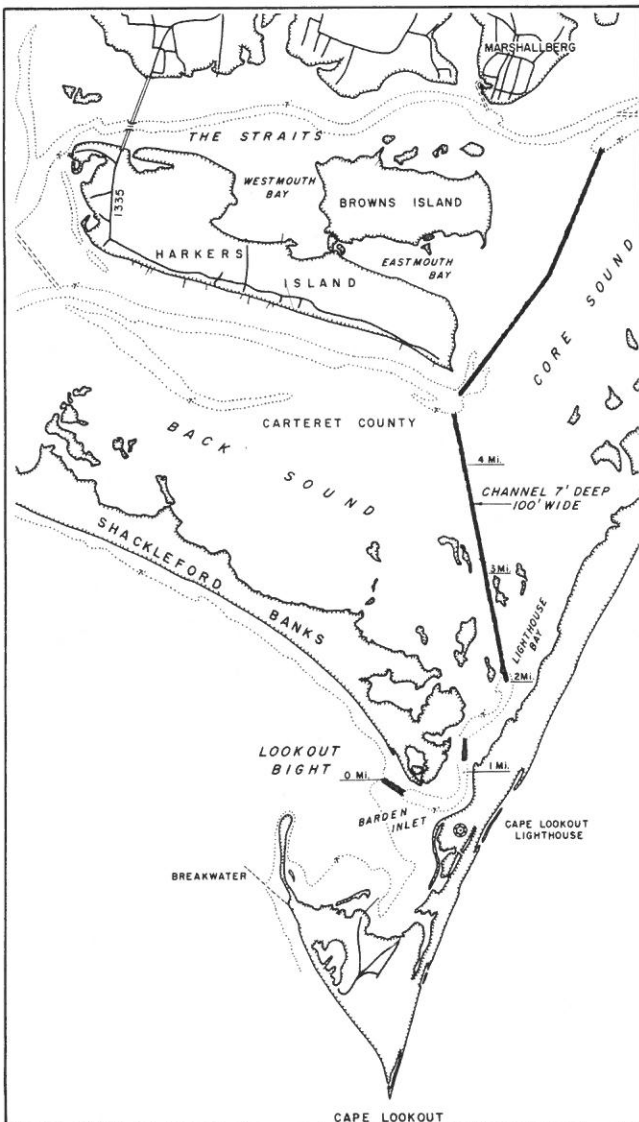
Hodges is expressing a commonly held opinion that the Corps should move the channel closer to the Shackleford Banks side of the inlet. That's reasoning that falls flat with Lim Vallianos, chief coastal engineer with the Wilmington office of the Corps of Engineers. Vallianos recently completed a study of the erosion problem at the cape. He points out that the Corps does not dredge in the section of channel directly in front of the lighthouse. That, he says, is a naturally deep channel, which needs no maintenance dredging. What's more, Vallianos says, to dredge across the shallow section of the inlet near Shackleford Banks would be complicated and practically futile. The natural ebb and flow of the inlet would quickly fill in the dredged channel, he contends.

To dredge or not to dredge

Hodges is not suggesting that the Corps cease dredging in Barden Inlet. For one thing, that would have a drastic effect on his marina business. The inlet is heavily used by both commercial and sport fishermen going to Core Banks or to the open ocean. It easily accommodates boats with a draft of five feet or less. And it's a favorite of small boaters because it's one of the calmest inlets on North Carolina's coast.

"I've seen days when the whole Morehead City fleet of charter boats would have to use Barden Inlet because Beaufort Inlet was too rough to get into," says Hodges.

Vallianos points out that inlet migration is a natural phenomenon. In fact, he contends that Barden Inlet has one of the lowest movement rates of all North Carolina's inlets. He points to New Inlet, which has moved a total of 7,000 feet in one direction, in spite of the fact that it has never been dredged. He adds that movement rates in some inlets actually drop after dredging is begun.



Dots outline channels in Barden Inlet. Dark areas indicate channels which are dredged by the Corps of Engineers.



Satellite photo shows channels and shoaling in Barden Inlet. Body of land on right is Core Banks, on left, Shackleford Banks.

But there are some experts who side with the popular opinion held by Hodges. Dr. Robert Dolan, a coastal geologist who has studied the Cape Lookout erosion problem, agrees that it is a difficult issue to handle. "One can debate the devil out of that forever," he says.

Dolan believes that when man interferes with inlets, things start happening in an unpredictable way. "These tidal inlets are so complex and the balance between erosion and deposition in the channel is so delicate that anything that is done from an engineering standpoint contributes to the erosion," he says.

Dolan points to the case of Oregon Inlet, which he believes has been radically affected by the construction of the Oregon Inlet Bridge.

But Dolan and Vallianos agree on one point: with the water almost lapping at the lighthouse, it's too late to bicker over who's responsible for the eroding shoreline. Any plan for saving the lighthouse must be undertaken immediately.

Nitty gritty

If things go on schedule, the question of what will become of the Cape Lookout Lighthouse will be decided by late spring. Work on the project could begin by early fall. And, if present erosion rates continue, that might be just in the nick of time.

The National Park Service, which operates the Cape Lookout National Seashore, began to take a serious look at the Core Banks erosion problem in late 1976. That year, the agency commissioned Dr. Robert Dolan, a coastal geologist at the University of Virginia, to study the problem. During 1978 the Park Service funded two other studies—one to examine the feasibility of moving the lighthouse and another erosion study by Dolan. In October, 1978, the U.S. Army Corps of Engineers completed an in-depth study of the erosion problem at the cape. The U.S. Coast Guard also has drawn up suggestions for management of the lighthouse. These agencies have held several joint meetings to discuss the problem.

The issue was officially opened to public debate in mid-January this year with meetings held on Bogue Banks and in Raleigh. Representatives of the Park Service, the Coast Guard, the Corps of Engineers and the N. C. Division of Archives and History presented their recommendations for action.

Prior to the meetings, a summary of official proposals for management of the lighthouse was mailed to about 300 people on the Park Service mailing list. The Park Service will receive public comment through February 17. Letters should be addressed to Superintendent, Cape Lookout National Seashore, P.O. Box 690, Beaufort, N.C. 28516. Proposal summaries are available upon request.

After considering public comment, the group of concerned agencies will jointly decide which plan to use. One of the agencies—either the Park Service or Coast Guard—will then request emergency funding from its Congressional budgetary committee.

At the moment, seven official proposals are being considered. Agency officials seem to be agreed on one point: there is no time to waste. Consequently, they are skeptical of any plan which might require an environmental impact statement. That process could hold up the work for years.

What follows is a summary of the proposals put forward by the Corps, the Coast Guard and the Park Service.

The Corps of Engineers research project was headed by chief coastal engineer at the Wilmington office, Lim Vallianos. The Corps sees four possibilities:

Plan 1A, Bank Revetment The first and preferred alternative calls for a revetment 2350 feet long to be constructed of granitic stone riprap on the shore in front of the lighthouse. The initial cost of this embankment would be about \$3.3 million. Additional annual costs, including interest, maintenance and surveys, would total \$225,000. Construction time is estimated to be 110 days.

Plan 1B, Extended Revetment This plan calls for the revetment to extend to a length of 3800 feet. The extension would be designed to prevent severe erosion at the edges of the revetment. Initial costs would be about \$5.5 million and annual costs would total \$414,000. Construction time would be about 170 days. Vallianos favors construction of the shorter revetment outlined in Plan 1A.

Plan 2, Training Dikes A series of training dikes would be constructed, extending perpendicularly from the shore in front of the lighthouse. The dike system would be designed to induce flows away from the eroding bank. According to Vallianos, this would be the most visually obtrusive of the Corps' proposals. Initial costs would be about \$3.5 million and annual costs would total \$274,000. Construction time is estimated at 160 days.

Vallianos notes that similar systems constructed in river beds have required bank revetments because eddy currents which set up in between the dikes may continue to erode the shore. In that case costs of the project would be considerably higher. Vallianos adds that this plan would have a greater chance of success if a physical model were constructed. But that would take a year. There is also the possibility that the dikes might present a navigation hazard at night, he adds.

Plan 3, Relocation of the channel A new channel would be dredged to the west of the main channel. The old one would be filled in and sand would be pumped onto the shore in front of the lighthouse. This would take about 195 days. The relocated channel, like the present one, would naturally migrate toward Core Banks, Vallianos contends. That means that the entire dredging operation would need to be repeated every 10 years. The cost of moving the channel would be \$2.9 million; annual costs would be about \$428,000.

Vallianos believes that because of the design risks, this plan is least likely to be successful. It will also probably require an environmental impact statement, and environmental constrictions ten years from now might prevent relocating the channel. The plan's only advantage, Vallianos believes, is that it would not change the appearance of the cape area.

Vallianos estimates that five to seven months would be required to make plans and award a contract for any of the Corps' proposals. Some protection would be afforded to the lighthouse during construction of either Plan 1 or 2. But Plan 3 would afford little erosion control until completion.

Moving the lighthouse Last fall the Park Service commissioned MTMA, a Raleigh consulting firm, to investigate the possibility of moving the lighthouse, the keeper's quarters, the summer kitchen and the storage shed. The lighthouse is 169 feet tall, with walls eight feet thick at its base tapering to two feet thick at the top. MTMA determined that the lighthouse could be moved if masonry saws were used to cut it into seven parts, each weighing less than 300 tons. "It would be sort of like cutting a frankfurter

up," says firm member Chris McLure. The cost would be about \$2.1 million.

The Coast Guard has proposed three alternatives:

Replacement of the lighthouse If the decision is made to abandon the lighthouse, the Coast Guard would replace it with a navigation tower. A 150-foot steel tower would be built near the Cape Lookout Coast Guard Station. The cost would be about \$525,000.

Protective barriers To save the present structure, the Coast Guard proposes to construct either of two types of protective barrier around the lighthouse to prevent erosion. A steel sheet pile bulkhead with a tieback system would cost \$1.6 million. A stone rip rap would cost \$2.6 million. Both systems would be designed to withstand a scour of up to 20 feet below mean low water.

The decision makers are likely to be influenced by Dr. Larry Tise, the state historic preservation officer. Because the lighthouse and surrounding buildings are listed in the National Register of Historic Places, Tise is responsible for seeing that they are preserved.

Tise does not endorse the Coast Guard proposal to protect the lighthouse but abandon the surrounding buildings. He also is skeptical of the proposal to move the lighthouse and buildings because that would destroy the historic setting and the possibility of archaeological excavations in the future.



Park superintendent Preston Riddel in front of keeper's quarters and lighthouse.

Guarding the 'paradise'

As early as 1590 explorer John White labeled Cape Lookout "promontorium tremendum"—horrible headland. Sailors quickly grew to fear its deadly combination of safe harbor and treacherous shoals.

In spite of the danger, it wasn't until 1812 that the lighthouse was built. The original lighthouse, surrounded by a grove of trees, did not resemble its contemporary version. A tower of brick was built inside a wooden frame building painted in horizontal red and white stripes.

This early lighthouse got mixed reviews from mariners using the Cape Lookout area. Some complained that early morning fog often obscured the light. Consequently, in 1852 the old lantern light was replaced with a more efficient system. At the same time, construction was begun on a taller tower which was completed in 1852.

The new 169-foot red brick tower became the prototype for all the lighthouses subsequently built on the Outer Banks. It wasn't until 1873 that this lighthouse was painted in its distinctive diamond pattern.

Building anything on the desolate stretches of Outer Banks was complicated, as all materials had to be hauled by barge from the mainland. For the lighthouse job a special dock and railroad track were con-

structed. A team of horses pulled a flatbed carrying supplies from the dock to the site. According to amateur historian Sallie Moore of Morehead City, one of the stories that has been passed down through the generations on the Outer Banks is that the brickwork was done by a single Irish brickmason. The story goes that the center stairway was built as the brick was laid so that no outside scaffolding was needed.

The brick tower and the light were damaged by Confederate troops before they surrendered the Outer Banks to Federal troops in 1862. In 1863 the original wooden stairway was recognized as a fire hazard and replaced by a cast iron spiral stairway.

The keeper's quarters that now stand between the lighthouse and the inlet were built in 1873. A second six-room frame house was constructed in 1907. This building has since been moved to private property on Core Banks. No one knows the exact construction dates of the other buildings now standing on the lighthouse property—a generator house or summer kitchen, a coal and wood shed and a small cement block oil house. But all of the buildings are believed to have been completed by 1905.



Wild ponies on Shackleford Banks. Herds of similar wild ponies used to roam Core Banks.

Today personnel from the Coast Guard station on Core Banks visit the lighthouse periodically to see that the automatic equipment is functioning properly. But until 1950 a keeper, and often two assistants, were required to operate the lighthouse. They were hired by the Lighthouse Bureau, which was taken over by the Coast Guard in 1939.

The job of the keepers was to make sure that the light was functioning properly at all times and to maintain the property. Lighthouse keepers also remained in close contact with the men who manned the nearby lifesaving station about a mile down the beach. It was a peaceful, isolated life, with home and work nearby.

Willard Willis' father was an assistant keeper at the lighthouse during the 1930s and early 1940s. Today Willis' barber shop in Beaufort is plastered with photographs of Cape Lookout. He likes to reminisce about idyllic summers on the island.

"When I was a child, Core Banks was just as clean and beautiful as it could be. There were cattle, horses and sheep that kept it just like it had been mowed every day. It was just a paradise, is what it was," he says.

Off the presses

Here's an update on recent UNC Sea Grant publications. Please include the publication numbers with your request. Checks made payable to UNC Sea Grant should accompany orders. Write: UNC Sea Grant, Box 5001, Raleigh, N.C. 27650.

Wreck Diving in North Carolina

A directory of shipwrecks along the North Carolina coast.

By Dennis C. Regan and Virginia Worthington
UNC-SG-78-13 No charge.

Storms, People and Property in Coastal North Carolina

Historical and meteorological data on North Carolina's major coastal storms. Includes tips on survival and safety.

By Simon Baker

UNC-SG-78-15 No charge.

Estuarine Shoreline Erosion in North Carolina

A series of five colorful posters depicting erosion in four of the state's major estuaries: Core/Bogue Sounds, Albemarle Sound, Pamlico River and Neuse River. Each poster includes a map with a description of shoreline types and erosion rates. The fifth poster ("Cause and Effect") explains the reasons for estuarine erosion.

By Stan Riggs, Mike O'Connor, Vince Bellis

No charge. Please specify which posters you want.

Seafood Sourcebook

A consumer's guide to information on food from our oceans and lakes. Bibliography.

Published by the New England Marine Advisory Service, Sea Grant Program.

Available from UNC Sea Grant. No charge.

Home Smoking and Pickling of Fish

A consumer's guide.

Published by the University of Wisconsin Sea Grant Program, with a special insert on smoking North Carolina style.

Available from UNC Sea Grant. No charge.

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